Computer algebra independent integration tests

1_Algebraic_functions/1.1_Binomial_products/1.1.3General/1.1.3.4(ex)^m(a+bx^n)^p(c+d

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Contents

1 Introduction

This report gives the result of running the computer algebra independent integration problems. The listing of the problems are maintained by and can be downloaded from Albert Rich Rubi web site.

1.1 Listing of CAS systems tested

The following systems were tested at this time.

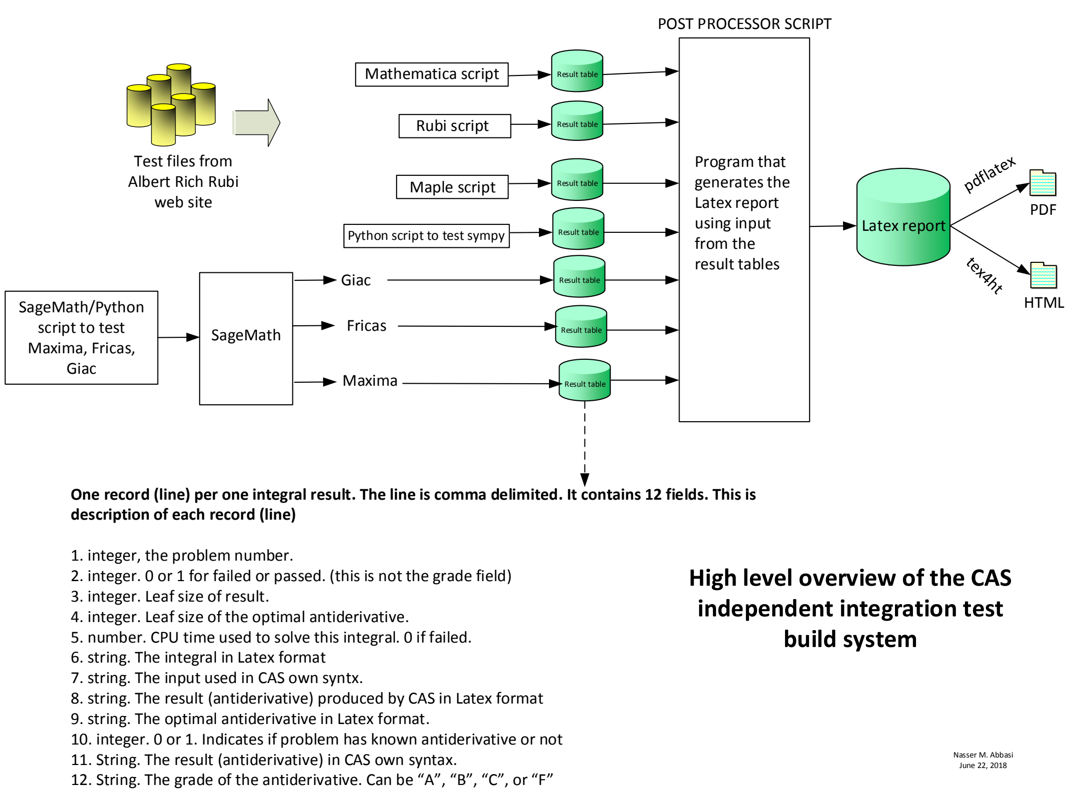
1. Mathematica 11.3 (64 bit).
2. Rubi 4.15.2 in Mathematica 11.3.
3. Rubi in Sympy (Version 1.3) under Python 3.7.0 using Anaconda distribution.
4. Maple 2018.1 (64 bit).
5. Maxima 5.41 Using Lisp ECL 16.1.2.
6. Fricas 1.3.4.
7. Sympy 1.3 under Python 3.7.0 using Anaconda distribution.
8. Giac/Xcas 1.4.9.

Maxima, Fricas and Giac/Xcas were called from inside SageMath version 8.3. This was done using SageMath integrate command by changing the name of the algorithm to use the different CAS systems.

Sympy was called directly using Python. Rubi in Sympy was also called directly using sympy 1.3 in python.

1.2 Design of the test system

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



1.3 Timing

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

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

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

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

1.4 Verification

A verification phase was applied on the result of integration for Rubi and Mathematica. Future version of this report will implement verification for the other CAS systems. For the integrals whose result was not run through a verification phase, it is assumed that the antiderivative produced was correct.

Verification phase has 3 minutes time out. An integral whose result was not verified could still be correct. Further investigation is needed on those integrals which failed verifications. Such integrals are marked in the summary table below and also in each integral separate section so they are easy to identify and locate.

1.5 Important notes about some of the results

Important note about Maxima results Since these integrals are run in a batch mode, using an automated script, and by using sagemath (SageMath uses Maxima), then any integral where Maxima needs an interactive response from the user to answer a question during evaluation of the integral in order to complete the integration, will fail and is counted as failed.

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

The percentage of such failures were not counted for each test file, but for an example, for the Timofeev test file, there were about 30 such integrals out of total 705, or about 4 percent. This pecrentage can be higher or lower depending on the specific input test file.

Such integrals can be indentified by looking at the output of the integration in each section for Maxima. If the output was an exception `ValueError` then this is most likely due to this reason.

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

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

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

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

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

Important note about FriCAS and Giac/XCAS results There are Few integrals which failed due to SageMath not able to translate the result back to SageMath syntax and not because these CAS system were not able to do the integrations.

These will fail With error `Exception raised: NotImplementedError`

The number of such cases seems to be very small. About 1 or 2 percent of all integrals.

Hopefully the next version of SageMath will have complete translation of FriCAS and XCAS syntax and I will re-run all the tests again when this happens.

Important note about finding leaf size of antiderivative For Mathematica, Rubi and Maple, the buildin system function `LeafSize` is used to find the leaf size of each antiderivative.

The other CAS systems (SageMath and Sympy) do not have special buildin function for this purpose at this time. Therefore the leaf size is determined as follows.

For Fricas, Giac and Maxima (all called via sagemath) the following code is used

```
#see https://stackoverflow.com/questions/25202346/how-to-obtain-leaf-count-express

def tree(expr):
    if expr.operator() is None:
       return expr
    else:
       return [expr.operator()]+map(tree, expr.operands())

try:
    # 1.35 is a fudge factor since this estimate of leaf count is bit lower than
    #what it should be compared to Mathematica's
    leafCount = round(1.35*len(flatten(tree(anti))))
except Exception as ee:
    leafCount =1
```

For Sympy, called directly from Python, the following code is used

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

  except Exception as ee:
         leafCount =1
```

When these cas systems implement a buildin function to find the leaf size of expressions, it will be used instead, and these tests run again.

1.6 Grading of results

The table below summarizes the grading of each CAS system.

Important note: A number of problems in this test suite have no antiderivative in closed form. This means the antiderivative of these integrals can not be expressed in terms of elementary, special functions or `Hypergeometric2F1` functions. `RootSum` and `RootOf` are not allowed.

If a CAS returns the above integral unevaluated within the time limit, then the result is counted as passed and assigned an A grade.

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

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

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

System	solved	Failed
Rubi	% 100. (912)	% 0. (0)
Rubi in Sympy	% 88.82 (810)	% 11.18 (102)
Mathematica	% 100. (912)	% 0. (0)
Maple	% 78.95 (720)	% 21.05 (192)
Maxima	% 23.03 (210)	% 76.97 (702)
Fricas	% 62.39 (569)	% 37.61 (343)
Sympy	% 32.89 (300)	% 67.11 (612)
Giac	% 50.88 (464)	% 49.12 (448)

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

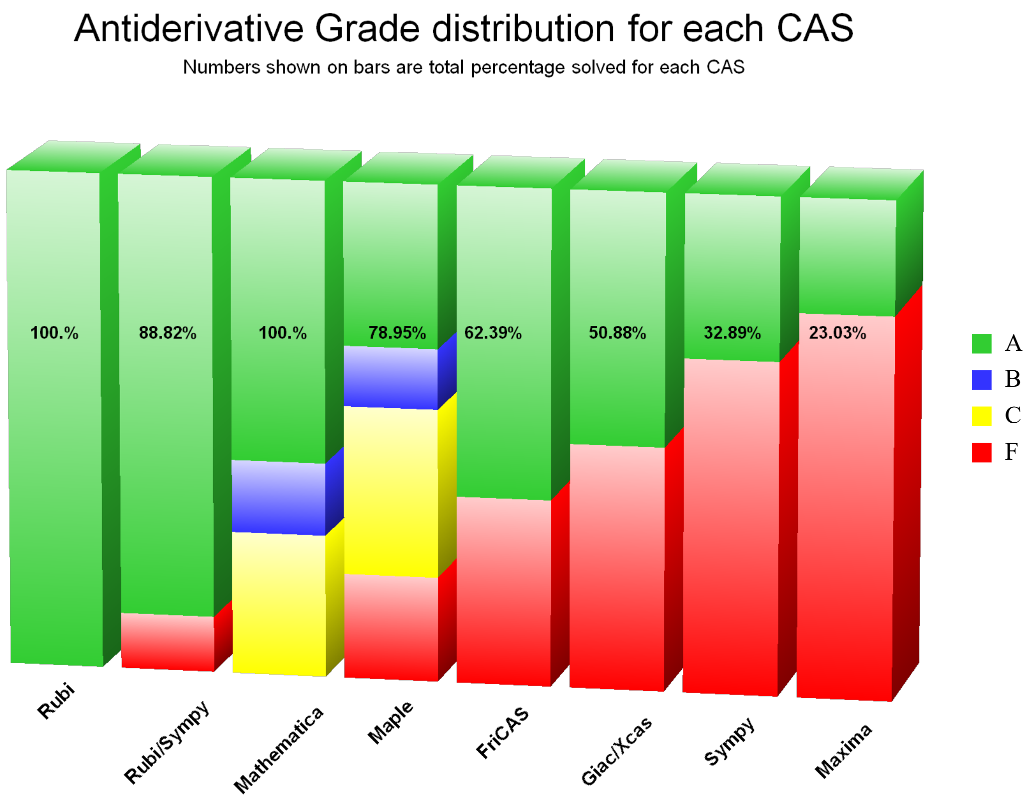
grade	description
A	Integral was solved and antiderivative is optimal in quality and leaf size.
B	Integral was solved and antiderivative is optimal in quality but leaf size is larger than twice the optimal antiderivatives leaf size.
C	Integral was solved and antiderivative is non-optimal in quality.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

Grading is currently implemented only for for Mathematica, Rubi and Maple results. For all other CAS systems (Maxima, Fricas, Sympy, Giac, Rubi in sympy), the grading function is not yet implemented. For these systems, a grade of A is assigned if the integrate command completes successfully and a grade of F otherwise.

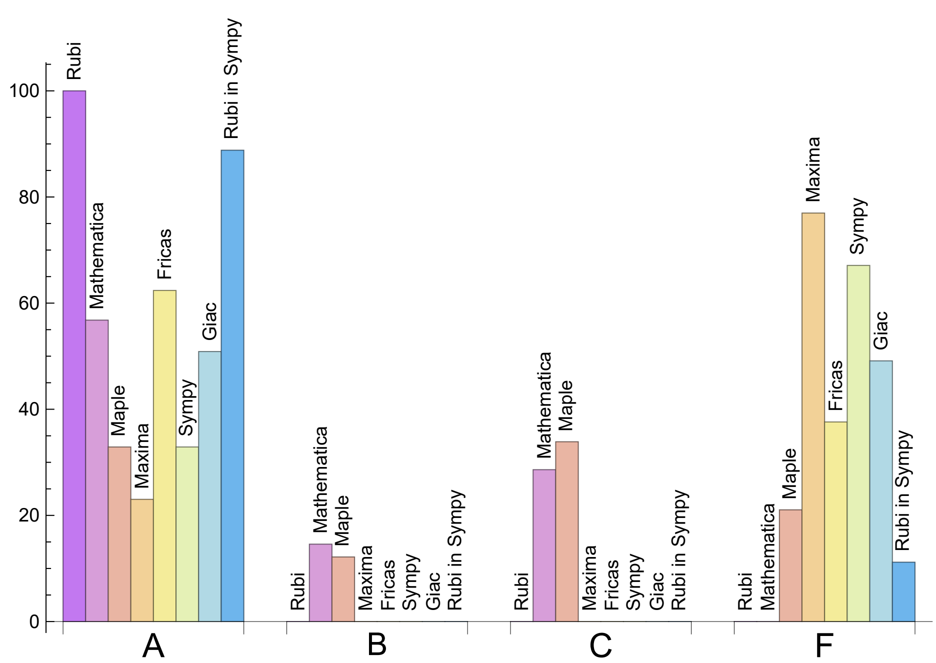
Based on the above, the following table summarizes the grading for this test suite.

System	% A grade	% B grade	% C grade	% F grade
Rubi	100.	0.	0.	0.
Rubi in Sympy	88.82	0.	0.	11.18
Mathematica	56.8	14.58	28.62	0.
Maple	32.89	12.17	33.88	21.05
Maxima	23.03	0.	0.	76.97
Fricas	62.39	0.	0.	37.61
Sympy	32.89	0.	0.	67.11
Giac	50.88	0.	0.	49.12

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



The figure below compares the CAS systems for each grade level.



1.7 Performance

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

System	Mean time (sec)	Mean size	Normalized mean	Median size	Normalized median
Rubi	0.48	207.04	1.	104.	1.
Rubi in Sympy	32.12	127.85	0.82	76.	0.86
Mathematica	0.46	183.99	1.56	154.5	0.93
Maple	0.03	883.31	5.57	425.	1.69
Maxima	1.5	111.7	1.86	99.	1.42
Fricas	0.37	215.79	1.36	1.	0.07
Sympy	21.19	223.27	2.23	124.	1.14
Giac	0.25	169.76	1.72	142.5	1.38

1.8 list of integrals that has no closed form antiderivative

{}

1.9 list of integrals not solved by each system

Not solved by Rubi {}

Not solved by Rubi in Sympy {1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 31, 32, 33, 34, 35, 36, 37, 39, 40, 42, 43, 45, 46, 47, 48, 49, 50, 56, 57, 60, 71, 72, 73, 74, 75, 88, 89, 95, 96, 107, 123, 156, 157, 159, 160, 162, 164, 165, 167, 168, 170, 172, 173, 175, 176, 178, 598, 599, 615, 617, 626, 627, 630, 631, 646, 649, 652, 665, 666, 667, 668, 669, 670, 671, 728, 730, 731, 733, 749, 750, 751, 752, 753, 754, 863, 870, 871, 872, 876, 877, 878, 879}

Not solved by Mathematica {}

Not solved by Maple {127, 128, 129, 130, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 632, 633, 634, 635, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 849, 850, 851, 852, 853, 855, 856, 857, 858, 859, 861, 862, 863, 864, 865, 866, 868, 869, 886, 895, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 912}

Not solved by Maxima {56, 58, 59, 61, 62, 64, 65, 67, 68, 70, 71, 73, 74, 76, 77, 79, 80, 82, 83, 85, 86, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 108, 109, 111, 112, 114, 115, 117, 118, 120, 121, 123, 124, 125, 126, 127, 128, 129, 130, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 772, 773, 774, 775, 776, 777, 778, 779, 788, 789, 790, 791, 792, 793, 794, 795, 801, 802, 803, 804, 805, 806, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 849, 850, 851, 852, 853, 856, 857, 858, 859, 861, 862, 863, 864, 865, 866, 868, 869, 885, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908}

Not solved by Fricas {127, 128, 129, 130, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 219, 220, 221, 222, 223, 224, 225, 226, 227, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 264, 265, 266, 267, 268, 269, 275, 277, 278, 279, 280, 289, 290, 291, 292, 293, 294, 302, 303, 304, 305, 306, 307, 315, 316, 318, 319, 320, 321, 322, 323, 324, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 363, 364, 365, 366, 367, 373, 374, 375, 376, 377, 383, 384, 385, 386, 387, 393, 394, 395, 396, 397, 405, 406, 407, 408, 409, 410, 418, 419, 420, 421, 422, 423, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 465, 466, 467, 468, 469, 475, 476, 477, 478, 479, 485, 486, 487, 488, 489, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 510, 511, 512, 513, 514, 515, 517, 518, 520, 521, 523, 524, 526, 528, 529, 531, 532, 534, 536, 537, 539, 540, 542, 544, 545, 547, 548, 550, 552, 553, 555, 556, 558, 560, 561, 563, 564, 566, 572, 575, 580, 582, 583, 595, 596, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 646, 647, 648, 649, 650, 651, 652, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 694, 695, 696, 697, 698, 699, 700, 711, 712, 713, 714, 715, 716, 717, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 849, 850, 851, 852, 853, 856, 857, 858, 859, 861, 862, 863, 864, 865, 866, 868, 869}

Not solved by Sympy {50, 51, 52, 53, 54, 55, 108, 109, 116, 118, 119, 120, 121, 122, 123, 128, 129, 130, 147, 148, 155, 156, 157, 158, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 232, 233, 238, 242, 243, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 523, 524, 525, 526, 527, 528, 529, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 550, 551, 552, 553, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 602, 603, 604, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 675, 676, 677, 678, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 845, 846, 847, 848, 849, 850, 851, 852, 853, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 873, 874, 875, 876, 877, 878, 879, 880, 881, 885, 886, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 910, 911, 912}

Not solved by Giac {107, 110, 113, 116, 119, 122, 127, 128, 129, 130, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 219, 220, 221, 222, 223, 224, 225, 226, 227, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 264, 265, 266, 267, 268, 269, 275, 276, 277, 278, 279, 280, 281, 289, 290, 291, 292, 293, 294, 302, 303, 304, 305, 306, 307, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 363, 364, 365, 366, 367, 373, 374, 375, 376, 377, 383, 384, 385, 386, 387, 393, 394, 395, 396, 397, 405, 406, 407, 408, 409, 410, 418, 419, 420, 421, 422, 423, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 465, 466, 467, 468, 469, 475, 476, 477, 478, 479, 485, 486, 487, 488, 489, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 610, 611, 612, 613, 614, 615, 616, 617, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 646, 647, 648, 649, 650, 651, 652, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 689, 694, 695, 696, 697, 698, 699, 700, 711, 712, 713, 714, 715, 716, 717, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 795, 796, 797, 798, 799, 800, 801, 802, 803, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 842, 843, 844, 845, 849, 850, 851, 852, 853, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 890, 894, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908}

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

Rubi {}

Rubi in Sympy {}

Mathematica {}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

1.11 list of integrals solved by CAS but failed verification

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

Rubi {264, 265, 266, 275, 277, 342, 345, 346, 349, 626, 627, 628, 629, 630, 631, 646, 647, 648, 649, 650, 651, 652, 665, 666, 667, 668, 669, 670, 671, 728, 729, 730, 731, 732, 733, 749, 750, 751, 752, 753, 754}

Mathematica {185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 219, 220, 221, 222, 223, 224, 225, 226, 227, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 262, 263, 264, 265, 266, 267, 268, 269, 273, 274, 275, 276, 277, 278, 279, 280, 281, 286, 287, 288, 289, 290, 291, 292, 293, 294, 299, 300, 301, 302, 303, 304, 305, 306, 307, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 361, 362, 363, 364, 365, 366, 367, 371, 372, 373, 374, 375, 376, 377, 381, 382, 383, 384, 385, 386, 387, 391, 392, 393, 394, 395, 396, 397, 402, 403, 404, 405, 406, 407, 408, 409, 410, 415, 416, 417, 418, 419, 420, 421, 422, 423, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 463, 464, 465, 466, 467, 468, 469, 473, 474, 475, 476, 477, 478, 479, 483, 484, 485, 486, 487, 488, 489, 493, 494, 495, 496, 497, 498, 499, 508, 509, 510, 511, 512, 513, 514, 515, 517, 518, 520, 521, 523, 524, 526, 528, 529, 531, 532, 534, 536, 537, 539, 540, 542, 544, 545, 547, 548, 550, 552, 553, 555, 556, 558, 560, 561, 563, 564, 566, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 588, 589, 590, 592, 593, 594, 595, 596, 597, 622, 624, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 639, 640, 646, 647, 648, 649, 650, 651, 652, 657, 658, 665, 666, 667, 668, 669, 670, 671, 675, 676, 677, 681, 682, 683, 687, 688, 694, 695, 696, 697, 698, 699, 700, 704, 705, 711, 712, 713, 714, 715, 716, 717, 721, 722, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 742, 743, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 817, 818, 819, 820, 821, 822, 823, 824, 826, 827, 828, 829, 830, 831, 832}

Maple Verification phase not implemented yet.

Maxima Verification phase not implemented yet.

Fricas Verification phase not implemented yet.

Sympy Verification phase not implemented yet.

Giac Verification phase not implemented yet.

Rubi in Sympy Verification phase not implemented yet.

2 detailed summary tables of results

2.1 Detailed conclusion table per each integral for all CAS systems

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

In this table,the column **normalized size** is defined as $\frac{\text{antiderivative leaf size}}{\text{optimal antiderivative leaf size}}$

Problem 1	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	33	33	33	28	36	1	29	39	0
normalized size	1	1.	1.	0.85	1.09	0.03	0.88	1.18	0.
time (sec)	N/A	0.104	0.015	0.002	1.406	0.201	0.079	0.236	0.

Problem 2	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	33	33	33	28	36	1	29	39	0
normalized size	1	1.	1.	0.85	1.09	0.03	0.88	1.18	0.
time (sec)	N/A	0.062	0.01	0.	1.375	0.204	0.077	0.22	0.

Problem 3	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	28	28	25	32	1	26	35	0
normalized size	1	1.	1.	0.89	1.14	0.04	0.93	1.25	0.
time (sec)	N/A	0.041	0.01	0.001	1.372	0.198	0.07	0.219	0.

Problem 4	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	29	28	38	34	27	38	0
normalized size	1	1.	1.	0.97	1.31	1.17	0.93	1.31	0.
time (sec)	N/A	0.066	0.016	0.003	1.367	0.225	1.043	0.223	0.

Problem 5	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	31	31	31	30	36	39	26	39	0
normalized size	1	1.	1.	0.97	1.16	1.26	0.84	1.26	0.
time (sec)	N/A	0.055	0.019	0.005	1.38	0.217	1.036	0.224	0.

Problem 6	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	28	28	24	32	38	24	31	0
normalized size	1	1.	1.	0.86	1.14	1.36	0.86	1.11	0.
time (sec)	N/A	0.057	0.017	0.005	1.371	0.215	1.059	0.222	0.

Problem 7	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	29	26	38	41	26	54	0
normalized size	1	1.	1.	0.9	1.31	1.41	0.9	1.86	0.
time (sec)	N/A	0.079	0.022	0.008	1.374	0.225	1.395	0.226	0.

Problem 8	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	31	31	32	28	39	39	29	42	0
normalized size	1	1.	1.03	0.9	1.26	1.26	0.94	1.35	0.
time (sec)	N/A	0.058	0.02	0.007	1.371	0.215	1.56	0.222	0.

Problem 9	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	28	30	25	36	39	27	39	0
normalized size	1	1.	1.07	0.89	1.29	1.39	0.96	1.39	0.
time (sec)	N/A	0.055	0.023	0.008	1.419	0.215	1.667	0.224	0.

Problem 10	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	31	28	41	42	27	50	31
normalized size	1	1.	1.07	0.97	1.41	1.45	0.93	1.72	1.07
time (sec)	N/A	0.072	0.032	0.007	1.374	0.229	2.675	0.224	8.355

Problem 11	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	51	52	69	1	54	72	34
normalized size	1	1.	1.21	1.24	1.64	0.02	1.29	1.71	0.81
time (sec)	N/A	0.203	0.029	0.001	1.373	0.2	0.103	0.221	14.988

Problem 12	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	55	55	52	69	1	54	72	0
normalized size	1	1.	1.	0.95	1.25	0.02	0.98	1.31	0.
time (sec)	N/A	0.114	0.015	0.001	1.375	0.214	0.111	0.226	0.

Problem 13	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	50	49	65	1	51	68	0
normalized size	1	1.	1.	0.98	1.3	0.02	1.02	1.36	0.
time (sec)	N/A	0.07	0.015	0.001	1.37	0.197	0.104	0.221	0.

Problem 14	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	51	52	70	66	53	70	0
normalized size	1	1.	1.11	1.13	1.52	1.43	1.15	1.52	0.
time (sec)	N/A	0.092	0.033	0.003	1.378	0.223	1.16	0.222	0.

Problem 15	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	53	53	69	72	49	70	0
normalized size	1	1.	1.	1.	1.3	1.36	0.92	1.32	0.
time (sec)	N/A	0.095	0.035	0.005	1.388	0.215	1.173	0.219	0.

Problem 16	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	50	49	65	72	49	65	0
normalized size	1	1.	1.	0.98	1.3	1.44	0.98	1.3	0.
time (sec)	N/A	0.091	0.032	0.005	1.478	0.21	1.169	0.213	0.

Problem 17	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	49	51	70	73	51	93	0
normalized size	1	1.	0.96	1.	1.37	1.43	1.	1.82	0.
time (sec)	N/A	0.148	0.045	0.008	1.428	0.219	1.617	0.212	0.

Problem 18	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	51	50	72	72	51	73	0
normalized size	1	1.	0.96	0.94	1.36	1.36	0.96	1.38	0.
time (sec)	N/A	0.094	0.03	0.007	1.37	0.218	1.82	0.21	0.

Problem 19	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	50	46	69	72	51	69	0
normalized size	1	1.	1.	0.92	1.38	1.44	1.02	1.38	0.
time (sec)	N/A	0.094	0.037	0.007	1.418	0.222	1.91	0.212	0.

Problem 20	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	51	73	74	49	95	0
normalized size	1	1.	1.	1.	1.43	1.45	0.96	1.86	0.
time (sec)	N/A	0.134	0.037	0.009	1.366	0.224	3.447	0.213	0.

Problem 21	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	54	48	73	72	54	76	0
normalized size	1	1.	1.02	0.91	1.38	1.36	1.02	1.43	0.
time (sec)	N/A	0.095	0.03	0.008	1.414	0.213	4.047	0.213	0.

Problem 22	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	50	45	69	72	51	72	0
normalized size	1	1.	1.	0.9	1.38	1.44	1.02	1.44	0.
time (sec)	N/A	0.09	0.045	0.009	1.398	0.217	4.332	0.214	0.

Problem 23	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	117	124	161	1	136	169	114
normalized size	1	1.	1.	1.06	1.38	0.01	1.16	1.44	0.97
time (sec)	N/A	0.283	0.038	0.003	1.373	0.201	0.167	0.216	25.392

Problem 24	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	107	124	161	1	136	169	85
normalized size	1	1.	1.13	1.31	1.69	0.01	1.43	1.78	0.89
time (sec)	N/A	0.607	0.055	0.002	1.418	0.193	0.169	0.216	30.616

Problem 25	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	117	124	161	1	134	169	112
normalized size	1	1.	1.	1.06	1.38	0.01	1.15	1.44	0.96
time (sec)	N/A	0.275	0.034	0.002	1.373	0.205	0.167	0.215	25.343

Problem 26	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	117	124	161	1	136	169	114
normalized size	1	1.	1.	1.06	1.38	0.01	1.16	1.44	0.97
time (sec)	N/A	0.24	0.035	0.003	1.409	0.203	0.167	0.216	25.181

Problem 27	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	107	124	161	1	138	169	58
normalized size	1	1.	1.6	1.85	2.4	0.01	2.06	2.52	0.87
time (sec)	N/A	0.447	0.049	0.002	1.462	0.202	0.166	0.215	24.896

Problem 28	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	117	124	161	1	136	169	114
normalized size	1	1.	1.	1.06	1.38	0.01	1.16	1.44	0.97
time (sec)	N/A	0.249	0.033	0.003	1.455	0.202	0.168	0.215	25.373

Problem 29	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	117	124	161	1	133	167	112
normalized size	1	1.	1.	1.06	1.38	0.01	1.14	1.43	0.96
time (sec)	N/A	0.243	0.033	0.002	1.428	0.209	0.163	0.216	26.795

Problem 30	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	107	124	161	1	136	169	34
normalized size	1	1.	2.55	2.95	3.83	0.02	3.24	4.02	0.81
time (sec)	N/A	0.225	0.049	0.003	1.473	0.208	0.159	0.217	19.815

Problem 31	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	117	124	161	1	134	167	0
normalized size	1	1.	1.	1.06	1.38	0.01	1.15	1.43	0.
time (sec)	N/A	0.237	0.03	0.002	1.482	0.203	0.163	0.217	0.

Problem 32	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	109	121	155	1	128	162	0
normalized size	1	1.	1.	1.11	1.42	0.01	1.17	1.49	0.
time (sec)	N/A	0.168	0.033	0.002	1.41	0.199	0.161	0.216	0.

Problem 33	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	113	124	162	158	134	167	0
normalized size	1	1.	1.28	1.41	1.84	1.8	1.52	1.9	0.
time (sec)	N/A	0.16	0.058	0.003	1.363	0.222	1.521	0.22	0.

Problem 34	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	112	125	159	163	129	167	0
normalized size	1	1.	1.	1.12	1.42	1.46	1.15	1.49	0.
time (sec)	N/A	0.198	0.067	0.006	1.377	0.22	1.538	0.218	0.

Problem 35	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	112	120	157	163	128	161	0
normalized size	1	1.	1.	1.07	1.4	1.46	1.14	1.44	0.
time (sec)	N/A	0.188	0.062	0.005	1.392	0.212	1.545	0.217	0.

Problem 36	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	115	123	162	166	133	193	0
normalized size	1	1.	1.02	1.09	1.43	1.47	1.18	1.71	0.
time (sec)	N/A	0.336	0.08	0.011	1.37	0.236	2.008	0.22	0.

Problem 37	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	115	123	163	163	131	171	0
normalized size	1	1.	1.02	1.09	1.44	1.44	1.16	1.51	0.
time (sec)	N/A	0.21	0.07	0.009	1.361	0.221	2.175	0.216	0.

Problem 38	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	113	119	162	163	131	167	110
normalized size	1	1.	1.	1.05	1.43	1.44	1.16	1.48	0.97
time (sec)	N/A	0.195	0.068	0.008	1.403	0.219	2.375	0.216	25.531

Problem 39	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	106	124	165	166	129	200	0
normalized size	1	1.	0.93	1.09	1.45	1.46	1.13	1.75	0.
time (sec)	N/A	0.315	0.098	0.01	1.379	0.221	4.161	0.217	0.

Problem 40	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	110	117	163	163	126	171	0
normalized size	1	1.	1.	1.06	1.48	1.48	1.15	1.55	0.
time (sec)	N/A	0.21	0.073	0.009	1.387	0.226	4.734	0.218	0.

Problem 41	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	113	114	162	163	129	167	110
normalized size	1	1.	1.	1.01	1.43	1.44	1.14	1.48	0.97
time (sec)	N/A	0.208	0.07	0.01	1.363	0.226	4.9	0.218	25.742

Problem 42	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	106	124	166	166	126	203	0
normalized size	1	1.	0.93	1.09	1.46	1.46	1.11	1.78	0.
time (sec)	N/A	0.308	0.121	0.014	1.404	0.223	9.16	0.22	0.

Problem 43	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	118	111	165	163	126	171	0
normalized size	1	1.	1.03	0.97	1.43	1.42	1.1	1.49	0.
time (sec)	N/A	0.212	0.047	0.008	1.433	0.216	11.706	0.219	0.

Problem 44	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	109	108	162	163	126	167	105
normalized size	1	1.	1.	0.99	1.49	1.5	1.16	1.53	0.96
time (sec)	N/A	0.196	0.076	0.009	1.443	0.212	13.061	0.218	25.

Problem 45	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	118	124	166	166	124	201	0
normalized size	1	1.	1.04	1.09	1.46	1.46	1.09	1.76	0.
time (sec)	N/A	0.301	0.074	0.012	1.522	0.22	24.328	0.22	0.

Problem 46	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	117	107	165	163	128	173	0
normalized size	1	1.	1.02	0.93	1.43	1.42	1.11	1.5	0.
time (sec)	N/A	0.215	0.075	0.009	1.453	0.229	34.117	0.217	0.

Problem 47	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	110	102	161	163	122	166	0
normalized size	1	1.	1.	0.93	1.46	1.48	1.11	1.51	0.
time (sec)	N/A	0.218	0.084	0.01	1.37	0.217	54.383	0.216	0.

Problem 48	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	116	123	166	166	122	196	0
normalized size	1	1.	1.03	1.09	1.47	1.47	1.08	1.73	0.
time (sec)	N/A	0.268	0.113	0.011	1.379	0.224	81.417	0.217	0.

Problem 49	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	118	104	165	163	126	173	0
normalized size	1	1.	1.03	0.9	1.43	1.42	1.1	1.5	0.
time (sec)	N/A	0.214	0.063	0.008	1.386	0.218	129.937	0.215	0.

Problem 50	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	110	101	161	163	0	169	0
normalized size	1	1.	1.	0.92	1.46	1.48	0.	1.54	0.
time (sec)	N/A	0.199	0.101	0.009	1.395	0.212	0.	0.212	0.

Problem 51	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	121	124	166	166	0	184	95
normalized size	1	1.	1.33	1.36	1.82	1.82	0.	2.02	1.04
time (sec)	N/A	0.156	0.079	0.012	1.438	0.226	0.	0.215	20.178

Problem 52	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	119	104	163	163	0	171	109
normalized size	1	1.	1.05	0.92	1.44	1.44	0.	1.51	0.96
time (sec)	N/A	0.21	0.066	0.008	1.374	0.215	0.	0.214	22.783

Problem 53	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	121	104	163	163	0	171	116
normalized size	1	1.	1.03	0.89	1.39	1.39	0.	1.46	0.99
time (sec)	N/A	0.2	0.068	0.009	1.366	0.21	0.	0.215	22.76

Problem 54	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	118	104	163	163	0	171	41
normalized size	1	1.	2.46	2.17	3.4	3.4	0.	3.56	0.85
time (sec)	N/A	0.129	0.067	0.009	1.373	0.224	0.	0.213	9.763

Problem 55	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	117	104	163	163	0	171	114
normalized size	1	1.	1.	0.89	1.39	1.39	0.	1.46	0.97
time (sec)	N/A	0.209	0.096	0.008	1.377	0.221	0.	0.213	23.041

Problem 56	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	183	183	171	249	0	244	110	293	0
normalized size	1	1.	0.93	1.36	0.	1.33	0.6	1.6	0.
time (sec)	N/A	0.381	0.275	0.005	0.	0.246	2.459	0.22	0.

Problem 57	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	47	62	68	69	44	70	0
normalized size	1	1.	0.87	1.15	1.26	1.28	0.81	1.3	0.
time (sec)	N/A	0.154	0.038	0.005	1.379	0.232	2.074	0.219	0.

Problem 58	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	167	167	154	226	0	247	112	279	153
normalized size	1	1.	0.92	1.35	0.	1.48	0.67	1.67	0.92
time (sec)	N/A	0.316	0.168	0.006	0.	0.236	2.121	0.22	37.718

Problem 59	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	162	162	152	221	0	213	87	251	150
normalized size	1	1.	0.94	1.36	0.	1.31	0.54	1.55	0.93
time (sec)	N/A	0.289	0.15	0.003	0.	0.236	2.268	0.216	40.132

Problem 60	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	35	35	31	40	42	41	27	43	0
normalized size	1	1.	0.89	1.14	1.2	1.17	0.77	1.23	0.
time (sec)	N/A	0.101	0.022	0.003	1.371	0.222	1.908	0.216	0.

Problem 61	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	152	198	0	193	92	247	138
normalized size	1	1.	1.01	1.32	0.	1.29	0.61	1.65	0.92
time (sec)	N/A	0.243	0.097	0.004	0.	0.234	1.925	0.221	31.553

Problem 62	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	145	145	129	195	0	176	71	217	134
normalized size	1	1.	0.89	1.34	0.	1.21	0.49	1.5	0.92
time (sec)	N/A	0.2	0.112	0.003	0.	0.235	2.024	0.219	31.863

Problem 63	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	34	34	34	37	47	43	26	46	29
normalized size	1	1.	1.	1.09	1.38	1.26	0.76	1.35	0.85
time (sec)	N/A	0.101	0.024	0.007	1.376	0.231	3.107	0.217	12.592

Problem 64	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	147	147	134	195	0	189	90	239	134
normalized size	1	1.	0.91	1.33	0.	1.29	0.61	1.63	0.91
time (sec)	N/A	0.224	0.162	0.005	0.	0.235	2.091	0.219	32.925

Problem 65	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	135	195	0	198	73	217	138
normalized size	1	1.	0.91	1.31	0.	1.33	0.49	1.46	0.93
time (sec)	N/A	0.237	0.222	0.005	0.	0.252	2.33	0.22	33.3

Problem 66	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	49	56	65	63	41	93	44
normalized size	1	1.	0.98	1.12	1.3	1.26	0.82	1.86	0.88
time (sec)	N/A	0.139	0.038	0.009	1.388	0.229	3.816	0.218	14.459

Problem 67	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	154	216	0	248	112	266	150
normalized size	1	1.	0.93	1.31	0.	1.5	0.68	1.61	0.91
time (sec)	N/A	0.286	0.233	0.009	0.	0.23	2.65	0.222	37.821

Problem 68	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	168	168	154	217	0	266	99	238	153
normalized size	1	1.	0.92	1.29	0.	1.58	0.59	1.42	0.91
time (sec)	N/A	0.287	0.24	0.011	0.	0.237	3.181	0.217	38.719

Problem 69	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	70	81	95	99	61	134	63
normalized size	1	1.	1.01	1.17	1.38	1.43	0.88	1.94	0.91
time (sec)	N/A	0.174	0.052	0.012	1.385	0.231	5.115	0.217	17.659

Problem 70	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	184	184	173	247	0	278	139	292	167
normalized size	1	1.	0.94	1.34	0.	1.51	0.76	1.59	0.91
time (sec)	N/A	0.346	0.33	0.01	0.	0.23	3.931	0.218	43.733

Problem 71	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	233	233	203	288	0	385	153	329	0
normalized size	1	1.	0.87	1.24	0.	1.65	0.66	1.41	0.
time (sec)	N/A	0.385	0.305	0.014	0.	0.238	4.494	0.219	0.

Problem 72	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	72	97	111	163	78	143	0
normalized size	1	1.	0.88	1.18	1.35	1.99	0.95	1.74	0.
time (sec)	N/A	0.253	0.13	0.008	1.458	0.227	4.229	0.218	0.

Problem 73	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	215	215	185	266	0	375	151	319	0
normalized size	1	1.	0.86	1.24	0.	1.74	0.7	1.48	0.
time (sec)	N/A	0.38	0.258	0.013	0.	0.233	4.649	0.219	0.

Problem 74	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	213	213	181	257	0	343	124	285	0
normalized size	1	1.	0.85	1.21	0.	1.61	0.58	1.34	0.
time (sec)	N/A	0.351	0.272	0.013	0.	0.241	4.151	0.219	0.

Problem 75	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	50	74	81	109	56	123	0
normalized size	1	1.	0.83	1.23	1.35	1.82	0.93	2.05	0.
time (sec)	N/A	0.179	0.066	0.009	1.373	0.224	3.832	0.218	0.

Problem 76	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	196	165	235	0	313	126	285	182
normalized size	1	1.	0.84	1.2	0.	1.6	0.64	1.45	0.93
time (sec)	N/A	0.327	0.252	0.013	0.	0.241	4.21	0.221	40.49

Problem 77	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	190	190	160	228	0	296	102	254	173
normalized size	1	1.	0.84	1.2	0.	1.56	0.54	1.34	0.91
time (sec)	N/A	0.302	0.241	0.011	0.	0.237	3.592	0.219	43.038

Problem 78	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	41	41	47	54	59	36	88	32
normalized size	1	1.	1.	1.15	1.32	1.44	0.88	2.15	0.78
time (sec)	N/A	0.115	0.027	0.007	1.365	0.222	2.755	0.218	12.683

Problem 79	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	171	171	146	223	0	293	117	273	156
normalized size	1	1.	0.85	1.3	0.	1.71	0.68	1.6	0.91
time (sec)	N/A	0.343	0.18	0.012	0.	0.238	3.024	0.221	33.858

Problem 80	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	169	169	145	221	0	275	97	246	155
normalized size	1	1.	0.86	1.31	0.	1.63	0.57	1.46	0.92
time (sec)	N/A	0.224	0.18	0.011	0.	0.234	2.691	0.218	33.556

Problem 81	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	46	53	69	95	46	82	44
normalized size	1	1.	0.9	1.04	1.35	1.86	0.9	1.61	0.86
time (sec)	N/A	0.13	0.059	0.012	1.374	0.229	2.69	0.217	14.76

Problem 82	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	196	164	241	0	305	122	273	172
normalized size	1	1.	0.84	1.23	0.	1.56	0.62	1.39	0.88
time (sec)	N/A	0.296	0.255	0.016	0.	0.237	3.183	0.217	39.992

Problem 83	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	196	163	237	0	327	109	254	182
normalized size	1	1.	0.83	1.21	0.	1.67	0.56	1.3	0.93
time (sec)	N/A	0.285	0.305	0.014	0.	0.24	3.633	0.223	40.984

Problem 84	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	64	87	103	159	70	108	68
normalized size	1	1.	0.84	1.14	1.36	2.09	0.92	1.42	0.89
time (sec)	N/A	0.204	0.088	0.015	1.374	0.229	5.509	0.219	18.825

Problem 85	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	215	215	185	257	0	386	153	312	199
normalized size	1	1.	0.86	1.2	0.	1.8	0.71	1.45	0.93
time (sec)	N/A	0.347	0.314	0.019	0.	0.232	5.187	0.221	46.267

Problem 86	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	215	215	183	252	0	402	138	278	201
normalized size	1	1.	0.85	1.17	0.	1.87	0.64	1.29	0.93
time (sec)	N/A	0.35	0.322	0.018	0.	0.236	6.747	0.219	47.107

Problem 87	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	85	116	143	208	100	201	94
normalized size	1	1.	0.88	1.2	1.47	2.14	1.03	2.07	0.97
time (sec)	N/A	0.264	0.182	0.016	1.549	0.23	10.735	0.22	24.21

Problem 88	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	94	134	155	242	112	177	0
normalized size	1	1.	0.88	1.25	1.45	2.26	1.05	1.65	0.
time (sec)	N/A	0.346	0.132	0.012	1.411	0.221	10.688	0.221	0.

Problem 89	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	92	110	127	192	94	126	0
normalized size	1	1.	1.05	1.25	1.44	2.18	1.07	1.43	0.
time (sec)	N/A	0.254	0.068	0.009	1.373	0.224	9.182	0.218	0.

Problem 90	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	64	81	97	120	70	82	56
normalized size	1	1.	0.97	1.23	1.47	1.82	1.06	1.24	0.85
time (sec)	N/A	0.177	0.045	0.008	1.406	0.227	7.115	0.22	18.406

Problem 91	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	30	39	57	57	42	38	26
normalized size	1	1.	0.94	1.22	1.78	1.78	1.31	1.19	0.81
time (sec)	N/A	0.08	0.026	0.007	1.368	0.217	4.348	0.219	8.115

Problem 92	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	59	68	104	161	75	100	60
normalized size	1	1.	0.87	1.	1.53	2.37	1.1	1.47	0.88
time (sec)	N/A	0.16	0.085	0.012	1.368	0.237	4.475	0.22	18.227

Problem 93	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	87	117	147	266	107	184	90
normalized size	1	1.	0.86	1.16	1.46	2.63	1.06	1.82	0.89
time (sec)	N/A	0.268	0.11	0.016	1.374	0.228	13.358	0.219	23.411

Problem 94	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	108	147	184	309	133	177	112
normalized size	1	1.	0.89	1.2	1.51	2.53	1.09	1.45	0.92
time (sec)	N/A	0.329	0.151	0.016	1.369	0.232	44.081	0.221	29.864

Problem 95	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	246	246	216	308	0	520	189	350	0
normalized size	1	1.	0.88	1.25	0.	2.11	0.77	1.42	0.
time (sec)	N/A	0.448	0.335	0.019	0.	0.241	12.625	0.224	0.

Problem 96	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	244	244	210	299	0	487	162	316	0
normalized size	1	1.	0.86	1.23	0.	2.	0.66	1.3	0.
time (sec)	N/A	0.44	0.316	0.018	0.	0.242	9.293	0.222	0.

Problem 97	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	222	222	194	275	0	458	162	313	209
normalized size	1	1.	0.87	1.24	0.	2.06	0.73	1.41	0.94
time (sec)	N/A	0.399	0.343	0.014	0.	0.234	11.476	0.222	47.458

Problem 98	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	220	220	188	268	0	440	141	282	206
normalized size	1	1.	0.85	1.22	0.	2.	0.64	1.28	0.94
time (sec)	N/A	0.357	0.352	0.017	0.	0.238	7.835	0.223	48.532

Problem 99	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	181	241	0	433	153	300	184
normalized size	1	1.	0.9	1.2	0.	2.15	0.76	1.49	0.92
time (sec)	N/A	0.304	0.339	0.014	0.	0.238	8.029	0.225	40.841

Problem 100	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	199	199	178	239	0	416	134	274	182
normalized size	1	1.	0.89	1.2	0.	2.09	0.67	1.38	0.91
time (sec)	N/A	0.318	0.345	0.015	0.	0.238	5.466	0.223	42.4

Problem 101	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	178	251	0	433	153	301	184
normalized size	1	1.	0.89	1.25	0.	2.15	0.76	1.5	0.92
time (sec)	N/A	0.305	0.29	0.013	0.	0.235	4.639	0.221	39.548

Problem 102	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	197	197	175	249	0	414	133	273	180
normalized size	1	1.	0.89	1.26	0.	2.1	0.68	1.39	0.91
time (sec)	N/A	0.261	0.258	0.014	0.	0.241	3.86	0.221	38.152

Problem 103	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	227	227	193	281	0	444	162	305	202
normalized size	1	1.	0.85	1.24	0.	1.96	0.71	1.34	0.89
time (sec)	N/A	0.336	0.327	0.018	0.	0.245	6.309	0.222	46.468

Problem 104	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	227	227	189	277	0	456	143	282	209
normalized size	1	1.	0.83	1.22	0.	2.01	0.63	1.24	0.92
time (sec)	N/A	0.362	0.351	0.019	0.	0.24	8.223	0.219	47.478

Problem 105	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	246	246	214	299	0	531	189	343	233
normalized size	1	1.	0.87	1.22	0.	2.16	0.77	1.39	0.95
time (sec)	N/A	0.424	0.368	0.025	0.	0.241	18.219	0.221	52.926

Problem 106	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	246	246	210	295	0	547	173	309	235
normalized size	1	1.	0.85	1.2	0.	2.22	0.7	1.26	0.96
time (sec)	N/A	0.392	0.359	0.023	0.	0.238	27.74	0.223	54.273

Problem 107	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	66	65	92	97	201	0	0
normalized size	1	1.	0.94	0.93	1.31	1.39	2.87	0.	0.
time (sec)	N/A	0.191	0.061	0.011	1.412	0.418	18.103	0.	0.

Problem 108	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	301	301	242	269	0	412	0	436	269
normalized size	1	1.	0.8	0.89	0.	1.37	0.	1.45	0.89
time (sec)	N/A	0.728	0.278	0.011	0.	0.487	0.	0.228	114.541

Problem 109	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	296	296	238	266	0	327	0	416	265
normalized size	1	1.	0.8	0.9	0.	1.1	0.	1.41	0.9
time (sec)	N/A	0.644	0.253	0.011	0.	0.263	0.	0.228	96.832

Problem 110	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	43	50	66	57	144	0	39
normalized size	1	1.	0.81	0.94	1.25	1.08	2.72	0.	0.74
time (sec)	N/A	0.144	0.038	0.009	1.375	0.286	10.457	0.	18.29

Problem 111	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	288	288	224	246	0	366	573	386	260
normalized size	1	1.	0.78	0.85	0.	1.27	1.99	1.34	0.9
time (sec)	N/A	0.397	0.194	0.01	0.	0.273	29.973	0.23	67.069

Problem 112	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	288	288	224	246	0	284	342	375	260
normalized size	1	1.	0.78	0.85	0.	0.99	1.19	1.3	0.9
time (sec)	N/A	0.382	0.187	0.008	0.	0.25	38.685	0.228	70.142

Problem 113	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	31	42	55	42	138	0	36
normalized size	1	1.	0.69	0.93	1.22	0.93	3.07	0.	0.8
time (sec)	N/A	0.098	0.034	0.01	1.463	0.232	4.319	0.	12.616

Problem 114	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	288	288	224	222	0	323	515	392	260
normalized size	1	1.	0.78	0.77	0.	1.12	1.79	1.36	0.9
time (sec)	N/A	0.368	0.228	0.009	0.	0.259	17.553	0.229	65.204

Problem 115	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	288	288	224	222	0	377	447	375	260
normalized size	1	1.	0.78	0.77	0.	1.31	1.55	1.3	0.9
time (sec)	N/A	0.349	0.223	0.002	0.	0.303	105.04	0.227	66.582

Problem 116	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	54	59	82	73	0	0	49
normalized size	1	1.	0.87	0.95	1.32	1.18	0.	0.	0.79
time (sec)	N/A	0.172	0.056	0.013	1.381	0.55	0.	0.	23.221

Problem 117	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	299	299	244	257	0	377	661	412	267
normalized size	1	1.	0.82	0.86	0.	1.26	2.21	1.38	0.89
time (sec)	N/A	0.692	0.31	0.013	0.	0.253	108.363	0.229	115.728

Problem 118	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	301	301	259	257	0	447	0	417	270
normalized size	1	1.	0.86	0.85	0.	1.49	0.	1.39	0.9
time (sec)	N/A	0.635	0.375	0.013	0.	1.124	0.	0.225	103.149

Problem 119	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	88	87	117	134	0	0	76
normalized size	1	1.	1.01	1.	1.34	1.54	0.	0.	0.87
time (sec)	N/A	0.245	0.08	0.016	1.404	1.835	0.	0.	30.418

Problem 120	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	318	318	282	291	0	470	0	443	286
normalized size	1	1.	0.89	0.92	0.	1.48	0.	1.39	0.9
time (sec)	N/A	1.	0.383	0.016	0.	1.153	0.	0.229	178.47

Problem 121	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	321	321	282	293	0	525	0	454	289
normalized size	1	1.	0.88	0.91	0.	1.64	0.	1.41	0.9
time (sec)	N/A	1.1	0.417	0.017	0.	0.356	0.	0.228	157.701

Problem 122	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	119	119	119	124	158	171	0	0	109
normalized size	1	1.	1.	1.04	1.33	1.44	0.	0.	0.92
time (sec)	N/A	0.322	0.101	0.017	1.484	6.	0.	0.	37.474

Problem 123	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	352	352	304	334	0	508	0	509	0
normalized size	1	1.	0.86	0.95	0.	1.44	0.	1.45	0.
time (sec)	N/A	1.338	0.494	0.018	0.	0.418	0.	0.232	0.

Problem 124	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	148	148	136	1078	0	1149	5418	1	138
normalized size	1	1.	0.92	7.28	0.	7.76	36.61	0.01	0.93
time (sec)	N/A	0.278	0.22	0.014	0.	0.25	75.319	0.24	29.129

Problem 125	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	65	262	0	290	1057	513	63
normalized size	1	1.	0.92	3.69	0.	4.08	14.89	7.23	0.89
time (sec)	N/A	0.125	0.087	0.009	0.	0.243	10.519	0.222	14.251

Problem 126	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	41	110	0	124	410	225	37
normalized size	1	1.	0.91	2.44	0.	2.76	9.11	5.	0.82
time (sec)	N/A	0.07	0.048	0.006	0.	0.246	4.459	0.216	8.512

Problem 127	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	55	0	0	0	190	0	49
normalized size	1	1.	0.83	0.	0.	0.	2.88	0.	0.74
time (sec)	N/A	0.109	0.091	0.053	0.	0.	93.251	0.	10.402

Problem 128	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	80	0	0	0	0	0	71
normalized size	1	1.	0.86	0.	0.	0.	0.	0.	0.76
time (sec)	N/A	0.135	0.089	0.065	0.	0.	0.	0.	12.438

Problem 129	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	80	0	0	0	0	0	73
normalized size	1	1.	0.86	0.	0.	0.	0.	0.	0.78
time (sec)	N/A	0.14	0.089	0.053	0.	0.	0.	0.	11.978

Problem 130	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	86	0	0	0	0	0	83
normalized size	1	1.	0.77	0.	0.	0.	0.	0.	0.74
time (sec)	N/A	0.185	0.098	0.086	0.	0.	0.	0.	20.177

Problem 131	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	33	32	36	43	46	39	41
normalized size	1	1.	0.85	0.82	0.92	1.1	1.18	1.	1.05
time (sec)	N/A	0.058	0.021	0.006	1.365	0.222	70.576	0.211	6.081

Problem 132	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	33	32	36	43	46	39	41
normalized size	1	1.	0.85	0.82	0.92	1.1	1.18	1.	1.05
time (sec)	N/A	0.058	0.02	0.005	1.416	0.229	38.102	0.214	6.048

Problem 133	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	33	32	36	43	46	39	41
normalized size	1	1.	0.85	0.82	0.92	1.1	1.18	1.	1.05
time (sec)	N/A	0.057	0.019	0.004	1.369	0.235	19.408	0.21	6.08

Problem 134	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	33	32	36	41	37	39	41
normalized size	1	1.	0.85	0.82	0.92	1.05	0.95	1.	1.05
time (sec)	N/A	0.056	0.019	0.006	1.365	0.229	4.95	0.213	6.279

Problem 135	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	33	32	36	39	44	39	39
normalized size	1	1.	0.89	0.86	0.97	1.05	1.19	1.05	1.05
time (sec)	N/A	0.056	0.023	0.005	1.429	0.223	6.46	0.215	6.086

Problem 136	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	33	32	36	39	44	39	39
normalized size	1	1.	0.89	0.86	0.97	1.05	1.19	1.05	1.05
time (sec)	N/A	0.056	0.02	0.005	1.407	0.227	8.255	0.214	6.102

Problem 137	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	34	32	36	38	46	39	41
normalized size	1	1.	0.87	0.82	0.92	0.97	1.18	1.	1.05
time (sec)	N/A	0.057	0.02	0.006	1.584	0.228	9.959	0.212	6.092

Problem 138	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	33	32	36	39	42	39	37
normalized size	1	1.	0.89	0.86	0.97	1.05	1.14	1.05	1.
time (sec)	N/A	0.058	0.02	0.004	1.859	0.228	14.726	0.212	6.126

Problem 139	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	53	56	69	76	80	72	63
normalized size	1	1.	0.84	0.89	1.1	1.21	1.27	1.14	1.
time (sec)	N/A	0.104	0.037	0.007	1.613	0.235	167.797	0.215	10.756

Problem 140	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	63	56	69	76	80	72	63
normalized size	1	1.	1.	0.89	1.1	1.21	1.27	1.14	1.
time (sec)	N/A	0.099	0.04	0.009	1.859	0.234	95.414	0.213	10.734

Problem 141	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	53	56	69	76	80	72	63
normalized size	1	1.	0.84	0.89	1.1	1.21	1.27	1.14	1.
time (sec)	N/A	0.099	0.039	0.008	1.398	0.234	53.245	0.213	10.786

Problem 142	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	53	56	69	73	66	72	63
normalized size	1	1.	0.84	0.89	1.1	1.16	1.05	1.14	1.
time (sec)	N/A	0.096	0.036	0.01	1.501	0.229	14.165	0.212	11.093

Problem 143	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	53	56	69	72	78	72	61
normalized size	1	1.	0.87	0.92	1.13	1.18	1.28	1.18	1.
time (sec)	N/A	0.098	0.036	0.007	1.424	0.231	24.104	0.211	10.785

Problem 144	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	53	56	69	72	78	72	61
normalized size	1	1.	0.87	0.92	1.13	1.18	1.28	1.18	1.
time (sec)	N/A	0.099	0.036	0.009	1.487	0.226	28.567	0.212	10.791

Problem 145	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	57	56	69	72	80	72	63
normalized size	1	1.	0.9	0.89	1.1	1.14	1.27	1.14	1.
time (sec)	N/A	0.099	0.031	0.008	1.455	0.229	33.556	0.213	10.799

Problem 146	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	53	56	69	72	76	72	61
normalized size	1	1.	0.87	0.92	1.13	1.18	1.25	1.18	1.
time (sec)	N/A	0.098	0.037	0.009	1.427	0.234	42.091	0.21	10.894

Problem 147	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	71	80	99	105	0	104	85
normalized size	1	1.	0.84	0.94	1.16	1.24	0.	1.22	1.
time (sec)	N/A	0.135	0.049	0.009	1.437	0.235	0.	0.214	14.148

Problem 148	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	85	80	99	105	0	104	85
normalized size	1	1.	1.	0.94	1.16	1.24	0.	1.22	1.
time (sec)	N/A	0.128	0.046	0.009	1.407	0.225	0.	0.213	14.124

Problem 149	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	85	80	99	105	114	104	85
normalized size	1	1.	1.	0.94	1.16	1.24	1.34	1.22	1.
time (sec)	N/A	0.126	0.047	0.009	1.44	0.228	124.276	0.212	14.082

Problem 150	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	71	80	99	103	95	104	85
normalized size	1	1.	0.84	0.94	1.16	1.21	1.12	1.22	1.
time (sec)	N/A	0.126	0.047	0.009	1.352	0.222	29.649	0.212	14.523

Problem 151	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	83	80	99	101	112	104	83
normalized size	1	1.	1.	0.96	1.19	1.22	1.35	1.25	1.
time (sec)	N/A	0.126	0.046	0.009	1.365	0.234	62.51	0.211	14.263

Problem 152	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	83	80	99	101	112	104	83
normalized size	1	1.	1.	0.96	1.19	1.22	1.35	1.25	1.
time (sec)	N/A	0.126	0.068	0.009	1.367	0.231	71.223	0.211	14.156

Problem 153	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	77	80	99	101	112	104	83
normalized size	1	1.	0.91	0.94	1.16	1.19	1.32	1.22	0.98
time (sec)	N/A	0.13	0.041	0.01	1.358	0.239	80.953	0.213	14.315

Problem 154	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	83	80	99	101	110	104	83
normalized size	1	1.	1.	0.96	1.19	1.22	1.33	1.25	1.
time (sec)	N/A	0.125	0.062	0.008	1.352	0.231	104.28	0.215	14.28

Problem 155	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	180	78	0	1	0	86	66
normalized size	1	1.	2.47	1.07	0.	0.01	0.	1.18	0.9
time (sec)	N/A	0.148	0.176	0.013	0.	0.244	0.	0.216	16.875

Problem 156	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	288	288	264	371	0	2828	0	390	0
normalized size	1	1.	0.92	1.29	0.	9.82	0.	1.35	0.
time (sec)	N/A	1.146	0.376	0.087	0.	0.288	0.	0.227	0.

Problem 157	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	270	270	229	350	0	4471	0	1	0
normalized size	1	1.	0.85	1.3	0.	16.56	0.	0.	0.
time (sec)	N/A	1.465	0.282	0.066	0.	0.286	0.	0.603	0.

Problem 158	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	A	F(-2)	A	F(-2)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	139	53	0	1	0	53	48
normalized size	1	1.	2.62	1.	0.	0.02	0.	1.	0.91
time (sec)	N/A	0.108	0.114	0.01	0.	0.245	0.	0.214	13.548

Problem 159	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	268	268	228	347	0	2805	864	378	0
normalized size	1	1.	0.85	1.29	0.	10.47	3.22	1.41	0.
time (sec)	N/A	1.025	0.249	0.048	0.	0.274	100.154	0.226	0.

Problem 160	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	268	268	242	349	0	4532	0	1	0
normalized size	1	1.	0.9	1.3	0.	16.91	0.	0.	0.
time (sec)	N/A	1.412	0.378	0.052	0.	0.293	0.	0.631	0.

Problem 161	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	160	53	0	1	0	53	49
normalized size	1	1.	3.02	1.	0.	0.02	0.	1.	0.92
time (sec)	N/A	0.113	0.178	0.013	0.	0.245	0.	0.212	13.698

Problem 162	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	270	270	244	352	0	2817	0	378	0
normalized size	1	1.	0.9	1.3	0.	10.43	0.	1.4	0.
time (sec)	N/A	1.027	0.416	0.053	0.	0.28	0.	0.226	0.

Problem 163	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	160	93	0	1	0	92	80
normalized size	1	1.	1.68	0.98	0.	0.01	0.	0.97	0.84
time (sec)	N/A	0.17	0.256	0.024	0.	0.242	0.	0.216	18.98

Problem 164	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	312	312	273	399	0	3002	0	423	0
normalized size	1	1.	0.88	1.28	0.	9.62	0.	1.36	0.
time (sec)	N/A	1.173	0.541	0.06	0.	0.287	0.	0.228	0.

Problem 165	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	289	289	244	381	0	4672	0	1	0
normalized size	1	1.	0.84	1.32	0.	16.17	0.	0.	0.
time (sec)	N/A	1.365	0.398	0.058	0.	0.3	0.	0.623	0.

Problem 166	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	139	74	0	1	0	85	58
normalized size	1	1.	1.96	1.04	0.	0.01	0.	1.2	0.82
time (sec)	N/A	0.127	0.202	0.014	0.	0.25	0.	0.221	14.878

Problem 167	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	289	289	244	381	0	2988	0	408	0
normalized size	1	1.	0.84	1.32	0.	10.34	0.	1.41	0.
time (sec)	N/A	1.02	0.374	0.058	0.	0.277	0.	0.236	0.

Problem 168	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	318	318	274	395	0	4690	0	414	0
normalized size	1	1.	0.86	1.24	0.	14.75	0.	1.3	0.
time (sec)	N/A	1.603	0.728	0.066	0.	0.303	0.	0.308	0.

Problem 169	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	162	93	0	1	0	89	80
normalized size	1	1.	1.67	0.96	0.	0.01	0.	0.92	0.82
time (sec)	N/A	0.173	0.389	0.026	0.	0.253	0.	0.222	19.013

Problem 170	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	318	318	278	389	0	3048	0	423	0
normalized size	1	1.	0.87	1.22	0.	9.58	0.	1.33	0.
time (sec)	N/A	1.128	0.54	0.063	0.	0.277	0.	0.235	0.

Problem 171	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	179	96	0	1	0	113	88
normalized size	1	1.	1.72	0.92	0.	0.01	0.	1.09	0.85
time (sec)	N/A	0.173	0.34	0.025	0.	0.255	0.	0.223	19.387

Problem 172	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	327	327	296	416	0	3208	0	443	0
normalized size	1	1.	0.91	1.27	0.	9.81	0.	1.35	0.
time (sec)	N/A	1.133	0.619	0.064	0.	0.287	0.	0.24	0.

Problem 173	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	327	327	284	411	0	4878	0	443	0
normalized size	1	1.	0.87	1.26	0.	14.92	0.	1.35	0.
time (sec)	N/A	1.514	0.434	0.063	0.	0.304	0.	0.272	0.

Problem 174	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	176	97	0	1	0	113	88
normalized size	1	1.	1.69	0.93	0.	0.01	0.	1.09	0.85
time (sec)	N/A	0.169	0.256	0.013	0.	0.253	0.	0.224	19.351

Problem 175	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	321	321	279	401	0	3148	0	435	0
normalized size	1	1.	0.87	1.25	0.	9.81	0.	1.36	0.
time (sec)	N/A	1.326	0.491	0.063	0.	0.284	0.	0.24	0.

Problem 176	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	351	351	306	435	0	4833	0	444	0
normalized size	1	1.	0.87	1.24	0.	13.77	0.	1.26	0.
time (sec)	N/A	1.612	0.674	0.069	0.	0.3	0.	0.308	0.

Problem 177	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	194	133	0	1	0	119	109
normalized size	1	1.	1.49	1.02	0.	0.01	0.	0.92	0.84
time (sec)	N/A	0.212	0.337	0.028	0.	0.293	0.	0.22	23.629

Problem 178	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	351	351	308	429	0	3190	0	451	0
normalized size	1	1.	0.88	1.22	0.	9.09	0.	1.28	0.
time (sec)	N/A	1.205	0.735	0.068	0.	0.29	0.	0.243	0.

Problem 179	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	75	77	159	134	219	144	99
normalized size	1	1.	0.73	0.75	1.54	1.3	2.13	1.4	0.96
time (sec)	N/A	0.255	0.093	0.01	1.378	0.24	11.234	0.217	22.357

Problem 180	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	57	53	113	101	168	107	68
normalized size	1	1.	0.78	0.73	1.55	1.38	2.3	1.47	0.93
time (sec)	N/A	0.191	0.061	0.008	1.461	0.249	4.714	0.218	16.676

Problem 181	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	34	31	66	68	117	63	41
normalized size	1	1.	0.74	0.67	1.43	1.48	2.54	1.37	0.89
time (sec)	N/A	0.129	0.044	0.008	1.372	0.248	1.742	0.218	12.092

Problem 182	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	62	50	0	1	126	82	58
normalized size	1	1.	0.97	0.78	0.	0.02	1.97	1.28	0.91
time (sec)	N/A	0.144	0.26	0.01	0.	0.276	12.184	0.221	11.936

Problem 183	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	67	72	0	1	134	92	75
normalized size	1	1.	0.8	0.86	0.	0.01	1.6	1.1	0.89
time (sec)	N/A	0.199	0.263	0.013	0.	0.25	30.966	0.22	14.12

Problem 184	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	82	96	0	1	160	162	76
normalized size	1	1.	0.93	1.09	0.	0.01	1.82	1.84	0.86
time (sec)	N/A	0.211	0.333	0.012	0.	0.273	68.828	0.222	14.329

Problem 185	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	303	303	209	658	0	0	83	0	277
normalized size	1	1.	0.69	2.17	0.	0.	0.27	0.	0.91
time (sec)	N/A	0.444	0.973	0.01	0.	0.	5.452	0.	27.493

Problem 186	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	268	268	182	618	0	0	82	0	241
normalized size	1	1.	0.68	2.31	0.	0.	0.31	0.	0.9
time (sec)	N/A	0.264	1.295	0.007	0.	0.	4.329	0.	16.785

Problem 187	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	269	269	175	596	0	0	85	0	236
normalized size	1	1.	0.65	2.22	0.	0.	0.32	0.	0.88
time (sec)	N/A	0.285	0.949	0.012	0.	0.	5.249	0.	17.507

Problem 188	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	272	272	189	616	0	0	94	0	236
normalized size	1	1.	0.69	2.26	0.	0.	0.35	0.	0.87
time (sec)	N/A	0.293	1.442	0.012	0.	0.	6.163	0.	18.848

Problem 189	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	305	305	206	660	0	0	97	0	274
normalized size	1	1.	0.68	2.16	0.	0.	0.32	0.	0.9
time (sec)	N/A	0.385	1.708	0.013	0.	0.	9.178	0.	25.867

Problem 190	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	581	581	263	966	0	0	83	0	527
normalized size	1	1.	0.45	1.66	0.	0.	0.14	0.	0.91
time (sec)	N/A	0.875	0.655	0.01	0.	0.	6.029	0.	59.777

Problem 191	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	548	548	246	926	0	0	83	0	493
normalized size	1	1.	0.45	1.69	0.	0.	0.15	0.	0.9
time (sec)	N/A	0.684	0.521	0.009	0.	0.	4.614	0.	47.131

Problem 192	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	545	545	236	902	0	0	85	0	486
normalized size	1	1.	0.43	1.66	0.	0.	0.16	0.	0.89
time (sec)	N/A	0.684	0.373	0.012	0.	0.	5.155	0.	47.808

Problem 193	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	546	546	249	920	0	0	92	0	479
normalized size	1	1.	0.46	1.68	0.	0.	0.17	0.	0.88
time (sec)	N/A	0.683	0.581	0.012	0.	0.	5.708	0.	48.162

Problem 194	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	581	581	272	964	0	0	97	0	520
normalized size	1	1.	0.47	1.66	0.	0.	0.17	0.	0.9
time (sec)	N/A	0.822	0.61	0.051	0.	0.	7.561	0.	59.697

Problem 195	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	614	614	284	1006	0	0	97	0	554
normalized size	1	1.	0.46	1.64	0.	0.	0.16	0.	0.9
time (sec)	N/A	0.949	0.869	0.039	0.	0.	12.876	0.	71.572

Problem 196	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	78	77	159	167	267	323	99
normalized size	1	1.	0.76	0.75	1.54	1.62	2.59	3.14	0.96
time (sec)	N/A	0.255	0.11	0.01	1.462	0.246	25.732	0.217	22.519

Problem 197	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	57	53	113	134	216	247	68
normalized size	1	1.	0.78	0.73	1.55	1.84	2.96	3.38	0.93
time (sec)	N/A	0.188	0.073	0.009	1.479	0.243	13.391	0.217	16.901

Problem 198	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	34	31	66	99	165	162	41
normalized size	1	1.	0.74	0.67	1.43	2.15	3.59	3.52	0.89
time (sec)	N/A	0.141	0.058	0.009	1.476	0.243	5.933	0.216	12.076

Problem 199	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	83	66	0	1	144	108	75
normalized size	1	1.	1.02	0.81	0.	0.01	1.78	1.33	0.93
time (sec)	N/A	0.203	0.38	0.01	0.	0.264	19.816	0.218	14.024

Problem 200	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	82	101	0	1	223	139	99
normalized size	1	1.	0.75	0.92	0.	0.01	2.03	1.26	0.9
time (sec)	N/A	0.241	0.373	0.013	0.	0.254	42.07	0.22	16.796

Problem 201	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	84	107	0	1	243	177	100
normalized size	1	1.	0.73	0.93	0.	0.01	2.11	1.54	0.87
time (sec)	N/A	0.251	0.417	0.012	0.	0.265	88.54	0.22	17.136

Problem 202	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	336	336	229	694	0	0	172	0	309
normalized size	1	1.	0.68	2.07	0.	0.	0.51	0.	0.92
time (sec)	N/A	0.5	1.104	0.01	0.	0.	11.866	0.	34.316

Problem 203	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	299	299	202	654	0	0	170	0	272
normalized size	1	1.	0.68	2.19	0.	0.	0.57	0.	0.91
time (sec)	N/A	0.338	0.912	0.007	0.	0.	7.988	0.	21.703

Problem 204	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	295	295	193	629	0	0	172	0	265
normalized size	1	1.	0.65	2.13	0.	0.	0.58	0.	0.9
time (sec)	N/A	0.354	1.234	0.014	0.	0.	9.491	0.	21.703

Problem 205	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	297	297	193	626	0	0	184	0	264
normalized size	1	1.	0.65	2.11	0.	0.	0.62	0.	0.89
time (sec)	N/A	0.345	1.476	0.014	0.	0.	10.441	0.	22.646

Problem 206	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	302	302	209	653	0	0	196	0	267
normalized size	1	1.	0.69	2.16	0.	0.	0.65	0.	0.88
time (sec)	N/A	0.366	1.704	0.037	0.	0.	15.137	0.	24.5

Problem 207	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	614	614	283	1002	0	0	172	0	559
normalized size	1	1.	0.46	1.63	0.	0.	0.28	0.	0.91
time (sec)	N/A	0.982	0.662	0.011	0.	0.	13.649	0.	70.919

Problem 208	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	581	581	262	962	0	0	172	0	525
normalized size	1	1.	0.45	1.66	0.	0.	0.3	0.	0.9
time (sec)	N/A	0.809	0.603	0.009	0.	0.	8.9	0.	57.546

Problem 209	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	573	573	254	937	0	0	173	0	515
normalized size	1	1.	0.44	1.64	0.	0.	0.3	0.	0.9
time (sec)	N/A	0.803	0.486	0.013	0.	0.	9.761	0.	57.42

Problem 210	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	578	578	254	932	0	0	182	0	518
normalized size	1	1.	0.44	1.61	0.	0.	0.31	0.	0.9
time (sec)	N/A	0.796	0.628	0.013	0.	0.	10.041	0.	57.062

Problem 211	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	576	576	269	957	0	0	194	0	510
normalized size	1	1.	0.47	1.66	0.	0.	0.34	0.	0.89
time (sec)	N/A	0.783	0.71	0.037	0.	0.	13.164	0.	57.503

Problem 212	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	608	608	282	1002	0	0	199	0	544
normalized size	1	1.	0.46	1.65	0.	0.	0.33	0.	0.89
time (sec)	N/A	0.937	0.913	0.038	0.	0.	20.211	0.	70.706

Problem 213	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	78	77	159	103	175	140	99
normalized size	1	1.	0.76	0.75	1.54	1.	1.7	1.36	0.96
time (sec)	N/A	0.257	0.083	0.01	1.431	0.249	10.433	0.214	22.223

Problem 214	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	56	53	112	70	124	99	68
normalized size	1	1.	0.77	0.73	1.53	0.96	1.7	1.36	0.93
time (sec)	N/A	0.19	0.063	0.01	1.405	0.239	5.094	0.213	16.646

Problem 215	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	33	30	65	39	75	58	41
normalized size	1	1.	0.72	0.65	1.41	0.85	1.63	1.26	0.89
time (sec)	N/A	0.133	0.03	0.009	1.378	0.249	2.644	0.212	12.175

Problem 216	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	61	37	0	1	143	54	42
normalized size	1	1.	1.27	0.77	0.	0.02	2.98	1.12	0.88
time (sec)	N/A	0.123	0.122	0.011	0.	0.266	7.977	0.217	10.174

Problem 217	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	64	62	0	1	80	84	51
normalized size	1	1.	1.1	1.07	0.	0.02	1.38	1.45	0.88
time (sec)	N/A	0.158	0.24	0.012	0.	0.257	23.82	0.219	11.393

Problem 218	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	101	102	0	1	163	163	82
normalized size	1	1.	1.12	1.13	0.	0.01	1.81	1.81	0.91
time (sec)	N/A	0.216	0.171	0.012	0.	0.275	50.317	0.219	14.549

Problem 219	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	270	270	189	624	0	0	80	0	245
normalized size	1	1.	0.7	2.31	0.	0.	0.3	0.	0.91
time (sec)	N/A	0.327	0.69	0.01	0.	0.	5.476	0.	20.788

Problem 220	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	239	239	168	586	0	0	78	0	212
normalized size	1	1.	0.7	2.45	0.	0.	0.33	0.	0.89
time (sec)	N/A	0.198	0.952	0.007	0.	0.	4.039	0.	12.302

Problem 221	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	243	243	170	587	0	0	82	0	212
normalized size	1	1.	0.7	2.42	0.	0.	0.34	0.	0.87
time (sec)	N/A	0.22	0.83	0.013	0.	0.	4.604	0.	13.802

Problem 222	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	274	274	188	625	0	0	90	0	243
normalized size	1	1.	0.69	2.28	0.	0.	0.33	0.	0.89
time (sec)	N/A	0.305	1.409	0.012	0.	0.	6.275	0.	19.754

Problem 223	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	548	548	243	932	0	0	80	0	495
normalized size	1	1.	0.44	1.7	0.	0.	0.15	0.	0.9
time (sec)	N/A	0.707	0.603	0.01	0.	0.	5.992	0.	48.504

Problem 224	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	517	517	231	892	0	0	80	0	461
normalized size	1	1.	0.45	1.73	0.	0.	0.15	0.	0.89
time (sec)	N/A	0.558	0.577	0.01	0.	0.	4.737	0.	37.606

Problem 225	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	509	509	225	891	0	0	82	0	449
normalized size	1	1.	0.44	1.75	0.	0.	0.16	0.	0.88
time (sec)	N/A	0.555	0.388	0.012	0.	0.	4.458	0.	38.192

Problem 226	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	550	550	249	929	0	0	88	0	486
normalized size	1	1.	0.45	1.69	0.	0.	0.16	0.	0.88
time (sec)	N/A	0.674	0.583	0.013	0.	0.	5.653	0.	48.87

Problem 227	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	581	581	269	970	0	0	94	0	524
normalized size	1	1.	0.46	1.67	0.	0.	0.16	0.	0.9
time (sec)	N/A	0.819	0.741	0.033	0.	0.	8.163	0.	60.087

Problem 228	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	77	77	157	103	175	131	99
normalized size	1	1.	0.75	0.75	1.52	1.	1.7	1.27	0.96
time (sec)	N/A	0.258	0.092	0.01	1.416	0.252	11.652	0.215	21.999

Problem 229	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	55	52	109	69	124	88	68
normalized size	1	1.	0.75	0.71	1.49	0.95	1.7	1.21	0.93
time (sec)	N/A	0.19	0.068	0.009	1.384	0.264	5.793	0.216	16.521

Problem 230	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	33	30	63	39	75	47	42
normalized size	1	1.	0.72	0.65	1.37	0.85	1.63	1.02	0.91
time (sec)	N/A	0.131	0.03	0.01	1.366	0.25	3.075	0.213	12.031

Problem 231	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	61	57	0	1	214	72	51
normalized size	1	1.	1.05	0.98	0.	0.02	3.69	1.24	0.88
time (sec)	N/A	0.144	0.243	0.01	0.	0.265	57.571	0.218	11.589

Problem 232	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	73	100	0	1	0	134	78
normalized size	1	1.	0.85	1.16	0.	0.01	0.	1.56	0.91
time (sec)	N/A	0.214	0.425	0.012	0.	0.256	0.	0.22	15.088

Problem 233	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	120	95	141	0	1	0	185	110
normalized size	1	1.	0.79	1.18	0.	0.01	0.	1.54	0.92
time (sec)	N/A	0.274	0.597	0.013	0.	0.271	0.	0.222	18.181

Problem 234	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	300	300	205	666	0	0	80	0	275
normalized size	1	1.	0.68	2.22	0.	0.	0.27	0.	0.92
time (sec)	N/A	0.412	0.909	0.032	0.	0.	173.336	0.	25.998

Problem 235	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	269	269	182	627	0	0	80	0	243
normalized size	1	1.	0.68	2.33	0.	0.	0.3	0.	0.9
time (sec)	N/A	0.312	0.6	0.01	0.	0.	55.755	0.	20.908

Problem 236	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	251	251	176	613	0	0	78	0	219
normalized size	1	1.	0.7	2.44	0.	0.	0.31	0.	0.87
time (sec)	N/A	0.208	0.905	0.007	0.	0.	34.452	0.	13.696

Problem 237	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	272	272	193	631	0	0	82	0	243
normalized size	1	1.	0.71	2.32	0.	0.	0.3	0.	0.89
time (sec)	N/A	0.292	0.601	0.013	0.	0.	116.562	0.	18.75

Problem 238	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	304	304	218	667	0	0	0	0	275
normalized size	1	1.	0.72	2.19	0.	0.	0.	0.	0.9
time (sec)	N/A	0.383	0.768	0.013	0.	0.	0.	0.	26.382

Problem 239	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	547	547	236	937	0	0	80	0	493
normalized size	1	1.	0.43	1.71	0.	0.	0.15	0.	0.9
time (sec)	N/A	0.716	0.632	0.011	0.	0.	78.312	0.	48.788

Problem 240	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	524	524	235	921	0	0	80	0	464
normalized size	1	1.	0.45	1.76	0.	0.	0.15	0.	0.89
time (sec)	N/A	0.567	0.644	0.009	0.	0.	35.465	0.	40.668

Problem 241	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	548	548	243	939	0	0	82	0	490
normalized size	1	1.	0.44	1.71	0.	0.	0.15	0.	0.89
time (sec)	N/A	0.68	0.574	0.013	0.	0.	77.164	0.	49.373

Problem 242	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	580	580	266	975	0	0	0	0	520
normalized size	1	1.	0.46	1.68	0.	0.	0.	0.	0.9
time (sec)	N/A	0.809	0.632	0.013	0.	0.	0.	0.	59.633

Problem 243	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	611	611	292	1018	0	0	0	0	554
normalized size	1	1.	0.48	1.67	0.	0.	0.	0.	0.91
time (sec)	N/A	0.947	0.696	0.047	0.	0.	0.	0.	71.617

Problem 244	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	73	76	157	117	338	124	99
normalized size	1	1.	0.71	0.74	1.52	1.14	3.28	1.2	0.96
time (sec)	N/A	0.26	0.099	0.01	1.38	0.297	14.445	0.216	22.246

Problem 245	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	54	53	113	86	240	82	68
normalized size	1	1.	0.74	0.73	1.55	1.18	3.29	1.12	0.93
time (sec)	N/A	0.194	0.071	0.01	1.378	0.278	7.646	0.216	16.922

Problem 246	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	33	30	66	55	144	43	44
normalized size	1	1.	0.72	0.65	1.43	1.2	3.13	0.93	0.96
time (sec)	N/A	0.135	0.034	0.009	1.391	0.325	3.864	0.215	12.266

Problem 247	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	83	85	0	1	0	90	70
normalized size	1	1.	1.08	1.1	0.	0.01	0.	1.17	0.91
time (sec)	N/A	0.179	0.223	0.042	0.	0.274	0.	0.219	14.403

Problem 248	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	108	157	0	1	0	136	104
normalized size	1	1.	0.96	1.39	0.	0.01	0.	1.2	0.92
time (sec)	N/A	0.274	0.309	0.047	0.	0.297	0.	0.222	18.481

Problem 249	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	299	299	205	683	0	0	0	0	274
normalized size	1	1.	0.69	2.28	0.	0.	0.	0.	0.92
time (sec)	N/A	0.405	0.568	0.057	0.	0.	0.	0.	25.962

Problem 250	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	283	283	199	669	0	0	0	0	250
normalized size	1	1.	0.7	2.36	0.	0.	0.	0.	0.88
time (sec)	N/A	0.324	0.551	0.034	0.	0.	0.	0.	23.33

Problem 251	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	283	283	199	674	0	0	0	0	253
normalized size	1	1.	0.7	2.38	0.	0.	0.	0.	0.89
time (sec)	N/A	0.279	0.534	0.029	0.	0.	0.	0.	19.361

Problem 252	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	300	300	210	689	0	0	0	0	274
normalized size	1	1.	0.7	2.3	0.	0.	0.	0.	0.91
time (sec)	N/A	0.401	0.662	0.045	0.	0.	0.	0.	23.888

Problem 253	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	334	334	228	722	0	0	0	0	304
normalized size	1	1.	0.68	2.16	0.	0.	0.	0.	0.91
time (sec)	N/A	0.472	0.844	0.049	0.	0.	0.	0.	33.113

Problem 254	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	577	577	265	997	0	0	0	0	524
normalized size	1	1.	0.46	1.73	0.	0.	0.	0.	0.91
time (sec)	N/A	0.852	0.924	0.056	0.	0.	0.	0.	60.031

Problem 255	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	559	559	256	981	0	0	0	0	496
normalized size	1	1.	0.46	1.75	0.	0.	0.	0.	0.89
time (sec)	N/A	0.712	0.933	0.034	0.	0.	0.	0.	51.862

Problem 256	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	563	563	257	986	0	0	0	0	503
normalized size	1	1.	0.46	1.75	0.	0.	0.	0.	0.89
time (sec)	N/A	0.685	0.857	0.03	0.	0.	0.	0.	51.091

Problem 257	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	578	578	273	1001	0	0	0	0	522
normalized size	1	1.	0.47	1.73	0.	0.	0.	0.	0.9
time (sec)	N/A	0.783	1.015	0.043	0.	0.	0.	0.	60.272

Problem 258	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	610	610	293	1034	0	0	0	0	547
normalized size	1	1.	0.48	1.7	0.	0.	0.	0.	0.9
time (sec)	N/A	0.931	1.071	0.046	0.	0.	0.	0.	71.552

Problem 259	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	77	506	0	1	0	111	95
normalized size	1	1.	0.79	5.22	0.	0.01	0.	1.14	0.98
time (sec)	N/A	0.283	0.101	0.216	0.	0.284	0.	0.215	27.398

Problem 260	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	65	446	0	1	0	92	75
normalized size	1	1.	0.86	5.87	0.	0.01	0.	1.21	0.99
time (sec)	N/A	0.208	0.073	0.013	0.	0.357	0.	0.215	19.683

Problem 261	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	54	425	0	1	0	59	53
normalized size	1	1.	0.95	7.46	0.	0.02	0.	1.04	0.93
time (sec)	N/A	0.151	0.038	0.01	0.	0.288	0.	0.214	16.266

Problem 262	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	158	468	0	1	0	68	58
normalized size	1	1.	2.43	7.2	0.	0.02	0.	1.05	0.89
time (sec)	N/A	0.185	0.302	0.029	0.	0.319	0.	0.216	17.786

Problem 263	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	319	511	0	1	0	101	80
normalized size	1	1.	3.62	5.81	0.	0.01	0.	1.15	0.91
time (sec)	N/A	0.295	0.782	0.034	0.	0.285	0.	0.219	29.321

Problem 264	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	689	689	343	1309	0	0	0	0	712
normalized size	1	1.	0.5	1.9	0.	0.	0.	0.	1.03
time (sec)	N/A	1.13	0.727	0.056	0.	0.	0.	0.	81.594

Problem 265	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	659	659	167	848	0	0	0	0	685
normalized size	1	1.	0.25	1.29	0.	0.	0.	0.	1.04
time (sec)	N/A	0.544	0.255	0.009	0.	0.	0.	0.	44.392

Problem 266	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	697	697	344	1306	0	0	0	0	702
normalized size	1	1.	0.49	1.87	0.	0.	0.	0.	1.01
time (sec)	N/A	0.994	0.401	0.031	0.	0.	0.	0.	83.226

Problem 267	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	344	1003	0	0	0	0	53
normalized size	1	1.	5.21	15.2	0.	0.	0.	0.	0.8
time (sec)	N/A	0.201	0.778	0.055	0.	0.	0.	0.	28.043

Problem 268	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	165	696	0	0	0	0	51
normalized size	1	1.	2.58	10.88	0.	0.	0.	0.	0.8
time (sec)	N/A	0.101	0.258	0.008	0.	0.	0.	0.	26.171

Problem 269	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	344	1002	0	0	0	0	56
normalized size	1	1.	5.21	15.18	0.	0.	0.	0.	0.85
time (sec)	N/A	0.205	0.453	0.033	0.	0.	0.	0.	25.378

Problem 270	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	78	78	65	467	0	1	0	86	75
normalized size	1	1.	0.83	5.99	0.	0.01	0.	1.1	0.96
time (sec)	N/A	0.242	0.089	0.055	0.	0.246	0.	0.214	21.892

Problem 271	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	56	425	0	1	0	66	56
normalized size	1	1.	0.95	7.2	0.	0.02	0.	1.12	0.95
time (sec)	N/A	0.178	0.051	0.012	0.	0.245	0.	0.215	15.522

Problem 272	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	40	40	40	413	0	1	0	39	37
normalized size	1	1.	1.	10.32	0.	0.02	0.	0.98	0.92
time (sec)	N/A	0.129	0.031	0.011	0.	0.244	0.	0.214	12.656

Problem 273	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	160	433	0	1	0	72	60
normalized size	1	1.	2.46	6.66	0.	0.02	0.	1.11	0.92
time (sec)	N/A	0.2	0.096	0.029	0.	0.254	0.	0.214	17.704

Problem 274	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	324	477	0	1	0	101	80
normalized size	1	1.	3.68	5.42	0.	0.01	0.	1.15	0.91
time (sec)	N/A	0.321	0.382	0.033	0.	0.266	0.	0.216	30.322

Problem 275	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	667	667	169	848	0	0	0	0	690
normalized size	1	1.	0.25	1.27	0.	0.	0.	0.	1.03
time (sec)	N/A	0.678	0.088	0.051	0.	0.	0.	0.	53.15

Problem 276	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	206	206	167	416	0	3645	0	0	277
normalized size	1	1.	0.81	2.02	0.	17.69	0.	0.	1.34
time (sec)	N/A	0.147	0.078	0.008	0.	0.806	0.	0.	11.62

Problem 277	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	697	697	348	874	0	0	0	0	706
normalized size	1	1.	0.5	1.25	0.	0.	0.	0.	1.01
time (sec)	N/A	1.02	0.42	0.032	0.	0.	0.	0.	63.682

Problem 278	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	167	696	0	0	0	0	53
normalized size	1	1.	2.53	10.55	0.	0.	0.	0.	0.8
time (sec)	N/A	0.206	0.091	0.05	0.	0.	0.	0.	28.47

Problem 279	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	165	416	0	0	0	0	51
normalized size	1	1.	2.58	6.5	0.	0.	0.	0.	0.8
time (sec)	N/A	0.101	0.07	0.008	0.	0.	0.	0.	26.171

Problem 280	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	348	722	0	0	0	0	56
normalized size	1	1.	5.27	10.94	0.	0.	0.	0.	0.85
time (sec)	N/A	0.204	0.481	0.031	0.	0.	0.	0.	26.229

Problem 281	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	127	127	120	164	0	1451	0	0	155
normalized size	1	1.	0.94	1.29	0.	11.43	0.	0.	1.22
time (sec)	N/A	0.08	0.188	0.628	0.	0.365	0.	0.	6.118

Problem 282	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	81	582	0	1	0	135	104
normalized size	1	1.	0.73	5.24	0.	0.01	0.	1.22	0.94
time (sec)	N/A	0.292	0.118	0.089	0.	0.244	0.	0.215	31.308

Problem 283	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	70	507	0	1	0	112	83
normalized size	1	1.	0.78	5.63	0.	0.01	0.	1.24	0.92
time (sec)	N/A	0.258	0.098	0.016	0.	0.253	0.	0.218	27.794

Problem 284	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	58	446	0	1	0	93	63
normalized size	1	1.	0.84	6.46	0.	0.01	0.	1.35	0.91
time (sec)	N/A	0.194	0.072	0.015	0.	0.239	0.	0.214	19.544

Problem 285	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	47	425	0	1	0	58	41
normalized size	1	1.	0.94	8.5	0.	0.02	0.	1.16	0.82
time (sec)	N/A	0.148	0.04	0.011	0.	0.244	0.	0.213	16.296

Problem 286	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	158	468	0	1	0	65	48
normalized size	1	1.	2.72	8.07	0.	0.02	0.	1.12	0.83
time (sec)	N/A	0.179	0.314	0.016	0.	0.263	0.	0.216	18.155

Problem 287	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	321	511	0	1	0	104	70
normalized size	1	1.	3.96	6.31	0.	0.01	0.	1.28	0.86
time (sec)	N/A	0.285	0.827	0.015	0.	0.258	0.	0.218	32.331

Problem 288	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	341	574	0	1	0	126	92
normalized size	1	1.	3.19	5.36	0.	0.01	0.	1.18	0.86
time (sec)	N/A	0.403	0.366	0.037	0.	0.252	0.	0.22	50.71

Problem 289	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	648	648	361	1788	0	0	0	0	51
normalized size	1	1.	0.56	2.76	0.	0.	0.	0.	0.08
time (sec)	N/A	1.981	0.975	0.059	0.	0.	0.	0.	24.859

Problem 290	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	624	624	349	1310	0	0	0	0	51
normalized size	1	1.	0.56	2.1	0.	0.	0.	0.	0.08
time (sec)	N/A	1.72	0.305	0.013	0.	0.	0.	0.	24.99

Problem 291	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	601	601	168	848	0	0	0	0	51
normalized size	1	1.	0.28	1.41	0.	0.	0.	0.	0.08
time (sec)	N/A	1.203	0.314	0.01	0.	0.	0.	0.	20.455

Problem 292	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	632	632	345	1306	0	0	0	0	53
normalized size	1	1.	0.55	2.07	0.	0.	0.	0.	0.08
time (sec)	N/A	1.659	0.747	0.018	0.	0.	0.	0.	25.927

Problem 293	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	654	654	367	1782	0	0	0	0	56
normalized size	1	1.	0.56	2.72	0.	0.	0.	0.	0.09
time (sec)	N/A	1.974	0.464	0.036	0.	0.	0.	0.	25.87

Problem 294	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	678	678	378	2280	0	0	0	0	56
normalized size	1	1.	0.56	3.36	0.	0.	0.	0.	0.08
time (sec)	N/A	2.288	0.535	0.038	0.	0.	0.	0.	26.083

Problem 295	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	93	634	0	1	0	158	122
normalized size	1	1.	0.72	4.88	0.	0.01	0.	1.22	0.94
time (sec)	N/A	0.342	0.162	0.07	0.	0.254	0.	0.218	36.609

Problem 296	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	81	541	0	1	0	135	102
normalized size	1	1.	0.74	4.96	0.	0.01	0.	1.24	0.94
time (sec)	N/A	0.322	0.126	0.016	0.	0.242	0.	0.215	33.241

Problem 297	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	70	462	0	1	0	112	82
normalized size	1	1.	0.8	5.25	0.	0.01	0.	1.27	0.93
time (sec)	N/A	0.238	0.092	0.012	0.	0.25	0.	0.214	23.902

Problem 298	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	58	441	0	1	0	88	56
normalized size	1	1.	0.87	6.58	0.	0.01	0.	1.31	0.84
time (sec)	N/A	0.181	0.079	0.011	0.	0.245	0.	0.218	19.901

Problem 299	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	319	500	0	1	0	82	63
normalized size	1	1.	4.37	6.85	0.	0.01	0.	1.12	0.86
time (sec)	N/A	0.274	0.292	0.03	0.	0.263	0.	0.221	35.659

Problem 300	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	78	78	322	556	0	1	0	92	70
normalized size	1	1.	4.13	7.13	0.	0.01	0.	1.18	0.9
time (sec)	N/A	0.289	0.278	0.037	0.	0.254	0.	0.222	36.277

Problem 301	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	332	617	0	1	0	127	94
normalized size	1	1.	3.19	5.93	0.	0.01	0.	1.22	0.9
time (sec)	N/A	0.419	0.328	0.038	0.	0.255	0.	0.221	54.568

Problem 302	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	669	669	371	1840	0	0	0	0	49
normalized size	1	1.	0.55	2.75	0.	0.	0.	0.	0.07
time (sec)	N/A	2.295	0.365	0.068	0.	0.	0.	0.	24.696

Problem 303	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	645	645	357	1344	0	0	0	0	49
normalized size	1	1.	0.55	2.08	0.	0.	0.	0.	0.08
time (sec)	N/A	1.981	0.329	0.013	0.	0.	0.	0.	24.699

Problem 304	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	627	627	344	864	0	0	0	0	49
normalized size	1	1.	0.55	1.38	0.	0.	0.	0.	0.08
time (sec)	N/A	1.662	0.29	0.011	0.	0.	0.	0.	20.275

Problem 305	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	626	626	348	1339	0	0	0	0	51
normalized size	1	1.	0.56	2.14	0.	0.	0.	0.	0.08
time (sec)	N/A	1.677	0.276	0.035	0.	0.	0.	0.	26.03

Problem 306	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	651	651	363	1810	0	0	0	0	54
normalized size	1	1.	0.56	2.78	0.	0.	0.	0.	0.08
time (sec)	N/A	1.988	0.404	0.038	0.	0.	0.	0.	26.26

Problem 307	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	675	675	379	2306	0	0	0	0	54
normalized size	1	1.	0.56	3.42	0.	0.	0.	0.	0.08
time (sec)	N/A	2.067	0.415	0.039	0.	0.	0.	0.	26.049

Problem 308	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	69	528	0	1	0	111	83
normalized size	1	1.	0.77	5.87	0.	0.01	0.	1.23	0.92
time (sec)	N/A	0.229	0.11	0.064	0.	0.241	0.	0.219	26.23

Problem 309	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	58	468	0	1	0	88	65
normalized size	1	1.	0.82	6.59	0.	0.01	0.	1.24	0.92
time (sec)	N/A	0.205	0.084	0.016	0.	0.239	0.	0.224	22.571

Problem 310	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	49	425	0	1	0	65	46
normalized size	1	1.	0.94	8.17	0.	0.02	0.	1.25	0.88
time (sec)	N/A	0.148	0.046	0.013	0.	0.241	0.	0.221	15.723

Problem 311	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	33	33	33	413	0	1	0	36	27
normalized size	1	1.	1.	12.52	0.	0.03	0.	1.09	0.82
time (sec)	N/A	0.107	0.028	0.012	0.	0.24	0.	0.218	13.148

Problem 312	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	161	433	0	1	0	73	48
normalized size	1	1.	2.78	7.47	0.	0.02	0.	1.26	0.83
time (sec)	N/A	0.172	0.08	0.013	0.	0.252	0.	0.218	18.193

Problem 313	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	326	477	0	1	0	103	70
normalized size	1	1.	4.02	5.89	0.	0.01	0.	1.27	0.86
time (sec)	N/A	0.268	0.342	0.015	0.	0.253	0.	0.221	32.604

Problem 314	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	332	540	0	1	0	127	97
normalized size	1	1.	3.1	5.05	0.	0.01	0.	1.19	0.91
time (sec)	N/A	0.374	0.317	0.037	0.	0.252	0.	0.221	50.655

Problem 315	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	630	630	347	1311	0	0	0	0	51
normalized size	1	1.	0.55	2.08	0.	0.	0.	0.	0.08
time (sec)	N/A	1.508	0.305	0.074	0.	0.	0.	0.	25.523

Problem 316	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	601	601	170	848	0	0	0	0	51
normalized size	1	1.	0.28	1.41	0.	0.	0.	0.	0.08
time (sec)	N/A	1.206	0.087	0.012	0.	0.	0.	0.	25.655

Problem 317	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	141	141	168	416	0	3586	0	0	51
normalized size	1	1.	1.19	2.95	0.	25.43	0.	0.	0.36
time (sec)	N/A	0.755	0.08	0.009	0.	0.679	0.	0.	21.178

Problem 318	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	632	632	350	874	0	0	0	0	53
normalized size	1	1.	0.55	1.38	0.	0.	0.	0.	0.08
time (sec)	N/A	1.47	0.439	0.014	0.	0.	0.	0.	26.744

Problem 319	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	654	654	364	1351	0	0	0	0	56
normalized size	1	1.	0.56	2.07	0.	0.	0.	0.	0.09
time (sec)	N/A	1.78	0.325	0.035	0.	0.	0.	0.	26.916

Problem 320	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	678	678	378	1849	0	0	0	0	56
normalized size	1	1.	0.56	2.73	0.	0.	0.	0.	0.08
time (sec)	N/A	2.052	0.414	0.043	0.	0.	0.	0.	26.972

Problem 321	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	168	696	0	0	0	0	51
normalized size	1	1.	2.55	10.55	0.	0.	0.	0.	0.77
time (sec)	N/A	0.192	0.271	0.045	0.	0.	0.	0.	28.906

Problem 322	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	166	416	0	0	0	0	49
normalized size	1	1.	2.59	6.5	0.	0.	0.	0.	0.77
time (sec)	N/A	0.092	0.271	0.008	0.	0.	0.	0.	25.688

Problem 323	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	347	722	0	0	0	0	54
normalized size	1	1.	5.26	10.94	0.	0.	0.	0.	0.82
time (sec)	N/A	0.192	0.455	0.015	0.	0.	0.	0.	26.58

Problem 324	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	364	1047	0	0	0	0	56
normalized size	1	1.	5.52	15.86	0.	0.	0.	0.	0.85
time (sec)	N/A	0.198	0.309	0.036	0.	0.	0.	0.	26.974

Problem 325	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	70	560	0	1	0	111	83
normalized size	1	1.	0.78	6.22	0.	0.01	0.	1.23	0.92
time (sec)	N/A	0.266	0.181	0.084	0.	0.237	0.	0.22	31.083

Problem 326	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	67	501	0	1	0	78	65
normalized size	1	1.	0.94	7.06	0.	0.01	0.	1.1	0.92
time (sec)	N/A	0.212	0.107	0.016	0.	0.233	0.	0.219	26.464

Problem 327	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	49	456	0	1	0	63	46
normalized size	1	1.	0.94	8.77	0.	0.02	0.	1.21	0.88
time (sec)	N/A	0.153	0.067	0.014	0.	0.235	0.	0.218	16.517

Problem 328	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	55	52	435	0	1	0	65	44
normalized size	1	1.	0.95	7.91	0.	0.02	0.	1.18	0.8
time (sec)	N/A	0.142	0.065	0.013	0.	0.229	0.	0.218	17.007

Problem 329	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	310	485	0	1	0	92	65
normalized size	1	1.	4.08	6.38	0.	0.01	0.	1.21	0.86
time (sec)	N/A	0.254	0.271	0.036	0.	0.239	0.	0.217	31.308

Problem 330	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	326	549	0	1	0	128	92
normalized size	1	1.	3.26	5.49	0.	0.01	0.	1.28	0.92
time (sec)	N/A	0.375	0.384	0.04	0.	0.241	0.	0.218	51.318

Problem 331	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	128	128	336	636	0	1	0	146	119
normalized size	1	1.	2.62	4.97	0.	0.01	0.	1.14	0.93
time (sec)	N/A	0.488	0.362	0.044	0.	0.244	0.	0.22	70.403

Problem 332	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	629	629	337	1810	0	0	0	0	51
normalized size	1	1.	0.54	2.88	0.	0.	0.	0.	0.08
time (sec)	N/A	1.52	0.255	0.088	0.	0.	0.	0.	25.521

Problem 333	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	635	635	340	1346	0	0	0	0	51
normalized size	1	1.	0.54	2.12	0.	0.	0.	0.	0.08
time (sec)	N/A	1.518	0.261	0.013	0.	0.	0.	0.	25.248

Problem 334	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	632	632	336	875	0	0	0	0	51
normalized size	1	1.	0.53	1.38	0.	0.	0.	0.	0.08
time (sec)	N/A	1.479	0.314	0.01	0.	0.	0.	0.	20.886

Problem 335	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	653	653	356	1361	0	0	0	0	53
normalized size	1	1.	0.55	2.08	0.	0.	0.	0.	0.08
time (sec)	N/A	1.749	0.437	0.045	0.	0.	0.	0.	26.419

Problem 336	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	675	675	364	1864	0	0	0	0	56
normalized size	1	1.	0.54	2.76	0.	0.	0.	0.	0.08
time (sec)	N/A	2.043	0.377	0.042	0.	0.	0.	0.	26.574

Problem 337	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	699	699	378	2389	0	0	0	0	56
normalized size	1	1.	0.54	3.42	0.	0.	0.	0.	0.08
time (sec)	N/A	2.329	0.366	0.046	0.	0.	0.	0.	26.532

Problem 338	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	338	1038	0	0	0	0	51
normalized size	1	1.	5.12	15.73	0.	0.	0.	0.	0.77
time (sec)	N/A	0.201	0.246	0.057	0.	0.	0.	0.	29.

Problem 339	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	334	721	0	0	0	0	49
normalized size	1	1.	5.22	11.27	0.	0.	0.	0.	0.77
time (sec)	N/A	0.091	0.281	0.01	0.	0.	0.	0.	25.72

Problem 340	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	351	1053	0	0	0	0	54
normalized size	1	1.	5.32	15.95	0.	0.	0.	0.	0.82
time (sec)	N/A	0.196	0.432	0.037	0.	0.	0.	0.	26.282

Problem 341	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	364	1402	0	0	0	0	56
normalized size	1	1.	5.52	21.24	0.	0.	0.	0.	0.85
time (sec)	N/A	0.201	0.338	0.043	0.	0.	0.	0.	26.491

Problem 342	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	737	737	250	977	0	0	0	4	70
normalized size	1	1.	0.34	1.33	0.	0.	0.	0.01	0.09
time (sec)	N/A	0.684	0.49	0.334	0.	0.	0.	0.542	32.089

Problem 343	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	757	757	244	924	0	0	0	4	66
normalized size	1	1.	0.32	1.22	0.	0.	0.	0.01	0.09
time (sec)	N/A	0.721	0.562	0.345	0.	0.	0.	0.558	35.085

Problem 344	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	774	774	245	926	0	0	0	4	68
normalized size	1	1.	0.32	1.2	0.	0.	0.	0.01	0.09
time (sec)	N/A	0.734	0.569	0.118	0.	0.	0.	0.548	34.475

Problem 345	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	768	768	253	983	0	0	0	4	73
normalized size	1	1.	0.33	1.28	0.	0.	0.	0.01	0.1
time (sec)	N/A	0.729	0.523	0.138	0.	0.	0.	0.557	35.535

Problem 346	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	738	738	250	977	0	0	0	4	70
normalized size	1	1.	0.34	1.32	0.	0.	0.	0.01	0.09
time (sec)	N/A	0.643	0.652	0.233	0.	0.	0.	0.55	32.525

Problem 347	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	758	758	242	924	0	0	0	4	66
normalized size	1	1.	0.32	1.22	0.	0.	0.	0.01	0.09
time (sec)	N/A	0.657	0.598	0.214	0.	0.	0.	0.579	35.471

Problem 348	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	774	774	243	926	0	0	0	4	66
normalized size	1	1.	0.31	1.2	0.	0.	0.	0.01	0.09
time (sec)	N/A	0.678	0.64	0.11	0.	0.	0.	0.568	35.085

Problem 349	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	768	768	253	983	0	0	0	4	71
normalized size	1	1.	0.33	1.28	0.	0.	0.	0.01	0.09
time (sec)	N/A	0.645	0.635	0.103	0.	0.	0.	0.553	33.989

Problem 350	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	318	318	249	538	0	0	0	4	70
normalized size	1	1.	0.78	1.69	0.	0.	0.	0.01	0.22
time (sec)	N/A	0.244	0.548	0.099	0.	0.	0.	0.543	32.452

Problem 351	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	324	324	243	509	0	0	0	4	66
normalized size	1	1.	0.75	1.57	0.	0.	0.	0.01	0.2
time (sec)	N/A	0.215	0.552	0.101	0.	0.	0.	0.571	35.526

Problem 352	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	328	328	244	510	0	0	0	4	66
normalized size	1	1.	0.74	1.55	0.	0.	0.	0.01	0.2
time (sec)	N/A	0.205	0.539	0.094	0.	0.	0.	0.542	35.311

Problem 353	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	330	330	252	541	0	0	0	4	71
normalized size	1	1.	0.76	1.64	0.	0.	0.	0.01	0.22
time (sec)	N/A	0.212	0.55	0.123	0.	0.	0.	0.566	36.661

Problem 354	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	310	310	249	538	0	0	0	4	70
normalized size	1	1.	0.8	1.74	0.	0.	0.	0.01	0.23
time (sec)	N/A	0.198	0.712	0.1	0.	0.	0.	0.55	33.469

Problem 355	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	316	316	242	509	0	0	0	4	66
normalized size	1	1.	0.77	1.61	0.	0.	0.	0.01	0.21
time (sec)	N/A	0.188	0.67	0.097	0.	0.	0.	0.576	35.999

Problem 356	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	320	320	243	510	0	0	0	4	68
normalized size	1	1.	0.76	1.59	0.	0.	0.	0.01	0.21
time (sec)	N/A	0.189	0.685	0.097	0.	0.	0.	0.575	35.973

Problem 357	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	322	322	252	541	0	0	0	4	73
normalized size	1	1.	0.78	1.68	0.	0.	0.	0.01	0.23
time (sec)	N/A	0.192	0.688	0.096	0.	0.	0.	0.56	34.747

Problem 358	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	125	125	121	514	0	1	0	188	114
normalized size	1	1.	0.97	4.11	0.	0.01	0.	1.5	0.91
time (sec)	N/A	0.332	0.297	0.082	0.	0.223	0.	0.217	37.337

Problem 359	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	88	458	0	1	0	130	82
normalized size	1	1.	0.95	4.92	0.	0.01	0.	1.4	0.88
time (sec)	N/A	0.21	0.299	0.012	0.	0.223	0.	0.216	25.866

Problem 360	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	70	434	0	1	0	89	60
normalized size	1	1.	1.	6.2	0.	0.01	0.	1.27	0.86
time (sec)	N/A	0.155	0.06	0.01	0.	0.226	0.	0.213	21.54

Problem 361	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	160	476	0	1	0	117	73
normalized size	1	1.	1.88	5.6	0.	0.01	0.	1.38	0.86
time (sec)	N/A	0.2	0.291	0.014	0.	0.234	0.	0.218	24.577

Problem 362	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	407	518	0	1	0	163	104
normalized size	1	1.	3.54	4.5	0.	0.01	0.	1.42	0.9
time (sec)	N/A	0.351	0.991	0.016	0.	0.243	0.	0.221	47.255

Problem 363	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	426	1012	0	0	0	0	51
normalized size	1	1.	6.66	15.81	0.	0.	0.	0.	0.8
time (sec)	N/A	0.18	0.977	0.064	0.	0.	0.	0.	28.714

Problem 364	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	163	857	0	0	0	0	51
normalized size	1	1.	2.55	13.39	0.	0.	0.	0.	0.8
time (sec)	N/A	0.137	0.249	0.045	0.	0.	0.	0.	19.972

Problem 365	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	161	705	0	0	0	0	48
normalized size	1	1.	2.73	11.95	0.	0.	0.	0.	0.81
time (sec)	N/A	0.086	0.249	0.008	0.	0.	0.	0.	20.6

Problem 366	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	344	1314	0	0	0	0	51
normalized size	1	1.	5.55	21.19	0.	0.	0.	0.	0.82
time (sec)	N/A	0.185	1.015	0.016	0.	0.	0.	0.	24.592

Problem 367	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	344	1010	0	0	0	0	54
normalized size	1	1.	5.38	15.78	0.	0.	0.	0.	0.84
time (sec)	N/A	0.182	0.467	0.013	0.	0.	0.	0.	24.667

Problem 368	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	143	605	0	1	0	261	141
normalized size	1	1.	0.93	3.93	0.	0.01	0.	1.69	0.92
time (sec)	N/A	0.419	0.376	0.052	0.	0.241	0.	0.221	45.815

Problem 369	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	120	111	531	0	1	0	204	107
normalized size	1	1.	0.92	4.42	0.	0.01	0.	1.7	0.89
time (sec)	N/A	0.271	0.283	0.012	0.	0.245	0.	0.217	31.152

Problem 370	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	96	96	85	507	0	1	0	153	83
normalized size	1	1.	0.89	5.28	0.	0.01	0.	1.59	0.86
time (sec)	N/A	0.216	0.142	0.01	0.	0.249	0.	0.216	24.904

Problem 371	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	325	565	0	1	0	159	90
normalized size	1	1.	3.12	5.43	0.	0.01	0.	1.53	0.87
time (sec)	N/A	0.332	0.535	0.014	0.	0.276	0.	0.221	38.688

Problem 372	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	116	116	414	620	0	1	0	182	104
normalized size	1	1.	3.57	5.34	0.	0.01	0.	1.57	0.9
time (sec)	N/A	0.402	0.621	0.013	0.	0.285	0.	0.219	43.194

Problem 373	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	382	1101	0	0	0	0	53
normalized size	1	1.	5.88	16.94	0.	0.	0.	0.	0.82
time (sec)	N/A	0.187	1.018	0.06	0.	0.	0.	0.	28.17

Problem 374	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	437	930	0	0	0	0	53
normalized size	1	1.	6.72	14.31	0.	0.	0.	0.	0.82
time (sec)	N/A	0.14	0.698	0.05	0.	0.	0.	0.	20.362

Problem 375	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	434	776	0	0	0	0	49
normalized size	1	1.	7.23	12.93	0.	0.	0.	0.	0.82
time (sec)	N/A	0.088	0.705	0.007	0.	0.	0.	0.	21.743

Problem 376	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	450	1404	0	0	0	0	53
normalized size	1	1.	7.14	22.29	0.	0.	0.	0.	0.84
time (sec)	N/A	0.189	0.639	0.014	0.	0.	0.	0.	25.875

Problem 377	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	449	1096	0	0	0	0	56
normalized size	1	1.	6.91	16.86	0.	0.	0.	0.	0.86
time (sec)	N/A	0.186	0.647	0.032	0.	0.	0.	0.	25.227

Problem 378	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	91	488	0	1	0	143	94
normalized size	1	1.	0.88	4.69	0.	0.01	0.	1.38	0.9
time (sec)	N/A	0.298	0.226	0.049	0.	0.232	0.	0.215	30.768

Problem 379	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	74	448	0	1	0	86	63
normalized size	1	1.	1.	6.05	0.	0.01	0.	1.16	0.85
time (sec)	N/A	0.185	0.084	0.013	0.	0.224	0.	0.218	19.373

Problem 380	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	426	0	1	0	54	44
normalized size	1	1.	1.	8.35	0.	0.02	0.	1.06	0.86
time (sec)	N/A	0.133	0.037	0.009	0.	0.224	0.	0.215	15.173

Problem 381	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	162	453	0	1	0	107	75
normalized size	1	1.	1.91	5.33	0.	0.01	0.	1.26	0.88
time (sec)	N/A	0.212	0.075	0.015	0.	0.248	0.	0.216	22.602

Problem 382	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	409	498	0	1	0	159	104
normalized size	1	1.	3.5	4.26	0.	0.01	0.	1.36	0.89
time (sec)	N/A	0.362	0.585	0.014	0.	0.257	0.	0.218	44.427

Problem 383	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	165	719	0	0	0	0	51
normalized size	1	1.	2.58	11.23	0.	0.	0.	0.	0.8
time (sec)	N/A	0.195	0.088	0.046	0.	0.	0.	0.	28.901

Problem 384	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	163	429	0	0	0	0	51
normalized size	1	1.	2.55	6.7	0.	0.	0.	0.	0.8
time (sec)	N/A	0.146	0.085	0.041	0.	0.	0.	0.	20.885

Problem 385	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	161	429	0	0	0	0	48
normalized size	1	1.	2.73	7.27	0.	0.	0.	0.	0.81
time (sec)	N/A	0.089	0.079	0.007	0.	0.	0.	0.	21.353

Problem 386	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	345	890	0	0	0	0	51
normalized size	1	1.	5.56	14.35	0.	0.	0.	0.	0.82
time (sec)	N/A	0.194	0.588	0.014	0.	0.	0.	0.	25.964

Problem 387	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	344	738	0	0	0	0	54
normalized size	1	1.	5.38	11.53	0.	0.	0.	0.	0.84
time (sec)	N/A	0.187	0.527	0.013	0.	0.	0.	0.	25.925

Problem 388	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	99	527	0	1	0	139	138
normalized size	1	1.	0.93	4.93	0.	0.01	0.	1.3	1.29
time (sec)	N/A	0.346	0.492	0.055	0.	0.229	0.	0.217	50.272

Problem 389	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	80	487	0	1	0	105	70
normalized size	1	1.	0.98	5.94	0.	0.01	0.	1.28	0.85
time (sec)	N/A	0.2	0.146	0.013	0.	0.227	0.	0.217	21.932

Problem 390	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	76	463	0	1	0	99	66
normalized size	1	1.	0.99	6.01	0.	0.01	0.	1.29	0.86
time (sec)	N/A	0.178	0.118	0.011	0.	0.232	0.	0.216	20.318

Problem 391	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	396	512	0	1	0	158	97
normalized size	1	1.	3.47	4.49	0.	0.01	0.	1.39	0.85
time (sec)	N/A	0.349	0.805	0.013	0.	0.267	0.	0.218	44.678

Problem 392	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	501	575	0	1	0	248	139
normalized size	1	1.	3.17	3.64	0.	0.01	0.	1.57	0.88
time (sec)	N/A	0.641	1.232	0.014	0.	0.365	0.	0.219	72.931

Problem 393	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	332	1069	0	0	0	0	53
normalized size	1	1.	4.96	15.96	0.	0.	0.	0.	0.79
time (sec)	N/A	0.194	0.363	0.05	0.	0.	0.	0.	28.598

Problem 394	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	366	907	0	0	0	0	53
normalized size	1	1.	5.46	13.54	0.	0.	0.	0.	0.79
time (sec)	N/A	0.147	0.993	0.052	0.	0.	0.	0.	20.466

Problem 395	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	362	753	0	0	0	0	49
normalized size	1	1.	5.84	12.15	0.	0.	0.	0.	0.79
time (sec)	N/A	0.089	0.978	0.008	0.	0.	0.	0.	20.983

Problem 396	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	408	1392	0	0	0	0	53
normalized size	1	1.	6.28	21.42	0.	0.	0.	0.	0.82
time (sec)	N/A	0.198	1.344	0.013	0.	0.	0.	0.	25.405

Problem 397	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	418	1084	0	0	0	0	56
normalized size	1	1.	6.24	16.18	0.	0.	0.	0.	0.84
time (sec)	N/A	0.194	1.373	0.014	0.	0.	0.	0.	25.235

Problem 398	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	100	952	0	1	0	149	107
normalized size	1	1.	0.85	8.14	0.	0.01	0.	1.27	0.91
time (sec)	N/A	0.348	0.149	0.058	0.	0.221	0.	0.216	43.614

Problem 399	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	79	892	0	1	0	126	92
normalized size	1	1.	0.77	8.75	0.	0.01	0.	1.24	0.9
time (sec)	N/A	0.256	0.154	0.019	0.	0.222	0.	0.216	30.562

Problem 400	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	66	874	0	1	0	100	71
normalized size	1	1.	0.8	10.66	0.	0.01	0.	1.22	0.87
time (sec)	N/A	0.187	0.141	0.016	0.	0.222	0.	0.217	21.317

Problem 401	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	63	439	0	1	0	72	48
normalized size	1	1.	0.98	6.86	0.	0.02	0.	1.12	0.75
time (sec)	N/A	0.144	0.103	0.012	0.	0.221	0.	0.215	17.867

Problem 402	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	316	912	0	1	0	107	71
normalized size	1	1.	3.59	10.36	0.	0.01	0.	1.22	0.81
time (sec)	N/A	0.258	0.325	0.021	0.	0.231	0.	0.223	31.374

Problem 403	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	124	124	338	957	0	1	0	150	97
normalized size	1	1.	2.73	7.72	0.	0.01	0.	1.21	0.78
time (sec)	N/A	0.38	0.432	0.019	0.	0.231	0.	0.23	46.112

Problem 404	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	164	164	349	1020	0	1	0	140	122
normalized size	1	1.	2.13	6.22	0.	0.01	0.	0.85	0.74
time (sec)	N/A	0.503	0.461	0.02	0.	0.233	0.	0.225	70.089

Problem 405	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	663	663	344	2198	0	0	0	0	53
normalized size	1	1.	0.52	3.32	0.	0.	0.	0.	0.08
time (sec)	N/A	1.803	0.333	0.055	0.	0.	0.	0.	24.132

Problem 406	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	641	641	357	1740	0	0	0	0	53
normalized size	1	1.	0.56	2.71	0.	0.	0.	0.	0.08
time (sec)	N/A	1.488	0.369	0.015	0.	0.	0.	0.	24.105

Problem 407	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	644	644	353	882	0	0	0	0	53
normalized size	1	1.	0.55	1.37	0.	0.	0.	0.	0.08
time (sec)	N/A	1.474	0.375	0.009	0.	0.	0.	0.	20.392

Problem 408	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	665	665	372	2193	0	0	0	0	54
normalized size	1	1.	0.56	3.3	0.	0.	0.	0.	0.08
time (sec)	N/A	1.769	0.472	0.019	0.	0.	0.	0.	25.864

Problem 409	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	687	687	362	2671	0	0	0	0	58
normalized size	1	1.	0.53	3.89	0.	0.	0.	0.	0.08
time (sec)	N/A	2.07	0.388	0.019	0.	0.	0.	0.	24.407

Problem 410	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	711	711	377	3169	0	0	0	0	58
normalized size	1	1.	0.53	4.46	0.	0.	0.	0.	0.08
time (sec)	N/A	2.32	0.567	0.021	0.	0.	0.	0.	28.741

Problem 411	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	101	998	0	1	0	171	124
normalized size	1	1.	0.75	7.45	0.	0.01	0.	1.28	0.93
time (sec)	N/A	0.375	0.278	0.059	0.	0.227	0.	0.219	51.764

Problem 412	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	119	119	91	920	0	1	0	150	109
normalized size	1	1.	0.76	7.73	0.	0.01	0.	1.26	0.92
time (sec)	N/A	0.29	0.255	0.019	0.	0.229	0.	0.219	37.121

Problem 413	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	79	902	0	1	0	126	87
normalized size	1	1.	0.81	9.3	0.	0.01	0.	1.3	0.9
time (sec)	N/A	0.218	0.195	0.016	0.	0.228	0.	0.217	24.862

Problem 414	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	65	451	0	1	0	93	60
normalized size	1	1.	0.84	5.86	0.	0.01	0.	1.21	0.78
time (sec)	N/A	0.167	0.141	0.01	0.	0.226	0.	0.216	21.46

Problem 415	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	317	956	0	1	0	95	71
normalized size	1	1.	3.73	11.25	0.	0.01	0.	1.12	0.84
time (sec)	N/A	0.257	0.383	0.018	0.	0.234	0.	0.217	38.996

Problem 416	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	333	1014	0	1	0	153	99
normalized size	1	1.	2.75	8.38	0.	0.01	0.	1.26	0.82
time (sec)	N/A	0.379	0.374	0.02	0.	0.24	0.	0.22	56.071

Problem 417	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	349	1075	0	1	0	161	124
normalized size	1	1.	2.17	6.68	0.	0.01	0.	1.	0.77
time (sec)	N/A	0.498	0.499	0.02	0.	0.238	0.	0.22	76.52

Problem 418	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	681	681	357	2223	0	0	0	0	51
normalized size	1	1.	0.52	3.26	0.	0.	0.	0.	0.07
time (sec)	N/A	2.021	0.363	0.055	0.	0.	0.	0.	24.123

Problem 419	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	657	657	368	1747	0	0	0	0	51
normalized size	1	1.	0.56	2.66	0.	0.	0.	0.	0.08
time (sec)	N/A	1.715	0.396	0.016	0.	0.	0.	0.	27.042

Problem 420	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	638	638	330	873	0	0	0	0	51
normalized size	1	1.	0.52	1.37	0.	0.	0.	0.	0.08
time (sec)	N/A	1.511	0.343	0.01	0.	0.	0.	0.	21.328

Problem 421	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	522	522	242	2217	0	0	0	0	53
normalized size	1	1.	0.46	4.25	0.	0.	0.	0.	0.1
time (sec)	N/A	0.576	1.03	0.019	0.	0.	0.	0.	25.26

Problem 422	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	684	684	361	2690	0	0	0	0	56
normalized size	1	1.	0.53	3.93	0.	0.	0.	0.	0.08
time (sec)	N/A	2.074	0.378	0.021	0.	0.	0.	0.	24.195

Problem 423	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	708	708	373	3186	0	0	0	0	56
normalized size	1	1.	0.53	4.5	0.	0.	0.	0.	0.08
time (sec)	N/A	2.383	0.333	0.018	0.	0.	0.	0.	25.729

Problem 424	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	81	916	0	1	0	126	87
normalized size	1	1.	0.85	9.64	0.	0.01	0.	1.33	0.92
time (sec)	N/A	0.257	0.197	0.057	0.	0.23	0.	0.217	31.526

Problem 425	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	66	874	0	1	0	93	73
normalized size	1	1.	0.8	10.53	0.	0.01	0.	1.12	0.88
time (sec)	N/A	0.229	0.153	0.017	0.	0.228	0.	0.215	26.121

Problem 426	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	63	861	0	1	0	78	54
normalized size	1	1.	0.98	13.45	0.	0.02	0.	1.22	0.84
time (sec)	N/A	0.165	0.106	0.019	0.	0.23	0.	0.214	16.928

Problem 427	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	66	442	0	1	0	80	49
normalized size	1	1.	0.99	6.6	0.	0.01	0.	1.19	0.73
time (sec)	N/A	0.156	0.074	0.01	0.	0.229	0.	0.215	18.495

Problem 428	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	329	880	0	1	0	107	73
normalized size	1	1.	3.74	10.	0.	0.01	0.	1.22	0.83
time (sec)	N/A	0.27	0.311	0.02	0.	0.239	0.	0.213	35.747

Problem 429	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	124	124	347	926	0	1	0	153	107
normalized size	1	1.	2.8	7.47	0.	0.01	0.	1.23	0.86
time (sec)	N/A	0.385	0.408	0.019	0.	0.241	0.	0.216	54.588

Problem 430	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	164	164	349	989	0	1	0	158	138
normalized size	1	1.	2.13	6.03	0.	0.01	0.	0.96	0.84
time (sec)	N/A	0.509	0.417	0.019	0.	0.243	0.	0.22	75.074

Problem 431	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	641	641	333	1737	0	0	0	0	51
normalized size	1	1.	0.52	2.71	0.	0.	0.	0.	0.08
time (sec)	N/A	1.529	0.367	0.055	0.	0.	0.	0.	25.276

Problem 432	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	647	647	360	1304	0	0	0	0	51
normalized size	1	1.	0.56	2.02	0.	0.	0.	0.	0.08
time (sec)	N/A	1.527	0.445	0.019	0.	0.	0.	0.	25.454

Problem 433	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	644	644	332	882	0	0	0	0	51
normalized size	1	1.	0.52	1.37	0.	0.	0.	0.	0.08
time (sec)	N/A	1.481	0.433	0.01	0.	0.	0.	0.	21.32

Problem 434	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	665	665	375	1761	0	0	0	0	53
normalized size	1	1.	0.56	2.65	0.	0.	0.	0.	0.08
time (sec)	N/A	1.814	0.43	0.019	0.	0.	0.	0.	26.569

Problem 435	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	687	687	384	2240	0	0	0	0	56
normalized size	1	1.	0.56	3.26	0.	0.	0.	0.	0.08
time (sec)	N/A	2.065	0.355	0.02	0.	0.	0.	0.	25.578

Problem 436	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	711	711	377	2738	0	0	0	0	56
normalized size	1	1.	0.53	3.85	0.	0.	0.	0.	0.08
time (sec)	N/A	2.331	0.527	0.019	0.	0.	0.	0.	27.283

Problem 437	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	331	1431	0	0	0	0	51
normalized size	1	1.	5.02	21.68	0.	0.	0.	0.	0.77
time (sec)	N/A	0.2	0.822	0.052	0.	0.	0.	0.	25.556

Problem 438	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	355	1150	0	0	0	0	51
normalized size	1	1.	5.38	17.42	0.	0.	0.	0.	0.77
time (sec)	N/A	0.193	0.414	0.016	0.	0.	0.	0.	30.167

Problem 439	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	327	728	0	0	0	0	49
normalized size	1	1.	5.11	11.38	0.	0.	0.	0.	0.77
time (sec)	N/A	0.089	0.311	0.008	0.	0.	0.	0.	25.835

Problem 440	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	372	1455	0	0	0	0	54
normalized size	1	1.	5.64	22.05	0.	0.	0.	0.	0.82
time (sec)	N/A	0.181	0.37	0.018	0.	0.	0.	0.	25.505

Problem 441	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	384	1782	0	0	0	0	56
normalized size	1	1.	5.82	27.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.19	0.353	0.018	0.	0.	0.	0.	26.515

Problem 442	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	81	970	0	1	0	119	83
normalized size	1	1.	0.85	10.21	0.	0.01	0.	1.25	0.87
time (sec)	N/A	0.271	0.302	0.067	0.	0.223	0.	0.227	33.256

Problem 443	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	71	926	0	1	0	90	73
normalized size	1	1.	0.86	11.16	0.	0.01	0.	1.08	0.88
time (sec)	N/A	0.235	0.201	0.022	0.	0.224	0.	0.225	26.567

Problem 444	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	73	908	0	1	0	103	73
normalized size	1	1.	0.86	10.68	0.	0.01	0.	1.21	0.86
time (sec)	N/A	0.199	0.21	0.017	0.	0.224	0.	0.227	22.17

Problem 445	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	72	463	0	1	0	97	76
normalized size	1	1.	0.82	5.26	0.	0.01	0.	1.1	0.86
time (sec)	N/A	0.188	0.195	0.01	0.	0.221	0.	0.22	23.736

Problem 446	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	338	953	0	1	0	126	92
normalized size	1	1.	3.19	8.99	0.	0.01	0.	1.19	0.87
time (sec)	N/A	0.381	0.375	0.018	0.	0.23	0.	0.224	55.69

Problem 447	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	143	143	350	1019	0	1	0	171	129
normalized size	1	1.	2.45	7.13	0.	0.01	0.	1.2	0.9
time (sec)	N/A	0.502	0.386	0.02	0.	0.232	0.	0.222	75.103

Problem 448	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	349	1106	0	1	0	180	160
normalized size	1	1.	1.89	5.98	0.	0.01	0.	0.97	0.86
time (sec)	N/A	0.65	0.463	0.018	0.	0.233	0.	0.222	97.092

Problem 449	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	668	668	357	2255	0	0	0	0	51
normalized size	1	1.	0.53	3.38	0.	0.	0.	0.	0.08
time (sec)	N/A	1.739	0.478	0.064	0.	0.	0.	0.	26.913

Problem 450	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	671	671	337	1788	0	0	0	0	51
normalized size	1	1.	0.5	2.66	0.	0.	0.	0.	0.08
time (sec)	N/A	1.702	0.43	0.016	0.	0.	0.	0.	26.925

Problem 451	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	665	665	366	903	0	0	0	0	51
normalized size	1	1.	0.55	1.36	0.	0.	0.	0.	0.08
time (sec)	N/A	1.718	0.422	0.01	0.	0.	0.	0.	22.254

Problem 452	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	686	686	374	2269	0	0	0	0	53
normalized size	1	1.	0.55	3.31	0.	0.	0.	0.	0.08
time (sec)	N/A	2.075	0.522	0.02	0.	0.	0.	0.	28.119

Problem 453	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	708	708	389	2774	0	0	0	0	56
normalized size	1	1.	0.55	3.92	0.	0.	0.	0.	0.08
time (sec)	N/A	2.567	0.421	0.019	0.	0.	0.	0.	27.117

Problem 454	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	732	732	374	3299	0	0	0	0	56
normalized size	1	1.	0.51	4.51	0.	0.	0.	0.	0.08
time (sec)	N/A	2.881	0.426	0.02	0.	0.	0.	0.	28.297

Problem 455	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	189	1791	0	0	0	0	51
normalized size	1	1.	2.86	27.14	0.	0.	0.	0.	0.77
time (sec)	N/A	0.223	0.916	0.063	0.	0.	0.	0.	27.04

Problem 456	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	333	1478	0	0	0	0	51
normalized size	1	1.	5.05	22.39	0.	0.	0.	0.	0.77
time (sec)	N/A	0.215	0.365	0.016	0.	0.	0.	0.	31.34

Problem 457	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	331	747	0	0	0	0	49
normalized size	1	1.	5.17	11.67	0.	0.	0.	0.	0.77
time (sec)	N/A	0.1	0.289	0.008	0.	0.	0.	0.	26.641

Problem 458	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	375	1805	0	0	0	0	54
normalized size	1	1.	5.68	27.35	0.	0.	0.	0.	0.82
time (sec)	N/A	0.207	0.443	0.02	0.	0.	0.	0.	27.079

Problem 459	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	388	2156	0	0	0	0	56
normalized size	1	1.	5.88	32.67	0.	0.	0.	0.	0.85
time (sec)	N/A	0.219	0.399	0.019	0.	0.	0.	0.	27.915

Problem 460	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	111	917	0	1	0	184	139
normalized size	1	1.	0.69	5.7	0.	0.01	0.	1.14	0.86
time (sec)	N/A	0.533	0.293	0.057	0.	0.226	0.	0.219	46.663

Problem 461	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	91	897	0	1	0	150	117
normalized size	1	1.	0.67	6.6	0.	0.01	0.	1.1	0.86
time (sec)	N/A	0.307	0.157	0.016	0.	0.224	0.	0.22	34.437

Problem 462	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	80	453	0	1	0	107	65
normalized size	1	1.	1.	5.66	0.	0.01	0.	1.34	0.81
time (sec)	N/A	0.191	0.091	0.01	0.	0.224	0.	0.217	21.126

Problem 463	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	306	934	0	1	0	170	105
normalized size	1	1.	2.53	7.72	0.	0.01	0.	1.4	0.87
time (sec)	N/A	0.364	0.368	0.018	0.	0.25	0.	0.22	39.262

Problem 464	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	410	978	0	1	0	258	136
normalized size	1	1.	2.55	6.07	0.	0.01	0.	1.6	0.84
time (sec)	N/A	0.657	0.62	0.019	0.	0.256	0.	0.228	60.826

Problem 465	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	324	1468	0	0	0	0	53
normalized size	1	1.	5.06	22.94	0.	0.	0.	0.	0.83
time (sec)	N/A	0.201	0.347	0.057	0.	0.	0.	0.	29.95

Problem 466	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	324	908	0	0	0	0	53
normalized size	1	1.	5.06	14.19	0.	0.	0.	0.	0.83
time (sec)	N/A	0.156	0.339	0.055	0.	0.	0.	0.	18.595

Problem 467	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	322	753	0	0	0	0	49
normalized size	1	1.	5.46	12.76	0.	0.	0.	0.	0.83
time (sec)	N/A	0.096	0.342	0.008	0.	0.	0.	0.	19.271

Problem 468	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	347	2227	0	0	0	0	53
normalized size	1	1.	5.6	35.92	0.	0.	0.	0.	0.85
time (sec)	N/A	0.194	0.85	0.018	0.	0.	0.	0.	23.009

Problem 469	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	347	1768	0	0	0	0	56
normalized size	1	1.	5.42	27.62	0.	0.	0.	0.	0.88
time (sec)	N/A	0.189	0.721	0.018	0.	0.	0.	0.	22.417

Problem 470	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	189	189	162	1003	0	1	0	285	167
normalized size	1	1.	0.86	5.31	0.	0.01	0.	1.51	0.88
time (sec)	N/A	0.664	0.316	0.06	0.	0.225	0.	0.223	51.49

Problem 471	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	163	115	983	0	1	0	234	144
normalized size	1	1.	0.71	6.03	0.	0.01	0.	1.44	0.88
time (sec)	N/A	0.388	0.299	0.016	0.	0.224	0.	0.22	38.752

Problem 472	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	94	466	0	1	0	161	78
normalized size	1	1.	1.	4.96	0.	0.01	0.	1.71	0.83
time (sec)	N/A	0.234	0.175	0.01	0.	0.224	0.	0.219	23.676

Problem 473	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	131	131	328	1036	0	1	0	223	112
normalized size	1	1.	2.5	7.91	0.	0.01	0.	1.7	0.85
time (sec)	N/A	0.434	0.568	0.017	0.	0.249	0.	0.22	41.284

Problem 474	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	170	170	439	1093	0	1	0	300	153
normalized size	1	1.	2.58	6.43	0.	0.01	0.	1.76	0.9
time (sec)	N/A	0.748	0.808	0.02	0.	0.255	0.	0.226	79.159

Problem 475	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	358	1587	0	0	0	0	54
normalized size	1	1.	5.51	24.42	0.	0.	0.	0.	0.83
time (sec)	N/A	0.208	0.889	0.063	0.	0.	0.	0.	27.109

Problem 476	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	439	955	0	0	0	0	54
normalized size	1	1.	6.75	14.69	0.	0.	0.	0.	0.83
time (sec)	N/A	0.161	0.675	0.056	0.	0.	0.	0.	18.799

Problem 477	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	437	801	0	0	0	0	51
normalized size	1	1.	7.28	13.35	0.	0.	0.	0.	0.85
time (sec)	N/A	0.097	0.63	0.008	0.	0.	0.	0.	19.328

Problem 478	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	365	2364	0	0	0	0	54
normalized size	1	1.	5.79	37.52	0.	0.	0.	0.	0.86
time (sec)	N/A	0.201	1.09	0.019	0.	0.	0.	0.	25.154

Problem 479	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	366	1902	0	0	0	0	58
normalized size	1	1.	5.63	29.26	0.	0.	0.	0.	0.89
time (sec)	N/A	0.222	0.898	0.017	0.	0.	0.	0.	22.779

Problem 480	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	107	911	0	1	0	181	105
normalized size	1	1.	0.87	7.41	0.	0.01	0.	1.47	0.85
time (sec)	N/A	0.447	0.4	0.061	0.	0.229	0.	0.22	35.183

Problem 481	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	99	99	99	892	0	1	0	157	82
normalized size	1	1.	1.	9.01	0.	0.01	0.	1.59	0.83
time (sec)	N/A	0.259	0.125	0.016	0.	0.225	0.	0.219	23.906

Problem 482	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	84	457	0	1	0	124	70
normalized size	1	1.	0.97	5.25	0.	0.01	0.	1.43	0.8
time (sec)	N/A	0.21	0.143	0.01	0.	0.225	0.	0.218	20.4

Problem 483	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	132	132	396	915	0	1	0	207	117
normalized size	1	1.	3.	6.93	0.	0.01	0.	1.57	0.89
time (sec)	N/A	0.441	0.44	0.018	0.	0.269	0.	0.219	48.07

Problem 484	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	489	961	0	1	0	362	158
normalized size	1	1.	2.64	5.19	0.	0.01	0.	1.96	0.85
time (sec)	N/A	0.734	1.237	0.018	0.	0.341	0.	0.222	75.466

Problem 485	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	331	1207	0	0	0	0	53
normalized size	1	1.	5.17	18.86	0.	0.	0.	0.	0.83
time (sec)	N/A	0.212	0.327	0.057	0.	0.	0.	0.	26.778

Problem 486	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	342	923	0	0	0	0	53
normalized size	1	1.	5.34	14.42	0.	0.	0.	0.	0.83
time (sec)	N/A	0.163	0.519	0.054	0.	0.	0.	0.	20.518

Problem 487	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	341	769	0	0	0	0	49
normalized size	1	1.	5.78	13.03	0.	0.	0.	0.	0.83
time (sec)	N/A	0.096	0.531	0.007	0.	0.	0.	0.	19.899

Problem 488	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	399	1818	0	0	0	0	53
normalized size	1	1.	6.44	29.32	0.	0.	0.	0.	0.85
time (sec)	N/A	0.205	1.307	0.019	0.	0.	0.	0.	23.534

Problem 489	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	399	1512	0	0	0	0	56
normalized size	1	1.	6.23	23.62	0.	0.	0.	0.	0.88
time (sec)	N/A	0.197	1.221	0.018	0.	0.	0.	0.	22.994

Problem 490	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	118	978	0	1	0	263	134
normalized size	1	1.	0.79	6.56	0.	0.01	0.	1.77	0.9
time (sec)	N/A	0.559	0.591	0.072	0.	0.232	0.	0.229	44.648

Problem 491	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	111	958	0	1	0	244	112
normalized size	1	1.	0.83	7.15	0.	0.01	0.	1.82	0.84
time (sec)	N/A	0.333	0.293	0.016	0.	0.233	0.	0.224	32.973

Problem 492	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	108	108	99	485	0	1	0	203	90
normalized size	1	1.	0.92	4.49	0.	0.01	0.	1.88	0.83
time (sec)	N/A	0.256	0.236	0.01	0.	0.231	0.	0.219	27.071

Problem 493	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	172	172	453	1002	0	1	0	319	148
normalized size	1	1.	2.63	5.83	0.	0.01	0.	1.85	0.86
time (sec)	N/A	0.733	1.11	0.017	0.	0.419	0.	0.223	76.238

Problem 494	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	241	241	582	1067	0	1	0	510	216
normalized size	1	1.	2.41	4.43	0.	0.	0.	2.12	0.9
time (sec)	N/A	1.165	2.044	0.018	0.	0.793	0.	0.234	117.071

Problem 495	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	346	1593	0	0	0	0	54
normalized size	1	1.	5.16	23.78	0.	0.	0.	0.	0.81
time (sec)	N/A	0.218	0.763	0.069	0.	0.	0.	0.	27.157

Problem 496	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	482	986	0	0	0	0	54
normalized size	1	1.	7.19	14.72	0.	0.	0.	0.	0.81
time (sec)	N/A	0.165	1.039	0.063	0.	0.	0.	0.	19.202

Problem 497	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	480	830	0	0	0	0	51
normalized size	1	1.	7.74	13.39	0.	0.	0.	0.	0.82
time (sec)	N/A	0.099	0.994	0.01	0.	0.	0.	0.	19.542

Problem 498	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	483	2383	0	0	0	0	54
normalized size	1	1.	7.43	36.66	0.	0.	0.	0.	0.83
time (sec)	N/A	0.213	2.098	0.018	0.	0.	0.	0.	23.836

Problem 499	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	C	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	483	1919	0	0	0	0	58
normalized size	1	1.	7.21	28.64	0.	0.	0.	0.	0.87
time (sec)	N/A	0.206	2.135	0.017	0.	0.	0.	0.	23.422

Problem 500	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	200	0	0	0	0	0	112
normalized size	1	1.	1.49	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.269	0.507	0.034	0.	0.	0.	0.	18.874

Problem 501	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	132	132	149	0	0	0	252	0	110
normalized size	1	1.	1.13	0.	0.	0.	1.91	0.	0.83
time (sec)	N/A	0.246	0.223	0.033	0.	0.	90.502	0.	17.844

Problem 502	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	131	131	110	0	0	0	122	0	109
normalized size	1	1.	0.84	0.	0.	0.	0.93	0.	0.83
time (sec)	N/A	0.244	0.107	0.033	0.	0.	11.394	0.	17.589

Problem 503	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	131	131	110	0	0	0	119	0	109
normalized size	1	1.	0.84	0.	0.	0.	0.91	0.	0.83
time (sec)	N/A	0.244	0.142	0.036	0.	0.	7.473	0.	18.887

Problem 504	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	110	0	0	0	0	0	112
normalized size	1	1.	0.83	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.239	0.143	0.034	0.	0.	0.	0.	18.819

Problem 505	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	110	0	0	0	0	0	112
normalized size	1	1.	0.83	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.243	0.148	0.034	0.	0.	0.	0.	18.884

Problem 506	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	103	0	0	1	0	140	75
normalized size	1	1.	1.17	0.	0.	0.01	0.	1.59	0.85
time (sec)	N/A	0.264	0.122	0.082	0.	0.258	0.	0.236	18.322

Problem 507	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	63	0	0	1	0	73	44
normalized size	1	1.	1.31	0.	0.	0.02	0.	1.52	0.92
time (sec)	N/A	0.157	0.043	0.075	0.	0.236	0.	0.23	13.505

Problem 508	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F(-2)	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	155	0	0	1	0	120	46
normalized size	1	1.	3.23	0.	0.	0.02	0.	2.5	0.96
time (sec)	N/A	0.178	0.405	0.082	0.	0.253	0.	0.217	13.764

Problem 509	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F(-2)	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	192	0	0	1	0	558	78
normalized size	1	1.	2.11	0.	0.	0.01	0.	6.13	0.86
time (sec)	N/A	0.28	0.338	0.072	0.	0.292	0.	0.242	19.122

Problem 510	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	174	0	0	0	0	0	75
normalized size	1	1.	1.98	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.399	0.456	0.078	0.	0.	0.	0.	27.788

Problem 511	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	172	0	0	0	0	0	75
normalized size	1	1.	1.95	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.401	0.474	0.077	0.	0.	0.	0.	34.233

Problem 512	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	172	0	0	0	0	0	75
normalized size	1	1.	1.95	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.298	0.453	0.077	0.	0.	0.	0.	22.612

Problem 513	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	170	0	0	0	0	0	71
normalized size	1	1.	2.05	0.	0.	0.	0.	0.	0.86
time (sec)	N/A	0.166	0.427	0.076	0.	0.	0.	0.	26.251

Problem 514	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	357	0	0	0	0	0	75
normalized size	1	1.	4.15	0.	0.	0.	0.	0.	0.87
time (sec)	N/A	0.379	0.566	0.085	0.	0.	0.	0.	28.014

Problem 515	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	357	0	0	0	0	0	78
normalized size	1	1.	4.06	0.	0.	0.	0.	0.	0.89
time (sec)	N/A	0.379	0.503	0.085	0.	0.	0.	0.	27.833

Problem 516	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	124	7293	0	1	0	0	141
normalized size	1	1.	0.77	45.3	0.	0.01	0.	0.	0.88
time (sec)	N/A	0.342	0.264	0.312	0.	0.692	0.	0.	28.998

Problem 517	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	324	324	234	4175	0	0	0	0	292
normalized size	1	1.	0.72	12.89	0.	0.	0.	0.	0.9
time (sec)	N/A	0.739	1.114	0.082	0.	0.	0.	0.	36.392

Problem 518	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	581	581	279	5358	0	0	97	0	529
normalized size	1	1.	0.48	9.22	0.	0.	0.17	0.	0.91
time (sec)	N/A	1.382	5.367	0.082	0.	0.	129.444	0.	70.098

Problem 519	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	A	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	97	6858	0	1	201	0	104
normalized size	1	1.	0.8	56.68	0.	0.01	1.66	0.	0.86
time (sec)	N/A	0.259	0.238	0.063	0.	0.684	14.061	0.	22.988

Problem 520	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	286	286	209	3721	0	0	97	0	246
normalized size	1	1.	0.73	13.01	0.	0.	0.34	0.	0.86
time (sec)	N/A	0.568	0.714	0.06	0.	0.	7.463	0.	28.651

Problem 521	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	580	580	283	5736	0	0	100	0	527
normalized size	1	1.	0.49	9.89	0.	0.	0.17	0.	0.91
time (sec)	N/A	1.341	4.67	0.077	0.	0.	8.9	0.	73.228

Problem 522	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	118	118	92	6668	0	1	160	0	109
normalized size	1	1.	0.78	56.51	0.	0.01	1.36	0.	0.92
time (sec)	N/A	0.247	0.246	0.07	0.	0.678	31.685	0.	24.064

Problem 523	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	283	283	199	3512	0	0	0	0	253
normalized size	1	1.	0.7	12.41	0.	0.	0.	0.	0.89
time (sec)	N/A	0.562	0.715	0.067	0.	0.	0.	0.	29.337

Problem 524	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	564	564	285	5911	0	0	0	0	513
normalized size	1	1.	0.51	10.48	0.	0.	0.	0.	0.91
time (sec)	N/A	1.164	2.572	0.12	0.	0.	0.	0.	52.321

Problem 525	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	74	3759	0	1	0	147	73
normalized size	1	1.	0.94	47.58	0.	0.01	0.	1.86	0.92
time (sec)	N/A	0.142	0.171	0.091	0.	0.373	0.	0.231	13.407

Problem 526	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	269	269	206	3690	0	0	0	0	243
normalized size	1	1.	0.77	13.72	0.	0.	0.	0.	0.9
time (sec)	N/A	0.469	1.011	0.089	0.	0.	0.	0.	21.6

Problem 527	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	147	7705	0	1	0	0	182
normalized size	1	1.	0.73	38.33	0.	0.	0.	0.	0.91
time (sec)	N/A	0.395	0.292	0.069	0.	0.699	0.	0.	34.81

Problem 528	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	364	364	256	4619	0	0	0	0	332
normalized size	1	1.	0.7	12.69	0.	0.	0.	0.	0.91
time (sec)	N/A	0.779	0.887	0.067	0.	0.	0.	0.	44.417

Problem 529	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	621	621	303	5790	0	0	0	0	559
normalized size	1	1.	0.49	9.32	0.	0.	0.	0.	0.9
time (sec)	N/A	1.526	6.49	0.072	0.	0.	0.	0.	81.35

Problem 530	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	A	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	123	7290	0	1	335	0	138
normalized size	1	1.	0.76	45.28	0.	0.01	2.08	0.	0.86
time (sec)	N/A	0.324	0.273	0.045	0.	0.651	71.441	0.	27.75

Problem 531	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	324	324	234	4173	0	0	199	0	282
normalized size	1	1.	0.72	12.88	0.	0.	0.61	0.	0.87
time (sec)	N/A	0.67	0.792	0.042	0.	0.	50.942	0.	34.824

Problem 532	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	614	614	301	6142	0	0	202	0	563
normalized size	1	1.	0.49	10.	0.	0.	0.33	0.	0.92
time (sec)	N/A	1.515	4.418	0.053	0.	0.	63.068	0.	82.621

Problem 533	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	111	7108	0	1	289	0	138
normalized size	1	1.	0.73	46.76	0.	0.01	1.9	0.	0.91
time (sec)	N/A	0.306	0.24	0.048	0.	0.658	130.744	0.	28.439

Problem 534	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	314	314	215	3966	0	0	0	0	286
normalized size	1	1.	0.68	12.63	0.	0.	0.	0.	0.91
time (sec)	N/A	0.623	0.686	0.046	0.	0.	0.	0.	35.786

Problem 535	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	241	241	168	8117	0	1	0	0	218
normalized size	1	1.	0.7	33.68	0.	0.	0.	0.	0.9
time (sec)	N/A	0.471	0.299	0.072	0.	0.689	0.	0.	41.436

Problem 536	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	404	404	276	5063	0	0	0	0	360
normalized size	1	1.	0.68	12.53	0.	0.	0.	0.	0.89
time (sec)	N/A	0.882	0.922	0.067	0.	0.	0.	0.	52.604

Problem 537	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	661	661	337	6202	0	0	0	0	605
normalized size	1	1.	0.51	9.38	0.	0.	0.	0.	0.92
time (sec)	N/A	1.679	2.331	0.076	0.	0.	0.	0.	91.713

Problem 538	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	144	7702	0	1	0	0	177
normalized size	1	1.	0.72	38.32	0.	0.	0.	0.	0.88
time (sec)	N/A	0.386	0.273	0.047	0.	0.673	0.	0.	33.562

Problem 539	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	364	364	255	4617	0	0	0	0	318
normalized size	1	1.	0.7	12.68	0.	0.	0.	0.	0.87
time (sec)	N/A	0.754	0.872	0.045	0.	0.	0.	0.	42.01

Problem 540	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	650	650	329	6530	0	0	0	0	598
normalized size	1	1.	0.51	10.05	0.	0.	0.	0.	0.92
time (sec)	N/A	1.677	4.409	0.058	0.	0.	0.	0.	94.663

Problem 541	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	188	188	137	7544	0	1	0	0	177
normalized size	1	1.	0.73	40.13	0.	0.01	0.	0.	0.94
time (sec)	N/A	0.367	0.278	0.052	0.	0.673	0.	0.	33.96

Problem 542	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	352	352	242	4422	0	0	0	0	325
normalized size	1	1.	0.69	12.56	0.	0.	0.	0.	0.92
time (sec)	N/A	0.746	0.795	0.053	0.	0.	0.	0.	42.104

Problem 543	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	100	6861	0	1	0	0	110
normalized size	1	1.	0.83	56.7	0.	0.01	0.	0.	0.91
time (sec)	N/A	0.271	0.219	0.067	0.	0.65	0.	0.	23.552

Problem 544	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	286	286	210	3723	0	0	0	0	257
normalized size	1	1.	0.73	13.02	0.	0.	0.	0.	0.9
time (sec)	N/A	0.564	0.715	0.07	0.	0.	0.	0.	29.632

Problem 545	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	543	543	263	4914	0	0	94	0	491
normalized size	1	1.	0.48	9.05	0.	0.	0.17	0.	0.9
time (sec)	N/A	1.201	3.81	0.066	0.	0.	68.064	0.	60.507

Problem 546	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	A	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	82	6424	0	1	107	0	73
normalized size	1	1.	0.99	77.4	0.	0.01	1.29	0.	0.88
time (sec)	N/A	0.202	0.17	0.04	0.	0.634	8.519	0.	19.075

Problem 547	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	249	249	184	3275	0	0	94	0	216
normalized size	1	1.	0.74	13.15	0.	0.	0.38	0.	0.87
time (sec)	N/A	0.473	1.942	0.04	0.	0.	5.065	0.	22.739

Problem 548	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F	F	A	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	542	542	355	5385	0	0	97	0	490
normalized size	1	1.	0.65	9.94	0.	0.	0.18	0.	0.9
time (sec)	N/A	1.187	2.333	0.048	0.	0.	9.404	0.	63.085

Problem 549	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	75	65	3397	0	1	60	146	68
normalized size	1	1.	0.87	45.29	0.	0.01	0.8	1.95	0.91
time (sec)	N/A	0.181	0.099	0.042	0.	0.384	58.625	0.236	18.596

Problem 550	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	246	246	187	3303	0	0	0	0	223
normalized size	1	1.	0.76	13.43	0.	0.	0.	0.	0.91
time (sec)	N/A	0.461	1.766	0.043	0.	0.	0.	0.	23.554

Problem 551	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	120	91	7016	0	1	0	0	112
normalized size	1	1.	0.76	58.47	0.	0.01	0.	0.	0.93
time (sec)	N/A	0.262	0.229	0.079	0.	0.653	0.	0.	24.473

Problem 552	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	286	286	202	3760	0	0	0	0	257
normalized size	1	1.	0.71	13.15	0.	0.	0.	0.	0.9
time (sec)	N/A	0.557	0.607	0.073	0.	0.	0.	0.	30.285

Problem 553	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	553	553	266	5392	0	0	0	0	503
normalized size	1	1.	0.48	9.75	0.	0.	0.	0.	0.91
time (sec)	N/A	1.2	5.238	0.076	0.	0.	0.	0.	63.85

Problem 554	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F	A	A	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	80	3654	0	1	95	0	75
normalized size	1	1.	0.94	42.99	0.	0.01	1.12	0.	0.88
time (sec)	N/A	0.195	0.155	0.041	0.	0.386	57.265	0.	19.53

Problem 555	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	258	258	193	3565	0	0	0	0	226
normalized size	1	1.	0.75	13.82	0.	0.	0.	0.	0.88
time (sec)	N/A	0.48	0.771	0.049	0.	0.	0.	0.	24.758

Problem 556	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	585	585	372	5563	0	0	0	0	534
normalized size	1	1.	0.64	9.51	0.	0.	0.	0.	0.91
time (sec)	N/A	1.331	3.037	0.053	0.	0.	0.	0.	75.25

Problem 557	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	45	39	0	77	0	0	61
normalized size	1	1.	0.67	0.58	0.	1.15	0.	0.	0.91
time (sec)	N/A	0.111	0.071	0.009	0.	0.215	0.	0.	9.81

Problem 558	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	283	283	202	3783	0	0	0	0	260
normalized size	1	1.	0.71	13.37	0.	0.	0.	0.	0.92
time (sec)	N/A	0.561	0.649	0.05	0.	0.	0.	0.	30.314

Problem 559	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F	A	F(-1)	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	99	7081	0	1	0	0	104
normalized size	1	1.	0.87	62.11	0.	0.01	0.	0.	0.91
time (sec)	N/A	0.232	0.322	0.086	0.	0.402	0.	0.	24.381

Problem 560	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	299	299	216	7083	0	0	0	0	270
normalized size	1	1.	0.72	23.69	0.	0.	0.	0.	0.9
time (sec)	N/A	0.573	0.585	0.086	0.	0.	0.	0.	33.366

Problem 561	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	596	596	307	10786	0	0	0	0	544
normalized size	1	1.	0.52	18.1	0.	0.	0.	0.	0.91
time (sec)	N/A	1.335	2.591	0.107	0.	0.	0.	0.	75.32

Problem 562	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	44	39	0	80	0	86	66
normalized size	1	1.	0.56	0.49	0.	1.01	0.	1.09	0.84
time (sec)	N/A	0.121	0.058	0.01	0.	0.214	0.	0.233	11.303

Problem 563	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	297	297	214	7077	0	0	0	0	262
normalized size	1	1.	0.72	23.83	0.	0.	0.	0.	0.88
time (sec)	N/A	0.565	0.564	0.057	0.	0.	0.	0.	31.817

Problem 564	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	624	624	401	10961	0	0	0	0	571
normalized size	1	1.	0.64	17.57	0.	0.	0.	0.	0.92
time (sec)	N/A	1.488	4.272	0.08	0.	0.	0.	0.	86.461

Problem 565	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	65	62	0	126	0	0	97
normalized size	1	1.	0.62	0.6	0.	1.21	0.	0.	0.93
time (sec)	N/A	0.159	0.1	0.009	0.	0.214	0.	0.	14.19

Problem 566	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	320	320	232	7299	0	0	0	0	298
normalized size	1	1.	0.72	22.81	0.	0.	0.	0.	0.93
time (sec)	N/A	0.65	0.636	0.063	0.	0.	0.	0.	37.665

Problem 567	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	127	74	0	161	167	0	0	104
normalized size	1	1.	0.58	0.	1.27	1.31	0.	0.	0.82
time (sec)	N/A	0.233	0.073	0.085	1.674	0.214	0.	0.	12.742

Problem 568	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	128	128	70	0	161	196	0	0	102
normalized size	1	1.	0.55	0.	1.26	1.53	0.	0.	0.8
time (sec)	N/A	0.211	0.05	0.068	1.512	0.215	0.	0.	11.552

Problem 569	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	61	0	131	151	0	0	82
normalized size	1	1.	0.63	0.	1.35	1.56	0.	0.	0.85
time (sec)	N/A	0.191	0.05	0.029	1.559	0.215	0.	0.	10.947

Problem 570	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	58	0	131	178	0	0	82
normalized size	1	1.	0.59	0.	1.34	1.82	0.	0.	0.84
time (sec)	N/A	0.164	0.038	0.029	1.522	0.215	0.	0.	9.842

Problem 571	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	105	0	116	120	0	0	71
normalized size	1	1.	1.28	0.	1.41	1.46	0.	0.	0.87
time (sec)	N/A	0.136	0.056	0.	1.527	0.214	0.	0.	8.659

Problem 572	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-2)	F	F(-2)	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	111	0	0	0	0	0	121
normalized size	1	1.	0.81	0.	0.	0.	0.	0.	0.88
time (sec)	N/A	0.224	0.192	0.062	0.	0.	0.	0.	11.275

Problem 573	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	F(-2)	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	157	157	209	0	0	274	0	0	136
normalized size	1	1.	1.33	0.	0.	1.75	0.	0.	0.87
time (sec)	N/A	0.285	0.333	0.09	0.	0.22	0.	0.	15.797

Problem 574	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	226	226	233	0	0	301	0	0	206
normalized size	1	1.	1.03	0.	0.	1.33	0.	0.	0.91
time (sec)	N/A	0.385	0.454	0.08	0.	0.22	0.	0.	36.278

Problem 575	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	207	207	115	0	0	0	0	0	180
normalized size	1	1.	0.56	0.	0.	0.	0.	0.	0.87
time (sec)	N/A	0.277	0.112	0.06	0.	0.	0.	0.	30.522

Problem 576	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	104	0	0	302	0	0	107
normalized size	1	1.	0.85	0.	0.	2.48	0.	0.	0.88
time (sec)	N/A	0.133	0.121	0.054	0.	1.861	0.	0.	16.699

Problem 577	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	139	139	120	0	0	386	0	0	121
normalized size	1	1.	0.86	0.	0.	2.78	0.	0.	0.87
time (sec)	N/A	0.185	0.155	0.071	0.	1.842	0.	0.	21.958

Problem 578	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	140	140	123	0	0	348	0	0	121
normalized size	1	1.	0.88	0.	0.	2.49	0.	0.	0.86
time (sec)	N/A	0.216	0.233	0.039	0.	1.868	0.	0.	23.764

Problem 579	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	175	175	133	0	0	402	0	0	148
normalized size	1	1.	0.76	0.	0.	2.3	0.	0.	0.85
time (sec)	N/A	0.237	0.174	0.043	0.	1.848	0.	0.	24.366

Problem 580	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	115	0	0	0	0	0	17
normalized size	1	1.	4.42	0.	0.	0.	0.	0.	0.65
time (sec)	N/A	0.059	0.168	0.059	0.	0.	0.	0.	6.174

Problem 581	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	115	0	0	433	0	0	17
normalized size	1	1.	4.42	0.	0.	16.65	0.	0.	0.65
time (sec)	N/A	0.046	0.16	0.056	0.	1.793	0.	0.	5.143

Problem 582	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	229	0	0	0	0	0	17
normalized size	1	1.	9.54	0.	0.	0.	0.	0.	0.71
time (sec)	N/A	0.062	0.321	0.082	0.	0.	0.	0.	6.228

Problem 583	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	234	0	0	0	0	0	22
normalized size	1	1.	9.	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.062	0.297	0.086	0.	0.	0.	0.	6.274

Problem 584	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	125	125	70	0	161	198	0	0	100
normalized size	1	1.	0.56	0.	1.29	1.58	0.	0.	0.8
time (sec)	N/A	0.23	0.057	0.1	1.529	0.218	0.	0.	11.621

Problem 585	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	61	0	131	153	0	0	82
normalized size	1	1.	0.62	0.	1.34	1.56	0.	0.	0.84
time (sec)	N/A	0.196	0.052	0.075	1.52	0.221	0.	0.	10.895

Problem 586	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	59	0	131	181	0	0	80
normalized size	1	1.	0.62	0.	1.38	1.91	0.	0.	0.84
time (sec)	N/A	0.166	0.037	0.027	1.604	0.221	0.	0.	9.682

Problem 587	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	103	0	116	122	0	0	71
normalized size	1	1.	1.24	0.	1.4	1.47	0.	0.	0.86
time (sec)	N/A	0.142	0.061	0.058	1.524	0.213	0.	0.	8.607

Problem 588	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	F(-2)	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	113	0	0	258	0	0	121
normalized size	1	1.	0.82	0.	0.	1.88	0.	0.	0.88
time (sec)	N/A	0.228	0.237	0.065	0.	0.22	0.	0.	11.276

Problem 589	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	F(-2)	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	110	0	0	274	0	0	134
normalized size	1	1.	0.7	0.	0.	1.73	0.	0.	0.85
time (sec)	N/A	0.286	0.272	0.099	0.	0.222	0.	0.	15.763

Problem 590	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	207	207	115	0	0	274	0	0	180
normalized size	1	1.	0.56	0.	0.	1.32	0.	0.	0.87
time (sec)	N/A	0.309	0.193	0.059	0.	0.22	0.	0.	27.095

Problem 591	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	59	0	0	348	0	0	107
normalized size	1	1.	0.48	0.	0.	2.85	0.	0.	0.88
time (sec)	N/A	0.156	0.105	0.058	0.	1.448	0.	0.	16.713

Problem 592	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	154	0	0	324	0	0	117
normalized size	1	1.	1.12	0.	0.	2.36	0.	0.	0.85
time (sec)	N/A	0.193	0.834	0.087	0.	1.453	0.	0.	20.775

Problem 593	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	140	140	1024	0	0	396	0	0	121
normalized size	1	1.	7.31	0.	0.	2.83	0.	0.	0.86
time (sec)	N/A	0.219	44.143	0.082	0.	1.44	0.	0.	22.529

Problem 594	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	115	0	0	402	0	0	17
normalized size	1	1.	4.42	0.	0.	15.46	0.	0.	0.65
time (sec)	N/A	0.061	0.196	0.09	0.	1.874	0.	0.	6.15

Problem 595	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	115	0	0	0	0	0	17
normalized size	1	1.	4.42	0.	0.	0.	0.	0.	0.65
time (sec)	N/A	0.062	0.174	0.059	0.	0.	0.	0.	6.853

Problem 596	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	111	0	0	0	0	0	14
normalized size	1	1.	5.29	0.	0.	0.	0.	0.	0.67
time (sec)	N/A	0.033	0.185	0.054	0.	0.	0.	0.	4.622

Problem 597	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	A	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	120	0	0	474	0	0	20
normalized size	1	1.	4.62	0.	0.	18.23	0.	0.	0.77
time (sec)	N/A	0.063	0.182	0.08	0.	1.819	0.	0.	6.278

Problem 598	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	92	89	113	135	230	0	0
normalized size	1	1.	1.02	0.99	1.26	1.5	2.56	0.	0.
time (sec)	N/A	0.248	0.078	0.011	1.374	3.884	17.168	0.	0.

Problem 599	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	66	65	92	97	201	0	0
normalized size	1	1.	0.94	0.93	1.31	1.39	2.87	0.	0.
time (sec)	N/A	0.177	0.052	0.012	1.487	1.381	13.311	0.	0.

Problem 600	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	43	50	66	57	144	0	39
normalized size	1	1.	0.81	0.94	1.25	1.08	2.72	0.	0.74
time (sec)	N/A	0.138	0.036	0.009	1.391	0.505	8.046	0.	18.344

Problem 601	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	31	42	55	42	138	0	36
normalized size	1	1.	0.69	0.93	1.22	0.93	3.07	0.	0.8
time (sec)	N/A	0.094	0.032	0.01	1.368	0.214	3.013	0.	12.747

Problem 602	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	54	59	82	73	0	0	49
normalized size	1	1.	0.87	0.95	1.32	1.18	0.	0.	0.79
time (sec)	N/A	0.165	0.05	0.013	1.371	1.643	0.	0.	23.431

Problem 603	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	88	87	117	134	0	0	76
normalized size	1	1.	1.01	1.	1.34	1.54	0.	0.	0.87
time (sec)	N/A	0.228	0.071	0.016	1.398	7.121	0.	0.	30.384

Problem 604	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	104	105	0	1	0	722	94
normalized size	1	1.	0.93	0.94	0.	0.01	0.	6.45	0.84
time (sec)	N/A	0.639	0.385	0.013	0.	2.355	0.	0.257	73.962

Problem 605	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	82	81	0	1	932	482	75
normalized size	1	1.	0.89	0.88	0.	0.01	10.13	5.24	0.82
time (sec)	N/A	0.306	0.258	0.01	0.	0.557	17.796	0.25	44.905

Problem 606	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	66	60	0	1	576	271	66
normalized size	1	1.	0.84	0.76	0.	0.01	7.29	3.43	0.84
time (sec)	N/A	0.177	0.064	0.008	0.	0.272	52.651	0.234	28.141

Problem 607	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	66	60	0	1	719	261	66
normalized size	1	1.	0.84	0.76	0.	0.01	9.1	3.3	0.84
time (sec)	N/A	0.128	0.078	0.008	0.	0.275	31.263	0.244	23.026

Problem 608	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	169	81	0	1	1103	508	76
normalized size	1	1.	1.84	0.88	0.	0.01	11.99	5.52	0.83
time (sec)	N/A	0.311	0.383	0.012	0.	0.612	20.041	0.248	51.505

Problem 609	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	193	105	0	1	0	736	95
normalized size	1	1.	1.72	0.94	0.	0.01	0.	6.57	0.85
time (sec)	N/A	0.557	0.512	0.016	0.	3.189	0.	0.248	94.35

Problem 610	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	457	457	377	328	0	1501	0	0	405
normalized size	1	1.	0.82	0.72	0.	3.28	0.	0.	0.89
time (sec)	N/A	1.022	0.424	0.003	0.	0.443	0.	0.	151.257

Problem 611	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	449	449	340	320	0	1728	0	0	400
normalized size	1	1.	0.76	0.71	0.	3.85	0.	0.	0.89
time (sec)	N/A	0.652	0.217	0.001	0.	0.304	0.	0.	119.055

Problem 612	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	449	449	340	296	0	1315	0	0	400
normalized size	1	1.	0.76	0.66	0.	2.93	0.	0.	0.89
time (sec)	N/A	0.617	0.194	0.002	0.	0.245	0.	0.	117.598

Problem 613	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	449	449	340	296	0	1615	0	0	400
normalized size	1	1.	0.76	0.66	0.	3.6	0.	0.	0.89
time (sec)	N/A	0.635	0.259	0.003	0.	0.253	0.	0.	117.405

Problem 614	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	449	449	340	320	0	1472	0	0	400
normalized size	1	1.	0.76	0.71	0.	3.28	0.	0.	0.89
time (sec)	N/A	0.606	0.266	0.001	0.	0.377	0.	0.	114.059

Problem 615	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	460	460	385	331	0	1778	0	0	0
normalized size	1	1.	0.84	0.72	0.	3.87	0.	0.	0.
time (sec)	N/A	1.04	0.514	0.003	0.	0.593	0.	0.	0.

Problem 616	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	462	462	406	343	0	1567	0	0	410
normalized size	1	1.	0.88	0.74	0.	3.39	0.	0.	0.89
time (sec)	N/A	0.929	0.564	0.002	0.	4.894	0.	0.	157.768

Problem 617	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	479	479	428	365	0	1850	0	0	0
normalized size	1	1.	0.89	0.76	0.	3.86	0.	0.	0.
time (sec)	N/A	1.368	0.7	0.002	0.	7.851	0.	0.	0.

Problem 618	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	88	1015	0	1	0	130	76
normalized size	1	1.	0.95	10.91	0.	0.01	0.	1.4	0.82
time (sec)	N/A	0.261	0.347	0.028	0.	0.217	0.	0.212	24.019

Problem 619	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	120	114	1066	0	1	0	136	105
normalized size	1	1.	0.95	8.88	0.	0.01	0.	1.13	0.88
time (sec)	N/A	0.426	0.235	0.026	0.	0.31	0.	0.332	45.901

Problem 620	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	70	988	0	1	0	89	56
normalized size	1	1.	1.	14.11	0.	0.01	0.	1.27	0.8
time (sec)	N/A	0.182	0.064	0.01	0.	0.217	0.	0.212	18.907

Problem 621	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	89	1000	0	1	0	157	76
normalized size	1	1.	0.98	10.99	0.	0.01	0.	1.73	0.84
time (sec)	N/A	0.207	0.056	0.008	0.	0.254	0.	0.227	26.265

Problem 622	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	162	1037	0	1	0	117	70
normalized size	1	1.	1.91	12.2	0.	0.01	0.	1.38	0.82
time (sec)	N/A	0.223	0.288	0.022	0.	0.235	0.	0.223	23.539

Problem 623	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	136	1075	0	1	0	89	63
normalized size	1	1.	1.79	14.14	0.	0.01	0.	1.17	0.83
time (sec)	N/A	0.253	1.218	0.021	0.	0.233	0.	0.219	28.661

Problem 624	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	407	1107	0	1	0	163	100
normalized size	1	1.	3.54	9.63	0.	0.01	0.	1.42	0.87
time (sec)	N/A	0.384	0.956	0.023	0.	0.244	0.	0.216	43.369

Problem 625	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	156	1116	0	1	0	131	95
normalized size	1	1.	1.42	10.15	0.	0.01	0.	1.19	0.86
time (sec)	N/A	0.482	0.829	0.023	0.	0.28	0.	0.217	59.772

Problem 626	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	857	1095	428	421	0	0	0	0	0
normalized size	1	1.28	0.5	0.49	0.	0.	0.	0.	0.
time (sec)	N/A	3.847	0.981	0.076	0.	0.	0.	0.	0.

Problem 627	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	700	949	426	368	0	0	0	0	0
normalized size	1	1.36	0.61	0.53	0.	0.	0.	0.	0.
time (sec)	N/A	2.276	0.994	0.03	0.	0.	0.	0.	0.

Problem 628	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	786	1036	165	299	0	0	0	0	945
normalized size	1	1.32	0.21	0.38	0.	0.	0.	0.	1.2
time (sec)	N/A	1.727	0.244	0.01	0.	0.	0.	0.	154.848

Problem 629	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	679	931	161	273	0	0	0	0	813
normalized size	1	1.37	0.24	0.4	0.	0.	0.	0.	1.2
time (sec)	N/A	1.546	0.239	0.01	0.	0.	0.	0.	146.886

Problem 630	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	809	1062	343	421	0	0	0	0	0
normalized size	1	1.31	0.42	0.52	0.	0.	0.	0.	0.
time (sec)	N/A	2.647	0.447	0.02	0.	0.	0.	0.	0.

Problem 631	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	703	940	344	370	0	0	0	0	0
normalized size	1	1.34	0.49	0.53	0.	0.	0.	0.	0.
time (sec)	N/A	1.947	0.499	0.023	0.	0.	0.	0.	0.

Problem 632	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	170	0	0	0	0	0	58
normalized size	1	1.	2.39	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.382	0.26	0.076	0.	0.	0.	0.	43.872

Problem 633	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	170	0	0	0	0	0	58
normalized size	1	1.	2.39	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.387	0.259	0.066	0.	0.	0.	0.	44.236

Problem 634	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	168	0	0	0	0	0	56
normalized size	1	1.	2.43	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.224	0.264	0.078	0.	0.	0.	0.	50.207

Problem 635	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	348	0	0	0	0	0	60
normalized size	1	1.	5.04	0.	0.	0.	0.	0.	0.87
time (sec)	N/A	0.391	1.003	0.125	0.	0.	0.	0.	45.465

Problem 636	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	91	378	0	1	0	143	88
normalized size	1	1.	0.88	3.63	0.	0.01	0.	1.38	0.85
time (sec)	N/A	0.285	0.267	0.035	0.	0.239	0.	0.217	30.449

Problem 637	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	74	335	0	1	0	86	60
normalized size	1	1.	1.	4.53	0.	0.01	0.	1.16	0.81
time (sec)	N/A	0.183	0.09	0.012	0.	0.251	0.	0.213	19.331

Problem 638	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	316	0	1	0	54	42
normalized size	1	1.	1.	6.2	0.	0.02	0.	1.06	0.82
time (sec)	N/A	0.132	0.04	0.009	0.	0.24	0.	0.211	15.064

Problem 639	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	162	347	0	1	0	107	71
normalized size	1	1.	1.91	4.08	0.	0.01	0.	1.26	0.84
time (sec)	N/A	0.209	0.076	0.021	0.	0.266	0.	0.213	22.494

Problem 640	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	409	402	0	1	0	159	100
normalized size	1	1.	3.5	3.44	0.	0.01	0.	1.36	0.85
time (sec)	N/A	0.355	0.549	0.023	0.	0.286	0.	0.22	43.99

Problem 641	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	118	408	0	1	0	140	107
normalized size	1	1.	0.96	3.32	0.	0.01	0.	1.14	0.87
time (sec)	N/A	0.393	0.217	0.037	0.	0.362	0.	0.293	45.642

Problem 642	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	90	356	0	1	0	107	76
normalized size	1	1.	0.99	3.91	0.	0.01	0.	1.18	0.84
time (sec)	N/A	0.247	0.088	0.013	0.	0.346	0.	0.224	30.208

Problem 643	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	54	322	0	1	0	97	46
normalized size	1	1.	1.	5.96	0.	0.02	0.	1.8	0.85
time (sec)	N/A	0.118	0.039	0.008	0.	0.29	0.	0.224	16.198

Problem 644	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	129	350	0	1	0	86	68
normalized size	1	1.	1.61	4.38	0.	0.01	0.	1.08	0.85
time (sec)	N/A	0.242	1.131	0.022	0.	0.327	0.	0.224	30.88

Problem 645	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	149	383	0	1	0	144	100
normalized size	1	1.	1.3	3.33	0.	0.01	0.	1.25	0.87
time (sec)	N/A	0.471	1.286	0.026	0.	0.329	0.	0.223	63.379

Problem 646	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	911	911	429	363	0	0	0	0	0
normalized size	1	1.	0.47	0.4	0.	0.	0.	0.	0.
time (sec)	N/A	2.113	0.631	0.036	0.	0.	0.	0.	0.

Problem 647	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	638	873	165	265	0	0	0	0	768
normalized size	1	1.37	0.26	0.42	0.	0.	0.	0.	1.2
time (sec)	N/A	1.305	0.083	0.012	0.	0.	0.	0.	140.487

Problem 648	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	638	774	161	191	0	0	0	0	690
normalized size	1	1.21	0.25	0.3	0.	0.	0.	0.	1.08
time (sec)	N/A	0.817	0.083	0.007	0.	0.	0.	0.	98.002

Problem 649	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	677	901	344	288	0	0	0	0	0
normalized size	1	1.33	0.51	0.43	0.	0.	0.	0.	0.
time (sec)	N/A	1.57	0.488	0.023	0.	0.	0.	0.	0.

Problem 650	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	804	1030	165	292	0	0	0	0	911
normalized size	1	1.28	0.21	0.36	0.	0.	0.	0.	1.13
time (sec)	N/A	1.871	0.101	0.029	0.	0.	0.	0.	152.809

Problem 651	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	656	800	165	191	0	0	0	0	711
normalized size	1	1.22	0.25	0.29	0.	0.	0.	0.	1.08
time (sec)	N/A	0.963	0.098	0.008	0.	0.	0.	0.	89.615

Problem 652	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	833	1063	344	310	0	0	0	0	0
normalized size	1	1.28	0.41	0.37	0.	0.	0.	0.	0.
time (sec)	N/A	2.398	0.488	0.02	0.	0.	0.	0.	0.

Problem 653	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	175	175	130	923	0	1	0	243	158
normalized size	1	1.	0.74	5.27	0.	0.01	0.	1.39	0.9
time (sec)	N/A	0.496	0.551	0.05	0.	0.257	0.	0.222	41.784

Problem 654	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	107	876	0	1	0	181	104
normalized size	1	1.	0.87	7.12	0.	0.01	0.	1.47	0.85
time (sec)	N/A	0.372	0.37	0.02	0.	0.234	0.	0.217	35.263

Problem 655	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-2)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	99	99	99	851	0	1	0	157	80
normalized size	1	1.	1.	8.6	0.	0.01	0.	1.59	0.81
time (sec)	N/A	0.229	0.125	0.016	0.	0.243	0.	0.215	24.071

Problem 656	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-2)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	84	541	0	1	0	124	70
normalized size	1	1.	0.97	6.22	0.	0.01	0.	1.43	0.8
time (sec)	N/A	0.188	0.145	0.01	0.	0.238	0.	0.214	20.423

Problem 657	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	132	132	396	880	0	1	0	207	114
normalized size	1	1.	3.	6.67	0.	0.01	0.	1.57	0.86
time (sec)	N/A	0.384	0.443	0.02	0.	0.287	0.	0.216	47.718

Problem 658	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	489	938	0	1	0	362	158
normalized size	1	1.	2.64	5.07	0.	0.01	0.	1.96	0.85
time (sec)	N/A	0.649	1.211	0.02	0.	0.359	0.	0.223	75.49

Problem 659	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	191	150	953	0	1	0	238	167
normalized size	1	1.	0.79	4.99	0.	0.01	0.	1.25	0.87
time (sec)	N/A	0.806	0.631	0.045	0.	1.022	0.	0.368	84.729

Problem 660	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F(-2)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	141	141	135	893	0	1	0	205	122
normalized size	1	1.	0.96	6.33	0.	0.01	0.	1.45	0.87
time (sec)	N/A	0.419	0.318	0.019	0.	0.619	0.	0.231	50.23

Problem 661	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F(-2)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	90	861	0	1	0	124	76
normalized size	1	1.	0.97	9.26	0.	0.01	0.	1.33	0.82
time (sec)	N/A	0.253	0.164	0.017	0.	0.344	0.	0.225	29.445

Problem 662	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F(-2)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	104	867	0	1	0	320	87
normalized size	1	1.	1.	8.34	0.	0.01	0.	3.08	0.84
time (sec)	N/A	0.223	0.177	0.009	0.	0.378	0.	0.23	27.106

Problem 663	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	172	885	0	1	0	181	129
normalized size	1	1.	1.15	5.94	0.	0.01	0.	1.21	0.87
time (sec)	N/A	0.515	2.242	0.021	0.	0.404	0.	0.225	66.936

Problem 664	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	208	208	195	923	0	1	0	244	184
normalized size	1	1.	0.94	4.44	0.	0.	0.	1.17	0.88
time (sec)	N/A	0.869	2.139	0.024	0.	0.61	0.	0.227	136.229

Problem 665	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-2)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1043	1043	420	604	0	0	0	0	0
normalized size	1	1.	0.4	0.58	0.	0.	0.	0.	0.
time (sec)	N/A	3.357	0.574	0.044	0.	0.	0.	0.	0.

Problem 666	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-2)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1026	1026	331	530	0	0	0	0	0
normalized size	1	1.	0.32	0.52	0.	0.	0.	0.	0.
time (sec)	N/A	2.488	0.329	0.017	0.	0.	0.	0.	0.

Problem 667	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-2)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1034	1034	341	333	0	0	0	0	0
normalized size	1	1.	0.33	0.32	0.	0.	0.	0.	0.
time (sec)	N/A	2.288	0.53	0.01	0.	0.	0.	0.	0.

Problem 668	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-1)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1094	1094	399	626	0	0	0	0	0
normalized size	1	1.	0.36	0.57	0.	0.	0.	0.	0.
time (sec)	N/A	3.385	1.223	0.021	0.	0.	0.	0.	0.

Problem 669	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-2)	F(-2)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1190	1190	333	556	0	0	0	0	0
normalized size	1	1.	0.28	0.47	0.	0.	0.	0.	0.
time (sec)	N/A	2.903	0.313	0.049	0.	0.	0.	0.	0.

Problem 670	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-2)	F(-2)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1200	1200	342	359	0	0	0	0	0
normalized size	1	1.	0.28	0.3	0.	0.	0.	0.	0.
time (sec)	N/A	2.794	0.561	0.012	0.	0.	0.	0.	0.

Problem 671	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F(-2)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1281	1281	399	674	0	0	0	0	0
normalized size	1	1.	0.31	0.53	0.	0.	0.	0.	0.
time (sec)	N/A	3.789	1.34	0.02	0.	0.	0.	0.	0.

Problem 672	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	200	194	164	0	0	0	185	0	180
normalized size	1	0.97	0.82	0.	0.	0.	0.92	0.	0.9
time (sec)	N/A	0.566	0.218	0.047	0.	0.	133.659	0.	46.379

Problem 673	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	115	110	0	0	0	119	0	100
normalized size	1	0.93	0.89	0.	0.	0.	0.97	0.	0.81
time (sec)	N/A	0.183	0.133	0.036	0.	0.	11.592	0.	18.4

Problem 674	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	64	0	0	0	56	0	56
normalized size	1	1.	0.94	0.	0.	0.	0.82	0.	0.82
time (sec)	N/A	0.066	0.032	0.033	0.	0.	1.52	0.	8.218

Problem 675	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	282	0	0	0	0	0	65
normalized size	1	1.	3.48	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.2	0.614	0.052	0.	0.	0.	0.	29.314

Problem 676	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	488	0	0	0	0	0	66
normalized size	1	1.	6.02	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.199	1.361	0.051	0.	0.	0.	0.	28.056

Problem 677	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	209	0	0	0	0	0	66
normalized size	1	1.	2.58	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.2	0.59	0.05	0.	0.	0.	0.	28.14

Problem 678	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	198	198	167	0	0	0	0	0	165
normalized size	1	1.	0.84	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.477	0.244	0.044	0.	0.	0.	0.	50.843

Problem 679	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	132	132	110	0	0	0	119	0	105
normalized size	1	1.	0.83	0.	0.	0.	0.9	0.	0.8
time (sec)	N/A	0.188	0.132	0.032	0.	0.	178.942	0.	18.14

Problem 680	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	67	0	0	0	56	0	58
normalized size	1	1.	0.94	0.	0.	0.	0.79	0.	0.82
time (sec)	N/A	0.07	0.035	0.031	0.	0.	2.797	0.	8.233

Problem 681	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	329	0	0	0	0	0	66
normalized size	1	1.	3.92	0.	0.	0.	0.	0.	0.79
time (sec)	N/A	0.206	0.652	0.049	0.	0.	0.	0.	29.544

Problem 682	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	210	0	0	0	0	0	68
normalized size	1	1.	2.5	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.208	0.666	0.049	0.	0.	0.	0.	28.494

Problem 683	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	209	0	0	0	0	0	68
normalized size	1	1.	2.49	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.208	0.736	0.049	0.	0.	0.	0.	28.596

Problem 684	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	91	0	0	1	0	143	88
normalized size	1	1.	0.88	0.	0.	0.01	0.	1.38	0.85
time (sec)	N/A	0.292	0.272	0.098	0.	0.217	0.	0.218	30.442

Problem 685	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	74	0	0	1	0	86	60
normalized size	1	1.	1.	0.	0.	0.01	0.	1.16	0.81
time (sec)	N/A	0.183	0.093	0.081	0.	0.218	0.	0.213	19.383

Problem 686	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	0	0	1	0	54	42
normalized size	1	1.	1.	0.	0.	0.02	0.	1.06	0.82
time (sec)	N/A	0.131	0.039	0.051	0.	0.219	0.	0.212	15.047

Problem 687	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	162	0	0	1	0	107	71
normalized size	1	1.	1.91	0.	0.	0.01	0.	1.26	0.84
time (sec)	N/A	0.209	0.328	0.075	0.	0.271	0.	0.215	22.673

Problem 688	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	410	0	0	1	0	159	100
normalized size	1	1.	3.5	0.	0.	0.01	0.	1.36	0.85
time (sec)	N/A	0.357	0.791	0.125	0.	0.249	0.	0.217	44.255

Problem 689	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	118	0	0	1	0	0	107
normalized size	1	1.	0.96	0.	0.	0.01	0.	0.	0.87
time (sec)	N/A	0.399	0.249	0.115	0.	0.363	0.	0.	45.74

Problem 690	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	90	0	0	1	0	223	76
normalized size	1	1.	0.99	0.	0.	0.01	0.	2.45	0.84
time (sec)	N/A	0.255	0.086	0.066	0.	0.304	0.	0.232	30.193

Problem 691	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	54	0	0	1	0	97	46
normalized size	1	1.	1.	0.	0.	0.02	0.	1.8	0.85
time (sec)	N/A	0.138	0.042	0.061	0.	0.26	0.	0.224	17.392

Problem 692	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	129	0	0	1	0	185	68
normalized size	1	1.	1.61	0.	0.	0.01	0.	2.31	0.85
time (sec)	N/A	0.246	1.291	0.092	0.	0.289	0.	0.254	30.755

Problem 693	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	149	0	0	1	0	277	100
normalized size	1	1.	1.3	0.	0.	0.01	0.	2.41	0.87
time (sec)	N/A	0.48	1.402	0.099	0.	0.309	0.	0.268	63.397

Problem 694	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	165	0	0	0	0	0	51
normalized size	1	1.	2.58	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.193	0.278	0.061	0.	0.	0.	0.	24.645

Problem 695	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	165	0	0	0	0	0	51
normalized size	1	1.	2.58	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.235	0.283	0.059	0.	0.	0.	0.	27.341

Problem 696	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	163	0	0	0	0	0	51
normalized size	1	1.	2.55	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.162	0.288	0.058	0.	0.	0.	0.	26.838

Problem 697	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	161	0	0	0	0	0	48
normalized size	1	1.	2.73	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.088	0.286	0.06	0.	0.	0.	0.	21.021

Problem 698	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	344	0	0	0	0	0	51
normalized size	1	1.	5.55	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.19	0.721	0.11	0.	0.	0.	0.	25.208

Problem 699	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	345	0	0	0	0	0	54
normalized size	1	1.	5.39	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.287	0.718	0.107	0.	0.	0.	0.	32.569

Problem 700	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	344	0	0	0	0	0	54
normalized size	1	1.	5.38	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.287	0.694	0.115	0.	0.	0.	0.	32.417

Problem 701	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	107	0	0	1	0	181	104
normalized size	1	1.	0.87	0.	0.	0.01	0.	1.47	0.85
time (sec)	N/A	0.422	0.38	0.117	0.	0.235	0.	0.217	35.273

Problem 702	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	99	99	99	0	0	1	0	157	80
normalized size	1	1.	1.	0.	0.	0.01	0.	1.59	0.81
time (sec)	N/A	0.234	0.134	0.075	0.	0.235	0.	0.215	24.095

Problem 703	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	84	0	0	1	0	124	70
normalized size	1	1.	0.97	0.	0.	0.01	0.	1.43	0.8
time (sec)	N/A	0.19	0.15	0.056	0.	0.233	0.	0.214	20.541

Problem 704	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	132	132	396	0	0	1	0	207	114
normalized size	1	1.	3.	0.	0.	0.01	0.	1.57	0.86
time (sec)	N/A	0.388	0.447	0.081	0.	0.275	0.	0.217	47.257

Problem 705	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	489	0	0	1	0	362	158
normalized size	1	1.	2.64	0.	0.	0.01	0.	1.96	0.85
time (sec)	N/A	0.651	1.322	0.13	0.	0.352	0.	0.233	75.61

Problem 706	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	141	141	135	0	0	1	0	482	122
normalized size	1	1.	0.96	0.	0.	0.01	0.	3.42	0.87
time (sec)	N/A	0.441	0.36	0.075	0.	0.596	0.	0.254	49.587

Problem 707	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	90	0	0	1	0	248	76
normalized size	1	1.	0.97	0.	0.	0.01	0.	2.67	0.82
time (sec)	N/A	0.258	0.174	0.074	0.	0.322	0.	0.278	29.502

Problem 708	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	104	0	0	1	0	320	87
normalized size	1	1.	1.	0.	0.	0.01	0.	3.08	0.84
time (sec)	N/A	0.25	0.176	0.064	0.	0.347	0.	0.238	28.23

Problem 709	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	172	0	0	1	0	386	129
normalized size	1	1.	1.15	0.	0.	0.01	0.	2.59	0.87
time (sec)	N/A	0.531	2.181	0.103	0.	0.381	0.	0.31	67.424

Problem 710	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	208	208	195	0	0	1	0	494	184
normalized size	1	1.	0.94	0.	0.	0.	0.	2.38	0.88
time (sec)	N/A	0.866	1.937	0.116	0.	0.562	0.	0.308	136.273

Problem 711	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	342	0	0	0	0	0	53
normalized size	1	1.	5.34	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.201	0.521	0.064	0.	0.	0.	0.	23.268

Problem 712	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	342	0	0	0	0	0	53
normalized size	1	1.	5.34	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.246	0.53	0.066	0.	0.	0.	0.	26.241

Problem 713	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	343	0	0	0	0	0	53
normalized size	1	1.	5.36	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.163	0.555	0.062	0.	0.	0.	0.	26.184

Problem 714	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	341	0	0	0	0	0	49
normalized size	1	1.	5.78	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.087	0.766	0.062	0.	0.	0.	0.	20.421

Problem 715	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	399	0	0	0	0	0	53
normalized size	1	1.	6.44	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.193	1.32	0.121	0.	0.	0.	0.	24.254

Problem 716	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	399	0	0	0	0	0	56
normalized size	1	1.	6.23	0.	0.	0.	0.	0.	0.88
time (sec)	N/A	0.29	1.255	0.112	0.	0.	0.	0.	31.809

Problem 717	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	399	0	0	0	0	0	56
normalized size	1	1.	6.23	0.	0.	0.	0.	0.	0.88
time (sec)	N/A	0.281	1.192	0.117	0.	0.	0.	0.	31.372

Problem 718	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	91	0	0	1	0	143	88
normalized size	1	1.	0.88	0.	0.	0.01	0.	1.38	0.85
time (sec)	N/A	0.289	0.272	0.105	0.	0.226	0.	0.214	31.681

Problem 719	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	74	0	0	1	0	86	60
normalized size	1	1.	1.	0.	0.	0.01	0.	1.16	0.81
time (sec)	N/A	0.192	0.09	0.082	0.	0.226	0.	0.215	20.469

Problem 720	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	0	0	1	0	54	42
normalized size	1	1.	1.	0.	0.	0.02	0.	1.06	0.82
time (sec)	N/A	0.136	0.042	0.052	0.	0.225	0.	0.211	16.011

Problem 721	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	162	0	0	1	0	107	71
normalized size	1	1.	1.91	0.	0.	0.01	0.	1.26	0.84
time (sec)	N/A	0.212	0.323	0.076	0.	0.242	0.	0.213	23.227

Problem 722	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	410	0	0	1	0	159	100
normalized size	1	1.	3.5	0.	0.	0.01	0.	1.36	0.85
time (sec)	N/A	0.355	0.791	0.122	0.	0.256	0.	0.219	46.318

Problem 723	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	118	0	0	1	0	140	107
normalized size	1	1.	0.96	0.	0.	0.01	0.	1.14	0.87
time (sec)	N/A	0.417	0.22	0.117	0.	0.347	0.	0.308	49.626

Problem 724	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	90	0	0	1	0	107	76
normalized size	1	1.	0.99	0.	0.	0.01	0.	1.18	0.84
time (sec)	N/A	0.254	0.076	0.066	0.	0.313	0.	0.233	32.705

Problem 725	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	54	0	0	1	0	97	46
normalized size	1	1.	1.	0.	0.	0.02	0.	1.8	0.85
time (sec)	N/A	0.14	0.041	0.062	0.	0.271	0.	0.229	19.228

Problem 726	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	129	0	0	1	0	86	68
normalized size	1	1.	1.61	0.	0.	0.01	0.	1.08	0.85
time (sec)	N/A	0.249	1.333	0.093	0.	0.298	0.	0.229	34.135

Problem 727	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	149	0	0	1	0	144	100
normalized size	1	1.	1.3	0.	0.	0.01	0.	1.25	0.87
time (sec)	N/A	0.47	1.3	0.103	0.	0.321	0.	0.228	68.671

Problem 728	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	887	887	165	0	0	0	0	0	0
normalized size	1	1.	0.19	0.	0.	0.	0.	0.	0.
time (sec)	N/A	2.199	0.275	0.073	0.	0.	0.	0.	0.

Problem 729	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	786	786	165	0	0	0	0	0	690
normalized size	1	1.	0.21	0.	0.	0.	0.	0.	0.88
time (sec)	N/A	1.329	0.271	0.058	0.	0.	0.	0.	142.019

Problem 730	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	915	915	344	0	0	0	0	0	0
normalized size	1	1.	0.38	0.	0.	0.	0.	0.	0.
time (sec)	N/A	2.199	0.482	0.109	0.	0.	0.	0.	0.

Problem 731	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1053	1053	165	0	0	0	0	0	0
normalized size	1	1.	0.16	0.	0.	0.	0.	0.	0.
time (sec)	N/A	2.488	0.273	0.071	0.	0.	0.	0.	0.

Problem 732	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F	F	A
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	812	812	165	0	0	0	0	0	721
normalized size	1	1.	0.2	0.	0.	0.	0.	0.	0.89
time (sec)	N/A	1.439	0.276	0.061	0.	0.	0.	0.	143.284

Problem 733	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1088	1088	344	0	0	0	0	0	0
normalized size	1	1.	0.32	0.	0.	0.	0.	0.	0.
time (sec)	N/A	3.025	0.478	0.106	0.	0.	0.	0.	0.

Problem 734	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	165	0	0	0	0	0	51
normalized size	1	1.	2.58	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.202	0.274	0.059	0.	0.	0.	0.	25.97

Problem 735	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	165	0	0	0	0	0	51
normalized size	1	1.	2.58	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.201	0.282	0.061	0.	0.	0.	0.	26.471

Problem 736	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	161	0	0	0	0	0	48
normalized size	1	1.	2.73	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.092	0.272	0.059	0.	0.	0.	0.	21.999

Problem 737	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	344	0	0	0	0	0	51
normalized size	1	1.	5.55	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.2	0.966	0.11	0.	0.	0.	0.	25.83

Problem 738	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	345	0	0	0	0	0	54
normalized size	1	1.	5.39	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.2	0.698	0.108	0.	0.	0.	0.	26.659

Problem 739	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	107	0	0	1	0	181	104
normalized size	1	1.	0.87	0.	0.	0.01	0.	1.47	0.85
time (sec)	N/A	0.43	0.394	0.109	0.	0.241	0.	0.217	36.567

Problem 740	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	99	99	99	0	0	1	0	157	80
normalized size	1	1.	1.	0.	0.	0.01	0.	1.59	0.81
time (sec)	N/A	0.256	0.123	0.072	0.	0.232	0.	0.217	25.53

Problem 741	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	84	0	0	1	0	124	70
normalized size	1	1.	0.97	0.	0.	0.01	0.	1.43	0.8
time (sec)	N/A	0.208	0.143	0.057	0.	0.232	0.	0.213	21.125

Problem 742	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	132	132	396	0	0	1	0	207	114
normalized size	1	1.	3.	0.	0.	0.01	0.	1.57	0.86
time (sec)	N/A	0.416	0.447	0.082	0.	0.27	0.	0.215	48.623

Problem 743	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	A	F(-1)	A	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	489	0	0	1	0	362	158
normalized size	1	1.	2.64	0.	0.	0.01	0.	1.96	0.85
time (sec)	N/A	0.72	1.265	0.134	0.	0.343	0.	0.219	77.036

Problem 744	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	141	141	135	0	0	1	0	205	122
normalized size	1	1.	0.96	0.	0.	0.01	0.	1.45	0.87
time (sec)	N/A	0.472	0.34	0.079	0.	0.594	0.	0.239	50.469

Problem 745	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	90	0	0	1	0	124	76
normalized size	1	1.	0.97	0.	0.	0.01	0.	1.33	0.82
time (sec)	N/A	0.274	0.173	0.073	0.	0.328	0.	0.235	30.83

Problem 746	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	104	0	0	1	0	320	87
normalized size	1	1.	1.	0.	0.	0.01	0.	3.08	0.84
time (sec)	N/A	0.266	0.173	0.066	0.	0.358	0.	0.237	29.438

Problem 747	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	172	0	0	1	0	181	129
normalized size	1	1.	1.15	0.	0.	0.01	0.	1.21	0.87
time (sec)	N/A	0.555	1.96	0.108	0.	0.392	0.	0.235	69.203

Problem 748	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	208	208	195	0	0	1	0	244	184
normalized size	1	1.	0.94	0.	0.	0.	0.	1.17	0.88
time (sec)	N/A	0.915	1.861	0.12	0.	0.576	0.	0.237	138.058

Problem 749	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1042	1042	333	0	0	0	0	0	0
normalized size	1	1.	0.32	0.	0.	0.	0.	0.	0.
time (sec)	N/A	4.127	0.311	0.074	0.	0.	0.	0.	0.

Problem 750	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1050	1050	343	0	0	0	0	0	0
normalized size	1	1.	0.33	0.	0.	0.	0.	0.	0.
time (sec)	N/A	3.173	0.527	0.065	0.	0.	0.	0.	0.

Problem 751	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1108	1108	399	0	0	0	0	0	0
normalized size	1	1.	0.36	0.	0.	0.	0.	0.	0.
time (sec)	N/A	4.585	1.283	0.132	0.	0.	0.	0.	0.

Problem 752	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-2)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1208	1208	333	0	0	0	0	0	0
normalized size	1	1.	0.28	0.	0.	0.	0.	0.	0.
time (sec)	N/A	4.057	0.316	0.073	0.	0.	0.	0.	0.

Problem 753	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1218	1218	342	0	0	0	0	0	0
normalized size	1	1.	0.28	0.	0.	0.	0.	0.	0.
time (sec)	N/A	4.105	0.512	0.067	0.	0.	0.	0.	0.

Problem 754	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-2)	F(-1)	F	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1299	1299	399	0	0	0	0	0	0
normalized size	1	1.	0.31	0.	0.	0.	0.	0.	0.
time (sec)	N/A	5.428	1.539	0.124	0.	0.	0.	0.	0.

Problem 755	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	343	0	0	0	0	0	53
normalized size	1	1.	5.36	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.212	0.699	0.066	0.	0.	0.	0.	24.43

Problem 756	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-1)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	343	0	0	0	0	0	53
normalized size	1	1.	5.36	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.208	0.768	0.068	0.	0.	0.	0.	24.717

Problem 757	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	341	0	0	0	0	0	49
normalized size	1	1.	5.78	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.095	0.805	0.064	0.	0.	0.	0.	20.327

Problem 758	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	399	0	0	0	0	0	53
normalized size	1	1.	6.44	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.204	1.451	0.119	0.	0.	0.	0.	25.291

Problem 759	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	399	0	0	0	0	0	56
normalized size	1	1.	6.23	0.	0.	0.	0.	0.	0.88
time (sec)	N/A	0.202	1.52	0.117	0.	0.	0.	0.	25.177

Problem 760	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	123	167	0	1	226	196	107
normalized size	1	1.	1.	1.36	0.	0.01	1.84	1.59	0.87
time (sec)	N/A	0.275	0.155	0.021	0.	0.251	33.593	0.222	19.604

Problem 761	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	99	125	0	1	144	144	76
normalized size	1	1.	1.1	1.39	0.	0.01	1.6	1.6	0.84
time (sec)	N/A	0.21	0.097	0.011	0.	0.238	22.221	0.222	14.848

Problem 762	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	72	127	0	1	107	124	68
normalized size	1	1.	0.86	1.51	0.	0.01	1.27	1.48	0.81
time (sec)	N/A	0.179	0.118	0.019	0.	0.233	11.296	0.26	13.954

Problem 763	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	82	101	0	1	117	220	49
normalized size	1	1.	1.39	1.71	0.	0.02	1.98	3.73	0.83
time (sec)	N/A	0.148	0.129	0.017	0.	0.233	4.524	0.327	12.399

Problem 764	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	47	48	66	81	58	338	39
normalized size	1	1.	1.02	1.04	1.43	1.76	1.26	7.35	0.85
time (sec)	N/A	0.12	0.06	0.01	1.376	0.228	2.765	0.454	12.001

Problem 765	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	69	70	113	115	78	419	63
normalized size	1	1.	0.93	0.95	1.53	1.55	1.05	5.66	0.85
time (sec)	N/A	0.175	0.083	0.009	1.384	0.266	2.983	0.606	17.186

Problem 766	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	91	94	159	147	112	500	92
normalized size	1	1.	0.88	0.9	1.53	1.41	1.08	4.81	0.88
time (sec)	N/A	0.235	0.105	0.011	1.393	0.331	3.751	0.82	22.824

Problem 767	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	113	118	205	180	146	581	121
normalized size	1	1.	0.84	0.88	1.53	1.34	1.09	4.34	0.9
time (sec)	N/A	0.284	0.124	0.011	1.383	0.488	5.079	1.233	28.554

Problem 768	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	108	113	213	177	1386	217	146
normalized size	1	1.	0.72	0.75	1.42	1.18	9.24	1.45	0.97
time (sec)	N/A	0.257	0.099	0.011	1.37	0.231	15.578	0.231	18.013

Problem 769	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	86	89	167	144	910	180	112
normalized size	1	1.	0.74	0.76	1.43	1.23	7.78	1.54	0.96
time (sec)	N/A	0.219	0.084	0.011	1.39	0.233	10.247	0.215	13.751

Problem 770	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	64	65	122	111	422	142	78
normalized size	1	1.	0.76	0.77	1.45	1.32	5.02	1.69	0.93
time (sec)	N/A	0.152	0.067	0.01	1.493	0.219	6.489	0.214	10.477

Problem 771	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	42	43	74	77	119	99	46
normalized size	1	1.	0.79	0.81	1.4	1.45	2.25	1.87	0.87
time (sec)	N/A	0.106	0.05	0.007	1.451	0.216	4.113	0.216	7.533

Problem 772	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	97	83	0	1	107	157	56
normalized size	1	1.	1.47	1.26	0.	0.02	1.62	2.38	0.85
time (sec)	N/A	0.121	0.124	0.013	0.	0.232	4.305	0.217	10.803

Problem 773	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	109	142	0	1	107	103	71
normalized size	1	1.	1.28	1.67	0.	0.01	1.26	1.21	0.84
time (sec)	N/A	0.147	0.119	0.016	0.	0.234	6.009	0.24	13.439

Problem 774	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	119	187	0	1	144	176	76
normalized size	1	1.	1.31	2.05	0.	0.01	1.58	1.93	0.84
time (sec)	N/A	0.16	0.157	0.018	0.	0.238	9.859	0.25	13.012

Problem 775	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	146	232	0	1	226	207	107
normalized size	1	1.	1.19	1.89	0.	0.01	1.84	1.68	0.87
time (sec)	N/A	0.245	0.31	0.021	0.	0.256	16.722	0.257	18.327

Problem 776	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	124	165	0	1	253	197	105
normalized size	1	1.	1.01	1.34	0.	0.01	2.06	1.6	0.85
time (sec)	N/A	0.265	0.158	0.014	0.	0.254	48.978	0.236	19.102

Problem 777	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	91	174	0	1	216	170	104
normalized size	1	1.	0.79	1.51	0.	0.01	1.88	1.48	0.9
time (sec)	N/A	0.255	0.167	0.017	0.	0.243	31.924	0.303	17.737

Problem 778	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	109	203	0	1	187	304	94
normalized size	1	1.	0.99	1.85	0.	0.01	1.7	2.76	0.85
time (sec)	N/A	0.224	0.146	0.019	0.	0.241	17.726	0.363	16.955

Problem 779	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	92	142	0	1	134	343	65
normalized size	1	1.	1.21	1.87	0.	0.01	1.76	4.51	0.86
time (sec)	N/A	0.174	0.209	0.023	0.	0.248	13.456	0.504	14.613

Problem 780	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	49	48	66	113	138	500	39
normalized size	1	1.	1.07	1.04	1.43	2.46	3.	10.87	0.85
time (sec)	N/A	0.122	0.078	0.01	1.372	0.285	7.371	0.759	12.384

Problem 781	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	71	70	113	147	194	581	63
normalized size	1	1.	0.96	0.95	1.53	1.99	2.62	7.85	0.85
time (sec)	N/A	0.171	0.085	0.009	1.391	0.329	7.84	0.953	17.353

Problem 782	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	94	94	159	181	262	662	92
normalized size	1	1.	0.9	0.9	1.53	1.74	2.52	6.37	0.88
time (sec)	N/A	0.231	0.105	0.012	1.373	0.488	9.237	1.242	23.141

Problem 783	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	115	118	205	212	326	743	119
normalized size	1	1.	0.86	0.88	1.53	1.58	2.43	5.54	0.89
time (sec)	N/A	0.292	0.118	0.011	1.393	0.746	10.956	1.687	29.553

Problem 784	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	110	115	213	209	3351	440	146
normalized size	1	1.	0.73	0.77	1.42	1.39	22.34	2.93	0.97
time (sec)	N/A	0.262	0.097	0.011	1.387	0.227	35.952	0.238	20.48

Problem 785	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	89	91	167	178	2304	363	112
normalized size	1	1.	0.76	0.78	1.43	1.52	19.69	3.1	0.96
time (sec)	N/A	0.205	0.086	0.011	1.391	0.227	26.188	0.22	14.921

Problem 786	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	66	67	122	143	1340	288	78
normalized size	1	1.	0.79	0.8	1.45	1.7	15.95	3.43	0.93
time (sec)	N/A	0.155	0.07	0.011	1.393	0.225	17.401	0.219	10.975

Problem 787	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	44	45	74	108	498	203	46
normalized size	1	1.	0.83	0.85	1.4	2.04	9.4	3.83	0.87
time (sec)	N/A	0.103	0.049	0.008	1.442	0.223	11.127	0.215	8.222

Problem 788	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	109	99	0	1	184	189	75
normalized size	1	1.	1.27	1.15	0.	0.01	2.14	2.2	0.87
time (sec)	N/A	0.177	0.202	0.015	0.	0.236	8.631	0.218	15.714

Problem 789	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	128	170	0	1	202	155	105
normalized size	1	1.	1.06	1.4	0.	0.01	1.67	1.28	0.87
time (sec)	N/A	0.179	0.173	0.018	0.	0.24	10.442	0.246	14.83

Problem 790	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	129	227	0	1	216	196	100
normalized size	1	1.	1.15	2.03	0.	0.01	1.93	1.75	0.89
time (sec)	N/A	0.18	0.194	0.019	0.	0.239	16.001	0.253	16.356

Problem 791	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	147	273	0	1	253	234	104
normalized size	1	1.	1.2	2.22	0.	0.01	2.06	1.9	0.85
time (sec)	N/A	0.197	0.228	0.024	0.	0.258	26.262	0.261	15.584

Problem 792	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	159	159	171	316	0	1	287	289	143
normalized size	1	1.	1.08	1.99	0.	0.01	1.81	1.82	0.9
time (sec)	N/A	0.282	0.431	0.029	0.	0.306	42.286	0.27	23.543

Problem 793	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	98	131	0	1	150	220	82
normalized size	1	1.	1.09	1.46	0.	0.01	1.67	2.44	0.91
time (sec)	N/A	0.219	0.118	0.015	0.	0.235	24.651	0.248	16.543

Problem 794	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	82	90	0	1	66	107	48
normalized size	1	1.	1.39	1.53	0.	0.02	1.12	1.81	0.81
time (sec)	N/A	0.14	0.075	0.01	0.	0.234	12.447	0.246	11.305

Problem 795	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	43	76	70	0	1	138	0	36
normalized size	1	1.	1.77	1.63	0.	0.02	3.21	0.	0.84
time (sec)	N/A	0.129	0.064	0.016	0.	0.228	4.86	0.	10.875

Problem 796	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	43	39	47	65	53	139	0	37
normalized size	1	1.	0.91	1.09	1.51	1.23	3.23	0.	0.86
time (sec)	N/A	0.12	0.068	0.01	1.421	0.215	3.501	0.	12.431

Problem 797	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	60	70	112	84	206	0	61
normalized size	1	1.	0.83	0.97	1.56	1.17	2.86	0.	0.85
time (sec)	N/A	0.178	0.08	0.012	1.392	0.226	5.677	0.	17.43

Problem 798	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	92	94	159	116	270	0	90
normalized size	1	1.	0.91	0.93	1.57	1.15	2.67	0.	0.89
time (sec)	N/A	0.23	0.088	0.011	1.391	0.256	8.301	0.	23.035

Problem 799	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	56	67	115	80	338	0	76
normalized size	1	1.	0.68	0.82	1.4	0.98	4.12	0.	0.93
time (sec)	N/A	0.133	0.079	0.011	1.386	0.217	4.226	0.	9.941

Problem 800	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	34	44	66	49	70	0	44
normalized size	1	1.	0.67	0.86	1.29	0.96	1.37	0.	0.86
time (sec)	N/A	0.085	0.042	0.009	1.391	0.216	2.795	0.	7.116

Problem 801	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	89	73	0	1	39	0	39
normalized size	1	1.	1.89	1.55	0.	0.02	0.83	0.	0.83
time (sec)	N/A	0.098	0.092	0.014	0.	0.23	3.513	0.	11.351

Problem 802	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	108	105	0	1	66	0	51
normalized size	1	1.	1.77	1.72	0.	0.02	1.08	0.	0.84
time (sec)	N/A	0.125	0.131	0.017	0.	0.229	6.758	0.	11.48

Problem 803	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	129	148	0	1	150	0	82
normalized size	1	1.	1.39	1.59	0.	0.01	1.61	0.	0.88
time (sec)	N/A	0.174	0.182	0.032	0.	0.236	12.88	0.	14.415

Problem 804	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	120	113	142	0	1	177	261	114
normalized size	1	1.	0.94	1.18	0.	0.01	1.48	2.17	0.95
time (sec)	N/A	0.27	0.148	0.02	0.	0.245	24.274	0.255	19.036

Problem 805	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	89	116	0	1	264	182	73
normalized size	1	1.	1.03	1.35	0.	0.01	3.07	2.12	0.85
time (sec)	N/A	0.19	0.106	0.016	0.	0.239	16.377	0.25	14.733

Problem 806	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	75	75	0	1	218	0	42
normalized size	1	1.	1.44	1.44	0.	0.02	4.19	0.	0.81
time (sec)	N/A	0.148	0.067	0.013	0.	0.23	15.609	0.	12.183

Problem 807	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	36	46	62	62	68	0	34
normalized size	1	1.	0.86	1.1	1.48	1.48	1.62	0.	0.81
time (sec)	N/A	0.123	0.053	0.01	1.383	0.217	5.574	0.	12.197

Problem 808	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	60	69	109	99	476	0	61
normalized size	1	1.	0.88	1.01	1.6	1.46	7.	0.	0.9
time (sec)	N/A	0.173	0.075	0.011	1.465	0.225	37.091	0.	16.955

Problem 809	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	81	94	157	132	2273	0	88
normalized size	1	1.	0.81	0.94	1.57	1.32	22.73	0.	0.88
time (sec)	N/A	0.226	0.1	0.011	1.415	0.248	56.212	0.	22.803

Problem 810	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	104	118	204	163	6096	0	114
normalized size	1	1.	0.83	0.94	1.62	1.29	48.38	0.	0.9
time (sec)	N/A	0.29	0.12	0.011	1.391	0.309	93.874	0.	28.51

Problem 811	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	80	91	173	128	561	0	107
normalized size	1	1.	0.72	0.82	1.56	1.15	5.05	0.	0.96
time (sec)	N/A	0.163	0.088	0.012	1.39	0.231	16.402	0.	11.922

Problem 812	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	57	66	122	95	267	0	73
normalized size	1	1.	0.72	0.84	1.54	1.2	3.38	0.	0.92
time (sec)	N/A	0.112	0.07	0.01	1.388	0.228	11.492	0.	8.765

Problem 813	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	33	43	72	63	65	0	37
normalized size	1	1.	0.73	0.96	1.6	1.4	1.44	0.	0.82
time (sec)	N/A	0.103	0.034	0.008	1.423	0.232	10.101	0.	10.713

Problem 814	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	89	79	0	1	206	0	48
normalized size	1	1.	1.51	1.34	0.	0.02	3.49	0.	0.81
time (sec)	N/A	0.123	0.107	0.016	0.	0.255	18.255	0.	12.073

Problem 815	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	119	134	0	1	262	0	80
normalized size	1	1.	1.29	1.46	0.	0.01	2.85	0.	0.87
time (sec)	N/A	0.171	0.164	0.017	0.	0.259	30.652	0.	14.251

Problem 816	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	143	159	0	1	180	0	114
normalized size	1	1.	1.16	1.29	0.	0.01	1.46	0.	0.93
time (sec)	N/A	0.225	0.216	0.019	0.	0.254	53.301	0.	18.761

Problem 817	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	105	101	284	0	0	0	0	0	90
normalized size	1	0.96	2.7	0.	0.	0.	0.	0.	0.86
time (sec)	N/A	0.318	0.78	0.26	0.	0.	0.	0.	40.76

Problem 818	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	254	0	0	0	0	0	68
normalized size	1	1.	3.02	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.263	0.732	0.088	0.	0.	0.	0.	34.825

Problem 819	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	229	0	0	0	0	0	76
normalized size	1	1.	2.29	0.	0.	0.	0.	0.	0.76
time (sec)	N/A	0.242	0.705	0.084	0.	0.	0.	0.	29.9

Problem 820	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	254	0	0	0	0	0	68
normalized size	1	1.	3.02	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.264	0.718	0.082	0.	0.	0.	0.	34.863

Problem 821	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	229	0	0	0	0	0	76
normalized size	1	1.	2.34	0.	0.	0.	0.	0.	0.78
time (sec)	N/A	0.213	0.7	0.099	0.	0.	0.	0.	27.287

Problem 822	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	252	0	0	0	0	0	63
normalized size	1	1.	3.19	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.23	0.742	0.	0.	0.	0.	0.	33.244

Problem 823	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	223	0	0	0	0	0	71
normalized size	1	1.	2.3	0.	0.	0.	0.	0.	0.73
time (sec)	N/A	0.216	0.593	0.077	0.	0.	0.	0.	28.138

Problem 824	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	254	0	0	0	0	0	63
normalized size	1	1.	3.1	0.	0.	0.	0.	0.	0.77
time (sec)	N/A	0.181	0.705	0.107	0.	0.	0.	0.	32.957

Problem 825	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	109	0	0	0	0	0	66
normalized size	1	1.	1.28	0.	0.	0.	0.	0.	0.78
time (sec)	N/A	0.169	0.525	0.09	0.	0.	0.	0.	24.158

Problem 826	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	255	0	0	0	0	0	66
normalized size	1	1.	3.04	0.	0.	0.	0.	0.	0.79
time (sec)	N/A	0.28	0.876	0.1	0.	0.	0.	0.	40.765

Problem 827	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	260	0	0	0	0	0	75
normalized size	1	1.	2.86	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.329	0.852	0.038	0.	0.	0.	0.	49.865

Problem 828	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	260	0	0	0	0	0	75
normalized size	1	1.	2.86	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.335	0.866	0.037	0.	0.	0.	0.	49.817

Problem 829	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	260	0	0	0	0	0	73
normalized size	1	1.	2.86	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.33	0.888	0.036	0.	0.	0.	0.	50.043

Problem 830	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	260	0	0	0	0	0	71
normalized size	1	1.	2.92	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.325	0.811	0.037	0.	0.	0.	0.	49.956

Problem 831	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	260	0	0	0	0	0	71
normalized size	1	1.	2.92	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.235	0.803	0.038	0.	0.	0.	0.	57.893

Problem 832	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	260	0	0	0	0	0	73
normalized size	1	1.	2.86	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.345	0.824	0.037	0.	0.	0.	0.	50.274

Problem 833	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	135	80	75	77	315	0	0	121
normalized size	1	1.	0.59	0.56	0.57	2.33	0.	0.	0.9
time (sec)	N/A	0.196	0.068	0.013	1.366	0.218	0.	0.	19.721

Problem 834	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	75	65	63	261	0	0	88
normalized size	1	1.	0.72	0.62	0.61	2.51	0.	0.	0.85
time (sec)	N/A	0.148	0.051	0.009	1.375	0.215	0.	0.	17.09

Problem 835	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	70	52	50	207	0	0	61
normalized size	1	1.	0.96	0.71	0.68	2.84	0.	0.	0.84
time (sec)	N/A	0.108	0.045	0.008	1.365	0.218	0.	0.	15.551

Problem 836	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	49	72	35	153	0	0	31
normalized size	1	1.	1.32	1.95	0.95	4.14	0.	0.	0.84
time (sec)	N/A	0.073	0.029	0.008	1.377	0.214	0.	0.	9.397

Problem 837	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	62	47	36	103	0	65	61
normalized size	1	1.	0.93	0.7	0.54	1.54	0.	0.97	0.91
time (sec)	N/A	0.106	0.027	0.006	1.54	0.212	0.	0.338	12.231

Problem 838	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	31	31	34	23	14	104	0	65	27
normalized size	1	1.	1.1	0.74	0.45	3.35	0.	2.1	0.87
time (sec)	N/A	0.035	0.019	0.006	1.522	0.215	0.	0.214	4.338

Problem 839	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	39	28	28	131	0	122	56
normalized size	1	1.	0.62	0.44	0.44	2.08	0.	1.94	0.89
time (sec)	N/A	0.068	0.02	0.008	1.521	0.213	0.	0.22	7.228

Problem 840	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	46	33	42	161	0	150	85
normalized size	1	1.	0.49	0.35	0.45	1.71	0.	1.6	0.9
time (sec)	N/A	0.101	0.022	0.012	1.514	0.213	0.	0.223	9.617

Problem 841	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	125	125	51	38	55	185	0	178	114
normalized size	1	1.	0.41	0.3	0.44	1.48	0.	1.42	0.91
time (sec)	N/A	0.137	0.024	0.019	1.581	0.21	0.	0.229	12.362

Problem 842	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	76	65	63	261	0	0	94
normalized size	1	1.	0.73	0.62	0.61	2.51	0.	0.	0.9
time (sec)	N/A	0.15	0.047	0.014	1.427	0.213	0.	0.	16.064

Problem 843	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	70	55	50	200	0	0	65
normalized size	1	1.	0.96	0.75	0.68	2.74	0.	0.	0.89
time (sec)	N/A	0.113	0.046	0.014	1.375	0.215	0.	0.	13.133

Problem 844	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	35	35	59	41	32	153	83	0	31
normalized size	1	1.	1.69	1.17	0.91	4.37	2.37	0.	0.89
time (sec)	N/A	0.075	0.022	0.013	1.395	0.22	8.503	0.	10.111

Problem 845	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	8	8	20	40	22	36	0	0	7
normalized size	1	1.	2.5	5.	2.75	4.5	0.	0.	0.88
time (sec)	N/A	0.043	0.014	0.006	1.401	0.217	0.	0.	6.009

Problem 846	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	29	20	14	35	0	34	26
normalized size	1	1.	1.	0.69	0.48	1.21	0.	1.17	0.9
time (sec)	N/A	0.038	0.021	0.012	1.532	0.212	0.	0.209	4.443

Problem 847	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	36	25	28	90	0	65	56
normalized size	1	1.	0.57	0.4	0.44	1.43	0.	1.03	0.89
time (sec)	N/A	0.075	0.025	0.013	1.521	0.211	0.	0.213	7.072

Problem 848	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	41	30	42	117	0	93	85
normalized size	1	1.	0.44	0.32	0.45	1.24	0.	0.99	0.9
time (sec)	N/A	0.113	0.028	0.013	1.523	0.213	0.	0.22	9.864

Problem 849	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	78	78	78	0	0	0	0	0	60
normalized size	1	1.	1.	0.	0.	0.	0.	0.	0.77
time (sec)	N/A	0.121	0.154	0.217	0.	0.	0.	0.	21.316

Problem 850	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	70	0	0	0	0	0	56
normalized size	1	1.	1.	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.095	0.099	0.22	0.	0.	0.	0.	18.252

Problem 851	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	73	0	0	0	0	0	56
normalized size	1	1.	1.	0.	0.	0.	0.	0.	0.77
time (sec)	N/A	0.074	0.092	0.204	0.	0.	0.	0.	24.622

Problem 852	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	73	0	0	0	0	0	73
normalized size	1	1.	1.01	0.	0.	0.	0.	0.	1.01
time (sec)	N/A	0.179	0.111	0.218	0.	0.	0.	0.	23.599

Problem 853	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	76	0	0	0	0	0	60
normalized size	1	1.	1.	0.	0.	0.	0.	0.	0.79
time (sec)	N/A	0.117	0.105	0.222	0.	0.	0.	0.	21.201

Problem 854	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	36	20	15	10	22	14
normalized size	1	1.	1.	2.4	1.33	1.	0.67	1.47	0.93
time (sec)	N/A	0.05	0.01	0.014	1.419	0.217	0.128	0.211	7.854

Problem 855	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	18	0	49	54	39	66	17
normalized size	1	1.	0.82	0.	2.23	2.45	1.77	3.	0.77
time (sec)	N/A	0.06	0.094	0.103	15.959	0.235	15.701	0.22	8.505

Problem 856	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	88	0	0	0	0	0	80
normalized size	1	1.	0.77	0.	0.	0.	0.	0.	0.7
time (sec)	N/A	0.177	0.109	0.093	0.	0.	0.	0.	23.872

Problem 857	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	78	0	0	0	0	0	60
normalized size	1	1.	0.88	0.	0.	0.	0.	0.	0.67
time (sec)	N/A	0.144	0.088	0.101	0.	0.	0.	0.	18.885

Problem 858	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	78	0	0	0	0	0	60
normalized size	1	1.	0.88	0.	0.	0.	0.	0.	0.67
time (sec)	N/A	0.111	0.08	0.098	0.	0.	0.	0.	15.654

Problem 859	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	64	0	0	0	0	0	53
normalized size	1	1.	0.89	0.	0.	0.	0.	0.	0.74
time (sec)	N/A	0.074	0.053	0.001	0.	0.	0.	0.	12.261

Problem 860	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	56	69	93	78	0	0	49
normalized size	1	1.	0.89	1.1	1.48	1.24	0.	0.	0.78
time (sec)	N/A	0.186	0.086	0.015	1.388	0.242	0.	0.	27.28

Problem 861	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	74	0	0	0	0	0	56
normalized size	1	1.	0.82	0.	0.	0.	0.	0.	0.62
time (sec)	N/A	0.136	0.084	0.102	0.	0.	0.	0.	18.844

Problem 862	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	77	0	0	0	0	0	63
normalized size	1	1.	0.81	0.	0.	0.	0.	0.	0.66
time (sec)	N/A	0.134	0.084	0.108	0.	0.	0.	0.	18.958

Problem 863	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	175	175	141	0	0	0	0	0	0
normalized size	1	1.	0.81	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.755	0.337	0.11	0.	0.	0.	0.	0.

Problem 864	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	142	135	0	0	0	0	0	218
normalized size	1	1.	0.95	0.	0.	0.	0.	0.	1.54
time (sec)	N/A	0.607	0.292	0.186	0.	0.	0.	0.	160.394

Problem 865	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	143	143	134	0	0	0	0	0	218
normalized size	1	1.	0.94	0.	0.	0.	0.	0.	1.52
time (sec)	N/A	0.494	0.274	0.163	0.	0.	0.	0.	145.688

Problem 866	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	108	0	0	0	0	0	100
normalized size	1	1.	0.89	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.342	0.272	0.	0.	0.	0.	0.	53.751

Problem 867	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	96	131	204	302	0	0	85
normalized size	1	1.	0.95	1.3	2.02	2.99	0.	0.	0.84
time (sec)	N/A	0.281	0.455	0.018	1.398	0.251	0.	0.	41.306

Problem 868	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	142	133	0	0	0	0	0	206
normalized size	1	1.	0.94	0.	0.	0.	0.	0.	1.45
time (sec)	N/A	0.607	0.272	0.192	0.	0.	0.	0.	154.167

Problem 869	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	145	145	136	0	0	0	0	0	214
normalized size	1	1.	0.94	0.	0.	0.	0.	0.	1.48
time (sec)	N/A	0.589	0.276	0.165	0.	0.	0.	0.	156.965

Problem 870	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	134	284	312	239	0	0	0
normalized size	1	1.	1.03	2.18	2.4	1.84	0.	0.	0.
time (sec)	N/A	0.336	0.218	0.041	1.425	0.236	0.	0.	0.

Problem 871	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	87	173	203	146	202	0	0
normalized size	1	1.	0.97	1.92	2.26	1.62	2.24	0.	0.
time (sec)	N/A	0.233	0.134	0.038	1.402	0.233	144.008	0.	0.

Problem 872	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	50	87	112	76	105	0	0
normalized size	1	1.	0.83	1.45	1.87	1.27	1.75	0.	0.
time (sec)	N/A	0.153	0.066	0.03	1.391	0.233	53.322	0.	0.

Problem 873	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-2)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	44	59	81	61	0	0	39
normalized size	1	1.	0.81	1.09	1.5	1.13	0.	0.	0.72
time (sec)	N/A	0.163	0.085	0.033	1.388	0.235	0.	0.	20.885

Problem 874	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	75	75	109	163	162	0	0	58
normalized size	1	1.	1.	1.45	2.17	2.16	0.	0.	0.77
time (sec)	N/A	0.184	0.122	0.048	1.474	0.235	0.	0.	24.612

Problem 875	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	102	203	328	360	0	0	83
normalized size	1	1.	0.97	1.93	3.12	3.43	0.	0.	0.79
time (sec)	N/A	0.241	0.195	0.085	1.417	0.242	0.	0.	32.567

Problem 876	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	138	342	386	311	0	0	0
normalized size	1	1.	0.87	2.16	2.44	1.97	0.	0.	0.
time (sec)	N/A	0.397	0.347	0.048	1.405	0.237	0.	0.	0.

Problem 877	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	118	118	125	236	259	197	0	0	0
normalized size	1	1.	1.06	2.	2.19	1.67	0.	0.	0.
time (sec)	N/A	0.303	0.181	0.04	1.39	0.235	0.	0.	0.

Problem 878	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	76	125	151	111	0	0	0
normalized size	1	1.	0.88	1.45	1.76	1.29	0.	0.	0.
time (sec)	N/A	0.21	0.101	0.036	1.442	0.233	0.	0.	0.

Problem 879	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	66	78	109	100	0	0	0
normalized size	1	1.	0.93	1.1	1.54	1.41	0.	0.	0.
time (sec)	N/A	0.201	0.141	0.04	1.398	0.243	0.	0.	0.

Problem 880	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	93	163	198	224	0	0	76
normalized size	1	1.	0.98	1.72	2.08	2.36	0.	0.	0.8
time (sec)	N/A	0.254	0.187	0.049	1.416	0.246	0.	0.	34.633

Problem 881	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	120	120	214	354	406	0	0	99
normalized size	1	1.	1.	1.78	2.95	3.38	0.	0.	0.82
time (sec)	N/A	0.296	0.226	0.086	1.405	0.243	0.	0.	43.96

Problem 882	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	14	14	172	155	208	1	175	208	10
normalized size	1	1.	12.29	11.07	14.86	0.07	12.5	14.86	0.71
time (sec)	N/A	0.017	0.009	0.004	1.369	0.186	0.121	0.208	4.373

Problem 883	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	182	157	211	1	182	211	12
normalized size	1	1.	11.38	9.81	13.19	0.06	11.38	13.19	0.75
time (sec)	N/A	0.018	0.01	0.003	1.38	0.19	0.131	0.208	11.322

Problem 884	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	186	157	211	1	185	211	12
normalized size	1	1.	11.62	9.81	13.19	0.06	11.56	13.19	0.75
time (sec)	N/A	0.018	0.011	0.001	1.382	0.187	0.128	0.209	10.744

Problem 885	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	21	230	0	255	0	275	15
normalized size	1	1.	1.	10.95	0.	12.14	0.	13.1	0.71
time (sec)	N/A	0.051	0.061	0.052	0.	0.234	0.	0.289	9.4

Problem 886	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	13	13	13	0	22	43	0	107	10
normalized size	1	1.	1.	0.	1.69	3.31	0.	8.23	0.77
time (sec)	N/A	0.057	0.077	0.112	1.823	0.233	0.	0.221	6.808

Problem 887	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	8	9	9	9	12	14	8	15	8
normalized size	1	1.12	1.12	1.12	1.5	1.75	1.	1.88	1.
time (sec)	N/A	0.027	0.008	0.002	1.401	0.208	0.56	0.206	4.317

Problem 888	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	23	18	12	24	15
normalized size	1	1.	1.	0.93	1.53	1.2	0.8	1.6	1.
time (sec)	N/A	0.06	0.012	0.007	1.391	0.211	0.62	0.211	10.029

Problem 889	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	23	18	12	20	15
normalized size	1	1.	1.	0.93	1.53	1.2	0.8	1.33	1.
time (sec)	N/A	0.059	0.011	0.007	1.39	0.208	0.653	0.211	9.384

Problem 890	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	17	63	23	29	0	15
normalized size	1	1.	1.	1.13	4.2	1.53	1.93	0.	1.
time (sec)	N/A	0.061	0.022	0.003	1.442	0.233	0.975	0.	9.995

Problem 891	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	14	14	14	177	109	109	87	18	14
normalized size	1	1.	1.	12.64	7.79	7.79	6.21	1.29	1.
time (sec)	N/A	0.013	0.037	0.027	1.401	0.216	8.916	0.206	3.532

Problem 892	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	16	197	109	109	0	20	15
normalized size	1	1.	1.	12.31	6.81	6.81	0.	1.25	0.94
time (sec)	N/A	0.013	0.054	0.027	1.444	0.222	0.	0.21	8.768

Problem 893	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	16	197	109	109	0	20	15
normalized size	1	1.	1.	12.31	6.81	6.81	0.	1.25	0.94
time (sec)	N/A	0.013	0.064	0.02	1.397	0.223	0.	0.214	8.303

Problem 894	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	127	203	826	142	0	0	19
normalized size	1	1.	6.05	9.67	39.33	6.76	0.	0.	0.9
time (sec)	N/A	0.053	0.089	0.082	1.467	0.274	0.	0.	8.517

Problem 895	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	44	0	74	70	0	76	42
normalized size	1	1.	0.85	0.	1.42	1.35	0.	1.46	0.81
time (sec)	N/A	0.099	0.04	0.168	1.526	0.229	0.	0.212	10.17

Problem 896	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	134	142	0	1	0	0	80
normalized size	1	1.	1.44	1.53	0.	0.01	0.	0.	0.86
time (sec)	N/A	0.305	0.243	0.048	0.	0.463	0.	0.	22.815

Problem 897	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	252	252	218	0	0	1	0	0	221
normalized size	1	1.	0.87	0.	0.	0.	0.	0.	0.88
time (sec)	N/A	0.601	0.535	0.09	0.	0.37	0.	0.	51.321

Problem 898	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	199	199	172	0	0	1	0	0	170
normalized size	1	1.	0.86	0.	0.	0.01	0.	0.	0.85
time (sec)	N/A	0.446	0.341	0.085	0.	0.374	0.	0.	38.381

Problem 899	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	146	146	142	0	0	1	0	0	124
normalized size	1	1.	0.97	0.	0.	0.01	0.	0.	0.85
time (sec)	N/A	0.335	0.302	0.085	0.	0.312	0.	0.	28.48

Problem 900	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	106	0	0	1	0	0	75
normalized size	1	1.	1.19	0.	0.	0.01	0.	0.	0.84
time (sec)	N/A	0.242	0.16	0.091	0.	0.314	0.	0.	20.843

Problem 901	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	105	0	0	1	0	0	78
normalized size	1	1.	1.15	0.	0.	0.01	0.	0.	0.86
time (sec)	N/A	0.239	0.267	0.088	0.	0.375	0.	0.	20.08

Problem 902	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	57	0	0	182	0	0	78
normalized size	1	1.	0.6	0.	0.	1.92	0.	0.	0.82
time (sec)	N/A	0.225	0.155	0.087	0.	0.317	0.	0.	19.899

Problem 903	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	358	358	293	0	0	1	0	0	333
normalized size	1	1.	0.82	0.	0.	0.	0.	0.	0.93
time (sec)	N/A	1.	0.626	0.084	0.	0.384	0.	0.	81.248

Problem 904	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	291	291	234	0	0	1	0	0	269
normalized size	1	1.	0.8	0.	0.	0.	0.	0.	0.92
time (sec)	N/A	0.802	0.456	0.086	0.	0.358	0.	0.	59.333

Problem 905	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	221	221	183	0	0	1	0	0	201
normalized size	1	1.	0.83	0.	0.	0.	0.	0.	0.91
time (sec)	N/A	0.617	0.348	0.084	0.	0.321	0.	0.	41.934

Problem 906	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	141	0	0	1	0	0	131
normalized size	1	1.	0.94	0.	0.	0.01	0.	0.	0.87
time (sec)	N/A	0.44	0.325	0.083	0.	0.362	0.	0.	32.29

Problem 907	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	132	0	0	1	0	0	116
normalized size	1	1.	0.99	0.	0.	0.01	0.	0.	0.87
time (sec)	N/A	0.452	0.415	0.085	0.	0.437	0.	0.	34.607

Problem 908	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	147	147	136	0	0	1	0	0	133
normalized size	1	1.	0.93	0.	0.	0.01	0.	0.	0.9
time (sec)	N/A	0.407	0.391	0.096	0.	0.471	0.	0.	36.458

Problem 909	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	20	21	39	34	46	58	15
normalized size	1	1.	1.	1.05	1.95	1.7	2.3	2.9	0.75
time (sec)	N/A	0.019	0.039	0.005	1.543	0.234	5.209	0.213	3.739

Problem 910	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	26	26	47	43	0	73	20
normalized size	1	1.	0.96	0.96	1.74	1.59	0.	2.7	0.74
time (sec)	N/A	0.021	0.054	0.005	1.579	0.234	0.	0.216	6.801

Problem 911	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	26	26	47	43	0	78	20
normalized size	1	1.	0.96	0.96	1.74	1.59	0.	2.89	0.74
time (sec)	N/A	0.021	0.051	0.006	1.667	0.236	0.	0.218	6.076

Problem 912	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	26	0	53	47	0	95	20
normalized size	1	1.	0.96	0.	1.96	1.74	0.	3.52	0.74
time (sec)	N/A	0.049	0.094	0.124	1.871	0.231	0.	0.219	6.243

2.2 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is given. The larger this ratio is, the harder the integral was to solve. In this test, problem number [451] had the largest ratio of [0.56]

Table 1: Rubi specific breakdown of results for each integral

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1	A	3	2	1.	18	0.111
2	A	2	1	1.	16	0.062
3	A	2	1	1.	15	0.067
4	A	3	2	1.	18	0.111
5	A	2	1	1.	18	0.056
6	A	2	1	1.	18	0.056
7	A	3	2	1.	18	0.111
8	A	2	1	1.	18	0.056
9	A	2	1	1.	18	0.056
10	A	3	2	1.	18	0.111
11	A	3	2	1.	20	0.1
12	A	2	1	1.	18	0.056
13	A	2	1	1.	17	0.059
14	A	4	3	1.	20	0.15
15	A	2	1	1.	20	0.05
16	A	2	1	1.	20	0.05
17	A	3	2	1.	20	0.1
18	A	2	1	1.	20	0.05
19	A	2	1	1.	20	0.05

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
20	A	3	2	1.	20	0.1
21	A	2	1	1.	20	0.05
22	A	2	1	1.	20	0.05
23	A	2	1	1.	20	0.05
24	A	3	2	1.	20	0.1
25	A	2	1	1.	20	0.05
26	A	2	1	1.	20	0.05
27	A	3	2	1.	20	0.1
28	A	2	1	1.	20	0.05
29	A	2	1	1.	20	0.05
30	A	3	2	1.	20	0.1
31	A	2	1	1.	18	0.056
32	A	2	1	1.	17	0.059
33	A	4	3	1.	20	0.15
34	A	2	1	1.	20	0.05
35	A	2	1	1.	20	0.05
36	A	3	2	1.	20	0.1
37	A	2	1	1.	20	0.05
38	A	2	1	1.	20	0.05
39	A	3	2	1.	20	0.1
40	A	2	1	1.	20	0.05
41	A	2	1	1.	20	0.05
42	A	3	2	1.	20	0.1
43	A	2	1	1.	20	0.05
44	A	2	1	1.	20	0.05
45	A	3	2	1.	20	0.1
46	A	2	1	1.	20	0.05
47	A	2	1	1.	20	0.05
48	A	3	2	1.	20	0.1
49	A	2	1	1.	20	0.05
50	A	2	1	1.	20	0.05
51	A	4	3	1.	20	0.15
52	A	2	1	1.	20	0.05
53	A	2	1	1.	20	0.05
54	A	3	3	1.	20	0.15
55	A	2	1	1.	20	0.05
56	A	9	8	1.	20	0.4
57	A	3	2	1.	20	0.1
58	A	8	8	1.	20	0.4
59	A	8	8	1.	20	0.4
60	A	3	2	1.	20	0.1
61	A	7	7	1.	18	0.389
62	A	7	7	1.	17	0.412
63	A	3	2	1.	20	0.1
64	A	7	7	1.	20	0.35
65	A	7	7	1.	20	0.35
66	A	3	2	1.	20	0.1
67	A	8	8	1.	20	0.4
68	A	8	8	1.	20	0.4

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
69	A	3	2	1.	20	0.1
70	A	9	8	1.	20	0.4
71	A	9	8	1.	20	0.4
72	A	3	2	1.	20	0.1
73	A	9	8	1.	20	0.4
74	A	9	8	1.	20	0.4
75	A	3	2	1.	20	0.1
76	A	8	8	1.	20	0.4
77	A	8	8	1.	20	0.4
78	A	3	2	1.	20	0.1
79	A	7	7	1.	18	0.389
80	A	7	7	1.	17	0.412
81	A	3	2	1.	20	0.1
82	A	8	8	1.	20	0.4
83	A	8	8	1.	20	0.4
84	A	3	2	1.	20	0.1
85	A	9	8	1.	20	0.4
86	A	9	8	1.	20	0.4
87	A	3	2	1.	20	0.1
88	A	3	2	1.	20	0.1
89	A	3	2	1.	20	0.1
90	A	3	2	1.	20	0.1
91	A	2	2	1.	20	0.1
92	A	3	2	1.	20	0.1
93	A	3	2	1.	20	0.1
94	A	3	2	1.	20	0.1
95	A	10	9	1.	20	0.45
96	A	10	9	1.	20	0.45
97	A	9	9	1.	20	0.45
98	A	9	9	1.	20	0.45
99	A	8	8	1.	20	0.4
100	A	8	8	1.	20	0.4
101	A	8	8	1.	18	0.444
102	A	8	8	1.	17	0.471
103	A	9	9	1.	20	0.45
104	A	9	9	1.	20	0.45
105	A	10	9	1.	20	0.45
106	A	10	9	1.	20	0.45
107	A	3	2	1.	22	0.091
108	A	15	8	1.	22	0.364
109	A	14	8	1.	22	0.364
110	A	3	2	1.	22	0.091
111	A	13	7	1.	22	0.318
112	A	13	7	1.	22	0.318
113	A	4	3	1.	22	0.136
114	A	13	7	1.	20	0.35
115	A	13	7	1.	19	0.368
116	A	3	2	1.	22	0.091
117	A	15	8	1.	22	0.364

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
118	A	14	8	1.	22	0.364
119	A	3	2	1.	22	0.091
120	A	16	9	1.	22	0.409
121	A	15	9	1.	22	0.409
122	A	3	2	1.	22	0.091
123	A	17	9	1.	22	0.409
124	A	2	1	1.	20	0.05
125	A	2	1	1.	20	0.05
126	A	2	1	1.	18	0.056
127	A	2	2	1.	20	0.1
128	A	2	2	1.	20	0.1
129	A	2	2	1.	20	0.1
130	A	3	2	1.	24	0.083
131	A	2	1	1.	20	0.05
132	A	2	1	1.	20	0.05
133	A	2	1	1.	20	0.05
134	A	2	1	1.	20	0.05
135	A	2	1	1.	20	0.05
136	A	2	1	1.	20	0.05
137	A	2	1	1.	20	0.05
138	A	2	1	1.	20	0.05
139	A	2	1	1.	22	0.045
140	A	2	1	1.	22	0.045
141	A	2	1	1.	22	0.045
142	A	2	1	1.	22	0.045
143	A	2	1	1.	22	0.045
144	A	2	1	1.	22	0.045
145	A	2	1	1.	22	0.045
146	A	2	1	1.	22	0.045
147	A	2	1	1.	22	0.045
148	A	2	1	1.	22	0.045
149	A	2	1	1.	22	0.045
150	A	2	1	1.	22	0.045
151	A	2	1	1.	22	0.045
152	A	2	1	1.	22	0.045
153	A	2	1	1.	22	0.045
154	A	2	1	1.	22	0.045
155	A	5	5	1.	22	0.227
156	A	13	9	1.	22	0.409
157	A	12	8	1.	22	0.364
158	A	4	4	1.	22	0.182
159	A	12	8	1.	22	0.364
160	A	12	8	1.	22	0.364
161	A	4	4	1.	22	0.182
162	A	12	8	1.	22	0.364
163	A	5	5	1.	22	0.227
164	A	13	9	1.	22	0.409
165	A	12	8	1.	22	0.364
166	A	4	4	1.	22	0.182

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
167	A	12	8	1.	22	0.364
168	A	13	9	1.	22	0.409
169	A	5	5	1.	22	0.227
170	A	13	9	1.	22	0.409
171	A	5	5	1.	22	0.227
172	A	13	9	1.	22	0.409
173	A	13	9	1.	22	0.409
174	A	5	5	1.	22	0.227
175	A	13	9	1.	22	0.409
176	A	14	10	1.	22	0.454
177	A	6	6	1.	22	0.273
178	A	14	10	1.	22	0.454
179	A	3	2	1.	22	0.091
180	A	3	2	1.	22	0.091
181	A	3	2	1.	22	0.091
182	A	5	5	1.	22	0.227
183	A	5	5	1.	22	0.227
184	A	5	5	1.	22	0.227
185	A	4	4	1.	22	0.182
186	A	3	3	1.	19	0.158
187	A	3	3	1.	22	0.136
188	A	3	3	1.	22	0.136
189	A	4	4	1.	22	0.182
190	A	6	6	1.	22	0.273
191	A	5	5	1.	20	0.25
192	A	5	5	1.	22	0.227
193	A	5	5	1.	22	0.227
194	A	6	6	1.	22	0.273
195	A	7	6	1.	22	0.273
196	A	3	2	1.	22	0.091
197	A	3	2	1.	22	0.091
198	A	3	2	1.	22	0.091
199	A	6	5	1.	22	0.227
200	A	6	5	1.	22	0.227
201	A	6	6	1.	22	0.273
202	A	5	4	1.	22	0.182
203	A	4	3	1.	19	0.158
204	A	4	3	1.	22	0.136
205	A	4	4	1.	22	0.182
206	A	4	3	1.	22	0.136
207	A	7	6	1.	22	0.273
208	A	6	5	1.	20	0.25
209	A	6	5	1.	22	0.227
210	A	6	6	1.	22	0.273
211	A	6	5	1.	22	0.227
212	A	7	6	1.	22	0.273
213	A	3	2	1.	22	0.091
214	A	3	2	1.	22	0.091
215	A	3	2	1.	22	0.091

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
216	A	4	4	1.	22	0.182
217	A	4	4	1.	22	0.182
218	A	5	5	1.	22	0.227
219	A	3	3	1.	22	0.136
220	A	2	2	1.	19	0.105
221	A	2	2	1.	22	0.091
222	A	3	3	1.	22	0.136
223	A	5	5	1.	22	0.227
224	A	4	4	1.	20	0.2
225	A	4	4	1.	22	0.182
226	A	5	5	1.	22	0.227
227	A	6	5	1.	22	0.227
228	A	3	2	1.	22	0.091
229	A	3	2	1.	22	0.091
230	A	3	2	1.	22	0.091
231	A	4	4	1.	22	0.182
232	A	5	5	1.	22	0.227
233	A	6	5	1.	22	0.227
234	A	4	4	1.	22	0.182
235	A	3	3	1.	22	0.136
236	A	2	2	1.	19	0.105
237	A	3	3	1.	22	0.136
238	A	4	4	1.	22	0.182
239	A	5	5	1.	22	0.227
240	A	4	4	1.	20	0.2
241	A	5	5	1.	22	0.227
242	A	6	6	1.	22	0.273
243	A	7	6	1.	22	0.273
244	A	3	2	1.	22	0.091
245	A	3	2	1.	22	0.091
246	A	3	2	1.	22	0.091
247	A	5	5	1.	22	0.227
248	A	6	5	1.	22	0.227
249	A	4	3	1.	22	0.136
250	A	3	3	1.	22	0.136
251	A	3	3	1.	19	0.158
252	A	4	3	1.	22	0.136
253	A	5	4	1.	22	0.182
254	A	6	5	1.	22	0.227
255	A	5	5	1.	22	0.227
256	A	5	5	1.	20	0.25
257	A	6	5	1.	22	0.227
258	A	7	6	1.	22	0.273
259	A	6	5	1.	26	0.192
260	A	5	5	1.	26	0.192
261	A	4	4	1.	26	0.154
262	A	6	5	1.	26	0.192
263	A	7	6	1.	26	0.231
264	A	7	6	1.	26	0.231

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
265	A	5	5	1.	24	0.208
266	A	7	6	1.	26	0.231
267	A	2	2	1.	26	0.077
268	A	2	2	1.	23	0.087
269	A	2	2	1.	26	0.077
270	A	5	4	1.	26	0.154
271	A	4	4	1.	26	0.154
272	A	3	3	1.	26	0.115
273	A	6	5	1.	26	0.192
274	A	7	6	1.	26	0.231
275	A	5	5	1.	26	0.192
276	A	1	1	1.	24	0.042
277	A	7	6	1.	26	0.231
278	A	2	2	1.	26	0.077
279	A	2	2	1.	23	0.087
280	A	2	2	1.	26	0.077
281	A	1	1	1.	22	0.045
282	A	6	5	1.	27	0.185
283	A	6	5	1.	27	0.185
284	A	5	5	1.	27	0.185
285	A	4	4	1.	27	0.148
286	A	6	5	1.	27	0.185
287	A	7	6	1.	27	0.222
288	A	8	7	1.	27	0.259
289	A	15	14	1.	27	0.518
290	A	14	13	1.	27	0.482
291	A	12	12	1.	25	0.48
292	A	14	13	1.	27	0.482
293	A	15	14	1.	27	0.518
294	A	16	14	1.	27	0.518
295	A	7	5	1.	27	0.185
296	A	7	5	1.	27	0.185
297	A	6	5	1.	27	0.185
298	A	5	4	1.	27	0.148
299	A	7	6	1.	27	0.222
300	A	7	6	1.	27	0.222
301	A	8	7	1.	27	0.259
302	A	16	14	1.	27	0.518
303	A	15	14	1.	27	0.518
304	A	14	13	1.	25	0.52
305	A	14	13	1.	27	0.482
306	A	15	14	1.	27	0.518
307	A	16	14	1.	27	0.518
308	A	5	4	1.	27	0.148
309	A	5	4	1.	27	0.148
310	A	4	4	1.	27	0.148
311	A	3	3	1.	27	0.111
312	A	6	5	1.	27	0.185
313	A	7	6	1.	27	0.222

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
314	A	8	7	1.	27	0.259
315	A	14	13	1.	27	0.482
316	A	12	12	1.	27	0.444
317	A	8	8	1.	25	0.32
318	A	14	13	1.	27	0.482
319	A	15	14	1.	27	0.518
320	A	16	14	1.	27	0.518
321	A	2	2	1.	27	0.074
322	A	2	2	1.	24	0.083
323	A	2	2	1.	27	0.074
324	A	2	2	1.	27	0.074
325	A	7	5	1.	27	0.185
326	A	5	4	1.	27	0.148
327	A	4	4	1.	27	0.148
328	A	4	4	1.	27	0.148
329	A	7	6	1.	27	0.222
330	A	8	7	1.	27	0.259
331	A	9	8	1.	27	0.296
332	A	14	13	1.	27	0.482
333	A	14	13	1.	27	0.482
334	A	14	13	1.	25	0.52
335	A	15	14	1.	27	0.518
336	A	16	14	1.	27	0.518
337	A	17	14	1.	27	0.518
338	A	2	2	1.	27	0.074
339	A	2	2	1.	24	0.083
340	A	2	2	1.	27	0.074
341	A	2	2	1.	27	0.074
342	A	5	5	1.	33	0.152
343	A	5	5	1.	35	0.143
344	A	5	5	1.	35	0.143
345	A	5	5	1.	37	0.135
346	A	5	5	1.	33	0.152
347	A	5	5	1.	35	0.143
348	A	5	5	1.	36	0.139
349	A	5	5	1.	36	0.139
350	A	1	1	1.	33	0.03
351	A	1	1	1.	35	0.029
352	A	1	1	1.	35	0.029
353	A	1	1	1.	37	0.027
354	A	1	1	1.	33	0.03
355	A	1	1	1.	35	0.029
356	A	1	1	1.	36	0.028
357	A	1	1	1.	36	0.028
358	A	6	5	1.	24	0.208
359	A	5	5	1.	24	0.208
360	A	4	4	1.	24	0.167
361	A	6	5	1.	24	0.208
362	A	7	6	1.	24	0.25

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
363	A	2	2	1.	24	0.083
364	A	2	2	1.	22	0.091
365	A	2	2	1.	21	0.095
366	A	2	2	1.	24	0.083
367	A	2	2	1.	24	0.083
368	A	7	5	1.	24	0.208
369	A	6	5	1.	24	0.208
370	A	5	4	1.	24	0.167
371	A	7	6	1.	24	0.25
372	A	7	6	1.	24	0.25
373	A	2	2	1.	24	0.083
374	A	2	2	1.	22	0.091
375	A	2	2	1.	21	0.095
376	A	2	2	1.	24	0.083
377	A	2	2	1.	24	0.083
378	A	5	4	1.	24	0.167
379	A	4	4	1.	24	0.167
380	A	3	3	1.	24	0.125
381	A	6	5	1.	24	0.208
382	A	7	6	1.	24	0.25
383	A	2	2	1.	24	0.083
384	A	2	2	1.	22	0.091
385	A	2	2	1.	21	0.095
386	A	2	2	1.	24	0.083
387	A	2	2	1.	24	0.083
388	A	5	4	1.	24	0.167
389	A	4	4	1.	24	0.167
390	A	4	4	1.	24	0.167
391	A	7	6	1.	24	0.25
392	A	8	7	1.	24	0.292
393	A	2	2	1.	24	0.083
394	A	2	2	1.	22	0.091
395	A	2	2	1.	21	0.095
396	A	2	2	1.	24	0.083
397	A	2	2	1.	24	0.083
398	A	6	6	1.	27	0.222
399	A	6	6	1.	27	0.222
400	A	5	5	1.	27	0.185
401	A	4	4	1.	27	0.148
402	A	7	6	1.	27	0.222
403	A	8	7	1.	27	0.259
404	A	9	7	1.	27	0.259
405	A	15	14	1.	27	0.518
406	A	14	13	1.	27	0.482
407	A	14	13	1.	25	0.52
408	A	15	14	1.	27	0.518
409	A	16	14	1.	27	0.518
410	A	17	14	1.	27	0.518
411	A	7	7	1.	27	0.259

Continued on next page

Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
412	A	7	6	1.	27	0.222
413	A	6	5	1.	27	0.185
414	A	5	5	1.	27	0.185
415	A	7	6	1.	27	0.222
416	A	8	7	1.	27	0.259
417	A	9	7	1.	27	0.259
418	A	16	15	1.	27	0.556
419	A	15	14	1.	27	0.518
420	A	14	13	1.	25	0.52
421	A	6	6	1.	27	0.222
422	A	16	14	1.	27	0.518
423	A	17	14	1.	27	0.518
424	A	5	5	1.	27	0.185
425	A	5	5	1.	27	0.185
426	A	4	4	1.	27	0.148
427	A	4	4	1.	27	0.148
428	A	7	6	1.	27	0.222
429	A	8	7	1.	27	0.259
430	A	9	7	1.	27	0.259
431	A	14	13	1.	27	0.482
432	A	14	13	1.	27	0.482
433	A	14	13	1.	25	0.52
434	A	15	14	1.	27	0.518
435	A	16	14	1.	27	0.518
436	A	17	14	1.	27	0.518
437	A	2	2	1.	27	0.074
438	A	2	2	1.	27	0.074
439	A	2	2	1.	24	0.083
440	A	2	2	1.	27	0.074
441	A	2	2	1.	27	0.074
442	A	5	5	1.	27	0.185
443	A	5	5	1.	27	0.185
444	A	5	5	1.	27	0.185
445	A	5	5	1.	27	0.185
446	A	8	7	1.	27	0.259
447	A	9	8	1.	27	0.296
448	A	10	8	1.	27	0.296
449	A	15	14	1.	27	0.518
450	A	15	14	1.	27	0.518
451	A	15	14	1.	25	0.56
452	A	16	15	1.	27	0.556
453	A	17	15	1.	27	0.556
454	A	18	15	1.	27	0.556
455	A	2	2	1.	27	0.074
456	A	2	2	1.	27	0.074
457	A	2	2	1.	24	0.083
458	A	2	2	1.	27	0.074
459	A	2	2	1.	27	0.074
460	A	6	6	1.	24	0.25

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
461	A	5	5	1.	24	0.208
462	A	4	4	1.	24	0.167
463	A	7	6	1.	24	0.25
464	A	8	7	1.	24	0.292
465	A	2	2	1.	24	0.083
466	A	2	2	1.	22	0.091
467	A	2	2	1.	21	0.095
468	A	2	2	1.	24	0.083
469	A	2	2	1.	24	0.083
470	A	7	6	1.	24	0.25
471	A	6	5	1.	24	0.208
472	A	5	5	1.	24	0.208
473	A	7	6	1.	24	0.25
474	A	8	7	1.	24	0.292
475	A	2	2	1.	24	0.083
476	A	2	2	1.	22	0.091
477	A	2	2	1.	21	0.095
478	A	2	2	1.	24	0.083
479	A	2	2	1.	24	0.083
480	A	5	5	1.	24	0.208
481	A	4	4	1.	24	0.167
482	A	4	4	1.	24	0.167
483	A	7	6	1.	24	0.25
484	A	8	7	1.	24	0.292
485	A	2	2	1.	24	0.083
486	A	2	2	1.	22	0.091
487	A	2	2	1.	21	0.095
488	A	2	2	1.	24	0.083
489	A	2	2	1.	24	0.083
490	A	5	5	1.	24	0.208
491	A	5	5	1.	24	0.208
492	A	5	5	1.	24	0.208
493	A	8	7	1.	24	0.292
494	A	9	8	1.	24	0.333
495	A	2	2	1.	24	0.083
496	A	2	2	1.	22	0.091
497	A	2	2	1.	21	0.095
498	A	2	2	1.	24	0.083
499	A	2	2	1.	24	0.083
500	A	3	3	1.	24	0.125
501	A	3	3	1.	24	0.125
502	A	3	3	1.	24	0.125
503	A	3	3	1.	24	0.125
504	A	3	3	1.	24	0.125
505	A	3	3	1.	24	0.125
506	A	4	4	1.	26	0.154
507	A	3	3	1.	26	0.115
508	A	3	3	1.	26	0.115
509	A	4	4	1.	26	0.154

Continued on next page

Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
510	A	3	2	1.	26	0.077
511	A	3	2	1.	26	0.077
512	A	3	2	1.	24	0.083
513	A	3	2	1.	23	0.087
514	A	3	2	1.	26	0.077
515	A	3	2	1.	26	0.077
516	A	7	7	1.	26	0.269
517	A	5	5	1.	26	0.192
518	A	6	6	1.	26	0.231
519	A	6	6	1.	26	0.231
520	A	4	4	1.	26	0.154
521	A	6	6	1.	26	0.231
522	A	6	6	1.	26	0.231
523	A	4	4	1.	26	0.154
524	A	6	6	1.	24	0.25
525	A	6	6	1.	24	0.25
526	A	4	4	1.	24	0.167
527	A	8	7	1.	26	0.269
528	A	6	5	1.	26	0.192
529	A	7	6	1.	26	0.231
530	A	7	6	1.	26	0.231
531	A	5	4	1.	26	0.154
532	A	7	6	1.	26	0.231
533	A	7	6	1.	26	0.231
534	A	5	4	1.	26	0.154
535	A	9	7	1.	26	0.269
536	A	7	5	1.	26	0.192
537	A	8	6	1.	26	0.231
538	A	8	6	1.	26	0.231
539	A	6	4	1.	26	0.154
540	A	8	6	1.	26	0.231
541	A	8	6	1.	26	0.231
542	A	6	4	1.	26	0.154
543	A	6	6	1.	26	0.231
544	A	4	4	1.	26	0.154
545	A	5	5	1.	26	0.192
546	A	5	5	1.	26	0.192
547	A	3	3	1.	26	0.115
548	A	5	5	1.	26	0.192
549	A	5	5	1.	26	0.192
550	A	3	3	1.	26	0.115
551	A	6	6	1.	26	0.231
552	A	4	4	1.	26	0.154
553	A	5	5	1.	26	0.192
554	A	5	5	1.	26	0.192
555	A	3	3	1.	26	0.115
556	A	6	6	1.	26	0.231
557	A	2	2	1.	26	0.077
558	A	4	4	1.	26	0.154

Continued on next page

Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
559	A	6	6	1.	26	0.231
560	A	4	4	1.	26	0.154
561	A	6	6	1.	26	0.231
562	A	2	2	1.	26	0.077
563	A	4	4	1.	26	0.154
564	A	7	6	1.	26	0.231
565	A	3	3	1.	26	0.115
566	A	5	4	1.	26	0.154
567	A	7	6	1.	22	0.273
568	A	7	6	1.	22	0.273
569	A	7	6	1.	22	0.273
570	A	6	6	1.	22	0.273
571	A	5	5	1.	22	0.227
572	A	10	7	1.	22	0.318
573	A	11	8	1.	22	0.364
574	A	15	10	1.	22	0.454
575	A	14	9	1.	22	0.409
576	A	7	7	1.	19	0.368
577	A	8	8	1.	22	0.364
578	A	9	8	1.	22	0.364
579	A	9	8	1.	22	0.364
580	A	1	1	1.	22	0.045
581	A	1	1	1.	20	0.05
582	A	1	1	1.	22	0.045
583	A	1	1	1.	22	0.045
584	A	7	6	1.	22	0.273
585	A	7	6	1.	22	0.273
586	A	6	6	1.	22	0.273
587	A	5	5	1.	22	0.227
588	A	10	7	1.	22	0.318
589	A	11	8	1.	22	0.364
590	A	14	9	1.	22	0.409
591	A	7	7	1.	20	0.35
592	A	8	8	1.	22	0.364
593	A	9	8	1.	22	0.364
594	A	1	1	1.	22	0.045
595	A	1	1	1.	22	0.045
596	A	1	1	1.	19	0.053
597	A	1	1	1.	22	0.045
598	A	3	2	1.	22	0.091
599	A	3	2	1.	22	0.091
600	A	3	2	1.	22	0.091
601	A	4	3	1.	22	0.136
602	A	3	2	1.	22	0.091
603	A	3	2	1.	22	0.091
604	A	6	5	1.	22	0.227
605	A	5	4	1.	22	0.182
606	A	4	3	1.	22	0.136
607	A	4	3	1.	20	0.15

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
608	A	5	4	1.	22	0.182
609	A	6	5	1.	22	0.227
610	A	20	8	1.	22	0.364
611	A	19	7	1.	22	0.318
612	A	19	7	1.	22	0.318
613	A	19	7	1.	22	0.318
614	A	19	7	1.	19	0.368
615	A	21	8	1.	22	0.364
616	A	20	8	1.	22	0.364
617	A	22	9	1.	22	0.409
618	A	5	5	1.	24	0.208
619	A	7	7	1.	24	0.292
620	A	4	4	1.	24	0.167
621	A	6	6	1.	22	0.273
622	A	6	5	1.	24	0.208
623	A	5	5	1.	24	0.208
624	A	7	6	1.	24	0.25
625	A	6	6	1.	24	0.25
626	A	11	7	1.28	24	0.292
627	A	8	5	1.36	24	0.208
628	A	9	6	1.32	24	0.25
629	A	7	4	1.37	21	0.19
630	A	11	7	1.31	24	0.292
631	A	8	5	1.34	24	0.208
632	A	3	3	1.	28	0.107
633	A	3	3	1.	28	0.107
634	A	3	3	1.	28	0.107
635	A	3	3	1.	28	0.107
636	A	5	4	1.	24	0.167
637	A	4	4	1.	24	0.167
638	A	3	3	1.	24	0.125
639	A	6	5	1.	24	0.208
640	A	7	6	1.	24	0.25
641	A	7	7	1.	24	0.292
642	A	6	6	1.	24	0.25
643	A	3	3	1.	22	0.136
644	A	5	5	1.	24	0.208
645	A	6	6	1.	24	0.25
646	A	8	5	1.	24	0.208
647	A	7	4	1.37	24	0.167
648	A	5	3	1.21	21	0.143
649	A	8	5	1.33	24	0.208
650	A	9	6	1.28	24	0.25
651	A	5	3	1.22	24	0.125
652	A	11	7	1.28	24	0.292
653	A	5	5	1.	24	0.208
654	A	5	5	1.	24	0.208
655	A	4	4	1.	24	0.167
656	A	4	4	1.	24	0.167

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
657	A	7	6	1.	24	0.25
658	A	8	7	1.	24	0.292
659	A	8	8	1.	24	0.333
660	A	7	7	1.	24	0.292
661	A	5	5	1.	24	0.208
662	A	4	4	1.	22	0.182
663	A	6	6	1.	24	0.25
664	A	7	6	1.	24	0.25
665	A	8	5	1.	24	0.208
666	A	8	5	1.	24	0.208
667	A	8	5	1.	21	0.238
668	A	9	6	1.	24	0.25
669	A	11	7	1.	24	0.292
670	A	11	7	1.	24	0.292
671	A	12	8	1.	24	0.333
672	A	4	4	0.97	26	0.154
673	A	3	3	0.93	24	0.125
674	A	2	2	1.	17	0.118
675	A	2	2	1.	26	0.077
676	A	2	2	1.	26	0.077
677	A	2	2	1.	26	0.077
678	A	4	4	1.	26	0.154
679	A	3	3	1.	24	0.125
680	A	2	2	1.	17	0.118
681	A	2	2	1.	26	0.077
682	A	2	2	1.	26	0.077
683	A	2	2	1.	26	0.077
684	A	5	4	1.	24	0.167
685	A	4	4	1.	24	0.167
686	A	3	3	1.	24	0.125
687	A	6	5	1.	24	0.208
688	A	7	6	1.	24	0.25
689	A	7	7	1.	24	0.292
690	A	6	6	1.	24	0.25
691	A	3	3	1.	24	0.125
692	A	5	5	1.	24	0.208
693	A	6	6	1.	24	0.25
694	A	2	2	1.	24	0.083
695	A	3	3	1.	24	0.125
696	A	3	3	1.	22	0.136
697	A	2	2	1.	21	0.095
698	A	2	2	1.	24	0.083
699	A	3	3	1.	24	0.125
700	A	3	3	1.	24	0.125
701	A	5	5	1.	24	0.208
702	A	4	4	1.	24	0.167
703	A	4	4	1.	24	0.167
704	A	7	6	1.	24	0.25
705	A	8	7	1.	24	0.292

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
706	A	7	7	1.	24	0.292
707	A	5	5	1.	24	0.208
708	A	4	4	1.	24	0.167
709	A	6	6	1.	24	0.25
710	A	7	6	1.	24	0.25
711	A	2	2	1.	24	0.083
712	A	3	3	1.	24	0.125
713	A	3	3	1.	22	0.136
714	A	2	2	1.	21	0.095
715	A	2	2	1.	24	0.083
716	A	3	3	1.	24	0.125
717	A	3	3	1.	24	0.125
718	A	5	4	1.	24	0.167
719	A	4	4	1.	24	0.167
720	A	3	3	1.	24	0.125
721	A	6	5	1.	24	0.208
722	A	7	6	1.	24	0.25
723	A	7	7	1.	24	0.292
724	A	6	6	1.	24	0.25
725	A	3	3	1.	24	0.125
726	A	5	5	1.	24	0.208
727	A	6	6	1.	24	0.25
728	A	8	5	1.	24	0.208
729	A	6	4	1.	22	0.182
730	A	9	6	1.	24	0.25
731	A	10	7	1.	24	0.292
732	A	6	4	1.	24	0.167
733	A	12	8	1.	24	0.333
734	A	2	2	1.	24	0.083
735	A	2	2	1.	24	0.083
736	A	2	2	1.	21	0.095
737	A	2	2	1.	24	0.083
738	A	2	2	1.	24	0.083
739	A	5	5	1.	24	0.208
740	A	4	4	1.	24	0.167
741	A	4	4	1.	24	0.167
742	A	7	6	1.	24	0.25
743	A	8	7	1.	24	0.292
744	A	7	7	1.	24	0.292
745	A	5	5	1.	24	0.208
746	A	4	4	1.	24	0.167
747	A	6	6	1.	24	0.25
748	A	7	6	1.	24	0.25
749	A	9	6	1.	24	0.25
750	A	9	6	1.	22	0.273
751	A	10	7	1.	24	0.292
752	A	12	8	1.	24	0.333
753	A	12	8	1.	24	0.333
754	A	13	9	1.	24	0.375

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
755	A	2	2	1.	24	0.083
756	A	2	2	1.	24	0.083
757	A	2	2	1.	21	0.095
758	A	2	2	1.	24	0.083
759	A	2	2	1.	24	0.083
760	A	6	6	1.	22	0.273
761	A	5	5	1.	22	0.227
762	A	5	5	1.	20	0.25
763	A	5	5	1.	22	0.227
764	A	3	2	1.	22	0.091
765	A	3	2	1.	22	0.091
766	A	3	2	1.	22	0.091
767	A	3	2	1.	22	0.091
768	A	5	3	1.	22	0.136
769	A	4	3	1.	22	0.136
770	A	3	3	1.	22	0.136
771	A	2	2	1.	22	0.091
772	A	5	5	1.	22	0.227
773	A	5	5	1.	19	0.263
774	A	5	5	1.	22	0.227
775	A	6	6	1.	22	0.273
776	A	6	5	1.	22	0.227
777	A	6	6	1.	22	0.273
778	A	6	5	1.	20	0.25
779	A	6	5	1.	22	0.227
780	A	3	2	1.	22	0.091
781	A	3	2	1.	22	0.091
782	A	3	2	1.	22	0.091
783	A	3	2	1.	22	0.091
784	A	5	3	1.	22	0.136
785	A	4	3	1.	22	0.136
786	A	3	3	1.	22	0.136
787	A	2	2	1.	22	0.091
788	A	6	5	1.	22	0.227
789	A	6	6	1.	22	0.273
790	A	6	5	1.	19	0.263
791	A	6	5	1.	22	0.227
792	A	7	6	1.	22	0.273
793	A	5	5	1.	22	0.227
794	A	4	4	1.	20	0.2
795	A	4	4	1.	22	0.182
796	A	3	2	1.	22	0.091
797	A	3	2	1.	22	0.091
798	A	3	2	1.	22	0.091
799	A	3	3	1.	22	0.136
800	A	2	2	1.	22	0.091
801	A	4	4	1.	19	0.21
802	A	4	4	1.	22	0.182
803	A	5	5	1.	22	0.227

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
804	A	6	5	1.	22	0.227
805	A	5	5	1.	20	0.25
806	A	4	4	1.	22	0.182
807	A	3	2	1.	22	0.091
808	A	3	2	1.	22	0.091
809	A	3	2	1.	22	0.091
810	A	3	2	1.	22	0.091
811	A	4	4	1.	22	0.182
812	A	3	3	1.	22	0.136
813	A	3	3	1.	19	0.158
814	A	4	4	1.	22	0.182
815	A	5	5	1.	22	0.227
816	A	6	6	1.	22	0.273
817	A	4	3	0.96	24	0.125
818	A	4	3	1.	22	0.136
819	A	3	3	1.	22	0.136
820	A	4	3	1.	22	0.136
821	A	3	3	1.	20	0.15
822	A	4	3	1.	19	0.158
823	A	3	3	1.	22	0.136
824	A	4	3	1.	22	0.136
825	A	3	3	1.	22	0.136
826	A	4	3	1.	22	0.136
827	A	4	3	1.	26	0.115
828	A	4	3	1.	26	0.115
829	A	4	3	1.	26	0.115
830	A	4	3	1.	26	0.115
831	A	4	3	1.	26	0.115
832	A	4	3	1.	26	0.115
833	A	6	4	1.	28	0.143
834	A	5	4	1.	28	0.143
835	A	4	4	1.	28	0.143
836	A	3	3	1.	28	0.107
837	A	4	4	1.	28	0.143
838	A	1	1	1.	28	0.036
839	A	2	2	1.	28	0.071
840	A	3	2	1.	28	0.071
841	A	4	2	1.	28	0.071
842	A	5	3	1.	28	0.107
843	A	4	3	1.	28	0.107
844	A	3	3	1.	28	0.107
845	A	2	2	1.	28	0.071
846	A	1	1	1.	28	0.036
847	A	2	2	1.	28	0.071
848	A	3	2	1.	28	0.071
849	A	3	3	1.	24	0.125
850	A	3	3	1.	22	0.136
851	A	3	3	1.	21	0.143
852	A	4	4	1.	24	0.167

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
853	A	3	3	1.	24	0.125
854	A	3	2	1.	18	0.111
855	A	1	1	1.	33	0.03
856	A	3	2	1.	24	0.083
857	A	3	2	1.	22	0.091
858	A	3	2	1.	20	0.1
859	A	3	2	1.	19	0.105
860	A	3	2	1.	22	0.091
861	A	3	2	1.	22	0.091
862	A	3	2	1.	22	0.091
863	A	5	3	1.	24	0.125
864	A	5	3	1.	22	0.136
865	A	5	3	1.	20	0.15
866	A	4	3	1.	19	0.158
867	A	3	2	1.	22	0.091
868	A	5	3	1.	22	0.136
869	A	5	3	1.	22	0.136
870	A	3	2	1.	26	0.077
871	A	3	2	1.	26	0.077
872	A	3	2	1.	24	0.083
873	A	3	2	1.	26	0.077
874	A	3	2	1.	26	0.077
875	A	3	2	1.	26	0.077
876	A	3	2	1.	26	0.077
877	A	3	2	1.	26	0.077
878	A	3	2	1.	24	0.083
879	A	3	2	1.	26	0.077
880	A	3	2	1.	26	0.077
881	A	3	2	1.	26	0.077
882	A	1	1	1.	17	0.059
883	A	1	1	1.	21	0.048
884	A	1	1	1.	21	0.048
885	A	2	2	1.	25	0.08
886	A	1	1	1.	31	0.032
887	A	2	1	1.12	17	0.059
888	A	3	2	1.	21	0.095
889	A	3	2	1.	21	0.095
890	A	3	2	1.	21	0.095
891	A	1	1	1.	17	0.059
892	A	1	1	1.	21	0.048
893	A	1	1	1.	21	0.048
894	A	2	2	1.	25	0.08
895	A	5	5	1.	22	0.227
896	A	6	5	1.	26	0.192
897	A	7	5	1.	30	0.167
898	A	6	5	1.	30	0.167
899	A	5	5	1.	30	0.167
900	A	4	4	1.	30	0.133
901	A	4	4	1.	30	0.133

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
902	A	3	3	1.	30	0.1
903	A	8	6	1.	30	0.2
904	A	7	6	1.	30	0.2
905	A	6	6	1.	30	0.2
906	A	5	5	1.	30	0.167
907	A	5	5	1.	30	0.167
908	A	5	5	1.	30	0.167
909	A	1	1	1.	17	0.059
910	A	1	1	1.	27	0.037
911	A	1	1	1.	27	0.037
912	A	1	1	1.	27	0.037

3 Listing of integrals

3.1 $\int x^2 \left(a+bx^3\right) \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=33

$$\frac{1}{6}x^6(aB+Ab)+\frac{1}{3}aAx^3+\frac{1}{9}bBx^9$$

```
[Out] (a*A*x^3)/3 + ((A*b + a*B)*x^6)/6 + (b*B*x^9)/9
```

Rubi [A] time = 0.104397, antiderivative size = 33, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$\frac{1}{6}x^6(aB+Ab)+\frac{1}{3}aAx^3+\frac{1}{9}bBx^9$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (a*A*x^3)/3 + ((A*b + a*B)*x^6)/6 + (b*B*x^9)/9
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{Bbx^9}{9}+\frac{a\int^{x^3} A\,dx}{3}+\left(\frac{Ab}{3}+\frac{Ba}{3}\right)\int^{x^3} x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**2*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] B*b*x**9/9 + a*Integral(A, (x, x**3))/3 + (A*b/3 + B*a/3)*Integra
l(x, (x, x**3))
```

Mathematica [A] time = 0.0153083, size = 33, normalized size = 1.

$$\frac{1}{6}x^6(aB+Ab)+\frac{1}{3}aAx^3+\frac{1}{9}bBx^9$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (a*A*x^3)/3 + ((A*b + a*B)*x^6)/6 + (b*B*x^9)/9
```

Maple [A] time = 0.002, size = 28, normalized size = 0.9

$$\frac{aAx^3}{3}+\frac{(Ab+Ba)\,x^6}{6}+\frac{bBx^9}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(b*x^3+a)*(B*x^3+A),x)
```

```
[Out] 1/3*a*A*x^3+1/6*(A*b+B*a)*x^6+1/9*b*B*x^9
```

Maxima [A] time = 1.40642, size = 36, normalized size = 1.09

$$\frac{1}{9}Bbx^9 + \frac{1}{6}(Ba + Ab)x^6 + \frac{1}{3}Aax^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^2,x, algorithm="maxima")
```

```
[Out] 1/9*B*b*x^9 + 1/6*(B*a + A*b)*x^6 + 1/3*A*a*x^3
```

Fricas [A] time = 0.20057, size = 1, normalized size = 0.03

$$\frac{1}{9}x^9bB + \frac{1}{6}x^6aB + \frac{1}{6}x^6bA + \frac{1}{3}x^3aA$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^2,x, algorithm="fricas")
```

```
[Out] 1/9*x^9*b*B + 1/6*x^6*a*B + 1/6*x^6*b*A + 1/3*x^3*a*A
```

Sympy [A] time = 0.078523, size = 29, normalized size = 0.88

$$\frac{Aax^3}{3} + \frac{Bbx^9}{9} + x^6\left(\frac{Ab}{6} + \frac{Ba}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] A*a*x**3/3 + B*b*x**9/9 + x**6*(A*b/6 + B*a/6)
```

GIAC/XCAS [A] time = 0.235945, size = 39, normalized size = 1.18

$$\frac{1}{9}Bbx^9 + \frac{1}{6}Bax^6 + \frac{1}{6}Abx^6 + \frac{1}{3}Aax^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^2,x, algorithm="giac")
```

```
[Out] 1/9*B*b*x^9 + 1/6*B*a*x^6 + 1/6*A*b*x^6 + 1/3*A*a*x^3
```

3.2 $\int x\left(a+bx^3\right)\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=33

$$\frac{1}{5}x^5(aB+Ab)+\frac{1}{2}aAx^2+\frac{1}{8}bBx^8$$

```
[Out] (a*A*x^2)/2 + ((A*b + a*B)*x^5)/5 + (b*B*x^8)/8
```

Rubi [A] time = 0.0623301, antiderivative size = 33, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062

$$\frac{1}{5}x^5(aB+Ab)+\frac{1}{2}aAx^2+\frac{1}{8}bBx^8$$

Antiderivative was successfully verified.

```
[In] Int[x*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (a*A*x^2)/2 + ((A*b + a*B)*x^5)/5 + (b*B*x^8)/8
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$Aa\int x\,dx+\frac{Bbx^8}{8}+x^5\left(\frac{Ab}{5}+\frac{Ba}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] A*a*Integral(x, x) + B*b*x**8/8 + x**5*(A*b/5 + B*a/5)
```

Mathematica [A] time = 0.010034, size = 33, normalized size = 1.

$$\frac{1}{5}x^5(aB+Ab)+\frac{1}{2}aAx^2+\frac{1}{8}bBx^8$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (a*A*x^2)/2 + ((A*b + a*B)*x^5)/5 + (b*B*x^8)/8
```

Maple [A] time = 0., size = 28, normalized size = 0.9

$$\frac{aAx^2}{2}+\frac{(Ab+Ba)\,x^5}{5}+\frac{bBx^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(b*x^3+a)*(B*x^3+A),x)
```

```
[Out] 1/2*a*A*x^2+1/5*(A*b+B*a)*x^5+1/8*b*B*x^8
```

Maxima [A] time = 1.37498, size = 36, normalized size = 1.09

$$\frac{1}{8}Bbx^8 + \frac{1}{5}(Ba + Ab)x^5 + \frac{1}{2}Aax^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x,x, algorithm="maxima")
```

```
[Out] 1/8*B*b*x^8 + 1/5*(B*a + A*b)*x^5 + 1/2*A*a*x^2
```

Fricas [A] time = 0.203789, size = 1, normalized size = 0.03

$$\frac{1}{8}x^8bB + \frac{1}{5}x^5aB + \frac{1}{5}x^5bA + \frac{1}{2}x^2aA$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x,x, algorithm="fricas")
```

```
[Out] 1/8*x^8*b*B + 1/5*x^5*a*B + 1/5*x^5*b*A + 1/2*x^2*a*A
```

Sympy [A] time = 0.076719, size = 29, normalized size = 0.88

$$\frac{Aax^2}{2} + \frac{Bbx^8}{8} + x^5\left(\frac{Ab}{5} + \frac{Ba}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] A*a*x**2/2 + B*b*x**8/8 + x**5*(A*b/5 + B*a/5)
```

GIAC/XCAS [A] time = 0.220171, size = 39, normalized size = 1.18

$$\frac{1}{8}Bbx^8 + \frac{1}{5}Bax^5 + \frac{1}{5}Abx^5 + \frac{1}{2}Aax^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x,x, algorithm="giac")
```

```
[Out] 1/8*B*b*x^8 + 1/5*B*a*x^5 + 1/5*A*b*x^5 + 1/2*A*a*x^2
```

3.3 $\int (a+bx^3)(A+Bx^3)\,dx$

Optimal. Leaf size=28

$$\frac{1}{4}x^4(aB+Ab)+aAx+\frac{1}{7}bBx^7$$

```
[Out] a*A*x + ((A*b + a*B)*x^4)/4 + (b*B*x^7)/7
```

Rubi [A] time = 0.041408, antiderivative size = 28, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067

$$\frac{1}{4}x^4(aB+Ab)+aAx+\frac{1}{7}bBx^7$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] a*A*x + ((A*b + a*B)*x^4)/4 + (b*B*x^7)/7
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{Bbx^7}{7}+a\int A\,dx+x^4\left(\frac{Ab}{4}+\frac{Ba}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A),x)
```

```
[Out] B*b*x**7/7 + a*Integral(A, x) + x**4*(A*b/4 + B*a/4)
```

Mathematica [A] time = 0.00973132, size = 28, normalized size = 1.

$$\frac{1}{4}x^4(aB+Ab)+aAx+\frac{1}{7}bBx^7$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] a*A*x + ((A*b + a*B)*x^4)/4 + (b*B*x^7)/7
```

Maple [A] time = 0.001, size = 25, normalized size = 0.9

$$aAx+\frac{(Ab+Ba)\,x^4}{4}+\frac{bBx^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A),x)
```

```
[Out] a*A*x+1/4*(A*b+B*a)*x^4+1/7*b*B*x^7
```

Maxima [A] time = 1.37198, size = 32, normalized size = 1.14

$$\frac{1}{7}\,Bbx^{7} + \frac{1}{4}\,(Ba + Ab)x^{4} + Aax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] 1/7*B*b*x^7 + 1/4*(B*a + A*b)*x^4 + A*a*x
```

Fricas [A] time = 0.198188, size = 1, normalized size = 0.04

$$\frac{1}{7}x^{7}bB + \frac{1}{4}x^{4}aB + \frac{1}{4}x^{4}bA + xaA$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/7*x^7*b*B + 1/4*x^4*a*B + 1/4*x^4*b*A + x*a*A
```

Sympy [A] time = 0.070238, size = 26, normalized size = 0.93

$$Aax + \frac{Bbx^{7}}{7} + x^{4}\left(\frac{Ab}{4} + \frac{Ba}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A),x)
```

```
[Out] A*a*x + B*b*x**7/7 + x**4*(A*b/4 + B*a/4)
```

GIAC/XCAS [A] time = 0.219397, size = 35, normalized size = 1.25

$$\frac{1}{7}\,Bbx^{7} + \frac{1}{4}\,Bax^{4} + \frac{1}{4}\,Abx^{4} + Aax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 1/7*B*b*x^7 + 1/4*B*a*x^4 + 1/4*A*b*x^4 + A*a*x
```

3.4 $\int \frac{(a+bx^3)(A+Bx^3)}{x} \, dx$

Optimal. Leaf size=29

$$\frac{1}{3}x^3(aB+Ab)+aA\log(x)+\frac{1}{6}bBx^6$$

```
[Out] ((A*b + a*B)*x^3)/3 + (b*B*x^6)/6 + a*A*Log[x]
```

Rubi [A] time = 0.0664195, antiderivative size = 29, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$\frac{1}{3}x^3(aB+Ab)+aA\log(x)+\frac{1}{6}bBx^6$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)*(A + B*x^3))/x,x]
```

```
[Out] ((A*b + a*B)*x^3)/3 + (b*B*x^6)/6 + a*A*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{Aa\log\left(x^3\right)}{3}+\frac{Bb\int^{x^3}x\,dx}{3}+\frac{a\int^{x^3}B\,dx}{3}+\frac{b\int^{x^3}A\,dx}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A)/x,x)
```

```
[Out] A*a*log(x**3)/3 + B*b*Integral(x, (x, x**3))/3 + a*Integral(B, (x
, x**3))/3 + b*Integral(A, (x, x**3))/3
```

Mathematica [A] time = 0.0161975, size = 29, normalized size = 1.

$$\frac{1}{3}x^3(aB+Ab)+aA\log(x)+\frac{1}{6}bBx^6$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)*(A + B*x^3))/x,x]
```

```
[Out] ((A*b + a*B)*x^3)/3 + (b*B*x^6)/6 + a*A*Log[x]
```

Maple [A] time = 0.003, size = 28, normalized size = 1.

$$\frac{bBx^6}{6}+\frac{Ax^3b}{3}+\frac{Bx^3a}{3}+aA\ln(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A)/x,x)
```

```
[Out] 1/6*b*B*x^6+1/3*A*x^3*b+1/3*B*x^3*a+a*A*ln(x)
```

Maxima [A] time = 1.36714, size = 38, normalized size = 1.31

$$\frac{1}{6}Bbx^6 + \frac{1}{3}(Ba + Ab)x^3 + \frac{1}{3}Aa\log\left(x^3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x,x, algorithm="maxima")
```

```
[Out] 1/6*B*b*x^6 + 1/3*(B*a + A*b)*x^3 + 1/3*A*a*log(x^3)
```

Fricas [A] time = 0.224996, size = 34, normalized size = 1.17

$$\frac{1}{6}Bbx^6 + \frac{1}{3}(Ba + Ab)x^3 + Aa\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x,x, algorithm="fricas")
```

```
[Out] 1/6*B*b*x^6 + 1/3*(B*a + A*b)*x^3 + A*a*log(x)
```

Sympy [A] time = 1.04253, size = 27, normalized size = 0.93

$$Aa\log(x) + \frac{Bbx^6}{6} + x^3\left(\frac{Ab}{3} + \frac{Ba}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x,x)
```

```
[Out] A*a*log(x) + B*b*x**6/6 + x**3*(A*b/3 + B*a/3)
```

GIAC/XCAS [A] time = 0.222875, size = 38, normalized size = 1.31

$$\frac{1}{6}Bbx^6 + \frac{1}{3}Bax^3 + \frac{1}{3}Abx^3 + Aa\ln(|x|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x,x, algorithm="giac")
```

```
[Out] 1/6*B*b*x^6 + 1/3*B*a*x^3 + 1/3*A*b*x^3 + A*a*ln(abs(x))
```

3.5 $\int \frac{(a+bx^3)(A+Bx^3)}{x^2}\,dx$

Optimal. Leaf size=31

$$\frac{1}{2}x^2(aB+Ab)-\frac{aA}{x}+\frac{1}{5}bBx^5$$

```
[Out] -((a*A)/x) + ((A*b + a*B)*x^2)/2 + (b*B*x^5)/5
```

Rubi [A] time = 0.0554531, antiderivative size = 31, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056

$$\frac{1}{2}x^2(aB+Ab)-\frac{aA}{x}+\frac{1}{5}bBx^5$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)*(A + B*x^3))/x^2,x]

[Out] -((a*A)/x) + ((A*b + a*B)*x^2)/2 + (b*B*x^5)/5
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa}{x}+\frac{Bbx^5}{5}+(Ab+Ba)\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)*(B*x**3+A)/x**2,x)

[Out] -A*a/x + B*b*x**5/5 + (A*b + B*a)*Integral(x, x)
```

Mathematica [A] time = 0.0193497, size = 31, normalized size = 1.

$$\frac{1}{2}x^2(aB+Ab)-\frac{aA}{x}+\frac{1}{5}bBx^5$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)*(A + B*x^3))/x^2,x]

[Out] -((a*A)/x) + ((A*b + a*B)*x^2)/2 + (b*B*x^5)/5
```

Maple [A] time = 0.005, size = 30, normalized size = 1.

$$\frac{bBx^5}{5}+\frac{Ax^2b}{2}+\frac{Bx^2a}{2}-\frac{Aa}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^3+a)*(B*x^3+A)/x^2,x)

[Out] 1/5*b*B*x^5+1/2*A*x^2*b+1/2*B*x^2*a-a*A/x
```

Maxima [A] time = 1.37983, size = 36, normalized size = 1.16

$$\frac{1}{5}\,Bbx^5 + \frac{1}{2}\,(Ba + Ab)x^2 - \frac{Aa}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^2,x, algorithm="maxima")
```

```
[Out] 1/5*B*b*x^5 + 1/2*(B*a + A*b)*x^2 - A*a/x
```

Fricas [A] time = 0.21716, size = 39, normalized size = 1.26

$$\frac{2\,Bbx^6 + 5\,(Ba + Ab)x^3 - 10\,Aa}{10\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^2,x, algorithm="fricas")
```

```
[Out] 1/10*(2*B*b*x^6 + 5*(B*a + A*b)*x^3 - 10*A*a)/x
```

Sympy [A] time = 1.03608, size = 26, normalized size = 0.84

$$-\frac{Aa}{x} + \frac{Bbx^5}{5} + x^2\left(\frac{Ab}{2} + \frac{Ba}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**2,x)
```

```
[Out] -A*a/x + B*b*x**5/5 + x**2*(A*b/2 + B*a/2)
```

GIAC/XCAS [A] time = 0.223506, size = 39, normalized size = 1.26

$$\frac{1}{5}\,Bbx^5 + \frac{1}{2}\,Bax^2 + \frac{1}{2}\,Abx^2 - \frac{Aa}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^2,x, algorithm="giac")
```

```
[Out] 1/5*B*b*x^5 + 1/2*B*a*x^2 + 1/2*A*b*x^2 - A*a/x
```

3.6 $\int \frac{(a+bx^3)(A+Bx^3)}{x^3} dx$

Optimal. Leaf size=28

$$x(aB+Ab)-\frac{aA}{2x^2}+\frac{1}{4}bBx^4$$

```
[Out] -(a*A)/(2*x^2) + (A*b + a*B)*x + (b*B*x^4)/4
```

Rubi [A] time = 0.0568581, antiderivative size = 28, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056

$$x(aB+Ab)-\frac{aA}{2x^2}+\frac{1}{4}bBx^4$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)*(A + B*x^3))/x^3,x]

[Out] -(a*A)/(2*x^2) + (A*b + a*B)*x + (b*B*x^4)/4
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa}{2x^2}+\frac{Bbx^4}{4}+\frac{(Ab+Ba)\int A\,dx}{A}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)*(B*x**3+A)/x**3,x)

[Out] -A*a/(2*x**2) + B*b*x**4/4 + (A*b + B*a)*Integral(A, x)/A
```

Mathematica [A] time = 0.0167454, size = 28, normalized size = 1.

$$x(aB+Ab)-\frac{aA}{2x^2}+\frac{1}{4}bBx^4$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)*(A + B*x^3))/x^3,x]

[Out] -(a*A)/(2*x^2) + (A*b + a*B)*x + (b*B*x^4)/4
```

Maple [A] time = 0.005, size = 24, normalized size = 0.9

$$\frac{bBx^4}{4}+Axb+Bxa-\frac{Aa}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^3+a)*(B*x^3+A)/x^3,x)

[Out] 1/4*b*B*x^4+A*x*b+B*x*a-1/2*a*A/x^2
```

Maxima [A] time = 1.37077, size = 32, normalized size = 1.14

$$\frac{1}{4}\,Bbx^4 + (Ba + Ab)x - \frac{Aa}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^3,x, algorithm="maxima")
```

```
[Out] 1/4*B*b*x^4 + (B*a + A*b)*x - 1/2*A*a/x^2
```

Fricas [A] time = 0.214784, size = 38, normalized size = 1.36

$$\frac{Bbx^6 + 4\,(Ba + Ab)x^3 - 2\,Aa}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^3,x, algorithm="fricas")
```

```
[Out] 1/4*(B*b*x^6 + 4*(B*a + A*b)*x^3 - 2*A*a)/x^2
```

Sympy [A] time = 1.05901, size = 24, normalized size = 0.86

$$-\frac{Aa}{2x^2} + \frac{Bbx^4}{4} + x\,(Ab + Ba)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**3,x)
```

```
[Out] -A*a/(2*x**2) + B*b*x**4/4 + x*(A*b + B*a)
```

GIAC/XCAS [A] time = 0.222021, size = 31, normalized size = 1.11

$$\frac{1}{4}\,Bbx^4 + Bax + Abx - \frac{Aa}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^3,x, algorithm="giac")
```

```
[Out] 1/4*B*b*x^4 + B*a*x + A*b*x - 1/2*A*a/x^2
```

3.7 $\int \frac{(a+bx^3)(A+Bx^3)}{x^4}\,dx$

Optimal. Leaf size=29

$$\log(x)(aB+Ab)-\frac{aA}{3x^3}+\frac{1}{3}bBx^3$$

```
[Out] -(a*A)/(3*x^3) + (b*B*x^3)/3 + (A*b + a*B)*Log[x]
```

Rubi [A] time = 0.0786205, antiderivative size = 29, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$\log(x)(aB+Ab)-\frac{aA}{3x^3}+\frac{1}{3}bBx^3$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)*(A + B*x^3))/x^4,x]
```

```
[Out] -(a*A)/(3*x^3) + (b*B*x^3)/3 + (A*b + a*B)*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa}{3x^3}+\frac{b\int^{x^3} B\,dx}{3}+\left(\frac{Ab}{3}+\frac{Ba}{3}\right)\log\left(x^3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A)/x**4,x)
```

```
[Out] -A*a/(3*x**3) + b*Integral(B, (x, x**3))/3 + (A*b/3 + B*a/3)*log(
x**3)
```

Mathematica [A] time = 0.0224484, size = 29, normalized size = 1.

$$\log(x)(aB+Ab)-\frac{aA}{3x^3}+\frac{1}{3}bBx^3$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)*(A + B*x^3))/x^4,x]
```

```
[Out] -(a*A)/(3*x^3) + (b*B*x^3)/3 + (A*b + a*B)*Log[x]
```

Maple [A] time = 0.008, size = 26, normalized size = 0.9

$$\frac{bBx^3}{3}+A\ln(x)\,b+Ba\ln(x)-\frac{Aa}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A)/x^4,x)
```

```
[Out] 1/3*b*B*x^3+A*ln(x)*b+B*a*ln(x)-1/3*a*A/x^3
```

Maxima [A] time = 1.37409, size = 38, normalized size = 1.31

$$\frac{1}{3}\,Bbx^3 + \frac{1}{3}\,(Ba + Ab)\log\left(x^3\right) - \frac{Aa}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^4,x, algorithm="maxima")
```

```
[Out] 1/3*B*b*x^3 + 1/3*(B*a + A*b)*log(x^3) - 1/3*A*a/x^3
```

Fricas [A] time = 0.224578, size = 41, normalized size = 1.41

$$\frac{Bbx^6 + 3\,(Ba + Ab)x^3\log(x) - Aa}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^4,x, algorithm="fricas")
```

```
[Out] 1/3*(B*b*x^6 + 3*(B*a + A*b)*x^3*log(x) - A*a)/x^3
```

Sympy [A] time = 1.39514, size = 26, normalized size = 0.9

$$-\frac{Aa}{3x^3} + \frac{Bbx^3}{3} + (Ab + Ba)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**4,x)
```

```
[Out] -A*a/(3*x**3) + B*b*x**3/3 + (A*b + B*a)*log(x)
```

GIAC/XCAS [A] time = 0.226048, size = 54, normalized size = 1.86

$$\frac{1}{3}\,Bbx^3 + (Ba + Ab)\ln(|x|) - \frac{Bax^3 + Abx^3 + Aa}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^4,x, algorithm="giac")
```

```
[Out] 1/3*B*b*x^3 + (B*a + A*b)*ln(abs(x)) - 1/3*(B*a*x^3 + A*b*x^3 + A
*a)/x^3
```

3.8 $\int \frac{(a+bx^3)(A+Bx^3)}{x^5}\,dx$

Optimal. Leaf size=31

$$-\frac{aB+Ab}{x}-\frac{aA}{4x^4}+\frac{1}{2}bBx^2$$

```
[Out] -(a*A)/(4*x^4) - (A*b + a*B)/x + (b*B*x^2)/2
```

Rubi [A] time = 0.0584628, antiderivative size = 31, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056

$$-\frac{aB+Ab}{x}-\frac{aA}{4x^4}+\frac{1}{2}bBx^2$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)*(A + B*x^3))/x^5,x]

[Out] -(a*A)/(4*x^4) - (A*b + a*B)/x + (b*B*x^2)/2
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa}{4x^4}+Bb\int x\,dx-\frac{Ab+Ba}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A)/x**5,x)

[Out] -A*a/(4*x**4) + B*b*Integral(x, x) - (A*b + B*a)/x
```

Mathematica [A] time = 0.0203938, size = 32, normalized size = 1.03

$$\frac{-aB-Ab}{x}-\frac{aA}{4x^4}+\frac{1}{2}bBx^2$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)*(A + B*x^3))/x^5,x]

[Out] -(a*A)/(4*x^4) + (-(A*b) - a*B)/x + (b*B*x^2)/2
```

Maple [A] time = 0.007, size = 28, normalized size = 0.9

$$\frac{bBx^2}{2}-\frac{Aa}{4\,x^4}-\frac{Ab+Ba}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A)/x^5,x)

[Out] 1/2*b*B*x^2-1/4*a*A/x^4-(A*b+B*a)/x
```

Maxima [A] time = 1.37096, size = 39, normalized size = 1.26

$$\frac{1}{2}Bbx^2 - \frac{4(Ba + Ab)x^3 + Aa}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^5,x, algorithm="maxima")
```

```
[Out] 1/2*B*b*x^2 - 1/4*(4*(B*a + A*b)*x^3 + A*a)/x^4
```

Fricas [A] time = 0.21464, size = 39, normalized size = 1.26

$$\frac{2Bbx^6 - 4(Ba + Ab)x^3 - Aa}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^5,x, algorithm="fricas")
```

```
[Out] 1/4*(2*B*b*x^6 - 4*(B*a + A*b)*x^3 - A*a)/x^4
```

Sympy [A] time = 1.55975, size = 29, normalized size = 0.94

$$\frac{Bbx^2}{2} - \frac{Aa + x^3(4Ab + 4Ba)}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**5,x)
```

```
[Out] B*b*x**2/2 - (A*a + x**3*(4*A*b + 4*B*a))/(4*x**4)
```

GIAC/XCAS [A] time = 0.222422, size = 42, normalized size = 1.35

$$\frac{1}{2}Bbx^2 - \frac{4Bax^3 + 4Abx^3 + Aa}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^5,x, algorithm="giac")
```

```
[Out] 1/2*B*b*x^2 - 1/4*(4*B*a*x^3 + 4*A*b*x^3 + A*a)/x^4
```

3.9 $\int \frac{(a+bx^3)(A+Bx^3)}{x^6}\,dx$

Optimal. Leaf size=28

$$-\frac{aB+Ab}{2x^2}-\frac{aA}{5x^5}+bBx$$

```
[Out] -(a*A)/(5*x^5) - (A*b + a*B)/(2*x^2) + b*B*x
```

Rubi [A] time = 0.0548956, antiderivative size = 28, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056

$$-\frac{aB+Ab}{2x^2}-\frac{aA}{5x^5}+bBx$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)*(A + B*x^3))/x^6,x]

[Out] -(a*A)/(5*x^5) - (A*b + a*B)/(2*x^2) + b*B*x
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa}{5x^5}+b\int B\,dx-\frac{\frac{Ab}{2}+\frac{Ba}{2}}{x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A)/x**6,x)

[Out] -A*a/(5*x**5) + b*Integral(B, x) - (A*b/2 + B*a/2)/x**2
```

Mathematica [A] time = 0.0230193, size = 30, normalized size = 1.07

$$\frac{-aB-Ab}{2x^2}-\frac{aA}{5x^5}+bBx$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)*(A + B*x^3))/x^6,x]

[Out] -(a*A)/(5*x^5) + (-(A*b) - a*B)/(2*x^2) + b*B*x
```

Maple [A] time = 0.008, size = 25, normalized size = 0.9

$$bBx-\frac{Ab+Ba}{2\,x^2}-\frac{Aa}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A)/x^6,x)

[Out] b*B*x-1/2*(A*b+B*a)/x^2-1/5*a*A/x^5
```

Maxima [A] time = 1.41876, size = 36, normalized size = 1.29

$$Bbx - \frac{5\,(Ba + Ab)x^3 + 2\,Aa}{10\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^6,x, algorithm="maxima")
```

```
[Out] B*b*x - 1/10*(5*(B*a + A*b)*x^3 + 2*A*a)/x^5
```

Fricas [A] time = 0.214746, size = 39, normalized size = 1.39

$$\frac{10\,Bbx^6 - 5\,(Ba + Ab)x^3 - 2\,Aa}{10\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^6,x, algorithm="fricas")
```

```
[Out] 1/10*(10*B*b*x^6 - 5*(B*a + A*b)*x^3 - 2*A*a)/x^5
```

Sympy [A] time = 1.6675, size = 27, normalized size = 0.96

$$Bbx - \frac{2Aa + x^3\,(5Ab + 5Ba)}{10x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**6,x)
```

```
[Out] B*b*x - (2*A*a + x**3*(5*A*b + 5*B*a))/(10*x**5)
```

GIAC/XCAS [A] time = 0.223954, size = 39, normalized size = 1.39

$$Bbx - \frac{5\,Bax^3 + 5\,Abx^3 + 2\,Aa}{10\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^6,x, algorithm="giac")
```

```
[Out] B*b*x - 1/10*(5*B*a*x^3 + 5*A*b*x^3 + 2*A*a)/x^5
```

3.10 $\int \frac{(a+bx^3)(A+Bx^3)}{x^7} dx$

Optimal. Leaf size=29

$$-\frac{aB+Ab}{3x^3}-\frac{aA}{6x^6}+bB\log(x)$$

```
[Out] -(a*A)/(6*x^6) - (A*b + a*B)/(3*x^3) + b*B*Log[x]
```

Rubi [A] time = 0.0717959, antiderivative size = 29, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$-\frac{aB+Ab}{3x^3}-\frac{aA}{6x^6}+bB\log(x)$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)*(A + B*x^3))/x^7,x]

[Out] -(a*A)/(6*x^6) - (A*b + a*B)/(3*x^3) + b*B*Log[x]
```

Rubi in Sympy [A] time = 8.35459, size = 31, normalized size = 1.07

$$-\frac{Aa}{6x^6}+\frac{Bb\log\left(x^3\right)}{3}-\frac{\frac{Ab}{3}+\frac{Ba}{3}}{x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A)/x**7,x)

[Out] -A*a/(6*x**6) + B*b*log(x**3)/3 - (A*b/3 + B*a/3)/x**3
```

Mathematica [A] time = 0.0319615, size = 31, normalized size = 1.07

$$\frac{-aB-Ab}{3x^3}-\frac{aA}{6x^6}+bB\log(x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)*(A + B*x^3))/x^7,x]

[Out] -(a*A)/(6*x^6) + (-(A*b) - a*B)/(3*x^3) + b*B*Log[x]
```

Maple [A] time = 0.007, size = 28, normalized size = 1.

$$bB\ln(x)-\frac{Aa}{6\,x^6}-\frac{Ab}{3\,x^3}-\frac{Ba}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A)/x^7,x)

[Out] b*B*ln(x)-1/6*a*A/x^6-1/3/x^3*A*b-1/3/x^3*B*a
```

Maxima [A] time = 1.37386, size = 41, normalized size = 1.41

$$\frac{1}{3}\,Bb\log\left(x^3\right) - \frac{2\,(Ba + Ab)x^3 + Aa}{6\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^7,x, algorithm="maxima")
```

```
[Out] 1/3*B*b*log(x^3) - 1/6*(2*(B*a + A*b)*x^3 + A*a)/x^6
```

Fricas [A] time = 0.229256, size = 42, normalized size = 1.45

$$\frac{6\,Bbx^6\log(x) - 2\,(Ba + Ab)x^3 - Aa}{6\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^7,x, algorithm="fricas")
```

```
[Out] 1/6*(6*B*b*x^6*log(x) - 2*(B*a + A*b)*x^3 - A*a)/x^6
```

Sympy [A] time = 2.67505, size = 27, normalized size = 0.93

$$Bb\log(x) - \frac{Aa + x^3\,(2Ab + 2Ba)}{6x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**7,x)
```

```
[Out] B*b*log(x) - (A*a + x**3*(2*A*b + 2*B*a))/(6*x**6)
```

GIAC/XCAS [A] time = 0.224487, size = 50, normalized size = 1.72

$$Bb\ln(|x|) - \frac{3\,Bbx^6 + 2\,Bax^3 + 2\,Abx^3 + Aa}{6\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^7,x, algorithm="giac")
```

```
[Out] B*b*ln(abs(x)) - 1/6*(3*B*b*x^6 + 2*B*a*x^3 + 2*A*b*x^3 + A*a)/x^
6
```

3.11 $\int x^2 \left(a+bx^3\right)^2 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=42

$$\frac{\left(a+bx^3\right)^3 (Ab-aB)}{9b^2}+\frac{B\left(a+bx^3\right)^4}{12b^2}$$

```
[Out] ((A*b - a*B)*(a + b*x^3)^3)/(9*b^2) + (B*(a + b*x^3)^4)/(12*b^2)
```

Rubi [A] time = 0.20317, antiderivative size = 42, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{\left(a+bx^3\right)^3 (Ab-aB)}{9b^2}+\frac{B\left(a+bx^3\right)^4}{12b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] ((A*b - a*B)*(a + b*x^3)^3)/(9*b^2) + (B*(a + b*x^3)^4)/(12*b^2)
```

Rubi in Sympy [A] time = 14.988, size = 34, normalized size = 0.81

$$\frac{B\left(a+bx^3\right)^4}{12b^2}+\frac{\left(a+bx^3\right)^3 (Ab-Ba)}{9b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] B*(a + b*x**3)**4/(12*b**2) + (a + b*x**3)**3*(A*b - B*a)/(9*b**2
)
```

Mathematica [A] time = 0.0291949, size = 51, normalized size = 1.21

$$\frac{1}{36}x^3 \left(12a^2A+4bx^6(2aB+Ab)+6ax^3(aB+2Ab)+3b^2Bx^9\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (x^3*(12*a^2*A + 6*a*(2*A*b + a*B)*x^3 + 4*b*(A*b + 2*a*B)*x^6 +
3*b^2*B*x^9))/36
```

Maple [A] time = 0.001, size = 52, normalized size = 1.2

$$\frac{b^2Bx^{12}}{12}+\frac{\left(b^2A+2\,abB\right)x^9}{9}+\frac{\left(2\,abA+a^2B\right)x^6}{6}+\frac{a^2Ax^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a)^2*(B*x^3+A),x)
```

```
[Out] 1/12*b^2*B*x^12+1/9*(A*b^2+2*B*a*b)*x^9+1/6*(2*A*a*b+B*a^2)*x^6+1
/3*a^2*A*x^3
```

Maxima [A] time = 1.37271, size = 69, normalized size = 1.64

$$\frac{1}{12}\,Bb^2x^{12} + \frac{1}{9}\left(2\,Bab + Ab^2\right)x^9 + \frac{1}{6}\left(Ba^2 + 2\,Aab\right)x^6 + \frac{1}{3}\,Aa^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^2,x, algorithm="maxima")
```

```
[Out] 1/12*B*b^2*x^12 + 1/9*(2*B*a*b + A*b^2)*x^9 + 1/6*(B*a^2 + 2*A*a*
b)*x^6 + 1/3*A*a^2*x^3
```

Fricas [A] time = 0.200103, size = 1, normalized size = 0.02

$$\frac{1}{12}x^{12}b^2B + \frac{2}{9}x^9baB + \frac{1}{9}x^9b^2A + \frac{1}{6}x^6a^2B + \frac{1}{3}x^6baA + \frac{1}{3}x^3a^2A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^2,x, algorithm="fricas")
```

```
[Out] 1/12*x^12*b^2*B + 2/9*x^9*b*a*B + 1/9*x^9*b^2*A + 1/6*x^6*a^2*B +
 1/3*x^6*b*a*A + 1/3*x^3*a^2*A
```

Sympy [A] time = 0.103028, size = 54, normalized size = 1.29

$$\frac{Aa^2x^3}{3} + \frac{Bb^2x^{12}}{12} + x^9\left(\frac{Ab^2}{9} + \frac{2Bab}{9}\right) + x^6\left(\frac{Aab}{3} + \frac{Ba^2}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] A*a**2*x**3/3 + B*b**2*x**12/12 + x**9*(A*b**2/9 + 2*B*a*b/9) + x
**6*(A*a*b/3 + B*a**2/6)
```

GIAC/XCAS [A] time = 0.221227, size = 72, normalized size = 1.71

$$\frac{1}{12}\,Bb^2x^{12} + \frac{2}{9}\,Babx^9 + \frac{1}{9}\,Ab^2x^9 + \frac{1}{6}\,Ba^2x^6 + \frac{1}{3}\,Aabx^6 + \frac{1}{3}\,Aa^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^2,x, algorithm="giac")
```

```
[Out] 1/12*B*b^2*x^12 + 2/9*B*a*b*x^9 + 1/9*A*b^2*x^9 + 1/6*B*a^2*x^6 +
 1/3*A*a*b*x^6 + 1/3*A*a^2*x^3
```

3.12 $\int x \left(a+bx^3\right)^2 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=55

$$\frac{1}{2}a^2Ax^2+\frac{1}{8}bx^8(2aB+Ab)+\frac{1}{5}ax^5(aB+2Ab)+\frac{1}{11}b^2Bx^{11}$$

```
[Out] (a^2*A*x^2)/2 + (a*(2*A*b + a*B)*x^5)/5 + (b*(A*b + 2*a*B)*x^8)/8
 + (b^2*B*x^11)/11
```

Rubi [A] time = 0.113843, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$

$$\frac{1}{2}a^2Ax^2+\frac{1}{8}bx^8(2aB+Ab)+\frac{1}{5}ax^5(aB+2Ab)+\frac{1}{11}b^2Bx^{11}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (a^2*A*x^2)/2 + (a*(2*A*b + a*B)*x^5)/5 + (b*(A*b + 2*a*B)*x^8)/8
 + (b^2*B*x^11)/11
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$Aa^2\int x\,dx+\frac{Bb^2x^{11}}{11}+\frac{ax^5\left(2Ab+Ba\right)}{5}+\frac{bx^8\left(Ab+2Ba\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] A*a**2*Integral(x, x) + B*b**2*x**11/11 + a*x**5*(2*A*b + B*a)/5
+ b*x**8*(A*b + 2*B*a)/8
```

Mathematica [A] time = 0.0146997, size = 55, normalized size = 1.

$$\frac{1}{2}a^2Ax^2+\frac{1}{8}bx^8(2aB+Ab)+\frac{1}{5}ax^5(aB+2Ab)+\frac{1}{11}b^2Bx^{11}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (a^2*A*x^2)/2 + (a*(2*A*b + a*B)*x^5)/5 + (b*(A*b + 2*a*B)*x^8)/8
 + (b^2*B*x^11)/11
```

Maple [A] time = 0.001, size = 52, normalized size = 1.

$$\frac{b^2Bx^{11}}{11}+\frac{\left(b^2A+2\,abB\right)x^8}{8}+\frac{\left(2\,abA+a^2B\right)x^5}{5}+\frac{a^2Ax^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a)^2*(B*x^3+A),x)
```

```
[Out] 1/11*b^2*B*x^11+1/8*(A*b^2+2*B*a*b)*x^8+1/5*(2*A*a*b+B*a^2)*x^5+1
/2*a^2*A*x^2
```

Maxima [A] time = 1.37513, size = 69, normalized size = 1.25

$$\frac{1}{11}\,Bb^2x^{11} + \frac{1}{8}\left(2\,Bab + Ab^2\right)x^8 + \frac{1}{5}\left(Ba^2 + 2\,Aab\right)x^5 + \frac{1}{2}\,Aa^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x,x, algorithm="maxima")
```

```
[Out] 1/11*B*b^2*x^11 + 1/8*(2*B*a*b + A*b^2)*x^8 + 1/5*(B*a^2 + 2*A*a*
b)*x^5 + 1/2*A*a^2*x^2
```

Fricas [A] time = 0.21389, size = 1, normalized size = 0.02

$$\frac{1}{11}x^{11}b^2B + \frac{1}{4}x^8baB + \frac{1}{8}x^8b^2A + \frac{1}{5}x^5a^2B + \frac{2}{5}x^5baA + \frac{1}{2}x^2a^2A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x,x, algorithm="fricas")
```

```
[Out] 1/11*x^11*b^2*B + 1/4*x^8*b*a*B + 1/8*x^8*b^2*A + 1/5*x^5*a^2*B +
 2/5*x^5*b*a*A + 1/2*x^2*a^2*A
```

Sympy [A] time = 0.111307, size = 54, normalized size = 0.98

$$\frac{Aa^2x^2}{2} + \frac{Bb^2x^{11}}{11} + x^8\left(\frac{Ab^2}{8} + \frac{Bab}{4}\right) + x^5\left(\frac{2Aab}{5} + \frac{Ba^2}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] A*a**2*x**2/2 + B*b**2*x**11/11 + x**8*(A*b**2/8 + B*a*b/4) + x**
5*(2*A*a*b/5 + B*a**2/5)
```

GIAC/XCAS [A] time = 0.225562, size = 72, normalized size = 1.31

$$\frac{1}{11}\,Bb^2x^{11} + \frac{1}{4}\,Babx^8 + \frac{1}{8}\,Ab^2x^8 + \frac{1}{5}\,Ba^2x^5 + \frac{2}{5}\,Aabx^5 + \frac{1}{2}\,Aa^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x,x, algorithm="giac")
```

```
[Out] 1/11*B*b^2*x^11 + 1/4*B*a*b*x^8 + 1/8*A*b^2*x^8 + 1/5*B*a^2*x^5 +
 2/5*A*a*b*x^5 + 1/2*A*a^2*x^2
```

3.13 $\int (a+bx^3)^2 (A+Bx^3) \, dx$

Optimal. Leaf size=50

$$a^2Ax+\frac{1}{7}bx^7(2aB+Ab)+\frac{1}{4}ax^4(aB+2Ab)+\frac{1}{10}b^2Bx^{10}$$

```
[Out] a^2*A*x + (a*(2*A*b + a*B)*x^4)/4 + (b*(A*b + 2*a*B)*x^7)/7 + (b^
2*B*x^10)/10
```

Rubi [A] time = 0.070188, antiderivative size = 50, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$

$$a^2Ax+\frac{1}{7}bx^7(2aB+Ab)+\frac{1}{4}ax^4(aB+2Ab)+\frac{1}{10}b^2Bx^{10}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] a^2*A*x + (a*(2*A*b + a*B)*x^4)/4 + (b*(A*b + 2*a*B)*x^7)/7 + (b^
2*B*x^10)/10
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{Bb^2x^{10}}{10}+a^2\int A\,dx+\frac{ax^4\,(2Ab+Ba)}{4}+\frac{bx^7\,(Ab+2Ba)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] B*b**2*x**10/10 + a**2*Integral(A, x) + a*x**4*(2*A*b + B*a)/4 +
b*x**7*(A*b + 2*B*a)/7
```

Mathematica [A] time = 0.0146117, size = 50, normalized size = 1.

$$a^2Ax+\frac{1}{7}bx^7(2aB+Ab)+\frac{1}{4}ax^4(aB+2Ab)+\frac{1}{10}b^2Bx^{10}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] a^2*A*x + (a*(2*A*b + a*B)*x^4)/4 + (b*(A*b + 2*a*B)*x^7)/7 + (b^
2*B*x^10)/10
```

Maple [A] time = 0.001, size = 49, normalized size = 1.

$$\frac{b^2Bx^{10}}{10}+\frac{\left(b^2A+2\,abB\right)x^7}{7}+\frac{\left(2\,abA+a^2B\right)x^4}{4}+a^2Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A),x)
```

```
[Out] 1/10*b^2*B*x^10+1/7*(A*b^2+2*B*a*b)*x^7+1/4*(2*A*a*b+B*a^2)*x^4+a
^2*A*x
```

Maxima [A] time = 1.36998, size = 65, normalized size = 1.3

$$\frac{1}{10}\,Bb^2x^{10} + \frac{1}{7}\left(2\,Bab + Ab^2\right)x^7 + \frac{1}{4}\left(Ba^2 + 2\,Aab\right)x^4 + Aa^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] 1/10*B*b^2*x^10 + 1/7*(2*B*a*b + A*b^2)*x^7 + 1/4*(B*a^2 + 2*A*a*
b)*x^4 + A*a^2*x
```

Fricas [A] time = 0.19743, size = 1, normalized size = 0.02

$$\frac{1}{10}x^{10}b^2B + \frac{2}{7}x^7baB + \frac{1}{7}x^7b^2A + \frac{1}{4}x^4a^2B + \frac{1}{2}x^4baA + xa^2A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/10*x^10*b^2*B + 2/7*x^7*b*a*B + 1/7*x^7*b^2*A + 1/4*x^4*a^2*B +
 1/2*x^4*b*a*A + x*a^2*A
```

Sympy [A] time = 0.104109, size = 51, normalized size = 1.02

$$Aa^2x + \frac{Bb^2x^{10}}{10} + x^7\left(\frac{Ab^2}{7} + \frac{2Bab}{7}\right) + x^4\left(\frac{Aab}{2} + \frac{Ba^2}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] A*a**2*x + B*b**2*x**10/10 + x**7*(A*b**2/7 + 2*B*a*b/7) + x**4*(
A*a*b/2 + B*a**2/4)
```

GIAC/XCAS [A] time = 0.220903, size = 68, normalized size = 1.36

$$\frac{1}{10}\,Bb^2x^{10} + \frac{2}{7}\,Babx^7 + \frac{1}{7}\,Ab^2x^7 + \frac{1}{4}\,Ba^2x^4 + \frac{1}{2}\,Aabx^4 + Aa^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/10*B*b^2*x^10 + 2/7*B*a*b*x^7 + 1/7*A*b^2*x^7 + 1/4*B*a^2*x^4 +
 1/2*A*a*b*x^4 + A*a^2*x
```

3.14 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x}\,dx$

Optimal. Leaf size=46

$$a^2A\log(x)+\frac{2}{3}aAbx^3+\frac{B(a+bx^3)^3}{9b}+\frac{1}{6}Ab^2x^6$$

```
[Out] (2*a*A*b*x^3)/3 + (A*b^2*x^6)/6 + (B*(a + b*x^3)^3)/(9*b) + a^2*A
*Log[x]
```

Rubi [A] time = 0.0921061, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$a^2A\log(x)+\frac{2}{3}aAbx^3+\frac{B(a+bx^3)^3}{9b}+\frac{1}{6}Ab^2x^6$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^2*(A + B*x^3))/x,x]
```

```
[Out] (2*a*A*b*x^3)/3 + (A*b^2*x^6)/6 + (B*(a + b*x^3)^3)/(9*b) + a^2*A
*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{Aa^2\log(x^3)}{3}+\frac{2Aabx^3}{3}+\frac{Ab^2\int^{x^3}x\,dx}{3}+\frac{B(a+bx^3)^3}{9b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x,x)
```

```
[Out] A*a**2*log(x**3)/3 + 2*A*a*b*x**3/3 + A*b**2*Integral(x, (x, x**3
))/3 + B*(a + b*x**3)**3/(9*b)
```

Mathematica [A] time = 0.0332811, size = 51, normalized size = 1.11

$$a^2A\log(x)+\frac{1}{6}bx^6(2aB+Ab)+\frac{1}{3}ax^3(aB+2Ab)+\frac{1}{9}b^2Bx^9$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^2*(A + B*x^3))/x,x]
```

```
[Out] (a*(2*A*b + a*B)*x^3)/3 + (b*(A*b + 2*a*B)*x^6)/6 + (b^2*B*x^9)/9
 + a^2*A*Log[x]
```

Maple [A] time = 0.003, size = 52, normalized size = 1.1

$$\frac{Bx^9b^2}{9}+\frac{Ab^2x^6}{6}+\frac{Bx^6ab}{3}+\frac{2\,aAbx^3}{3}+\frac{Bx^3a^2}{3}+a^2A\ln(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^3+a)^2*(B*x^3+A)/x,x)

[Out] 1/9*B*x^9*b^2+1/6*A*b^2*x^6+1/3*B*x^6*a*b+2/3*a*A*b*x^3+1/3*B*x^3
*a^2+a^2*A*ln(x)
```

Maxima [A] time = 1.37785, size = 70, normalized size = 1.52

$$\frac{1}{9}Bb^2x^9 + \frac{1}{6}\left(2Bab + Ab^2\right)x^6 + \frac{1}{3}\left(Ba^2 + 2Aab\right)x^3 + \frac{1}{3}Aa^2\log\left(x^3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^2/x,x, algorithm="maxima")

[Out] 1/9*B*b^2*x^9 + 1/6*(2*B*a*b + A*b^2)*x^6 + 1/3*(B*a^2 + 2*A*a*b)
*x^3 + 1/3*A*a^2*log(x^3)
```

Fricas [A] time = 0.222815, size = 66, normalized size = 1.43

$$\frac{1}{9}Bb^2x^9 + \frac{1}{6}\left(2Bab + Ab^2\right)x^6 + \frac{1}{3}\left(Ba^2 + 2Aab\right)x^3 + Aa^2\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^2/x,x, algorithm="fricas")

[Out] 1/9*B*b^2*x^9 + 1/6*(2*B*a*b + A*b^2)*x^6 + 1/3*(B*a^2 + 2*A*a*b)
*x^3 + A*a^2*log(x)
```

Sympy [A] time = 1.16031, size = 53, normalized size = 1.15

$$Aa^2\log(x) + \frac{Bb^2x^9}{9} + x^6\left(\frac{Ab^2}{6} + \frac{Bab}{3}\right) + x^3\left(\frac{2Aab}{3} + \frac{Ba^2}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x**3+a)**2*(B*x**3+A)/x,x)

[Out] A*a**2*log(x) + B*b**2*x**9/9 + x**6*(A*b**2/6 + B*a*b/3) + x**3*
(2*A*a*b/3 + B*a**2/3)
```

GIAC/XCAS [A] time = 0.222278, size = 70, normalized size = 1.52

$$\frac{1}{9}Bb^2x^9 + \frac{1}{3}Babx^6 + \frac{1}{6}Ab^2x^6 + \frac{1}{3}Ba^2x^3 + \frac{2}{3}Aabx^3 + Aa^2\ln(|x|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^2/x,x, algorithm="giac")

[Out] 1/9*B*b^2*x^9 + 1/3*B*a*b*x^6 + 1/6*A*b^2*x^6 + 1/3*B*a^2*x^3 + 2
/3*A*a*b*x^3 + A*a^2*ln(abs(x))
```

3.15 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^2}\,dx$

Optimal. Leaf size=53

$$-\frac{a^2A}{x}+\frac{1}{5}bx^5(2aB+Ab)+\frac{1}{2}ax^2(aB+2Ab)+\frac{1}{8}b^2Bx^8$$

```
[Out] -((a^2*A)/x) + (a*(2*A*b + a*B)*x^2)/2 + (b*(A*b + 2*a*B)*x^5)/5
+ (b^2*B*x^8)/8
```

Rubi [A] time = 0.0946615, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^2A}{x}+\frac{1}{5}bx^5(2aB+Ab)+\frac{1}{2}ax^2(aB+2Ab)+\frac{1}{8}b^2Bx^8$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^2*(A + B*x^3))/x^2,x]
```

```
[Out] -((a^2*A)/x) + (a*(2*A*b + a*B)*x^2)/2 + (b*(A*b + 2*a*B)*x^5)/5
+ (b^2*B*x^8)/8
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^2}{x}+\frac{Bb^2x^8}{8}+a\left(2Ab+Ba\right)\int x\,dx+\frac{bx^5\left(Ab+2Ba\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**2,x)
```

```
[Out] -A*a**2/x + B*b**2*x**8/8 + a*(2*A*b + B*a)*Integral(x, x) + b*x*
*5*(A*b + 2*B*a)/5
```

Mathematica [A] time = 0.0353172, size = 53, normalized size = 1.

$$-\frac{a^2A}{x}+\frac{1}{5}bx^5(2aB+Ab)+\frac{1}{2}ax^2(aB+2Ab)+\frac{1}{8}b^2Bx^8$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^2*(A + B*x^3))/x^2,x]
```

```
[Out] -((a^2*A)/x) + (a*(2*A*b + a*B)*x^2)/2 + (b*(A*b + 2*a*B)*x^5)/5
+ (b^2*B*x^8)/8
```

Maple [A] time = 0.005, size = 53, normalized size = 1.

$$\frac{b^2Bx^8}{8}+\frac{Ax^5b^2}{5}+\frac{2\,Bx^5ab}{5}+Ax^2ab+\frac{Bx^2a^2}{2}-\frac{Aa^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^2,x)
```

```
[Out] 1/8*b^2*B*x^8+1/5*A*x^5*b^2+2/5*B*x^5*a*b+A*x^2*a*b+1/2*B*x^2*a^2
-a^2*A/x
```

Maxima [A] time = 1.38827, size = 69, normalized size = 1.3

$$\frac{1}{8}Bb^2x^8 + \frac{1}{5}\left(2Bab + Ab^2\right)x^5 + \frac{1}{2}\left(Ba^2 + 2Aab\right)x^2 - \frac{Aa^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^2,x, algorithm="maxima")
```

```
[Out] 1/8*B*b^2*x^8 + 1/5*(2*B*a*b + A*b^2)*x^5 + 1/2*(B*a^2 + 2*A*a*b)
*x^2 - A*a^2/x
```

Fricas [A] time = 0.21499, size = 72, normalized size = 1.36

$$\frac{5Bb^2x^9 + 8\left(2Bab + Ab^2\right)x^6 + 20\left(Ba^2 + 2Aab\right)x^3 - 40Aa^2}{40x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^2,x, algorithm="fricas")
```

```
[Out] 1/40*(5*B*b^2*x^9 + 8*(2*B*a*b + A*b^2)*x^6 + 20*(B*a^2 + 2*A*a*b
)*x^3 - 40*A*a^2)/x
```

Sympy [A] time = 1.17333, size = 49, normalized size = 0.92

$$-\frac{Aa^2}{x} + \frac{Bb^2x^8}{8} + x^5\left(\frac{Ab^2}{5} + \frac{2Bab}{5}\right) + x^2\left(Aab + \frac{Ba^2}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**2,x)
```

```
[Out] -A*a**2/x + B*b**2*x**8/8 + x**5*(A*b**2/5 + 2*B*a*b/5) + x**2*(A
*a*b + B*a**2/2)
```

GIAC/XCAS [A] time = 0.219328, size = 70, normalized size = 1.32

$$\frac{1}{8}Bb^2x^8 + \frac{2}{5}Babx^5 + \frac{1}{5}Ab^2x^5 + \frac{1}{2}Ba^2x^2 + Aabx^2 - \frac{Aa^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^2,x, algorithm="giac")
```

```
[Out] 1/8*B*b^2*x^8 + 2/5*B*a*b*x^5 + 1/5*A*b^2*x^5 + 1/2*B*a^2*x^2 + A
*a*b*x^2 - A*a^2/x
```

3.16 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^3}\,dx$

Optimal. Leaf size=50

$$-\frac{a^2A}{2x^2}+\frac{1}{4}bx^4(2aB+Ab)+ax(aB+2Ab)+\frac{1}{7}b^2Bx^7$$

```
[Out] -(a^2*A)/(2*x^2) + a*(2*A*b + a*B)*x + (b*(A*b + 2*a*B)*x^4)/4 +
(b^2*B*x^7)/7
```

Rubi [A] time = 0.0907577, antiderivative size = 50, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^2A}{2x^2}+\frac{1}{4}bx^4(2aB+Ab)+ax(aB+2Ab)+\frac{1}{7}b^2Bx^7$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^2*(A + B*x^3))/x^3,x]
```

```
[Out] -(a^2*A)/(2*x^2) + a*(2*A*b + a*B)*x + (b*(A*b + 2*a*B)*x^4)/4 +
(b^2*B*x^7)/7
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^2}{2x^2}+\frac{Bb^2x^7}{7}+\frac{bx^4\left(Ab+2Ba\right)}{4}+\frac{a\left(2Ab+Ba\right)\int B\,dx}{B}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**3,x)
```

```
[Out] -A*a**2/(2*x**2) + B*b**2*x**7/7 + b*x**4*(A*b + 2*B*a)/4 + a*(2*
A*b + B*a)*Integral(B, x)/B
```

Mathematica [A] time = 0.0323813, size = 50, normalized size = 1.

$$-\frac{a^2A}{2x^2}+\frac{1}{4}bx^4(2aB+Ab)+ax(aB+2Ab)+\frac{1}{7}b^2Bx^7$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^2*(A + B*x^3))/x^3,x]
```

```
[Out] -(a^2*A)/(2*x^2) + a*(2*A*b + a*B)*x + (b*(A*b + 2*a*B)*x^4)/4 +
(b^2*B*x^7)/7
```

Maple [A] time = 0.005, size = 49, normalized size = 1.

$$\frac{b^2Bx^7}{7}+\frac{Ax^4b^2}{4}+\frac{Bx^4ab}{2}+2\,Axab+Bxa^2-\frac{Aa^2}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^3+a)^2*(B*x^3+A)/x^3,x)
```

```
[Out] 1/7*b^2*B*x^7+1/4*A*x^4*b^2+1/2*B*x^4*a*b+2*A*x*a*b+B*x*a^2-1/2*a
^2*A/x^2
```

Maxima [A]   time = 1.47794, size = 65, normalized size = 1.3

$$\frac{1}{7}\,Bb^2x^7 + \frac{1}{4}\left(2\,Bab + Ab^2\right)x^4 + \left(Ba^2 + 2\,Aab\right)x - \frac{Aa^2}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^2/x^3,x, algorithm="maxima")
```

```
[Out] 1/7*B*b^2*x^7 + 1/4*(2*B*a*b + A*b^2)*x^4 + (B*a^2 + 2*A*a*b)*x -
 1/2*A*a^2/x^2
```

Fricas [A]   time = 0.210151, size = 72, normalized size = 1.44

$$\frac{4\,Bb^2x^9 + 7\left(2\,Bab + Ab^2\right)x^6 + 28\left(Ba^2 + 2\,Aab\right)x^3 - 14\,Aa^2}{28\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^2/x^3,x, algorithm="fricas")
```

```
[Out] 1/28*(4*B*b^2*x^9 + 7*(2*B*a*b + A*b^2)*x^6 + 28*(B*a^2 + 2*A*a*b
)*x^3 - 14*A*a^2)/x^2
```

Sympy [A]   time = 1.16922, size = 49, normalized size = 0.98

$$-\frac{Aa^2}{2x^2} + \frac{Bb^2x^7}{7} + x^4\left(\frac{Ab^2}{4} + \frac{Bab}{2}\right) + x\left(2Aab + Ba^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x**3+a)**2*(B*x**3+A)/x**3,x)
```

```
[Out] -A*a**2/(2*x**2) + B*b**2*x**7/7 + x**4*(A*b**2/4 + B*a*b/2) + x*
(2*A*a*b + B*a**2)
```

GIAC/XCAS [A]   time = 0.213079, size = 65, normalized size = 1.3

$$\frac{1}{7}\,Bb^2x^7 + \frac{1}{2}\,Babx^4 + \frac{1}{4}\,Ab^2x^4 + Ba^2x + 2\,Aabx - \frac{Aa^2}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^2/x^3,x, algorithm="giac")
```

```
[Out] 1/7*B*b^2*x^7 + 1/2*B*a*b*x^4 + 1/4*A*b^2*x^4 + B*a^2*x + 2*A*a*b
*x - 1/2*A*a^2/x^2
```

3.17 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^4}\,dx$

Optimal. Leaf size=51

$$-\frac{a^2A}{3x^3}+\frac{1}{3}bx^3(2aB+Ab)+a\log(x)(aB+2Ab)+\frac{1}{6}b^2Bx^6$$

```
[Out] -(a^2*A)/(3*x^3) + (b*(A*b + 2*a*B)*x^3)/3 + (b^2*B*x^6)/6 + a*(2
*A*b + a*B)*Log[x]
```

Rubi [A] time = 0.147847, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{a^2A}{3x^3}+\frac{1}{3}bx^3(2aB+Ab)+a\log(x)(aB+2Ab)+\frac{1}{6}b^2Bx^6$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^2*(A + B*x^3))/x^4,x]
```

```
[Out] -(a^2*A)/(3*x^3) + (b*(A*b + 2*a*B)*x^3)/3 + (b^2*B*x^6)/6 + a*(2
*A*b + a*B)*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^2}{3x^3}+\frac{Bb^2\int^{x^3}x\,dx}{3}+\frac{a\,(2Ab+Ba)\log\left(x^3\right)}{3}+\frac{b\,(Ab+2Ba)\int^{x^3}A\,dx}{3A}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**4,x)
```

```
[Out] -A*a**2/(3*x**3) + B*b**2*Integral(x, (x, x**3))/3 + a*(2*A*b + B
*a)*log(x**3)/3 + b*(A*b + 2*B*a)*Integral(A, (x, x**3))/(3*A)
```

Mathematica [A] time = 0.0448527, size = 49, normalized size = 0.96

$$\frac{1}{6}\left(-\frac{2a^2A}{x^3}+2bx^3(2aB+Ab)+6a\log(x)(aB+2Ab)+b^2Bx^6\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^2*(A + B*x^3))/x^4,x]
```

```
[Out] ((-2*a^2*A)/x^3 + 2*b*(A*b + 2*a*B)*x^3 + b^2*B*x^6 + 6*a*(2*A*b
+ a*B)*Log[x])/6
```

Maple [A] time = 0.008, size = 51, normalized size = 1.

$$\frac{b^2Bx^6}{6}+\frac{Ax^3b^2}{3}+\frac{2\,Bx^3ab}{3}+2\,A\ln(x)\,ab+a^2B\ln(x)-\frac{Aa^2}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^4,x)
```

```
[Out] 1/6*b^2*B*x^6+1/3*A*x^3*b^2+2/3*B*x^3*a*b+2*A*ln(x)*a*b+a^2*B*ln(
x)-1/3*a^2*A/x^3
```

Maxima [A] time = 1.42781, size = 70, normalized size = 1.37

$$\frac{1}{6}Bb^2x^6 + \frac{1}{3}\left(2\,Bab + Ab^2\right)x^3 + \frac{1}{3}\left(Ba^2 + 2\,Aab\right)\log\left(x^3\right) - \frac{Aa^2}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^4,x, algorithm="maxima")
```

```
[Out] 1/6*B*b^2*x^6 + 1/3*(2*B*a*b + A*b^2)*x^3 + 1/3*(B*a^2 + 2*A*a*b)
*log(x^3) - 1/3*A*a^2/x^3
```

Fricas [A] time = 0.2194, size = 73, normalized size = 1.43

$$\frac{Bb^2x^9 + 2\left(2\,Bab + Ab^2\right)x^6 + 6\left(Ba^2 + 2\,Aab\right)x^3\log\left(x\right) - 2\,Aa^2}{6\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^4,x, algorithm="fricas")
```

```
[Out] 1/6*(B*b^2*x^9 + 2*(2*B*a*b + A*b^2)*x^6 + 6*(B*a^2 + 2*A*a*b)*x^
3*log(x) - 2*A*a^2)/x^3
```

Sympy [A] time = 1.61716, size = 51, normalized size = 1.

$$-\frac{Aa^2}{3x^3} + \frac{Bb^2x^6}{6} + a\left(2Ab + Ba\right)\log\left(x\right) + x^3\left(\frac{Ab^2}{3} + \frac{2Bab}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**4,x)
```

```
[Out] -A*a**2/(3*x**3) + B*b**2*x**6/6 + a*(2*A*b + B*a)*log(x) + x**3*
(A*b**2/3 + 2*B*a*b/3)
```

GIAC/XCAS [A] time = 0.212246, size = 93, normalized size = 1.82

$$\frac{1}{6}Bb^2x^6 + \frac{2}{3}Babx^3 + \frac{1}{3}Ab^2x^3 + \left(Ba^2 + 2\,Aab\right)\ln\left(|x|\right) - \frac{Ba^2x^3 + 2\,Aabx^3 + Aa^2}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^4,x, algorithm="giac")
```

```
[Out] 1/6*B*b^2*x^6 + 2/3*B*a*b*x^3 + 1/3*A*b^2*x^3 + (B*a^2 + 2*A*a*b)
*ln(abs(x)) - 1/3*(B*a^2*x^3 + 2*A*a*b*x^3 + A*a^2)/x^3
```

3.18 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^5}\,dx$

Optimal. Leaf size=53

$$-\frac{a^2A}{4x^4}+\frac{1}{2}bx^2(2aB+Ab)-\frac{a(aB+2Ab)}{x}+\frac{1}{5}b^2Bx^5$$

```
[Out] -(a^2*A)/(4*x^4) - (a*(2*A*b + a*B))/x + (b*(A*b + 2*a*B)*x^2)/2
+ (b^2*B*x^5)/5
```

Rubi [A] time = 0.0940318, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^2A}{4x^4}+\frac{1}{2}bx^2(2aB+Ab)-\frac{a(aB+2Ab)}{x}+\frac{1}{5}b^2Bx^5$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^2*(A + B*x^3))/x^5,x]
```

```
[Out] -(a^2*A)/(4*x^4) - (a*(2*A*b + a*B))/x + (b*(A*b + 2*a*B)*x^2)/2
+ (b^2*B*x^5)/5
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^2}{4x^4}+\frac{Bb^2x^5}{5}-\frac{a\,(2Ab+Ba)}{x}+b\,(Ab+2Ba)\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**5,x)
```

```
[Out] -A*a**2/(4*x**4) + B*b**2*x**5/5 - a*(2*A*b + B*a)/x + b*(A*b + 2
*B*a)*Integral(x, x)
```

Mathematica [A] time = 0.0297485, size = 51, normalized size = 0.96

$$\frac{-5a^2A+10bx^6(2aB+Ab)-20ax^3(aB+2Ab)+4b^2Bx^9}{20x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^2*(A + B*x^3))/x^5,x]
```

```
[Out] (-5*a^2*A - 20*a*(2*A*b + a*B)*x^3 + 10*b*(A*b + 2*a*B)*x^6 + 4*b
^2*B*x^9)/(20*x^4)
```

Maple [A] time = 0.007, size = 50, normalized size = 0.9

$$\frac{b^2Bx^5}{5}+\frac{Ax^2b^2}{2}+Bx^2ab-\frac{Aa^2}{4\,x^4}-\frac{a\,(2\,Ab+Ba)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^5,x)
```

```
[Out] 1/5*b^2*B*x^5+1/2*A*x^2*b^2+B*x^2*a*b-1/4*a^2*A/x^4-a*(2*A*b+B*a)
/x
```

Maxima [A] time = 1.36996, size = 72, normalized size = 1.36

$$\frac{1}{5}\,Bb^2x^5 + \frac{1}{2}\left(2\,Bab + Ab^2\right)x^2 - \frac{4\left(Ba^2 + 2\,Aab\right)x^3 + Aa^2}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^5,x, algorithm="maxima")
```

```
[Out] 1/5*B*b^2*x^5 + 1/2*(2*B*a*b + A*b^2)*x^2 - 1/4*(4*(B*a^2 + 2*A*a
*b)*x^3 + A*a^2)/x^4
```

Fricas [A] time = 0.218444, size = 72, normalized size = 1.36

$$\frac{4\,Bb^2x^9 + 10\left(2\,Bab + Ab^2\right)x^6 - 20\left(Ba^2 + 2\,Aab\right)x^3 - 5\,Aa^2}{20\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^5,x, algorithm="fricas")
```

```
[Out] 1/20*(4*B*b^2*x^9 + 10*(2*B*a*b + A*b^2)*x^6 - 20*(B*a^2 + 2*A*a*
b)*x^3 - 5*A*a^2)/x^4
```

Sympy [A] time = 1.81983, size = 51, normalized size = 0.96

$$\frac{Bb^2x^5}{5} + x^2\left(\frac{Ab^2}{2} + Bab\right) - \frac{Aa^2 + x^3\left(8Aab + 4Ba^2\right)}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**5,x)
```

```
[Out] B*b**2*x**5/5 + x**2*(A*b**2/2 + B*a*b) - (A*a**2 + x**3*(8*A*a*b
 + 4*B*a**2))/(4*x**4)
```

GIAC/XCAS [A] time = 0.210177, size = 73, normalized size = 1.38

$$\frac{1}{5}\,Bb^2x^5 + Babx^2 + \frac{1}{2}\,Ab^2x^2 - \frac{4\,Ba^2x^3 + 8\,Aabx^3 + Aa^2}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^5,x, algorithm="giac")
```

```
[Out] 1/5*B*b^2*x^5 + B*a*b*x^2 + 1/2*A*b^2*x^2 - 1/4*(4*B*a^2*x^3 + 8*
A*a*b*x^3 + A*a^2)/x^4
```

3.19 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^6}\,dx$

Optimal. Leaf size=50

$$-\frac{a^2A}{5x^5}-\frac{a(aB+2Ab)}{2x^2}+bx(2aB+Ab)+\frac{1}{4}b^2Bx^4$$

```
[Out] -(a^2*A)/(5*x^5) - (a*(2*A*b + a*B))/(2*x^2) + b*(A*b + 2*a*B)*x
+ (b^2*B*x^4)/4
```

Rubi [A] time = 0.0937064, antiderivative size = 50, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^2A}{5x^5}-\frac{a(aB+2Ab)}{2x^2}+bx(2aB+Ab)+\frac{1}{4}b^2Bx^4$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^2*(A + B*x^3))/x^6,x]
```

```
[Out] -(a^2*A)/(5*x^5) - (a*(2*A*b + a*B))/(2*x^2) + b*(A*b + 2*a*B)*x
+ (b^2*B*x^4)/4
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^2}{5x^5}+\frac{Bb^2x^4}{4}-\frac{a\left(2Ab+Ba\right)}{2x^2}+\frac{b\left(Ab+2Ba\right)\int A\,dx}{A}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**6,x)
```

```
[Out] -A*a**2/(5*x**5) + B*b**2*x**4/4 - a*(2*A*b + B*a)/(2*x**2) + b*(
A*b + 2*B*a)*Integral(A, x)/A
```

Mathematica [A] time = 0.0366249, size = 50, normalized size = 1.

$$-\frac{a^2A}{5x^5}-\frac{a(aB+2Ab)}{2x^2}+bx(2aB+Ab)+\frac{1}{4}b^2Bx^4$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^2*(A + B*x^3))/x^6,x]
```

```
[Out] -(a^2*A)/(5*x^5) - (a*(2*A*b + a*B))/(2*x^2) + b*(A*b + 2*a*B)*x
+ (b^2*B*x^4)/4
```

Maple [A] time = 0.007, size = 46, normalized size = 0.9

$$\frac{b^2Bx^4}{4}+Axb^2+2\,Bxab-\frac{a\left(2\,Ab+Ba\right)}{2\,x^2}-\frac{Aa^2}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^6,x)
```

```
[Out] 1/4*b^2*B*x^4+A*x*b^2+2*B*x*a*b-1/2*a*(2*A*b+B*a)/x^2-1/5*a^2*A/x
^5
```

Maxima [A] time = 1.41779, size = 69, normalized size = 1.38

$$\frac{1}{4}Bb^2x^4 + \left(2\,Bab + Ab^2\right)x - \frac{5\left(Ba^2 + 2\,Aab\right)x^3 + 2\,Aa^2}{10\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^6,x, algorithm="maxima")
```

```
[Out] 1/4*B*b^2*x^4 + (2*B*a*b + A*b^2)*x - 1/10*(5*(B*a^2 + 2*A*a*b)*x
^3 + 2*A*a^2)/x^5
```

Fricas [A] time = 0.221617, size = 72, normalized size = 1.44

$$\frac{5\,Bb^2x^9 + 20\left(2\,Bab + Ab^2\right)x^6 - 10\left(Ba^2 + 2\,Aab\right)x^3 - 4\,Aa^2}{20\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^6,x, algorithm="fricas")
```

```
[Out] 1/20*(5*B*b^2*x^9 + 20*(2*B*a*b + A*b^2)*x^6 - 10*(B*a^2 + 2*A*a*
b)*x^3 - 4*A*a^2)/x^5
```

Sympy [A] time = 1.90952, size = 51, normalized size = 1.02

$$\frac{Bb^2x^4}{4} + x\left(Ab^2 + 2Bab\right) - \frac{2Aa^2 + x^3\left(10Aab + 5Ba^2\right)}{10x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**6,x)
```

```
[Out] B*b**2*x**4/4 + x*(A*b**2 + 2*B*a*b) - (2*A*a**2 + x**3*(10*A*a*b
 + 5*B*a**2))/(10*x**5)
```

GIAC/XCAS [A] time = 0.212217, size = 69, normalized size = 1.38

$$\frac{1}{4}Bb^2x^4 + 2\,Babx + Ab^2x - \frac{5\,Ba^2x^3 + 10\,Aabx^3 + 2\,Aa^2}{10\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^6,x, algorithm="giac")
```

```
[Out] 1/4*B*b^2*x^4 + 2*B*a*b*x + A*b^2*x - 1/10*(5*B*a^2*x^3 + 10*A*a*
b*x^3 + 2*A*a^2)/x^5
```

3.20 $\int \frac{\left(a+bx^3\right)^2\left(A+Bx^3\right)}{x^7}\,dx$

Optimal. Leaf size=51

$$-\frac{a^2A}{6x^6}-\frac{a(aB+2Ab)}{3x^3}+b\log(x)(2aB+Ab)+\frac{1}{3}b^2Bx^3$$

```
[Out] -(a^2*A)/(6*x^6) - (a*(2*A*b + a*B))/(3*x^3) + (b^2*B*x^3)/3 + b*
(A*b + 2*a*B)*Log[x]
```

Rubi [A] time = 0.133617, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{a^2A}{6x^6}-\frac{a(aB+2Ab)}{3x^3}+b\log(x)(2aB+Ab)+\frac{1}{3}b^2Bx^3$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^2*(A + B*x^3))/x^7,x]
```

```
[Out] -(a^2*A)/(6*x^6) - (a*(2*A*b + a*B))/(3*x^3) + (b^2*B*x^3)/3 + b*
(A*b + 2*a*B)*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^2}{6x^6}-\frac{a\left(2Ab+Ba\right)}{3x^3}+\frac{b^2\int^{x^3}B\,dx}{3}+\frac{b\left(Ab+2Ba\right)\log\left(x^3\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**7,x)
```

```
[Out] -A*a**2/(6*x**6) - a*(2*A*b + B*a)/(3*x**3) + b**2*Integral(B, (x
, x**3))/3 + b*(A*b + 2*B*a)*log(x**3)/3
```

Mathematica [A] time = 0.0371436, size = 51, normalized size = 1.

$$\frac{1}{6}\left(-\frac{a^2\left(A+2Bx^3\right)}{x^6}+6b\log(x)(2aB+Ab)-\frac{4aAb}{x^3}+2b^2Bx^3\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^2*(A + B*x^3))/x^7,x]
```

```
[Out] ((-4*a*A*b)/x^3 + 2*b^2*B*x^3 - (a^2*(A + 2*B*x^3))/x^6 + 6*b*(A*
b + 2*a*B)*Log[x])/6
```

Maple [A] time = 0.009, size = 51, normalized size = 1.

$$\frac{b^2Bx^3}{3}+A\ln\left(x\right)b^2+2\,B\ln\left(x\right)ab-\frac{Aa^2}{6\,x^6}-\frac{2\,abA}{3\,x^3}-\frac{a^2B}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^7,x)
```

```
[Out] 1/3*b^2*B*x^3+A*ln(x)*b^2+2*B*ln(x)*a*b-1/6*a^2*A/x^6-2/3*a/x^3*A
*b-1/3*a^2/x^3*B
```

Maxima [A] time = 1.36642, size = 73, normalized size = 1.43

$$\frac{1}{3}\,Bb^2x^3 + \frac{1}{3}\left(2\,Bab + Ab^2\right)\log\left(x^3\right) - \frac{2\left(Ba^2 + 2\,Aab\right)x^3 + Aa^2}{6\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^7,x, algorithm="maxima")
```

```
[Out] 1/3*B*b^2*x^3 + 1/3*(2*B*a*b + A*b^2)*log(x^3) - 1/6*(2*(B*a^2 +
2*A*a*b)*x^3 + A*a^2)/x^6
```

Fricas [A] time = 0.223914, size = 74, normalized size = 1.45

$$\frac{2\,Bb^2x^9 + 6\left(2\,Bab + Ab^2\right)x^6\log\left(x\right) - 2\left(Ba^2 + 2\,Aab\right)x^3 - Aa^2}{6\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^7,x, algorithm="fricas")
```

```
[Out] 1/6*(2*B*b^2*x^9 + 6*(2*B*a*b + A*b^2)*x^6*log(x) - 2*(B*a^2 + 2*
A*a*b)*x^3 - A*a^2)/x^6
```

Sympy [A] time = 3.4472, size = 49, normalized size = 0.96

$$\frac{Bb^2x^3}{3} + b\left(Ab + 2Ba\right)\log\left(x\right) - \frac{Aa^2 + x^3\left(4Aab + 2Ba^2\right)}{6x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**7,x)
```

```
[Out] B*b**2*x**3/3 + b*(A*b + 2*B*a)*log(x) - (A*a**2 + x**3*(4*A*a*b
+ 2*B*a**2))/(6*x**6)
```

GIAC/XCAS [A] time = 0.213081, size = 95, normalized size = 1.86

$$\frac{1}{3}\,Bb^2x^3 + \left(2\,Bab + Ab^2\right)\ln\left(|x|\right) - \frac{6\,Babx^6 + 3\,Ab^2x^6 + 2\,Ba^2x^3 + 4\,Aabx^3 + Aa^2}{6\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^7,x, algorithm="giac")
```

```
[Out] 1/3*B*b^2*x^3 + (2*B*a*b + A*b^2)*ln(abs(x)) - 1/6*(6*B*a*b*x^6 +
 3*A*b^2*x^6 + 2*B*a^2*x^3 + 4*A*a*b*x^3 + A*a^2)/x^6
```

3.21 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^8}\,dx$

Optimal. Leaf size=53

$$-\frac{a^2A}{7x^7}-\frac{a(aB+2Ab)}{4x^4}-\frac{b(2aB+Ab)}{x}+\frac{1}{2}b^2Bx^2$$

```
[Out] -(a^2*A)/(7*x^7) - (a*(2*A*b + a*B))/(4*x^4) - (b*(A*b + 2*a*B))/
x + (b^2*B*x^2)/2
```

Rubi [A] time = 0.0948535, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^2A}{7x^7}-\frac{a(aB+2Ab)}{4x^4}-\frac{b(2aB+Ab)}{x}+\frac{1}{2}b^2Bx^2$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^2*(A + B*x^3))/x^8,x]
```

```
[Out] -(a^2*A)/(7*x^7) - (a*(2*A*b + a*B))/(4*x^4) - (b*(A*b + 2*a*B))/
x + (b^2*B*x^2)/2
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^2}{7x^7}+Bb^2\int x\,dx-\frac{a\,(2Ab+Ba)}{4x^4}-\frac{b\,(Ab+2Ba)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**8,x)
```

```
[Out] -A*a**2/(7*x**7) + B*b**2*Integral(x, x) - a*(2*A*b + B*a)/(4*x**
4) - b*(A*b + 2*B*a)/x
```

Mathematica [A] time = 0.0301731, size = 54, normalized size = 1.02

$$-\frac{a^2\left(4A+7Bx^3\right)+14abx^3\left(A+4Bx^3\right)-14b^2x^6\left(Bx^3-2A\right)}{28x^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^2*(A + B*x^3))/x^8,x]
```

```
[Out] -(-14*b^2*x^6*(-2*A + B*x^3) + 14*a*b*x^3*(A + 4*B*x^3) + a^2*(4*
A + 7*B*x^3))/(28*x^7)
```

Maple [A] time = 0.008, size = 48, normalized size = 0.9

$$-\frac{Aa^2}{7\,x^7}-\frac{a\,(2\,Ab+Ba)}{4\,x^4}-\frac{b\,(Ab+2\,Ba)}{x}+\frac{b^2Bx^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^8,x)
```

```
[Out] -1/7*a^2*A/x^7-1/4*a*(2*A*b+B*a)/x^4-b*(A*b+2*B*a)/x+1/2*b^2*B*x^
2
```

Maxima [A] time = 1.41352, size = 73, normalized size = 1.38

$$\frac{1}{2}\,Bb^2x^2 - \frac{28\left(2\,Bab + Ab^2\right)x^6 + 7\left(Ba^2 + 2\,Aab\right)x^3 + 4\,Aa^2}{28\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^8,x, algorithm="maxima")
```

```
[Out] 1/2*B*b^2*x^2 - 1/28*(28*(2*B*a*b + A*b^2)*x^6 + 7*(B*a^2 + 2*A*a
*b)*x^3 + 4*A*a^2)/x^7
```

Fricas [A] time = 0.213405, size = 72, normalized size = 1.36

$$\frac{14\,Bb^2x^9 - 28\left(2\,Bab + Ab^2\right)x^6 - 7\left(Ba^2 + 2\,Aab\right)x^3 - 4\,Aa^2}{28\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^8,x, algorithm="fricas")
```

```
[Out] 1/28*(14*B*b^2*x^9 - 28*(2*B*a*b + A*b^2)*x^6 - 7*(B*a^2 + 2*A*a*
b)*x^3 - 4*A*a^2)/x^7
```

Sympy [A] time = 4.04729, size = 54, normalized size = 1.02

$$\frac{Bb^2x^2}{2} - \frac{4Aa^2 + x^6\left(28Ab^2 + 56Bab\right) + x^3\left(14Aab + 7Ba^2\right)}{28x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**8,x)
```

```
[Out] B*b**2*x**2/2 - (4*A*a**2 + x**6*(28*A*b**2 + 56*B*a*b) + x**3*(1
4*A*a*b + 7*B*a**2))/(28*x**7)
```

GIAC/XCAS [A] time = 0.213396, size = 76, normalized size = 1.43

$$\frac{1}{2}\,Bb^2x^2 - \frac{56\,Babx^6 + 28\,Ab^2x^6 + 7\,Ba^2x^3 + 14\,Aabx^3 + 4\,Aa^2}{28\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^8,x, algorithm="giac")
```

```
[Out] 1/2*B*b^2*x^2 - 1/28*(56*B*a*b*x^6 + 28*A*b^2*x^6 + 7*B*a^2*x^3 +
 14*A*a*b*x^3 + 4*A*a^2)/x^7
```

3.22 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^9} \, dx$

Optimal. Leaf size=50

$$-\frac{a^2A}{8x^8}-\frac{a(aB+2Ab)}{5x^5}-\frac{b(2aB+Ab)}{2x^2}+b^2Bx$$

```
[Out] -(a^2*A)/(8*x^8) - (a*(2*A*b + a*B))/(5*x^5) - (b*(A*b + 2*a*B))/
(2*x^2) + b^2*B*x
```

Rubi [A] time = 0.090473, antiderivative size = 50, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^2A}{8x^8}-\frac{a(aB+2Ab)}{5x^5}-\frac{b(2aB+Ab)}{2x^2}+b^2Bx$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^2*(A + B*x^3))/x^9,x]
```

```
[Out] -(a^2*A)/(8*x^8) - (a*(2*A*b + a*B))/(5*x^5) - (b*(A*b + 2*a*B))/
(2*x^2) + b^2*B*x
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^2}{8x^8}-\frac{a\left(2Ab+Ba\right)}{5x^5}+b^2\int B\,dx-\frac{b\left(Ab+2Ba\right)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**9,x)
```

```
[Out] -A*a**2/(8*x**8) - a*(2*A*b + B*a)/(5*x**5) + b**2*Integral(B, x)
 - b*(A*b + 2*B*a)/(2*x**2)
```

Mathematica [A] time = 0.04518, size = 50, normalized size = 1.

$$-\frac{a^2A}{8x^8}-\frac{a(aB+2Ab)}{5x^5}-\frac{b(2aB+Ab)}{2x^2}+b^2Bx$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^2*(A + B*x^3))/x^9,x]
```

```
[Out] -(a^2*A)/(8*x^8) - (a*(2*A*b + a*B))/(5*x^5) - (b*(A*b + 2*a*B))/
(2*x^2) + b^2*B*x
```

Maple [A] time = 0.009, size = 45, normalized size = 0.9

$$-\frac{Aa^2}{8\,x^8}-\frac{a\left(2\,Ab+Ba\right)}{5\,x^5}-\frac{b\left(Ab+2\,Ba\right)}{2\,x^2}+b^2Bx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^3+a)^2*(B*x^3+A)/x^9,x)
```

```
[Out] -1/8*a^2*A/x^8-1/5*a*(2*A*b+B*a)/x^5-1/2*b*(A*b+2*B*a)/x^2+b^2*B*
x
```

Maxima [A] time = 1.39796, size = 69, normalized size = 1.38

$$Bb^2x - \frac{20\left(2\,Bab + Ab^2\right)x^6 + 8\left(Ba^2 + 2\,Aab\right)x^3 + 5\,Aa^2}{40\,x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^9,x, algorithm="maxima")
```

```
[Out] B*b^2*x - 1/40*(20*(2*B*a*b + A*b^2)*x^6 + 8*(B*a^2 + 2*A*a*b)*x^
3 + 5*A*a^2)/x^8
```

Fricas [A] time = 0.217139, size = 72, normalized size = 1.44

$$\frac{40\,Bb^2x^9 - 20\left(2\,Bab + Ab^2\right)x^6 - 8\left(Ba^2 + 2\,Aab\right)x^3 - 5\,Aa^2}{40\,x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^9,x, algorithm="fricas")
```

```
[Out] 1/40*(40*B*b^2*x^9 - 20*(2*B*a*b + A*b^2)*x^6 - 8*(B*a^2 + 2*A*a*
b)*x^3 - 5*A*a^2)/x^8
```

Sympy [A] time = 4.33241, size = 51, normalized size = 1.02

$$Bb^2x - \frac{5Aa^2 + x^6\left(20Ab^2 + 40Bab\right) + x^3\left(16Aab + 8Ba^2\right)}{40x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**9,x)
```

```
[Out] B*b**2*x - (5*A*a**2 + x**6*(20*A*b**2 + 40*B*a*b) + x**3*(16*A*a
*b + 8*B*a**2))/(40*x**8)
```

GIAC/XCAS [A] time = 0.214336, size = 72, normalized size = 1.44

$$Bb^2x - \frac{40\,Babx^6 + 20\,Ab^2x^6 + 8\,Ba^2x^3 + 16\,Aabx^3 + 5\,Aa^2}{40\,x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^9,x, algorithm="giac")
```

```
[Out] B*b^2*x - 1/40*(40*B*a*b*x^6 + 20*A*b^2*x^6 + 8*B*a^2*x^3 + 16*A*
a*b*x^3 + 5*A*a^2)/x^8
```

3.23 $\int x^9 \left(a+bx^3\right)^5 \left(A+Bx^3\right)\, dx$

Optimal. Leaf size=117

$$\frac{1}{10}a^5Ax^{10}+\frac{1}{13}a^4x^{13}(aB+5Ab)+\frac{5}{16}a^3bx^{16}(aB+2Ab)+\frac{10}{19}a^2b^2x^{19}(aB+Ab)+\frac{1}{25}b^4x^{25}(5aB+Ab)+\frac{5}{22}ab^3x^{22}(2aB+Ab)+\frac{1}{28}b^5Bx^{28}$$

```
[Out] (a^5*A*x^10)/10 + (a^4*(5*A*b + a*B)*x^13)/13 + (5*a^3*b*(2*A*b +
 a*B)*x^16)/16 + (10*a^2*b^2*(A*b + a*B)*x^19)/19 + (5*a*b^3*(A*b
 + 2*a*B)*x^22)/22 + (b^4*(A*b + 5*a*B)*x^25)/25 + (b^5*B*x^28)/2
8
```

Rubi [A] time = 0.282509, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$\frac{1}{10}a^5Ax^{10}+\frac{1}{13}a^4x^{13}(aB+5Ab)+\frac{5}{16}a^3bx^{16}(aB+2Ab)+\frac{10}{19}a^2b^2x^{19}(aB+Ab)+\frac{1}{25}b^4x^{25}(5aB+Ab)+\frac{5}{22}ab^3x^{22}(2aB+Ab)+\frac{1}{28}b^5Bx^{28}$$

Antiderivative was successfully verified.

```
[In] Int[x^9*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^10)/10 + (a^4*(5*A*b + a*B)*x^13)/13 + (5*a^3*b*(2*A*b +
 a*B)*x^16)/16 + (10*a^2*b^2*(A*b + a*B)*x^19)/19 + (5*a*b^3*(A*b
 + 2*a*B)*x^22)/22 + (b^4*(A*b + 5*a*B)*x^25)/25 + (b^5*B*x^28)/2
8
```

Rubi in Sympy [A] time = 25.3916, size = 114, normalized size = 0.97

$$\frac{Aa^5x^{10}}{10}+\frac{Bb^5x^{28}}{28}+\frac{a^4x^{13}\left(5Ab+Ba\right)}{13}+\frac{5a^3bx^{16}\left(2Ab+Ba\right)}{16}+\frac{10a^2b^2x^{19}\left(Ab+Ba\right)}{19}+\frac{5ab^3x^{22}\left(Ab+2Ba\right)}{22}+\frac{b^4x^{25}\left(Ab+5Ba\right)}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**9*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**10/10 + B*b**5*x**28/28 + a**4*x**13*(5*A*b + B*a)/13 +
 5*a**3*b*x**16*(2*A*b + B*a)/16 + 10*a**2*b**2*x**19*(A*b + B*a)
/19 + 5*a*b**3*x**22*(A*b + 2*B*a)/22 + b**4*x**25*(A*b + 5*B*a)/
25
```

Mathematica [A] time = 0.0381813, size = 117, normalized size = 1.

$$\frac{1}{10}a^5Ax^{10}+\frac{1}{13}a^4x^{13}(aB+5Ab)+\frac{5}{16}a^3bx^{16}(aB+2Ab)+\frac{10}{19}a^2b^2x^{19}(aB+Ab)+\frac{1}{25}b^4x^{25}(5aB+Ab)+\frac{5}{22}ab^3x^{22}(2aB+Ab)+\frac{1}{28}b^5Bx^{28}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^9*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^10)/10 + (a^4*(5*A*b + a*B)*x^13)/13 + (5*a^3*b*(2*A*b +
 a*B)*x^16)/16 + (10*a^2*b^2*(A*b + a*B)*x^19)/19 + (5*a*b^3*(A*b
 + 2*a*B)*x^22)/22 + (b^4*(A*b + 5*a*B)*x^25)/25 + (b^5*B*x^28)/2
8
```

Maple [A] time = 0.003, size = 124, normalized size = 1.1

$$\frac{b^5Bx^{28}}{28}+\frac{\left(b^5A+5\,ab^4B\right)x^{25}}{25}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{22}}{22}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{19}}{19}+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^{16}}{16}+\frac{\left(5\,a^4bA+a^5B\right)x^{13}}{13}+\frac{a^5Ax^{10}}{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^9*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/28*b^5*B*x^28+1/25*(A*b^5+5*B*a*b^4)*x^25+1/22*(5*A*a*b^4+10*B*
a^2*b^3)*x^22+1/19*(10*A*a^2*b^3+10*B*a^3*b^2)*x^19+1/16*(10*A*a^
3*b^2+5*B*a^4*b)*x^16+1/13*(5*A*a^4*b+B*a^5)*x^13+1/10*a^5*A*x^10
```

Maxima [A] time = 1.37317, size = 161, normalized size = 1.38

$$\frac{1}{28}\,Bb^5x^{28}+\frac{1}{25}\left(5\,Bab^4+Ab^5\right)x^{25}+\frac{5}{22}\left(2\,Ba^2b^3+Aab^4\right)x^{22}+\frac{10}{19}\left(Ba^3b^2+Aa^2b^3\right)x^{19}+\frac{5}{16}\left(Ba^4b+2\,Aa^3b^2\right)x^{16}+\frac{1}{10}\,Aa^5x^{10}+\frac{1}{13}\left(Ba^5+5\,Aa^4b\right)x^{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x^9,x, algorithm="maxima")
```

```
[Out] 1/28*B*b^5*x^28 + 1/25*(5*B*a*b^4 + A*b^5)*x^25 + 5/22*(2*B*a^2*b
^3 + A*a*b^4)*x^22 + 10/19*(B*a^3*b^2 + A*a^2*b^3)*x^19 + 5/16*(B
*a^4*b + 2*A*a^3*b^2)*x^16 + 1/10*A*a^5*x^10 + 1/13*(B*a^5 + 5*A*
a^4*b)*x^13
```

Fricas [A] time = 0.200749, size = 1, normalized size = 0.01

$$\frac{1}{28}x^{28}b^5B+\frac{1}{5}x^{25}b^4aB+\frac{1}{25}x^{25}b^5A+\frac{5}{11}x^{22}b^3a^2B+\frac{5}{22}x^{22}b^4aA+\frac{10}{19}x^{19}b^2a^3B+\frac{10}{19}x^{19}b^3a^2A+\frac{5}{16}x^{16}ba^4B+\frac{5}{8}x^{16}b^2a^3A+\frac{1}{13}x^{13}a^5B+\frac{5}{13}x^{13}ba^4A+\frac{1}{10}x^{10}a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x^9,x, algorithm="fricas")
```

```
[Out] 1/28*x^28*b^5*B + 1/5*x^25*b^4*a*B + 1/25*x^25*b^5*A + 5/11*x^22*
b^3*a^2*B + 5/22*x^22*b^4*a*A + 10/19*x^19*b^2*a^3*B + 10/19*x^19
*b^3*a^2*A + 5/16*x^16*b*a^4*B + 5/8*x^16*b^2*a^3*A + 1/13*x^13*a
^5*B + 5/13*x^13*b*a^4*A + 1/10*x^10*a^5*A
```

Sympy [A] time = 0.167274, size = 136, normalized size = 1.16

$$\frac{Aa^5x^{10}}{10}+\frac{Bb^5x^{28}}{28}+x^{25}\left(\frac{Ab^5}{25}+\frac{Bab^4}{5}\right)+x^{22}\left(\frac{5Aab^4}{22}+\frac{5Ba^2b^3}{11}\right)+x^{19}\left(\frac{10Aa^2b^3}{19}+\frac{10Ba^3b^2}{19}\right)+x^{16}\left(\frac{5Aa^3b^2}{8}+\frac{5Ba^4b}{16}\right)+x^{13}\left(\frac{5Aa^4b}{13}+\frac{Ba^5}{13}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**10/10 + B*b**5*x**28/28 + x**25*(A*b**5/25 + B*a*b**4/5
) + x**22*(5*A*a*b**4/22 + 5*B*a**2*b**3/11) + x**19*(10*A*a**2*b
**3/19 + 10*B*a**3*b**2/19) + x**16*(5*A*a**3*b**2/8 + 5*B*a**4*b
/16) + x**13*(5*A*a**4*b/13 + B*a**5/13)
```

GIAC/XCAS [A] time = 0.216243, size = 169, normalized size = 1.44

$$\frac{1}{28} Bb^5x^{28} + \frac{1}{5} Bab^4x^{25} + \frac{1}{25} Ab^5x^{25} + \frac{5}{11} Ba^2b^3x^{22} + \frac{5}{22} Aab^4x^{22} + \frac{10}{19} Ba^3b^2x^{19} + \frac{10}{19} Aa^2b^3x^{19} + \frac{5}{16} Ba^4bx^{16} + \frac{5}{8} Aa^3b^2x^{16} + \frac{1}{13} Ba^5x^{13} + \frac{5}{13} Aa^4bx^{13} + \frac{1}{10} Aa^5x^{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^9,x, algorithm="giac")
```

```
[Out] 1/28*B*b^5*x^28 + 1/5*B*a*b^4*x^25 + 1/25*A*b^5*x^25 + 5/11*B*a^2
*b^3*x^22 + 5/22*A*a*b^4*x^22 + 10/19*B*a^3*b^2*x^19 + 10/19*A*a^
2*b^3*x^19 + 5/16*B*a^4*b*x^16 + 5/8*A*a^3*b^2*x^16 + 1/13*B*a^5*
x^13 + 5/13*A*a^4*b*x^13 + 1/10*A*a^5*x^10
```

3.24 $\int x^8 \left(a+bx^3\right)^5 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=95

$$\frac{a^2\left(a+bx^3\right)^6(Ab-aB)}{18b^4}+\frac{\left(a+bx^3\right)^8(Ab-3aB)}{24b^4}-\frac{a\left(a+bx^3\right)^7(2Ab-3aB)}{21b^4}+\frac{B\left(a+bx^3\right)^9}{27b^4}$$

```
[Out] (a^2*(A*b - a*B)*(a + b*x^3)^6)/(18*b^4) - (a*(2*A*b - 3*a*B)*(a
+ b*x^3)^7)/(21*b^4) + ((A*b - 3*a*B)*(a + b*x^3)^8)/(24*b^4) + (
B*(a + b*x^3)^9)/(27*b^4)
```

Rubi [A] time = 0.607123, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$\frac{a^2\left(a+bx^3\right)^6(Ab-aB)}{18b^4}+\frac{\left(a+bx^3\right)^8(Ab-3aB)}{24b^4}-\frac{a\left(a+bx^3\right)^7(2Ab-3aB)}{21b^4}+\frac{B\left(a+bx^3\right)^9}{27b^4}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^2*(A*b - a*B)*(a + b*x^3)^6)/(18*b^4) - (a*(2*A*b - 3*a*B)*(a
+ b*x^3)^7)/(21*b^4) + ((A*b - 3*a*B)*(a + b*x^3)^8)/(24*b^4) + (
B*(a + b*x^3)^9)/(27*b^4)
```

Rubi in Sympy [A] time = 30.6162, size = 85, normalized size = 0.89

$$\frac{B\left(a+bx^3\right)^9}{27b^4}+\frac{a^2\left(a+bx^3\right)^6(Ab-Ba)}{18b^4}-\frac{a\left(a+bx^3\right)^7(2Ab-3Ba)}{21b^4}+\frac{\left(a+bx^3\right)^8(Ab-3Ba)}{24b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] B*(a + b*x**3)**9/(27*b**4) + a**2*(a + b*x**3)**6*(A*b - B*a)/(1
8*b**4) - a*(a + b*x**3)**7*(2*A*b - 3*B*a)/(21*b**4) + (a + b*x*
*3)**8*(A*b - 3*B*a)/(24*b**4)
```

Mathematica [A] time = 0.0551935, size = 107, normalized size = 1.13

$$\frac{x^9\left(168a^5A+126a^4x^3(aB+5Ab)+504a^3bx^6(aB+2Ab)+840a^2b^2x^9(aB+Ab)+63b^4x^{15}(5aB+Ab)+360ab^3x^{12}(2aB+Ab)\right.}{1512}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (x^9*(168*a^5*A + 126*a^4*(5*A*b + a*B)*x^3 + 504*a^3*b*(2*A*b +
a*B)*x^6 + 840*a^2*b^2*(A*b + a*B)*x^9 + 360*a*b^3*(A*b + 2*a*B)*
x^12 + 63*b^4*(A*b + 5*a*B)*x^15 + 56*b^5*B*x^18))/1512
```

Maple [A] time = 0.002, size = 124, normalized size = 1.3

$$\frac{b^5Bx^{27}}{27}+\frac{\left(b^5A+5\,ab^4B\right)x^{24}}{24}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{21}}{21}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{18}}{18}+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^{15}}{15}+\frac{\left(5\,a^4bA+a^5B\right)x^{12}}{12}+\frac{a^5Ax^9}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/27*b^5*B*x^27+1/24*(A*b^5+5*B*a*b^4)*x^24+1/21*(5*A*a*b^4+10*B*
a^2*b^3)*x^21+1/18*(10*A*a^2*b^3+10*B*a^3*b^2)*x^18+1/15*(10*A*a^
3*b^2+5*B*a^4*b)*x^15+1/12*(5*A*a^4*b+B*a^5)*x^12+1/9*a^5*A*x^9
```

Maxima [A] time = 1.41794, size = 161, normalized size = 1.69

$$\frac{1}{27}\,Bb^5x^{27}+\frac{1}{24}\left(5\,Bab^4+Ab^5\right)x^{24}+\frac{5}{21}\left(2\,Ba^2b^3+Aab^4\right)x^{21}+\frac{5}{9}\left(Ba^3b^2+Aa^2b^3\right)x^{18}+\frac{1}{3}\left(Ba^4b+2\,Aa^3b^2\right)x^{15}+\frac{1}{9}\,Aa^5x^9+\frac{1}{12}\left(Ba^5+5\,Aa^4b\right)x^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^8,x, algorithm="maxima")
```

```
[Out] 1/27*B*b^5*x^27 + 1/24*(5*B*a*b^4 + A*b^5)*x^24 + 5/21*(2*B*a^2*b
^3 + A*a*b^4)*x^21 + 5/9*(B*a^3*b^2 + A*a^2*b^3)*x^18 + 1/3*(B*a^
4*b + 2*A*a^3*b^2)*x^15 + 1/9*A*a^5*x^9 + 1/12*(B*a^5 + 5*A*a^4*b
)*x^12
```

Fricas [A] time = 0.193193, size = 1, normalized size = 0.01

$$\frac{1}{27}x^{27}b^5B+\frac{5}{24}x^{24}b^4aB+\frac{1}{24}x^{24}b^5A+\frac{10}{21}x^{21}b^3a^2B+\frac{5}{21}x^{21}b^4aA+\frac{5}{9}x^{18}b^2a^3B+\frac{5}{9}x^{18}b^3a^2A+\frac{1}{3}x^{15}ba^4B+\frac{2}{3}x^{15}b^2a^3A+\frac{1}{12}x^{12}a^5B+\frac{5}{12}x^{12}ba^4A+\frac{1}{9}x^9a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^8,x, algorithm="fricas")
```

```
[Out] 1/27*x^27*b^5*B + 5/24*x^24*b^4*a*B + 1/24*x^24*b^5*A + 10/21*x^2
1*b^3*a^2*B + 5/21*x^21*b^4*a*A + 5/9*x^18*b^2*a^3*B + 5/9*x^18*b
^3*a^2*A + 1/3*x^15*b*a^4*B + 2/3*x^15*b^2*a^3*A + 1/12*x^12*a^5*
B + 5/12*x^12*b*a^4*A + 1/9*x^9*a^5*A
```

Sympy [A] time = 0.168798, size = 136, normalized size = 1.43

$$\frac{Aa^5x^9}{9}+\frac{Bb^5x^{27}}{27}+x^{24}\left(\frac{Ab^5}{24}+\frac{5Bab^4}{24}\right)+x^{21}\left(\frac{5Aab^4}{21}+\frac{10Ba^2b^3}{21}\right)+x^{18}\left(\frac{5Aa^2b^3}{9}+\frac{5Ba^3b^2}{9}\right)+x^{15}\left(\frac{2Aa^3b^2}{3}+\frac{Ba^4b}{3}\right)+x^{12}\left(\frac{5Aa^4b}{12}+\frac{Ba^5}{12}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**9/9 + B*b**5*x**27/27 + x**24*(A*b**5/24 + 5*B*a*b**4/2
4) + x**21*(5*A*a*b**4/21 + 10*B*a**2*b**3/21) + x**18*(5*A*a**2*
b**3/9 + 5*B*a**3*b**2/9) + x**15*(2*A*a**3*b**2/3 + B*a**4*b/3)
+ x**12*(5*A*a**4*b/12 + B*a**5/12)
```

<u>GIAC/XCAS</u> [A] time = 0.215987, size = 169, normalized size = 1.78

$$\frac{1}{27}\,Bb^{5}x^{27}+\frac{5}{24}\,Bab^{4}x^{24}+\frac{1}{24}\,Ab^{5}x^{24}+\frac{10}{21}\,Ba^{2}b^{3}x^{21}+\frac{5}{21}\,Aab^{4}x^{21}+\frac{5}{9}\,Ba^{3}b^{2}x^{18}+\frac{5}{9}\,Aa^{2}b^{3}x^{18}+\frac{1}{3}\,Ba^{4}bx^{15}+\frac{2}{3}\,Aa^{3}b^{2}x^{15}+\frac{1}{12}\,Ba^{5}x^{12}+\frac{5}{12}\,Aa^{4}bx^{12}+\frac{1}{9}\,Aa^{5}x^{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^8,x, algorithm="giac")
```

```
[Out] 1/27*B*b^5*x^27 + 5/24*B*a*b^4*x^24 + 1/24*A*b^5*x^24 + 10/21*B*a
^2*b^3*x^21 + 5/21*A*a*b^4*x^21 + 5/9*B*a^3*b^2*x^18 + 5/9*A*a^2*
b^3*x^18 + 1/3*B*a^4*b*x^15 + 2/3*A*a^3*b^2*x^15 + 1/12*B*a^5*x^1
2 + 5/12*A*a^4*b*x^12 + 1/9*A*a^5*x^9
```

3.25 $\int x^7 \left(a+bx^3\right)^5 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=117

$$\frac{1}{8}a^5Ax^8+\frac{1}{11}a^4x^{11}(aB+5Ab)+\frac{5}{14}a^3bx^{14}(aB+2Ab)+\frac{10}{17}a^2b^2x^{17}(aB+Ab)+\frac{1}{23}b^4x^{23}(5aB+Ab)+\frac{1}{4}ab^3x^{20}(2aB+Ab)+\frac{1}{26}b^5Bx^{26}$$

```
[Out] (a^5*A*x^8)/8 + (a^4*(5*A*b + a*B)*x^11)/11 + (5*a^3*b*(2*A*b + a
*B)*x^14)/14 + (10*a^2*b^2*(A*b + a*B)*x^17)/17 + (a*b^3*(A*b + 2
*a*B)*x^20)/4 + (b^4*(A*b + 5*a*B)*x^23)/23 + (b^5*B*x^26)/26
```

Rubi [A] time = 0.274944, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$\frac{1}{8}a^5Ax^8+\frac{1}{11}a^4x^{11}(aB+5Ab)+\frac{5}{14}a^3bx^{14}(aB+2Ab)+\frac{10}{17}a^2b^2x^{17}(aB+Ab)+\frac{1}{23}b^4x^{23}(5aB+Ab)+\frac{1}{4}ab^3x^{20}(2aB+Ab)+\frac{1}{26}b^5Bx^{26}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^8)/8 + (a^4*(5*A*b + a*B)*x^11)/11 + (5*a^3*b*(2*A*b + a
*B)*x^14)/14 + (10*a^2*b^2*(A*b + a*B)*x^17)/17 + (a*b^3*(A*b + 2
*a*B)*x^20)/4 + (b^4*(A*b + 5*a*B)*x^23)/23 + (b^5*B*x^26)/26
```

Rubi in Sympy [A] time = 25.3426, size = 112, normalized size = 0.96

$$\frac{Aa^5x^8}{8}+\frac{Bb^5x^{26}}{26}+\frac{a^4x^{11}\left(5Ab+Ba\right)}{11}+\frac{5a^3bx^{14}\left(2Ab+Ba\right)}{14}+\frac{10a^2b^2x^{17}\left(Ab+Ba\right)}{17}+\frac{ab^3x^{20}\left(Ab+2Ba\right)}{4}+\frac{b^4x^{23}\left(Ab+5Ba\right)}{23}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**8/8 + B*b**5*x**26/26 + a**4*x**11*(5*A*b + B*a)/11 + 5
*a**3*b*x**14*(2*A*b + B*a)/14 + 10*a**2*b**2*x**17*(A*b + B*a)/1
7 + a*b**3*x**20*(A*b + 2*B*a)/4 + b**4*x**23*(A*b + 5*B*a)/23
```

Mathematica [A] time = 0.0337851, size = 117, normalized size = 1.

$$\frac{1}{8}a^5Ax^8+\frac{1}{11}a^4x^{11}(aB+5Ab)+\frac{5}{14}a^3bx^{14}(aB+2Ab)+\frac{10}{17}a^2b^2x^{17}(aB+Ab)+\frac{1}{23}b^4x^{23}(5aB+Ab)+\frac{1}{4}ab^3x^{20}(2aB+Ab)+\frac{1}{26}b^5Bx^{26}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^8)/8 + (a^4*(5*A*b + a*B)*x^11)/11 + (5*a^3*b*(2*A*b + a
*B)*x^14)/14 + (10*a^2*b^2*(A*b + a*B)*x^17)/17 + (a*b^3*(A*b + 2
*a*B)*x^20)/4 + (b^4*(A*b + 5*a*B)*x^23)/23 + (b^5*B*x^26)/26
```

Maple [A] time = 0.002, size = 124, normalized size = 1.1

$$\frac{b^5Bx^{26}}{26}+\frac{\left(b^5A+5\,ab^4B\right)x^{23}}{23}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{20}}{20}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{17}}{17}+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^{14}}{14}+\frac{\left(5\,a^4bA+a^5B\right)x^{11}}{11}+\frac{a^5Ax^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/26*b^5*B*x^26+1/23*(A*b^5+5*B*a*b^4)*x^23+1/20*(5*A*a*b^4+10*B*
a^2*b^3)*x^20+1/17*(10*A*a^2*b^3+10*B*a^3*b^2)*x^17+1/14*(10*A*a^
3*b^2+5*B*a^4*b)*x^14+1/11*(5*A*a^4*b+B*a^5)*x^11+1/8*a^5*A*x^8
```

Maxima [A] time = 1.37311, size = 161, normalized size = 1.38

$$\frac{1}{26}\,Bb^5x^{26}+\frac{1}{23}\left(5\,Bab^4+Ab^5\right)x^{23}+\frac{1}{4}\left(2\,Ba^2b^3+Aab^4\right)x^{20}+\frac{10}{17}\left(Ba^3b^2+Aa^2b^3\right)x^{17}+\frac{5}{14}\left(Ba^4b+2\,Aa^3b^2\right)x^{14}+\frac{1}{8}\,Aa^5x^8+\frac{1}{11}\left(Ba^5+5\,Aa^4b\right)x^{11}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^7,x, algorithm="maxima")
```

```
[Out] 1/26*B*b^5*x^26 + 1/23*(5*B*a*b^4 + A*b^5)*x^23 + 1/4*(2*B*a^2*b^
3 + A*a*b^4)*x^20 + 10/17*(B*a^3*b^2 + A*a^2*b^3)*x^17 + 5/14*(B*
a^4*b + 2*A*a^3*b^2)*x^14 + 1/8*A*a^5*x^8 + 1/11*(B*a^5 + 5*A*a^4
*b)*x^11
```

Fricas [A] time = 0.205117, size = 1, normalized size = 0.01

$$\frac{1}{26}x^{26}b^5B+\frac{5}{23}x^{23}b^4aB+\frac{1}{23}x^{23}b^5A+\frac{1}{2}x^{20}b^3a^2B+\frac{1}{4}x^{20}b^4aA+\frac{10}{17}x^{17}b^2a^3B+\frac{10}{17}x^{17}b^3a^2A+\frac{5}{14}x^{14}ba^4B+\frac{5}{7}x^{14}b^2a^3A+\frac{1}{11}x^{11}a^5B+\frac{5}{11}x^{11}ba^4A+\frac{1}{8}x^8a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^7,x, algorithm="fricas")
```

```
[Out] 1/26*x^26*b^5*B + 5/23*x^23*b^4*a*B + 1/23*x^23*b^5*A + 1/2*x^20*
b^3*a^2*B + 1/4*x^20*b^4*a*A + 10/17*x^17*b^2*a^3*B + 10/17*x^17*
b^3*a^2*A + 5/14*x^14*b*a^4*B + 5/7*x^14*b^2*a^3*A + 1/11*x^11*a^
5*B + 5/11*x^11*b*a^4*A + 1/8*x^8*a^5*A
```

Sympy [A] time = 0.167246, size = 134, normalized size = 1.15

$$\frac{Aa^5x^8}{8}+\frac{Bb^5x^{26}}{26}+x^{23}\left(\frac{Ab^5}{23}+\frac{5Bab^4}{23}\right)+x^{20}\left(\frac{Aab^4}{4}+\frac{Ba^2b^3}{2}\right)+x^{17}\left(\frac{10Aa^2b^3}{17}+\frac{10Ba^3b^2}{17}\right)+x^{14}\left(\frac{5Aa^3b^2}{7}+\frac{5Ba^4b}{14}\right)+x^{11}\left(\frac{5Aa^4b}{11}+\frac{Ba^5}{11}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**8/8 + B*b**5*x**26/26 + x**23*(A*b**5/23 + 5*B*a*b**4/2
3) + x**20*(A*a*b**4/4 + B*a**2*b**3/2) + x**17*(10*A*a**2*b**3/1
7 + 10*B*a**3*b**2/17) + x**14*(5*A*a**3*b**2/7 + 5*B*a**4*b/14)
+ x**11*(5*A*a**4*b/11 + B*a**5/11)
```

GIAC/XCAS [A] time = 0.215264, size = 169, normalized size = 1.44

$$\frac{1}{26}\,Bb^{5}x^{26}+\frac{5}{23}\,Bab^{4}x^{23}+\frac{1}{23}\,Ab^{5}x^{23}+\frac{1}{2}\,Ba^{2}b^{3}x^{20}+\frac{1}{4}\,Aab^{4}x^{20}+\frac{10}{17}\,Ba^{3}b^{2}x^{17}+\frac{10}{17}\,Aa^{2}b^{3}x^{17}+\frac{5}{14}\,Ba^{4}bx^{14}+\frac{5}{7}\,Aa^{3}b^{2}x^{14}+\frac{1}{11}\,Ba^{5}x^{11}+\frac{5}{11}\,Aa^{4}bx^{11}+\frac{1}{8}\,Aa^{5}x^{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^7,x, algorithm="giac")
```

```
[Out] 1/26*B*b^5*x^26 + 5/23*B*a*b^4*x^23 + 1/23*A*b^5*x^23 + 1/2*B*a^2
*b^3*x^20 + 1/4*A*a*b^4*x^20 + 10/17*B*a^3*b^2*x^17 + 10/17*A*a^2
*b^3*x^17 + 5/14*B*a^4*b*x^14 + 5/7*A*a^3*b^2*x^14 + 1/11*B*a^5*x
^11 + 5/11*A*a^4*b*x^11 + 1/8*A*a^5*x^8
```

3.26 $\int x^6 \left(a+bx^3\right)^5 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=117

$$\frac{1}{7}a^5Ax^7+\frac{1}{10}a^4x^{10}(aB+5Ab)+\frac{5}{13}a^3bx^{13}(aB+2Ab)+\frac{5}{8}a^2b^2x^{16}(aB+Ab)+\frac{1}{22}b^4x^{22}(5aB+Ab)+\frac{5}{19}ab^3x^{19}(2aB+Ab)+\frac{1}{25}b^5Bx^{25}$$

```
[Out] (a^5*A*x^7)/7 + (a^4*(5*A*b + a*B)*x^10)/10 + (5*a^3*b*(2*A*b + a
*B)*x^13)/13 + (5*a^2*b^2*(A*b + a*B)*x^16)/8 + (5*a*b^3*(A*b + 2
*a*B)*x^19)/19 + (b^4*(A*b + 5*a*B)*x^22)/22 + (b^5*B*x^25)/25
```

Rubi [A] time = 0.240023, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$\frac{1}{7}a^5Ax^7+\frac{1}{10}a^4x^{10}(aB+5Ab)+\frac{5}{13}a^3bx^{13}(aB+2Ab)+\frac{5}{8}a^2b^2x^{16}(aB+Ab)+\frac{1}{22}b^4x^{22}(5aB+Ab)+\frac{5}{19}ab^3x^{19}(2aB+Ab)+\frac{1}{25}b^5Bx^{25}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^7)/7 + (a^4*(5*A*b + a*B)*x^10)/10 + (5*a^3*b*(2*A*b + a
*B)*x^13)/13 + (5*a^2*b^2*(A*b + a*B)*x^16)/8 + (5*a*b^3*(A*b + 2
*a*B)*x^19)/19 + (b^4*(A*b + 5*a*B)*x^22)/22 + (b^5*B*x^25)/25
```

Rubi in Sympy [A] time = 25.1809, size = 114, normalized size = 0.97

$$\frac{Aa^5x^7}{7}+\frac{Bb^5x^{25}}{25}+\frac{a^4x^{10}\left(5Ab+Ba\right)}{10}+\frac{5a^3bx^{13}\left(2Ab+Ba\right)}{13}+\frac{5a^2b^2x^{16}\left(Ab+Ba\right)}{8}+\frac{5ab^3x^{19}\left(Ab+2Ba\right)}{19}+\frac{b^4x^{22}\left(Ab+5Ba\right)}{22}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**7/7 + B*b**5*x**25/25 + a**4*x**10*(5*A*b + B*a)/10 + 5
*a**3*b*x**13*(2*A*b + B*a)/13 + 5*a**2*b**2*x**16*(A*b + B*a)/8
+ 5*a*b**3*x**19*(A*b + 2*B*a)/19 + b**4*x**22*(A*b + 5*B*a)/22
```

Mathematica [A] time = 0.0349514, size = 117, normalized size = 1.

$$\frac{1}{7}a^5Ax^7+\frac{1}{10}a^4x^{10}(aB+5Ab)+\frac{5}{13}a^3bx^{13}(aB+2Ab)+\frac{5}{8}a^2b^2x^{16}(aB+Ab)+\frac{1}{22}b^4x^{22}(5aB+Ab)+\frac{5}{19}ab^3x^{19}(2aB+Ab)+\frac{1}{25}b^5Bx^{25}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^6*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^7)/7 + (a^4*(5*A*b + a*B)*x^10)/10 + (5*a^3*b*(2*A*b + a
*B)*x^13)/13 + (5*a^2*b^2*(A*b + a*B)*x^16)/8 + (5*a*b^3*(A*b + 2
*a*B)*x^19)/19 + (b^4*(A*b + 5*a*B)*x^22)/22 + (b^5*B*x^25)/25
```

Maple [A] time = 0.003, size = 124, normalized size = 1.1

$$\frac{b^5Bx^{25}}{25}+\frac{\left(b^5A+5\,ab^4B\right)x^{22}}{22}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{19}}{19}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{16}}{16}+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^{13}}{13}+\frac{\left(5\,a^4bA+a^5B\right)x^{10}}{10}+\frac{a^5Ax^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/25*b^5*B*x^25+1/22*(A*b^5+5*B*a*b^4)*x^22+1/19*(5*A*a*b^4+10*B*
a^2*b^3)*x^19+1/16*(10*A*a^2*b^3+10*B*a^3*b^2)*x^16+1/13*(10*A*a^
3*b^2+5*B*a^4*b)*x^13+1/10*(5*A*a^4*b+B*a^5)*x^10+1/7*a^5*A*x^7
```

Maxima [A] time = 1.40924, size = 161, normalized size = 1.38

$$\frac{1}{25}\,Bb^5x^{25}+\frac{1}{22}\left(5\,Bab^4+Ab^5\right)x^{22}+\frac{5}{19}\left(2\,Ba^2b^3+Aab^4\right)x^{19}+\frac{5}{8}\left(Ba^3b^2+Aa^2b^3\right)x^{16}+\frac{5}{13}\left(Ba^4b+2\,Aa^3b^2\right)x^{13}+\frac{1}{7}\,Aa^5x^7+\frac{1}{10}\left(Ba^5+5\,Aa^4b\right)x^{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^6,x, algorithm="maxima")
```

```
[Out] 1/25*B*b^5*x^25 + 1/22*(5*B*a*b^4 + A*b^5)*x^22 + 5/19*(2*B*a^2*b
^3 + A*a*b^4)*x^19 + 5/8*(B*a^3*b^2 + A*a^2*b^3)*x^16 + 5/13*(B*a
^4*b + 2*A*a^3*b^2)*x^13 + 1/7*A*a^5*x^7 + 1/10*(B*a^5 + 5*A*a^4*
b)*x^10
```

Fricas [A] time = 0.20279, size = 1, normalized size = 0.01

$$\frac{1}{25}x^{25}b^5B+\frac{5}{22}x^{22}b^4aB+\frac{1}{22}x^{22}b^5A+\frac{10}{19}x^{19}b^3a^2B+\frac{5}{19}x^{19}b^4aA+\frac{5}{8}x^{16}b^2a^3B+\frac{5}{8}x^{16}b^3a^2A+\frac{5}{13}x^{13}ba^4B+\frac{10}{13}x^{13}b^2a^3A+\frac{1}{10}x^{10}a^5B+\frac{1}{2}x^{10}ba^4A+\frac{1}{7}x^7a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^6,x, algorithm="fricas")
```

```
[Out] 1/25*x^25*b^5*B + 5/22*x^22*b^4*a*B + 1/22*x^22*b^5*A + 10/19*x^1
9*b^3*a^2*B + 5/19*x^19*b^4*a*A + 5/8*x^16*b^2*a^3*B + 5/8*x^16*b
^3*a^2*A + 5/13*x^13*b*a^4*B + 10/13*x^13*b^2*a^3*A + 1/10*x^10*a
^5*B + 1/2*x^10*b*a^4*A + 1/7*x^7*a^5*A
```

Sympy [A] time = 0.166508, size = 136, normalized size = 1.16

$$\frac{Aa^5x^7}{7}+\frac{Bb^5x^{25}}{25}+x^{22}\left(\frac{Ab^5}{22}+\frac{5Bab^4}{22}\right)+x^{19}\left(\frac{5Aab^4}{19}+\frac{10Ba^2b^3}{19}\right)+x^{16}\left(\frac{5Aa^2b^3}{8}+\frac{5Ba^3b^2}{8}\right)+x^{13}\left(\frac{10Aa^3b^2}{13}+\frac{5Ba^4b}{13}\right)+x^{10}\left(\frac{Aa^4b}{2}+\frac{Ba^5}{10}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**7/7 + B*b**5*x**25/25 + x**22*(A*b**5/22 + 5*B*a*b**4/2
2) + x**19*(5*A*a*b**4/19 + 10*B*a**2*b**3/19) + x**16*(5*A*a**2*
b**3/8 + 5*B*a**3*b**2/8) + x**13*(10*A*a**3*b**2/13 + 5*B*a**4*b
/13) + x**10*(A*a**4*b/2 + B*a**5/10)
```

GIAC/XCAS [A] time = 0.215524, size = 169, normalized size = 1.44

$$\frac{1}{25}\,Bb^5x^{25}+\frac{5}{22}\,Bab^4x^{22}+\frac{1}{22}\,Ab^5x^{22}+\frac{10}{19}\,Ba^2b^3x^{19}+\frac{5}{19}\,Aab^4x^{19}+\frac{5}{8}\,Ba^3b^2x^{16}+\frac{5}{8}\,Aa^2b^3x^{16}+\frac{5}{13}\,Ba^4bx^{13}+\frac{10}{13}\,Aa^3b^2x^{13}+\frac{1}{10}\,Ba^5x^{10}+\frac{1}{2}\,Aa^4bx^{10}+\frac{1}{7}\,Aa^5x^7$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^6,x, algorithm="giac")
```

```
[Out] 1/25*B*b^5*x^25 + 5/22*B*a*b^4*x^22 + 1/22*A*b^5*x^22 + 10/19*B*a
^2*b^3*x^19 + 5/19*A*a*b^4*x^19 + 5/8*B*a^3*b^2*x^16 + 5/8*A*a^2*
b^3*x^16 + 5/13*B*a^4*b*x^13 + 10/13*A*a^3*b^2*x^13 + 1/10*B*a^5*
x^10 + 1/2*A*a^4*b*x^10 + 1/7*A*a^5*x^7
```

3.27 $\int x^5 \left(a+bx^3\right)^5 \left(A+Bx^3\right)\,dx$

Optimal. Leaf size=67

$$\frac{\left(a+bx^3\right)^7 (Ab-2aB)}{21b^3}-\frac{a\left(a+bx^3\right)^6 (Ab-aB)}{18b^3}+\frac{B\left(a+bx^3\right)^8}{24b^3}$$

```
[Out] -(a*(A*b - a*B)*(a + b*x^3)^6)/(18*b^3) + ((A*b - 2*a*B)*(a + b*x
^3)^7)/(21*b^3) + (B*(a + b*x^3)^8)/(24*b^3)
```

Rubi [A] time = 0.447123, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$\frac{\left(a+bx^3\right)^7 (Ab-2aB)}{21b^3}-\frac{a\left(a+bx^3\right)^6 (Ab-aB)}{18b^3}+\frac{B\left(a+bx^3\right)^8}{24b^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] -(a*(A*b - a*B)*(a + b*x^3)^6)/(18*b^3) + ((A*b - 2*a*B)*(a + b*x
^3)^7)/(21*b^3) + (B*(a + b*x^3)^8)/(24*b^3)
```

Rubi in Sympy [A] time = 24.8959, size = 58, normalized size = 0.87

$$\frac{B\left(a+bx^3\right)^8}{24b^3}-\frac{a\left(a+bx^3\right)^6 (Ab-Ba)}{18b^3}+\frac{\left(a+bx^3\right)^7 (Ab-2Ba)}{21b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] B*(a + b*x**3)**8/(24*b**3) - a*(a + b*x**3)**6*(A*b - B*a)/(18*b
**3) + (a + b*x**3)**7*(A*b - 2*B*a)/(21*b**3)
```

Mathematica [A] time = 0.0491097, size = 107, normalized size = 1.6

$$\frac{1}{504}x^6\left(84a^5A+56a^4x^3(aB+5Ab)+210a^3bx^6(aB+2Ab)+336a^2b^2x^9(aB+Ab)\right.$$
$$\left.+24b^4x^{15}(5aB+Ab)+140ab^3x^{12}(2aB+Ab)+21b^5Bx^{18}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (x^6*(84*a^5*A + 56*a^4*(5*A*b + a*B)*x^3 + 210*a^3*b*(2*A*b + a*
B)*x^6 + 336*a^2*b^2*(A*b + a*B)*x^9 + 140*a*b^3*(A*b + 2*a*B)*x^
12 + 24*b^4*(A*b + 5*a*B)*x^15 + 21*b^5*B*x^18))/504
```

Maple [B] time = 0.002, size = 124, normalized size = 1.9

$$\frac{b^5Bx^{24}}{24}+\frac{\left(b^5A+5\,ab^4B\right)x^{21}}{21}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{18}}{18}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{15}}{15}$$
$$+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^{12}}{12}+\frac{\left(5\,a^4bA+a^5B\right)x^9}{9}+\frac{a^5Ax^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^5*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/24*b^5*B*x^24+1/21*(A*b^5+5*B*a*b^4)*x^21+1/18*(5*A*a*b^4+10*B*
a^2*b^3)*x^18+1/15*(10*A*a^2*b^3+10*B*a^3*b^2)*x^15+1/12*(10*A*a^
3*b^2+5*B*a^4*b)*x^12+1/9*(5*A*a^4*b+B*a^5)*x^9+1/6*a^5*A*x^6
```

Maxima [A] time = 1.46211, size = 161, normalized size = 2.4

$$\frac{1}{24}\,Bb^5x^{24}+\frac{1}{21}\left(5\,Bab^4+Ab^5\right)x^{21}+\frac{5}{18}\left(2\,Ba^2b^3+Aab^4\right)x^{18}+\frac{2}{3}\left(Ba^3b^2+Aa^2b^3\right)x^{15}+\frac{5}{12}\left(Ba^4b+2\,Aa^3b^2\right)x^{12}+\frac{1}{6}\,Aa^5x^6+\frac{1}{9}\left(Ba^5+5\,Aa^4b\right)x^9$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x^5,x, algorithm="maxima")
```

```
[Out] 1/24*B*b^5*x^24 + 1/21*(5*B*a*b^4 + A*b^5)*x^21 + 5/18*(2*B*a^2*b
^3 + A*a*b^4)*x^18 + 2/3*(B*a^3*b^2 + A*a^2*b^3)*x^15 + 5/12*(B*a
^4*b + 2*A*a^3*b^2)*x^12 + 1/6*A*a^5*x^6 + 1/9*(B*a^5 + 5*A*a^4*b
)*x^9
```

Fricas [A] time = 0.202244, size = 1, normalized size = 0.01

$$\frac{1}{24}x^{24}b^5B+\frac{5}{21}x^{21}b^4aB+\frac{1}{21}x^{21}b^5A+\frac{5}{9}x^{18}b^3a^2B+\frac{5}{18}x^{18}b^4aA+\frac{2}{3}x^{15}b^2a^3B+\frac{2}{3}x^{15}b^3a^2A+\frac{5}{12}x^{12}ba^4B+\frac{5}{6}x^{12}b^2a^3A+\frac{1}{9}x^9a^5B+\frac{5}{9}x^9ba^4A+\frac{1}{6}x^6a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x^5,x, algorithm="fricas")
```

```
[Out] 1/24*x^24*b^5*B + 5/21*x^21*b^4*a*B + 1/21*x^21*b^5*A + 5/9*x^18*
b^3*a^2*B + 5/18*x^18*b^4*a*A + 2/3*x^15*b^2*a^3*B + 2/3*x^15*b^3
*a^2*A + 5/12*x^12*b*a^4*B + 5/6*x^12*b^2*a^3*A + 1/9*x^9*a^5*B +
 5/9*x^9*b*a^4*A + 1/6*x^6*a^5*A
```

Sympy [A] time = 0.166453, size = 138, normalized size = 2.06

$$\frac{Aa^5x^6}{6}+\frac{Bb^5x^{24}}{24}+x^{21}\left(\frac{Ab^5}{21}+\frac{5Bab^4}{21}\right)+x^{18}\left(\frac{5Aab^4}{18}+\frac{5Ba^2b^3}{9}\right)+x^{15}\left(\frac{2Aa^2b^3}{3}+\frac{2Ba^3b^2}{3}\right)+x^{12}\left(\frac{5Aa^3b^2}{6}+\frac{5Ba^4b}{12}\right)+x^9\left(\frac{5Aa^4b}{9}+\frac{Ba^5}{9}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**5*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**6/6 + B*b**5*x**24/24 + x**21*(A*b**5/21 + 5*B*a*b**4/2
1) + x**18*(5*A*a*b**4/18 + 5*B*a**2*b**3/9) + x**15*(2*A*a**2*b*
*3/3 + 2*B*a**3*b**2/3) + x**12*(5*A*a**3*b**2/6 + 5*B*a**4*b/12)
 + x**9*(5*A*a**4*b/9 + B*a**5/9)
```

GIAC/XCAS [A] time = 0.215473, size = 169, normalized size = 2.52

$$\frac{1}{24}Bb^5x^{24} + \frac{5}{21}Bab^4x^{21} + \frac{1}{21}Ab^5x^{21} + \frac{5}{9}Ba^2b^3x^{18} + \frac{5}{18}Aab^4x^{18} + \frac{2}{3}Ba^3b^2x^{15} + \frac{2}{3}Aa^2b^3x^{15} + \frac{5}{12}Ba^4bx^{12} + \frac{5}{6}Aa^3b^2x^{12} + \frac{1}{9}Ba^5x^9 + \frac{5}{9}Aa^4bx^9 + \frac{1}{6}Aa^5x^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^5,x, algorithm="giac")
```

```
[Out] 1/24*B*b^5*x^24 + 5/21*B*a*b^4*x^21 + 1/21*A*b^5*x^21 + 5/9*B*a^2
*b^3*x^18 + 5/18*A*a*b^4*x^18 + 2/3*B*a^3*b^2*x^15 + 2/3*A*a^2*b^
3*x^15 + 5/12*B*a^4*b*x^12 + 5/6*A*a^3*b^2*x^12 + 1/9*B*a^5*x^9 +
 5/9*A*a^4*b*x^9 + 1/6*A*a^5*x^6
```

3.28 $\int x^4 \left(a+bx^3\right)^5 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=117

$$\frac{1}{5}a^5Ax^5+\frac{1}{8}a^4x^8(aB+5Ab)+\frac{5}{11}a^3bx^{11}(aB+2Ab)+\frac{5}{7}a^2b^2x^{14}(aB+Ab)+\frac{1}{20}b^4x^{20}(5aB+Ab)+\frac{5}{17}ab^3x^{17}(2aB+Ab)+\frac{1}{23}b^5Bx^{23}$$

```
[Out] (a^5*A*x^5)/5 + (a^4*(5*A*b + a*B)*x^8)/8 + (5*a^3*b*(2*A*b + a*B
)*x^11)/11 + (5*a^2*b^2*(A*b + a*B)*x^14)/7 + (5*a*b^3*(A*b + 2*a
*B)*x^17)/17 + (b^4*(A*b + 5*a*B)*x^20)/20 + (b^5*B*x^23)/23
```

Rubi [A] time = 0.249455, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$\frac{1}{5}a^5Ax^5+\frac{1}{8}a^4x^8(aB+5Ab)+\frac{5}{11}a^3bx^{11}(aB+2Ab)+\frac{5}{7}a^2b^2x^{14}(aB+Ab)+\frac{1}{20}b^4x^{20}(5aB+Ab)+\frac{5}{17}ab^3x^{17}(2aB+Ab)+\frac{1}{23}b^5Bx^{23}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^5)/5 + (a^4*(5*A*b + a*B)*x^8)/8 + (5*a^3*b*(2*A*b + a*B
)*x^11)/11 + (5*a^2*b^2*(A*b + a*B)*x^14)/7 + (5*a*b^3*(A*b + 2*a
*B)*x^17)/17 + (b^4*(A*b + 5*a*B)*x^20)/20 + (b^5*B*x^23)/23
```

Rubi in Sympy [A] time = 25.3733, size = 114, normalized size = 0.97

$$\frac{Aa^5x^5}{5}+\frac{Bb^5x^{23}}{23}+\frac{a^4x^8\left(5Ab+Ba\right)}{8}+\frac{5a^3bx^{11}\left(2Ab+Ba\right)}{11}+\frac{5a^2b^2x^{14}\left(Ab+Ba\right)}{7}+\frac{5ab^3x^{17}\left(Ab+2Ba\right)}{17}+\frac{b^4x^{20}\left(Ab+5Ba\right)}{20}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**5/5 + B*b**5*x**23/23 + a**4*x**8*(5*A*b + B*a)/8 + 5*a
**3*b*x**11*(2*A*b + B*a)/11 + 5*a**2*b**2*x**14*(A*b + B*a)/7 +
5*a*b**3*x**17*(A*b + 2*B*a)/17 + b**4*x**20*(A*b + 5*B*a)/20
```

Mathematica [A] time = 0.0326379, size = 117, normalized size = 1.

$$\frac{1}{5}a^5Ax^5+\frac{1}{8}a^4x^8(aB+5Ab)+\frac{5}{11}a^3bx^{11}(aB+2Ab)+\frac{5}{7}a^2b^2x^{14}(aB+Ab)+\frac{1}{20}b^4x^{20}(5aB+Ab)+\frac{5}{17}ab^3x^{17}(2aB+Ab)+\frac{1}{23}b^5Bx^{23}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^5)/5 + (a^4*(5*A*b + a*B)*x^8)/8 + (5*a^3*b*(2*A*b + a*B
)*x^11)/11 + (5*a^2*b^2*(A*b + a*B)*x^14)/7 + (5*a*b^3*(A*b + 2*a
*B)*x^17)/17 + (b^4*(A*b + 5*a*B)*x^20)/20 + (b^5*B*x^23)/23
```

Maple [A] time = 0.003, size = 124, normalized size = 1.1

$$\frac{b^5Bx^{23}}{23}+\frac{\left(b^5A+5\,ab^4B\right)x^{20}}{20}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{17}}{17}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{14}}{14}+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^{11}}{11}+\frac{\left(5\,a^4bA+a^5B\right)x^8}{8}+\frac{a^5Ax^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/23*b^5*B*x^23+1/20*(A*b^5+5*B*a*b^4)*x^20+1/17*(5*A*a*b^4+10*B*
a^2*b^3)*x^17+1/14*(10*A*a^2*b^3+10*B*a^3*b^2)*x^14+1/11*(10*A*a^
3*b^2+5*B*a^4*b)*x^11+1/8*(5*A*a^4*b+B*a^5)*x^8+1/5*a^5*A*x^5
```

Maxima [A] time = 1.45509, size = 161, normalized size = 1.38

$$\frac{1}{23}\,Bb^5x^{23}+\frac{1}{20}\left(5\,Bab^4+Ab^5\right)x^{20}+\frac{5}{17}\left(2\,Ba^2b^3+Aab^4\right)x^{17}+\frac{5}{7}\left(Ba^3b^2+Aa^2b^3\right)x^{14}+\frac{5}{11}\left(Ba^4b+2\,Aa^3b^2\right)x^{11}+\frac{1}{5}\,Aa^5x^5+\frac{1}{8}\left(Ba^5+5\,Aa^4b\right)x^8$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^4,x, algorithm="maxima")
```

```
[Out] 1/23*B*b^5*x^23 + 1/20*(5*B*a*b^4 + A*b^5)*x^20 + 5/17*(2*B*a^2*b
^3 + A*a*b^4)*x^17 + 5/7*(B*a^3*b^2 + A*a^2*b^3)*x^14 + 5/11*(B*a
^4*b + 2*A*a^3*b^2)*x^11 + 1/5*A*a^5*x^5 + 1/8*(B*a^5 + 5*A*a^4*b
)*x^8
```

Fricas [A] time = 0.202253, size = 1, normalized size = 0.01

$$\frac{1}{23}x^{23}b^5B+\frac{1}{4}x^{20}b^4aB+\frac{1}{20}x^{20}b^5A+\frac{10}{17}x^{17}b^3a^2B+\frac{5}{17}x^{17}b^4aA+\frac{5}{7}x^{14}b^2a^3B+\frac{5}{7}x^{14}b^3a^2A+\frac{5}{11}x^{11}ba^4B+\frac{10}{11}x^{11}b^2a^3A+\frac{1}{8}x^8a^5B+\frac{5}{8}x^8ba^4A+\frac{1}{5}x^5a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^4,x, algorithm="fricas")
```

```
[Out] 1/23*x^23*b^5*B + 1/4*x^20*b^4*a*B + 1/20*x^20*b^5*A + 10/17*x^17
*b^3*a^2*B + 5/17*x^17*b^4*a*A + 5/7*x^14*b^2*a^3*B + 5/7*x^14*b^
3*a^2*A + 5/11*x^11*b*a^4*B + 10/11*x^11*b^2*a^3*A + 1/8*x^8*a^5*
B + 5/8*x^8*b*a^4*A + 1/5*x^5*a^5*A
```

Sympy [A] time = 0.168105, size = 136, normalized size = 1.16

$$\frac{Aa^5x^5}{5}+\frac{Bb^5x^{23}}{23}+x^{20}\left(\frac{Ab^5}{20}+\frac{Bab^4}{4}\right)+x^{17}\left(\frac{5Aab^4}{17}+\frac{10Ba^2b^3}{17}\right)+x^{14}\left(\frac{5Aa^2b^3}{7}+\frac{5Ba^3b^2}{7}\right)+x^{11}\left(\frac{10Aa^3b^2}{11}+\frac{5Ba^4b}{11}\right)+x^8\left(\frac{5Aa^4b}{8}+\frac{Ba^5}{8}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**5/5 + B*b**5*x**23/23 + x**20*(A*b**5/20 + B*a*b**4/4)
+ x**17*(5*A*a*b**4/17 + 10*B*a**2*b**3/17) + x**14*(5*A*a**2*b**
3/7 + 5*B*a**3*b**2/7) + x**11*(10*A*a**3*b**2/11 + 5*B*a**4*b/11
) + x**8*(5*A*a**4*b/8 + B*a**5/8)
```

GIAC/XCAS [A] time = 0.21534, size = 169, normalized size = 1.44

$$\frac{1}{23}Bb^5x^{23} + \frac{1}{4}Bab^4x^{20} + \frac{1}{20}Ab^5x^{20} + \frac{10}{17}Ba^2b^3x^{17} + \frac{5}{17}Aab^4x^{17} + \frac{5}{7}Ba^3b^2x^{14} + \frac{5}{7}Aa^2b^3x^{14} + \frac{5}{11}Ba^4bx^{11} + \frac{10}{11}Aa^3b^2x^{11} + \frac{1}{8}Ba^5x^8 + \frac{5}{8}Aa^4bx^8 + \frac{1}{5}Aa^5x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^4,x, algorithm="giac")
```

```
[Out] 1/23*B*b^5*x^23 + 1/4*B*a*b^4*x^20 + 1/20*A*b^5*x^20 + 10/17*B*a^
2*b^3*x^17 + 5/17*A*a*b^4*x^17 + 5/7*B*a^3*b^2*x^14 + 5/7*A*a^2*b
^3*x^14 + 5/11*B*a^4*b*x^11 + 10/11*A*a^3*b^2*x^11 + 1/8*B*a^5*x^
8 + 5/8*A*a^4*b*x^8 + 1/5*A*a^5*x^5
```

3.29 $\int x^3 \left(a+bx^3\right)^5 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=117

$$\frac{1}{4}a^5Ax^4+\frac{1}{7}a^4x^7(aB+5Ab)+\frac{1}{2}a^3bx^{10}(aB+2Ab)+\frac{10}{13}a^2b^2x^{13}(aB+Ab)+\frac{1}{19}b^4x^{19}(5aB+Ab)+\frac{5}{16}ab^3x^{16}(2aB+Ab)+\frac{1}{22}b^5Bx^{22}$$

```
[Out] (a^5*A*x^4)/4 + (a^4*(5*A*b + a*B)*x^7)/7 + (a^3*b*(2*A*b + a*B)*
x^10)/2 + (10*a^2*b^2*(A*b + a*B)*x^13)/13 + (5*a*b^3*(A*b + 2*a*
B)*x^16)/16 + (b^4*(A*b + 5*a*B)*x^19)/19 + (b^5*B*x^22)/22
```

Rubi [A] time = 0.242558, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{1}{4}a^5Ax^4+\frac{1}{7}a^4x^7(aB+5Ab)+\frac{1}{2}a^3bx^{10}(aB+2Ab)+\frac{10}{13}a^2b^2x^{13}(aB+Ab)+\frac{1}{19}b^4x^{19}(5aB+Ab)+\frac{5}{16}ab^3x^{16}(2aB+Ab)+\frac{1}{22}b^5Bx^{22}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^4)/4 + (a^4*(5*A*b + a*B)*x^7)/7 + (a^3*b*(2*A*b + a*B)*
x^10)/2 + (10*a^2*b^2*(A*b + a*B)*x^13)/13 + (5*a*b^3*(A*b + 2*a*
B)*x^16)/16 + (b^4*(A*b + 5*a*B)*x^19)/19 + (b^5*B*x^22)/22
```

Rubi in Sympy [A] time = 26.7946, size = 112, normalized size = 0.96

$$\frac{Aa^5x^4}{4}+\frac{Bb^5x^{22}}{22}+\frac{a^4x^7\left(5Ab+Ba\right)}{7}+\frac{a^3bx^{10}\left(2Ab+Ba\right)}{2}+\frac{10a^2b^2x^{13}\left(Ab+Ba\right)}{13}+\frac{5ab^3x^{16}\left(Ab+2Ba\right)}{16}+\frac{b^4x^{19}\left(Ab+5Ba\right)}{19}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**4/4 + B*b**5*x**22/22 + a**4*x**7*(5*A*b + B*a)/7 + a**
3*b*x**10*(2*A*b + B*a)/2 + 10*a**2*b**2*x**13*(A*b + B*a)/13 + 5
*a*b**3*x**16*(A*b + 2*B*a)/16 + b**4*x**19*(A*b + 5*B*a)/19
```

Mathematica [A] time = 0.0332382, size = 117, normalized size = 1.

$$\frac{1}{4}a^5Ax^4+\frac{1}{7}a^4x^7(aB+5Ab)+\frac{1}{2}a^3bx^{10}(aB+2Ab)+\frac{10}{13}a^2b^2x^{13}(aB+Ab)+\frac{1}{19}b^4x^{19}(5aB+Ab)+\frac{5}{16}ab^3x^{16}(2aB+Ab)+\frac{1}{22}b^5Bx^{22}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^4)/4 + (a^4*(5*A*b + a*B)*x^7)/7 + (a^3*b*(2*A*b + a*B)*
x^10)/2 + (10*a^2*b^2*(A*b + a*B)*x^13)/13 + (5*a*b^3*(A*b + 2*a*
B)*x^16)/16 + (b^4*(A*b + 5*a*B)*x^19)/19 + (b^5*B*x^22)/22
```

Maple [A] time = 0.002, size = 124, normalized size = 1.1

$$\frac{b^5Bx^{22}}{22}+\frac{\left(b^5A+5\,ab^4B\right)x^{19}}{19}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{16}}{16}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{13}}{13}+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^{10}}{10}+\frac{\left(5\,a^4bA+a^5B\right)x^7}{7}+\frac{a^5Ax^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^3*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/22*b^5*B*x^22+1/19*(A*b^5+5*B*a*b^4)*x^19+1/16*(5*A*a*b^4+10*B*
a^2*b^3)*x^16+1/13*(10*A*a^2*b^3+10*B*a^3*b^2)*x^13+1/10*(10*A*a^
3*b^2+5*B*a^4*b)*x^10+1/7*(5*A*a^4*b+B*a^5)*x^7+1/4*a^5*A*x^4
```

Maxima [A] time = 1.4285, size = 161, normalized size = 1.38

$$\frac{1}{22}\,Bb^5x^{22}+\frac{1}{19}\left(5\,Bab^4+Ab^5\right)x^{19}+\frac{5}{16}\left(2\,Ba^2b^3+Aab^4\right)x^{16}+\frac{10}{13}\left(Ba^3b^2+Aa^2b^3\right)x^{13}+\frac{1}{2}\left(Ba^4b+2\,Aa^3b^2\right)x^{10}+\frac{1}{4}\,Aa^5x^4+\frac{1}{7}\left(Ba^5+5\,Aa^4b\right)x^7$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x^3,x, algorithm="maxima")
```

```
[Out] 1/22*B*b^5*x^22 + 1/19*(5*B*a*b^4 + A*b^5)*x^19 + 5/16*(2*B*a^2*b
^3 + A*a*b^4)*x^16 + 10/13*(B*a^3*b^2 + A*a^2*b^3)*x^13 + 1/2*(B*
a^4*b + 2*A*a^3*b^2)*x^10 + 1/4*A*a^5*x^4 + 1/7*(B*a^5 + 5*A*a^4*
b)*x^7
```

Fricas [A] time = 0.208703, size = 1, normalized size = 0.01

$$\frac{1}{22}x^{22}b^5B+\frac{5}{19}x^{19}b^4aB+\frac{1}{19}x^{19}b^5A+\frac{5}{8}x^{16}b^3a^2B+\frac{5}{16}x^{16}b^4aA+\frac{10}{13}x^{13}b^2a^3B+\frac{10}{13}x^{13}b^3a^2A+\frac{1}{2}x^{10}ba^4B+x^{10}b^2a^3A+\frac{1}{7}x^7a^5B+\frac{5}{7}x^7ba^4A+\frac{1}{4}x^4a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x^3,x, algorithm="fricas")
```

```
[Out] 1/22*x^22*b^5*B + 5/19*x^19*b^4*a*B + 1/19*x^19*b^5*A + 5/8*x^16*
b^3*a^2*B + 5/16*x^16*b^4*a*A + 10/13*x^13*b^2*a^3*B + 10/13*x^13
*b^3*a^2*A + 1/2*x^10*b*a^4*B + x^10*b^2*a^3*A + 1/7*x^7*a^5*B +
5/7*x^7*b*a^4*A + 1/4*x^4*a^5*A
```

Sympy [A] time = 0.163197, size = 133, normalized size = 1.14

$$\frac{Aa^5x^4}{4}+\frac{Bb^5x^{22}}{22}+x^{19}\left(\frac{Ab^5}{19}+\frac{5Bab^4}{19}\right)+x^{16}\left(\frac{5Aab^4}{16}+\frac{5Ba^2b^3}{8}\right)+x^{13}\left(\frac{10Aa^2b^3}{13}+\frac{10Ba^3b^2}{13}\right)+x^{10}\left(Aa^3b^2+\frac{Ba^4b}{2}\right)+x^7\left(\frac{5Aa^4b}{7}+\frac{Ba^5}{7}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**4/4 + B*b**5*x**22/22 + x**19*(A*b**5/19 + 5*B*a*b**4/1
9) + x**16*(5*A*a*b**4/16 + 5*B*a**2*b**3/8) + x**13*(10*A*a**2*b
**3/13 + 10*B*a**3*b**2/13) + x**10*(A*a**3*b**2 + B*a**4*b/2) +
x**7*(5*A*a**4*b/7 + B*a**5/7)
```

GIAC/XCAS [A] time = 0.215658, size = 167, normalized size = 1.43

$$\frac{1}{22}\,Bb^5x^{22} + \frac{5}{19}\,Bab^4x^{19} + \frac{1}{19}\,Ab^5x^{19} + \frac{5}{8}\,Ba^2b^3x^{16} + \frac{5}{16}\,Aab^4x^{16} + \frac{10}{13}\,Ba^3b^2x^{13} + \frac{10}{13}\,Aa^2b^3x^{13} + \frac{1}{2}\,Ba^4bx^{10} + Aa^3b^2x^{10} + \frac{1}{7}\,Ba^5x^7 + \frac{5}{7}\,Aa^4bx^7 + \frac{1}{4}\,Aa^5x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^3,x, algorithm="giac")
```

```
[Out] 1/22*B*b^5*x^22 + 5/19*B*a*b^4*x^19 + 1/19*A*b^5*x^19 + 5/8*B*a^2
*b^3*x^16 + 5/16*A*a*b^4*x^16 + 10/13*B*a^3*b^2*x^13 + 10/13*A*a^
2*b^3*x^13 + 1/2*B*a^4*b*x^10 + A*a^3*b^2*x^10 + 1/7*B*a^5*x^7 +
5/7*A*a^4*b*x^7 + 1/4*A*a^5*x^4
```

3.30 $\int x^2 \left(a+bx^3\right)^5 \left(A+Bx^3\right)\,dx$

Optimal. Leaf size=42

$$\frac{\left(a+bx^3\right)^6(Ab-aB)}{18b^2}+\frac{B\left(a+bx^3\right)^7}{21b^2}$$

```
[Out] ((A*b - a*B)*(a + b*x^3)^6)/(18*b^2) + (B*(a + b*x^3)^7)/(21*b^2)
```

Rubi [A] time = 0.225466, antiderivative size = 42, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{\left(a+bx^3\right)^6(Ab-aB)}{18b^2}+\frac{B\left(a+bx^3\right)^7}{21b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(a + b*x^3)^5*(A + B*x^3),x]

[Out] ((A*b - a*B)*(a + b*x^3)^6)/(18*b^2) + (B*(a + b*x^3)^7)/(21*b^2)
```

Rubi in Sympy [A] time = 19.8151, size = 34, normalized size = 0.81

$$\frac{B\left(a+bx^3\right)^7}{21b^2}+\frac{\left(a+bx^3\right)^6(Ab-Ba)}{18b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a)**5*(B*x**3+A),x)

[Out] B*(a + b*x**3)**7/(21*b**2) + (a + b*x**3)**6*(A*b - B*a)/(18*b**
2)
```

Mathematica [B] time = 0.0494556, size = 107, normalized size = 2.55

$$\frac{1}{126}x^3\left(42a^5A+21a^4x^3(aB+5Ab)+70a^3bx^6(aB+2Ab)+105a^2b^2x^9(aB+Ab)\right.$$
$$\left.+7b^4x^{15}(5aB+Ab)+42ab^3x^{12}(2aB+Ab)+6b^5Bx^{18}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(a + b*x^3)^5*(A + B*x^3),x]

[Out] (x^3*(42*a^5*A + 21*a^4*(5*A*b + a*B)*x^3 + 70*a^3*b*(2*A*b + a*B
)*x^6 + 105*a^2*b^2*(A*b + a*B)*x^9 + 42*a*b^3*(A*b + 2*a*B)*x^12
 + 7*b^4*(A*b + 5*a*B)*x^15 + 6*b^5*B*x^18))/126
```

Maple [B] time = 0.003, size = 124, normalized size = 3.

$$\frac{b^5Bx^{21}}{21}+\frac{\left(b^5A+5\,ab^4B\right)x^{18}}{18}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{15}}{15}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{12}}{12}$$
$$+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^9}{9}+\frac{\left(5\,a^4bA+a^5B\right)x^6}{6}+\frac{a^5Ax^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/21*b^5*B*x^21+1/18*(A*b^5+5*B*a*b^4)*x^18+1/15*(5*A*a*b^4+10*B*
a^2*b^3)*x^15+1/12*(10*A*a^2*b^3+10*B*a^3*b^2)*x^12+1/9*(10*A*a^3
*b^2+5*B*a^4*b)*x^9+1/6*(5*A*a^4*b+B*a^5)*x^6+1/3*a^5*A*x^3
```

Maxima [A] time = 1.47286, size = 161, normalized size = 3.83

$$\frac{1}{21}\,Bb^5x^{21}+\frac{1}{18}\left(5\,Bab^4+Ab^5\right)x^{18}+\frac{1}{3}\left(2\,Ba^2b^3+Aab^4\right)x^{15}+\frac{5}{6}\left(Ba^3b^2+Aa^2b^3\right)x^{12}+\frac{5}{9}\left(Ba^4b+2\,Aa^3b^2\right)x^9+\frac{1}{3}\,Aa^5x^3+\frac{1}{6}\left(Ba^5+5\,Aa^4b\right)x^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x^2,x, algorithm="maxima")
```

```
[Out] 1/21*B*b^5*x^21 + 1/18*(5*B*a*b^4 + A*b^5)*x^18 + 1/3*(2*B*a^2*b^
3 + A*a*b^4)*x^15 + 5/6*(B*a^3*b^2 + A*a^2*b^3)*x^12 + 5/9*(B*a^4
*b + 2*A*a^3*b^2)*x^9 + 1/3*A*a^5*x^3 + 1/6*(B*a^5 + 5*A*a^4*b)*x
^6
```

Fricas [A] time = 0.207557, size = 1, normalized size = 0.02

$$\frac{1}{21}x^{21}b^5B+\frac{5}{18}x^{18}b^4aB+\frac{1}{18}x^{18}b^5A+\frac{2}{3}x^{15}b^3a^2B+\frac{1}{3}x^{15}b^4aA+\frac{5}{6}x^{12}b^2a^3B+\frac{5}{6}x^{12}b^3a^2A+\frac{5}{9}x^9ba^4B+\frac{10}{9}x^9b^2a^3A+\frac{1}{6}x^6a^5B+\frac{5}{6}x^6ba^4A+\frac{1}{3}x^3a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x^2,x, algorithm="fricas")
```

```
[Out] 1/21*x^21*b^5*B + 5/18*x^18*b^4*a*B + 1/18*x^18*b^5*A + 2/3*x^15*
b^3*a^2*B + 1/3*x^15*b^4*a*A + 5/6*x^12*b^2*a^3*B + 5/6*x^12*b^3*
a^2*A + 5/9*x^9*b*a^4*B + 10/9*x^9*b^2*a^3*A + 1/6*x^6*a^5*B + 5/
6*x^6*b*a^4*A + 1/3*x^3*a^5*A
```

Sympy [A] time = 0.159224, size = 136, normalized size = 3.24

$$\frac{Aa^5x^3}{3}+\frac{Bb^5x^{21}}{21}+x^{18}\left(\frac{Ab^5}{18}+\frac{5Bab^4}{18}\right)+x^{15}\left(\frac{Aab^4}{3}+\frac{2Ba^2b^3}{3}\right)+x^{12}\left(\frac{5Aa^2b^3}{6}+\frac{5Ba^3b^2}{6}\right)+x^9\left(\frac{10Aa^3b^2}{9}+\frac{5Ba^4b}{9}\right)+x^6\left(\frac{5Aa^4b}{6}+\frac{Ba^5}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**2*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**3/3 + B*b**5*x**21/21 + x**18*(A*b**5/18 + 5*B*a*b**4/1
8) + x**15*(A*a*b**4/3 + 2*B*a**2*b**3/3) + x**12*(5*A*a**2*b**3/
6 + 5*B*a**3*b**2/6) + x**9*(10*A*a**3*b**2/9 + 5*B*a**4*b/9) + x
**6*(5*A*a**4*b/6 + B*a**5/6)
```

GIAC/XCAS [A] time = 0.216843, size = 169, normalized size = 4.02

$$\frac{1}{21}Bb^5x^{21} + \frac{5}{18}Bab^4x^{18} + \frac{1}{18}Ab^5x^{18} + \frac{2}{3}Ba^2b^3x^{15} + \frac{1}{3}Aab^4x^{15} + \frac{5}{6}Ba^3b^2x^{12} + \frac{5}{6}Aa^2b^3x^{12} + \frac{5}{9}Ba^4bx^9 + \frac{10}{9}Aa^3b^2x^9 + \frac{1}{6}Ba^5x^6 + \frac{5}{6}Aa^4bx^6 + \frac{1}{3}Aa^5x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^2,x, algorithm="giac")
```

```
[Out] 1/21*B*b^5*x^21 + 5/18*B*a*b^4*x^18 + 1/18*A*b^5*x^18 + 2/3*B*a^2
*b^3*x^15 + 1/3*A*a*b^4*x^15 + 5/6*B*a^3*b^2*x^12 + 5/6*A*a^2*b^3
*x^12 + 5/9*B*a^4*b*x^9 + 10/9*A*a^3*b^2*x^9 + 1/6*B*a^5*x^6 + 5/
6*A*a^4*b*x^6 + 1/3*A*a^5*x^3
```

3.31 $\int x\left(a+bx^3\right)^5\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=117

$$\frac{1}{2}a^5Ax^2+\frac{1}{5}a^4x^5(aB+5Ab)+\frac{5}{8}a^3bx^8(aB+2Ab)+\frac{10}{11}a^2b^2x^{11}(aB+Ab)+\frac{1}{17}b^4x^{17}(5aB+Ab)+\frac{5}{14}ab^3x^{14}(2aB+Ab)+\frac{1}{20}b^5Bx^{20}$$

```
[Out] (a^5*A*x^2)/2 + (a^4*(5*A*b + a*B)*x^5)/5 + (5*a^3*b*(2*A*b + a*B
)*x^8)/8 + (10*a^2*b^2*(A*b + a*B)*x^11)/11 + (5*a*b^3*(A*b + 2*a
*B)*x^14)/14 + (b^4*(A*b + 5*a*B)*x^17)/17 + (b^5*B*x^20)/20
```

Rubi [A] time = 0.236889, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056

$$\frac{1}{2}a^5Ax^2+\frac{1}{5}a^4x^5(aB+5Ab)+\frac{5}{8}a^3bx^8(aB+2Ab)+\frac{10}{11}a^2b^2x^{11}(aB+Ab)+\frac{1}{17}b^4x^{17}(5aB+Ab)+\frac{5}{14}ab^3x^{14}(2aB+Ab)+\frac{1}{20}b^5Bx^{20}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^2)/2 + (a^4*(5*A*b + a*B)*x^5)/5 + (5*a^3*b*(2*A*b + a*B
)*x^8)/8 + (10*a^2*b^2*(A*b + a*B)*x^11)/11 + (5*a*b^3*(A*b + 2*a
*B)*x^14)/14 + (b^4*(A*b + 5*a*B)*x^17)/17 + (b^5*B*x^20)/20
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$Aa^5\int x\,dx+\frac{Bb^5x^{20}}{20}+\frac{a^4x^5\left(5Ab+Ba\right)}{5}+\frac{5a^3bx^8\left(2Ab+Ba\right)}{8}+\frac{10a^2b^2x^{11}\left(Ab+Ba\right)}{11}+\frac{5ab^3x^{14}\left(Ab+2Ba\right)}{14}+\frac{b^4x^{17}\left(Ab+5Ba\right)}{17}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*Integral(x, x) + B*b**5*x**20/20 + a**4*x**5*(5*A*b + B*a)
/5 + 5*a**3*b*x**8*(2*A*b + B*a)/8 + 10*a**2*b**2*x**11*(A*b + B*
a)/11 + 5*a*b**3*x**14*(A*b + 2*B*a)/14 + b**4*x**17*(A*b + 5*B*a
)/17
```

Mathematica [A] time = 0.0303177, size = 117, normalized size = 1.

$$\frac{1}{2}a^5Ax^2+\frac{1}{5}a^4x^5(aB+5Ab)+\frac{5}{8}a^3bx^8(aB+2Ab)+\frac{10}{11}a^2b^2x^{11}(aB+Ab)+\frac{1}{17}b^4x^{17}(5aB+Ab)+\frac{5}{14}ab^3x^{14}(2aB+Ab)+\frac{1}{20}b^5Bx^{20}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^2)/2 + (a^4*(5*A*b + a*B)*x^5)/5 + (5*a^3*b*(2*A*b + a*B
)*x^8)/8 + (10*a^2*b^2*(A*b + a*B)*x^11)/11 + (5*a*b^3*(A*b + 2*a
```

```
*B)*x^14)/14 + (b^4*(A*b + 5*a*B)*x^17)/17 + (b^5*B*x^20)/20
```

Maple [A] time = 0.002, size = 124, normalized size = 1.1

$$\frac{b^5Bx^{20}}{20}+\frac{\left(b^5A+5\,ab^4B\right)x^{17}}{17}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{14}}{14}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{11}}{11}+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^8}{8}+\frac{\left(5\,a^4bA+a^5B\right)x^5}{5}+\frac{a^5Ax^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/20*b^5*B*x^20+1/17*(A*b^5+5*B*a*b^4)*x^17+1/14*(5*A*a*b^4+10*B*
a^2*b^3)*x^14+1/11*(10*A*a^2*b^3+10*B*a^3*b^2)*x^11+1/8*(10*A*a^3
*b^2+5*B*a^4*b)*x^8+1/5*(5*A*a^4*b+B*a^5)*x^5+1/2*a^5*A*x^2
```

Maxima [A] time = 1.48239, size = 161, normalized size = 1.38

$$\frac{1}{20}\,Bb^5x^{20}+\frac{1}{17}\left(5\,Bab^4+Ab^5\right)x^{17}+\frac{5}{14}\left(2\,Ba^2b^3+Aab^4\right)x^{14}+\frac{10}{11}\left(Ba^3b^2+Aa^2b^3\right)x^{11}+\frac{5}{8}\left(Ba^4b+2\,Aa^3b^2\right)x^8+\frac{1}{2}\,Aa^5x^2+\frac{1}{5}\left(Ba^5+5\,Aa^4b\right)x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x,x, algorithm="maxima")
```

```
[Out] 1/20*B*b^5*x^20 + 1/17*(5*B*a*b^4 + A*b^5)*x^17 + 5/14*(2*B*a^2*b
^3 + A*a*b^4)*x^14 + 10/11*(B*a^3*b^2 + A*a^2*b^3)*x^11 + 5/8*(B*
a^4*b + 2*A*a^3*b^2)*x^8 + 1/2*A*a^5*x^2 + 1/5*(B*a^5 + 5*A*a^4*b
)*x^5
```

Fricas [A] time = 0.202513, size = 1, normalized size = 0.01

$$\frac{1}{20}x^{20}b^5B+\frac{5}{17}x^{17}b^4aB+\frac{1}{17}x^{17}b^5A+\frac{5}{7}x^{14}b^3a^2B+\frac{5}{14}x^{14}b^4aA+\frac{10}{11}x^{11}b^2a^3B+\frac{10}{11}x^{11}b^3a^2A+\frac{5}{8}x^8ba^4B+\frac{5}{4}x^8b^2a^3A+\frac{1}{5}x^5a^5B+x^5ba^4A+\frac{1}{2}x^2a^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5*x,x, algorithm="fricas")
```

```
[Out] 1/20*x^20*b^5*B + 5/17*x^17*b^4*a*B + 1/17*x^17*b^5*A + 5/7*x^14*
b^3*a^2*B + 5/14*x^14*b^4*a*A + 10/11*x^11*b^2*a^3*B + 10/11*x^11
*b^3*a^2*A + 5/8*x^8*b*a^4*B + 5/4*x^8*b^2*a^3*A + 1/5*x^5*a^5*B
+ x^5*b*a^4*A + 1/2*x^2*a^5*A
```

Sympy [A] time = 0.162806, size = 134, normalized size = 1.15

$$\frac{Aa^5x^2}{2}+\frac{Bb^5x^{20}}{20}+x^{17}\left(\frac{Ab^5}{17}+\frac{5Bab^4}{17}\right)+x^{14}\left(\frac{5Aab^4}{14}+\frac{5Ba^2b^3}{7}\right)+x^{11}\left(\frac{10Aa^2b^3}{11}+\frac{10Ba^3b^2}{11}\right)+x^8\left(\frac{5Aa^3b^2}{4}+\frac{5Ba^4b}{8}\right)+x^5\left(Aa^4b+\frac{Ba^5}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**2/2 + B*b**5*x**20/20 + x**17*(A*b**5/17 + 5*B*a*b**4/1
7) + x**14*(5*A*a*b**4/14 + 5*B*a**2*b**3/7) + x**11*(10*A*a**2*b
**3/11 + 10*B*a**3*b**2/11) + x**8*(5*A*a**3*b**2/4 + 5*B*a**4*b/
8) + x**5*(A*a**4*b + B*a**5/5)
```

GIAC/XCAS [A] time = 0.217262, size = 167, normalized size = 1.43

$$\frac{1}{20}\,Bb^5x^{20} + \frac{5}{17}\,Bab^4x^{17} + \frac{1}{17}\,Ab^5x^{17} + \frac{5}{7}\,Ba^2b^3x^{14} + \frac{5}{14}\,Aab^4x^{14} + \frac{10}{11}\,Ba^3b^2x^{11} + \frac{10}{11}\,Aa^2b^3x^{11} + \frac{5}{8}\,Ba^4bx^8 + \frac{5}{4}\,Aa^3b^2x^8 + \frac{1}{5}\,Ba^5x^5 + Aa^4bx^5 + \frac{1}{2}\,Aa^5x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x,x, algorithm="giac")
```

```
[Out] 1/20*B*b^5*x^20 + 5/17*B*a*b^4*x^17 + 1/17*A*b^5*x^17 + 5/7*B*a^2
*b^3*x^14 + 5/14*A*a*b^4*x^14 + 10/11*B*a^3*b^2*x^11 + 10/11*A*a^
2*b^3*x^11 + 5/8*B*a^4*b*x^8 + 5/4*A*a^3*b^2*x^8 + 1/5*B*a^5*x^5
+ A*a^4*b*x^5 + 1/2*A*a^5*x^2
```

3.32 $\int \left(a+bx^3\right)^5 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=109

$$a^5Ax+\frac{1}{4}a^4x^4(aB+5Ab)+\frac{5}{7}a^3bx^7(aB+2Ab)+a^2b^2x^{10}(aB+Ab)+\frac{1}{16}b^4x^{16}(5aB+Ab)+\frac{5}{13}ab^3x^{13}(2aB+Ab)+\frac{1}{19}b^5Bx^{19}$$

```
[Out] a^5*A*x + (a^4*(5*A*b + a*B)*x^4)/4 + (5*a^3*b*(2*A*b + a*B)*x^7)
/7 + a^2*b^2*(A*b + a*B)*x^10 + (5*a*b^3*(A*b + 2*a*B)*x^13)/13 +
 (b^4*(A*b + 5*a*B)*x^16)/16 + (b^5*B*x^19)/19
```

Rubi [A] time = 0.168, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$

$$a^5Ax+\frac{1}{4}a^4x^4(aB+5Ab)+\frac{5}{7}a^3bx^7(aB+2Ab)+a^2b^2x^{10}(aB+Ab)+\frac{1}{16}b^4x^{16}(5aB+Ab)+\frac{5}{13}ab^3x^{13}(2aB+Ab)+\frac{1}{19}b^5Bx^{19}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] a^5*A*x + (a^4*(5*A*b + a*B)*x^4)/4 + (5*a^3*b*(2*A*b + a*B)*x^7)
/7 + a^2*b^2*(A*b + a*B)*x^10 + (5*a*b^3*(A*b + 2*a*B)*x^13)/13 +
 (b^4*(A*b + 5*a*B)*x^16)/16 + (b^5*B*x^19)/19
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{Bb^5x^{19}}{19}+a^5\int A\,dx+\frac{a^4x^4\left(5Ab+Ba\right)}{4}+\frac{5a^3bx^7\left(2Ab+Ba\right)}{7}+a^2b^2x^{10}\left(Ab+Ba\right)+\frac{5ab^3x^{13}\left(Ab+2Ba\right)}{13}+\frac{b^4x^{16}\left(Ab+5Ba\right)}{16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] B*b**5*x**19/19 + a**5*Integral(A, x) + a**4*x**4*(5*A*b + B*a)/4
 + 5*a**3*b*x**7*(2*A*b + B*a)/7 + a**2*b**2*x**10*(A*b + B*a) +
5*a*b**3*x**13*(A*b + 2*B*a)/13 + b**4*x**16*(A*b + 5*B*a)/16
```

Mathematica [A] time = 0.0326415, size = 109, normalized size = 1.

$$a^5Ax+\frac{1}{4}a^4x^4(aB+5Ab)+\frac{5}{7}a^3bx^7(aB+2Ab)+a^2b^2x^{10}(aB+Ab)+\frac{1}{16}b^4x^{16}(5aB+Ab)+\frac{5}{13}ab^3x^{13}(2aB+Ab)+\frac{1}{19}b^5Bx^{19}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] a^5*A*x + (a^4*(5*A*b + a*B)*x^4)/4 + (5*a^3*b*(2*A*b + a*B)*x^7)
/7 + a^2*b^2*(A*b + a*B)*x^10 + (5*a*b^3*(A*b + 2*a*B)*x^13)/13 +
```

```
(b^4*(A*b + 5*a*B)*x^16)/16 + (b^5*B*x^19)/19
```

Maple [A] time = 0.002, size = 121, normalized size = 1.1

$$\frac{b^5Bx^{19}}{19}+\frac{\left(b^5A+5\,ab^4B\right)x^{16}}{16}+\frac{\left(5\,ab^4A+10\,a^2b^3B\right)x^{13}}{13}+\frac{\left(10\,a^2b^3A+10\,a^3b^2B\right)x^{10}}{10}+\frac{\left(10\,a^3b^2A+5\,a^4bB\right)x^7}{7}+\frac{\left(5\,a^4bA+a^5B\right)x^4}{4}+a^5Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] 1/19*b^5*B*x^19+1/16*(A*b^5+5*B*a*b^4)*x^16+1/13*(5*A*a*b^4+10*B*
a^2*b^3)*x^13+1/10*(10*A*a^2*b^3+10*B*a^3*b^2)*x^10+1/7*(10*A*a^3
*b^2+5*B*a^4*b)*x^7+1/4*(5*A*a^4*b+B*a^5)*x^4+a^5*A*x
```

Maxima [A] time = 1.4104, size = 155, normalized size = 1.42

$$\frac{1}{19}\,Bb^5x^{19}+\frac{1}{16}\left(5\,Bab^4+Ab^5\right)x^{16}+\frac{5}{13}\left(2\,Ba^2b^3+Aab^4\right)x^{13}+\left(Ba^3b^2+Aa^2b^3\right)x^{10}+\frac{5}{7}\left(Ba^4b+2\,Aa^3b^2\right)x^7+Aa^5x+\frac{1}{4}\left(Ba^5+5\,Aa^4b\right)x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5,x, algorithm="maxima")
```

```
[Out] 1/19*B*b^5*x^19 + 1/16*(5*B*a*b^4 + A*b^5)*x^16 + 5/13*(2*B*a^2*b
^3 + A*a*b^4)*x^13 + (B*a^3*b^2 + A*a^2*b^3)*x^10 + 5/7*(B*a^4*b
+ 2*A*a^3*b^2)*x^7 + A*a^5*x + 1/4*(B*a^5 + 5*A*a^4*b)*x^4
```

Fricas [A] time = 0.199336, size = 1, normalized size = 0.01

$$\frac{1}{19}x^{19}b^5B+\frac{5}{16}x^{16}b^4aB+\frac{1}{16}x^{16}b^5A+\frac{10}{13}x^{13}b^3a^2B+\frac{5}{13}x^{13}b^4aA+x^{10}b^2a^3B+x^{10}b^3a^2A+\frac{5}{7}x^7ba^4B+\frac{10}{7}x^7b^2a^3A+\frac{1}{4}x^4a^5B+\frac{5}{4}x^4ba^4A+xa^5A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5,x, algorithm="fricas")
```

```
[Out] 1/19*x^19*b^5*B + 5/16*x^16*b^4*a*B + 1/16*x^16*b^5*A + 10/13*x^1
3*b^3*a^2*B + 5/13*x^13*b^4*a*A + x^10*b^2*a^3*B + x^10*b^3*a^2*A
 + 5/7*x^7*b*a^4*B + 10/7*x^7*b^2*a^3*A + 1/4*x^4*a^5*B + 5/4*x^4
*b*a^4*A + x*a^5*A
```

Sympy [A] time = 0.16129, size = 128, normalized size = 1.17

$$Aa^5x+\frac{Bb^5x^{19}}{19}+x^{16}\left(\frac{Ab^5}{16}+\frac{5Bab^4}{16}\right)+x^{13}\left(\frac{5Aab^4}{13}+\frac{10Ba^2b^3}{13}\right)+x^{10}\left(Aa^2b^3+Ba^3b^2\right)+x^7\left(\frac{10Aa^3b^2}{7}+\frac{5Ba^4b}{7}\right)+x^4\left(\frac{5Aa^4b}{4}+\frac{Ba^5}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x + B*b**5*x**19/19 + x**16*(A*b**5/16 + 5*B*a*b**4/16) +
x**13*(5*A*a*b**4/13 + 10*B*a**2*b**3/13) + x**10*(A*a**2*b**3 +
B*a**3*b**2) + x**7*(10*A*a**3*b**2/7 + 5*B*a**4*b/7) + x**4*(5*A
*a**4*b/4 + B*a**5/4)
```

GIAC/XCAS [A] time = 0.216203, size = 162, normalized size = 1.49

$$\frac{1}{19}Bb^5x^{19} + \frac{5}{16}Bab^4x^{16} + \frac{1}{16}Ab^5x^{16} + \frac{10}{13}Ba^2b^3x^{13} + \frac{5}{13}Aab^4x^{13} + Ba^3b^2x^{10} + Aa^2b^3x^{10} + \frac{5}{7}Ba^4bx^7 + \frac{10}{7}Aa^3b^2x^7 + \frac{1}{4}Ba^5x^4 + \frac{5}{4}Aa^4bx^4 + Aa^5x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5,x, algorithm="giac")
```

```
[Out] 1/19*B*b^5*x^19 + 5/16*B*a*b^4*x^16 + 1/16*A*b^5*x^16 + 10/13*B*a
^2*b^3*x^13 + 5/13*A*a*b^4*x^13 + B*a^3*b^2*x^10 + A*a^2*b^3*x^10
 + 5/7*B*a^4*b*x^7 + 10/7*A*a^3*b^2*x^7 + 1/4*B*a^5*x^4 + 5/4*A*a
^4*b*x^4 + A*a^5*x
```

3.33 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x} \, dx$

Optimal. Leaf size=88

$$a^5 A \log(x) + \frac{5}{3}a^4 Abx^3 + \frac{5}{3}a^3 Ab^2 x^6 + \frac{10}{9}a^2 Ab^3 x^9 + \frac{5}{12}aAb^4 x^{12} + \frac{B\left(a+bx^3\right)^6}{18b} + \frac{1}{15}Ab^5 x^{15}$$

```
[Out] (5*a^4*A*b*x^3)/3 + (5*a^3*A*b^2*x^6)/3 + (10*a^2*A*b^3*x^9)/9 +
(5*a*A*b^4*x^12)/12 + (A*b^5*x^15)/15 + (B*(a + b*x^3)^6)/(18*b)
+ a^5*A*Log[x]
```

Rubi [A] time = 0.159854, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.15$

$$a^5 A \log(x) + \frac{5}{3}a^4 Abx^3 + \frac{5}{3}a^3 Ab^2 x^6 + \frac{10}{9}a^2 Ab^3 x^9 + \frac{5}{12}aAb^4 x^{12} + \frac{B\left(a+bx^3\right)^6}{18b} + \frac{1}{15}Ab^5 x^{15}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x,x]
```

```
[Out] (5*a^4*A*b*x^3)/3 + (5*a^3*A*b^2*x^6)/3 + (10*a^2*A*b^3*x^9)/9 +
(5*a*A*b^4*x^12)/12 + (A*b^5*x^15)/15 + (B*(a + b*x^3)^6)/(18*b)
+ a^5*A*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{Aa^5 \log\left(x^3\right)}{3} + \frac{5Aa^4 bx^3}{3} + \frac{10Aa^3 b^2 \int^{x^3} x \, dx}{3} + \frac{10Aa^2 b^3 x^9}{9} + \frac{5Aab^4 x^{12}}{12} + \frac{Ab^5 x^{15}}{15} + \frac{B\left(a+bx^3\right)^6}{18b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x,x)
```

```
[Out] A*a**5*log(x**3)/3 + 5*A*a**4*b*x**3/3 + 10*A*a**3*b**2*Integral(
x, (x, x**3))/3 + 10*A*a**2*b**3*x**9/9 + 5*A*a*b**4*x**12/12 + A
*b**5*x**15/15 + B*(a + b*x**3)**6/(18*b)
```

Mathematica [A] time = 0.0578494, size = 113, normalized size = 1.28

$$a^5 A \log(x) + \frac{1}{3}a^4 x^3 (aB + 5Ab) + \frac{5}{6}a^3 bx^6 (aB + 2Ab) + \frac{10}{9}a^2 b^2 x^9 (aB + Ab) + \frac{1}{15}b^4 x^{15} (5aB + Ab) + \frac{5}{12}ab^3 x^{12} (2aB + Ab) + \frac{1}{18}b^5 Bx^{18}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x,x]
```

```
[Out] (a^4*(5*A*b + a*B)*x^3)/3 + (5*a^3*b*(2*A*b + a*B)*x^6)/6 + (10*a
^2*b^2*(A*b + a*B)*x^9)/9 + (5*a*b^3*(A*b + 2*a*B)*x^12)/12 + (b^
4*(A*b + 5*a*B)*x^15)/15 + (b^5*B*x^18)/18 + a^5*A*Log[x]
```

Maple [A] time = 0.003, size = 124, normalized size = 1.4

$$\frac{Bb^5x^{18}}{18}+\frac{Ab^5x^{15}}{15}+\frac{Bx^{15}ab^4}{3}+\frac{5\,aAb^4x^{12}}{12}+\frac{5\,Bx^{12}a^2b^3}{6}+\frac{10\,a^2Ab^3x^9}{9}+\frac{10\,Bx^9a^3b^2}{9}+\frac{5\,a^3Ab^2x^6}{3}+\frac{5\,Bx^6a^4b}{6}+\frac{5\,a^4Abx^3}{3}+\frac{Bx^3a^5}{3}+a^5A\ln(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^3+a)^5*(B*x^3+A)/x,x)
```

```
[Out] 1/18*B*b^5*x^18+1/15*A*b^5*x^15+1/3*B*x^15*a*b^4+5/12*a*A*b^4*x^1
2+5/6*B*x^12*a^2*b^3+10/9*a^2*A*b^3*x^9+10/9*B*x^9*a^3*b^2+5/3*a^
3*A*b^2*x^6+5/6*B*x^6*a^4*b+5/3*a^4*A*b*x^3+1/3*B*x^3*a^5+a^5*A*l
n(x)
```

Maxima [A] time = 1.3632, size = 162, normalized size = 1.84

$$\frac{1}{18}\,Bb^5x^{18}+\frac{1}{15}\left(5\,Bab^4+Ab^5\right)x^{15}+\frac{5}{12}\left(2\,Ba^2b^3+Aab^4\right)x^{12}+\frac{10}{9}\left(Ba^3b^2+Aa^2b^3\right)x^9+\frac{5}{6}\left(Ba^4b+2\,Aa^3b^2\right)x^6+\frac{1}{3}\,Aa^5\log\left(x^3\right)+\frac{1}{3}\left(Ba^5+5\,Aa^4b\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5/x,x, algorithm="maxima")
```

```
[Out] 1/18*B*b^5*x^18 + 1/15*(5*B*a*b^4 + A*b^5)*x^15 + 5/12*(2*B*a^2*b
^3 + A*a*b^4)*x^12 + 10/9*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 5/6*(B*a^
4*b + 2*A*a^3*b^2)*x^6 + 1/3*A*a^5*log(x^3) + 1/3*(B*a^5 + 5*A*a^
4*b)*x^3
```

Fricas [A] time = 0.221784, size = 158, normalized size = 1.8

$$\frac{1}{18}\,Bb^5x^{18}+\frac{1}{15}\left(5\,Bab^4+Ab^5\right)x^{15}+\frac{5}{12}\left(2\,Ba^2b^3+Aab^4\right)x^{12}+\frac{10}{9}\left(Ba^3b^2+Aa^2b^3\right)x^9+\frac{5}{6}\left(Ba^4b+2\,Aa^3b^2\right)x^6+Aa^5\log(x)+\frac{1}{3}\left(Ba^5+5\,Aa^4b\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5/x,x, algorithm="fricas")
```

```
[Out] 1/18*B*b^5*x^18 + 1/15*(5*B*a*b^4 + A*b^5)*x^15 + 5/12*(2*B*a^2*b
^3 + A*a*b^4)*x^12 + 10/9*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 5/6*(B*a^
4*b + 2*A*a^3*b^2)*x^6 + A*a^5*log(x) + 1/3*(B*a^5 + 5*A*a^4*b)*x
^3
```

Sympy [A] time = 1.52077, size = 134, normalized size = 1.52

$$Aa^5\log(x)+\frac{Bb^5x^{18}}{18}+x^{15}\left(\frac{Ab^5}{15}+\frac{Bab^4}{3}\right)+x^{12}\left(\frac{5Aab^4}{12}+\frac{5Ba^2b^3}{6}\right)+x^9\left(\frac{10Aa^2b^3}{9}+\frac{10Ba^3b^2}{9}\right)+x^6\left(\frac{5Aa^3b^2}{3}+\frac{5Ba^4b}{6}\right)+x^3\left(\frac{5Aa^4b}{3}+\frac{Ba^5}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x**3+a)**5*(B*x**3+A)/x,x)
```

```
[Out] A*a**5*log(x) + B*b**5*x**18/18 + x**15*(A*b**5/15 + B*a*b**4/3)
+ x**12*(5*A*a*b**4/12 + 5*B*a**2*b**3/6) + x**9*(10*A*a**2*b**3/
9 + 10*B*a**3*b**2/9) + x**6*(5*A*a**3*b**2/3 + 5*B*a**4*b/6) + x
**3*(5*A*a**4*b/3 + B*a**5/3)
```

GIAC/XCAS [A] time = 0.219947, size = 167, normalized size = 1.9

$$\frac{1}{18}Bb^5x^{18} + \frac{1}{3}Bab^4x^{15} + \frac{1}{15}Ab^5x^{15} + \frac{5}{6}Ba^2b^3x^{12} + \frac{5}{12}Aab^4x^{12} + \frac{10}{9}Ba^3b^2x^9 + \frac{10}{9}Aa^2b^3x^9 + \frac{5}{6}Ba^4bx^6 + \frac{5}{3}Aa^3b^2x^6 + \frac{1}{3}Ba^5x^3 + \frac{5}{3}Aa^4bx^3 + Aa^5\ln(|x|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x,x, algorithm="giac")
```

```
[Out] 1/18*B*b^5*x^18 + 1/3*B*a*b^4*x^15 + 1/15*A*b^5*x^15 + 5/6*B*a^2*
b^3*x^12 + 5/12*A*a*b^4*x^12 + 10/9*B*a^3*b^2*x^9 + 10/9*A*a^2*b^
3*x^9 + 5/6*B*a^4*b*x^6 + 5/3*A*a^3*b^2*x^6 + 1/3*B*a^5*x^3 + 5/3
*A*a^4*b*x^3 + A*a^5*ln(abs(x))
```

3.34 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^2} dx$

Optimal. Leaf size=112

$$-\frac{a^5A}{x}+\frac{1}{2}a^4x^2(aB+5Ab)+a^3bx^5(aB+2Ab)+\frac{5}{4}a^2b^2x^8(aB+Ab)+\frac{1}{14}b^4x^{14}(5aB+Ab)+\frac{5}{11}ab^3x^{11}(2aB+Ab)+\frac{1}{17}b^5Bx^{17}$$

```
[Out] -((a^5*A)/x) + (a^4*(5*A*b + a*B)*x^2)/2 + a^3*b*(2*A*b + a*B)*x^
5 + (5*a^2*b^2*(A*b + a*B)*x^8)/4 + (5*a*b^3*(A*b + 2*a*B)*x^11)/
11 + (b^4*(A*b + 5*a*B)*x^14)/14 + (b^5*B*x^17)/17
```

Rubi [A] time = 0.198324, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{x}+\frac{1}{2}a^4x^2(aB+5Ab)+a^3bx^5(aB+2Ab)+\frac{5}{4}a^2b^2x^8(aB+Ab)+\frac{1}{14}b^4x^{14}(5aB+Ab)+\frac{5}{11}ab^3x^{11}(2aB+Ab)+\frac{1}{17}b^5Bx^{17}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^2,x]
```

```
[Out] -((a^5*A)/x) + (a^4*(5*A*b + a*B)*x^2)/2 + a^3*b*(2*A*b + a*B)*x^
5 + (5*a^2*b^2*(A*b + a*B)*x^8)/4 + (5*a*b^3*(A*b + 2*a*B)*x^11)/
11 + (b^4*(A*b + 5*a*B)*x^14)/14 + (b^5*B*x^17)/17
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{x}+\frac{Bb^5x^{17}}{17}+a^4\left(5Ab+Ba\right)\int x\,dx+a^3bx^5\left(2Ab+Ba\right)+\frac{5a^2b^2x^8\left(Ab+Ba\right)}{4}+\frac{5ab^3x^{11}\left(Ab+2Ba\right)}{11}+\frac{b^4x^{14}\left(Ab+5Ba\right)}{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**2,x)
```

```
[Out] -A*a**5/x + B*b**5*x**17/17 + a**4*(5*A*b + B*a)*Integral(x, x) +
 a**3*b*x**5*(2*A*b + B*a) + 5*a**2*b**2*x**8*(A*b + B*a)/4 + 5*a
*b**3*x**11*(A*b + 2*B*a)/11 + b**4*x**14*(A*b + 5*B*a)/14
```

Mathematica [A] time = 0.0669558, size = 112, normalized size = 1.

$$-\frac{a^5A}{x}+\frac{1}{2}a^4x^2(aB+5Ab)+a^3bx^5(aB+2Ab)+\frac{5}{4}a^2b^2x^8(aB+Ab)+\frac{1}{14}b^4x^{14}(5aB+Ab)+\frac{5}{11}ab^3x^{11}(2aB+Ab)+\frac{1}{17}b^5Bx^{17}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^2,x]
```

```
[Out] -((a^5*A)/x) + (a^4*(5*A*b + a*B)*x^2)/2 + a^3*b*(2*A*b + a*B)*x^
5 + (5*a^2*b^2*(A*b + a*B)*x^8)/4 + (5*a*b^3*(A*b + 2*a*B)*x^11)/
```

```
11 + (b^4*(A*b + 5*a*B)*x^14)/14 + (b^5*B*x^17)/17
```

Maple [A] time = 0.006, size = 125, normalized size = 1.1

$$\frac{b^5Bx^{17}}{17}+\frac{Ax^{14}b^5}{14}+\frac{5\,Bx^{14}ab^4}{14}+\frac{5\,Ax^{11}ab^4}{11}+\frac{10\,Bx^{11}a^2b^3}{11}+\frac{5\,Ax^8a^2b^3}{4}+\frac{5\,Bx^8a^3b^2}{4}+2\,Ax^5a^3b^2+Bx^5a^4b+\frac{5\,Ax^2a^4b}{2}+\frac{Bx^2a^5}{2}-\frac{Aa^5}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^2,x)
```

```
[Out] 1/17*b^5*B*x^17+1/14*A*x^14*b^5+5/14*B*x^14*a*b^4+5/11*A*x^11*a*b
^4+10/11*B*x^11*a^2*b^3+5/4*A*x^8*a^2*b^3+5/4*B*x^8*a^3*b^2+2*A*x
^5*a^3*b^2+B*x^5*a^4*b+5/2*A*x^2*a^4*b+1/2*B*x^2*a^5-a^5*A/x
```

Maxima [A] time = 1.37657, size = 159, normalized size = 1.42

$$\frac{1}{17}\,Bb^5x^{17}+\frac{1}{14}\left(5\,Bab^4+Ab^5\right)x^{14}+\frac{5}{11}\left(2\,Ba^2b^3+Aab^4\right)x^{11}+\frac{5}{4}\left(Ba^3b^2+Aa^2b^3\right)x^8+\left(Ba^4b+2\,Aa^3b^2\right)x^5-\frac{Aa^5}{x}+\frac{1}{2}\left(Ba^5+5\,Aa^4b\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^2,x, algorithm="maxima")
```

```
[Out] 1/17*B*b^5*x^17 + 1/14*(5*B*a*b^4 + A*b^5)*x^14 + 5/11*(2*B*a^2*b
^3 + A*a*b^4)*x^11 + 5/4*(B*a^3*b^2 + A*a^2*b^3)*x^8 + (B*a^4*b +
 2*A*a^3*b^2)*x^5 - A*a^5/x + 1/2*(B*a^5 + 5*A*a^4*b)*x^2
```

Fricas [A] time = 0.219968, size = 163, normalized size = 1.46

$$\frac{308\,Bb^5x^{18}+374\left(5\,Bab^4+Ab^5\right)x^{15}+2380\left(2\,Ba^2b^3+Aab^4\right)x^{12}+6545\left(Ba^3b^2+Aa^2b^3\right)x^9+5236\left(Ba^4b+2\,Aa^3b^2\right)x^6-5}{5236\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^2,x, algorithm="fricas")
```

```
[Out] 1/5236*(308*B*b^5*x^18 + 374*(5*B*a*b^4 + A*b^5)*x^15 + 2380*(2*B
*a^2*b^3 + A*a*b^4)*x^12 + 6545*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 523
6*(B*a^4*b + 2*A*a^3*b^2)*x^6 - 5236*A*a^5 + 2618*(B*a^5 + 5*A*a^
4*b)*x^3)/x
```

Sympy [A] time = 1.5383, size = 129, normalized size = 1.15

$$-\frac{Aa^5}{x}+\frac{Bb^5x^{17}}{17}+x^{14}\left(\frac{Ab^5}{14}+\frac{5Bab^4}{14}\right)+x^{11}\left(\frac{5Aab^4}{11}+\frac{10Ba^2b^3}{11}\right)+x^8\left(\frac{5Aa^2b^3}{4}+\frac{5Ba^3b^2}{4}\right)+x^5\left(2Aa^3b^2+Ba^4b\right)+x^2\left(\frac{5Aa^4b}{2}+\frac{Ba^5}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**2,x)
```

```
[Out] -A*a**5/x + B*b**5*x**17/17 + x**14*(A*b**5/14 + 5*B*a*b**4/14) +
 x**11*(5*A*a*b**4/11 + 10*B*a**2*b**3/11) + x**8*(5*A*a**2*b**3/
4 + 5*B*a**3*b**2/4) + x**5*(2*A*a**3*b**2 + B*a**4*b) + x**2*(5*
A*a**4*b/2 + B*a**5/2)
```

GIAC/XCAS [A] time = 0.218487, size = 167, normalized size = 1.49

$$\frac{1}{17}\,Bb^5x^{17} + \frac{5}{14}\,Bab^4x^{14} + \frac{1}{14}\,Ab^5x^{14} + \frac{10}{11}\,Ba^2b^3x^{11} + \frac{5}{11}\,Aab^4x^{11} + \frac{5}{4}\,Ba^3b^2x^8 + \frac{5}{4}\,Aa^2b^3x^8 + Ba^4bx^5 + 2\,Aa^3b^2x^5 + \frac{1}{2}\,Ba^5x^2 + \frac{5}{2}\,Aa^4bx^2 - \frac{Aa^5}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^2,x, algorithm="giac")
```

```
[Out] 1/17*B*b^5*x^17 + 5/14*B*a*b^4*x^14 + 1/14*A*b^5*x^14 + 10/11*B*a
^2*b^3*x^11 + 5/11*A*a*b^4*x^11 + 5/4*B*a^3*b^2*x^8 + 5/4*A*a^2*b
^3*x^8 + B*a^4*b*x^5 + 2*A*a^3*b^2*x^5 + 1/2*B*a^5*x^2 + 5/2*A*a^
4*b*x^2 - A*a^5/x
```

3.35 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^3} \, dx$

Optimal. Leaf size=112

$$-\frac{a^5 A}{2x^2} + a^4 x(aB + 5Ab) + \frac{5}{4} a^3 b x^4 (aB + 2Ab) + \frac{10}{7} a^2 b^2 x^7 (aB + Ab) + \frac{1}{13} b^4 x^{13} (5aB + Ab) + \frac{1}{2} a b^3 x^{10} (2aB + Ab) + \frac{1}{16} b^5 B x^{16}$$

```
[Out] -(a^5*A)/(2*x^2) + a^4*(5*A*b + a*B)*x + (5*a^3*b*(2*A*b + a*B)*x
^4)/4 + (10*a^2*b^2*(A*b + a*B)*x^7)/7 + (a*b^3*(A*b + 2*a*B)*x^1
0)/2 + (b^4*(A*b + 5*a*B)*x^13)/13 + (b^5*B*x^16)/16
```

Rubi [A] time = 0.188466, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$-\frac{a^5 A}{2x^2} + a^4 x(aB + 5Ab) + \frac{5}{4} a^3 b x^4 (aB + 2Ab) + \frac{10}{7} a^2 b^2 x^7 (aB + Ab) + \frac{1}{13} b^4 x^{13} (5aB + Ab) + \frac{1}{2} a b^3 x^{10} (2aB + Ab) + \frac{1}{16} b^5 B x^{16}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^3,x]
```

```
[Out] -(a^5*A)/(2*x^2) + a^4*(5*A*b + a*B)*x + (5*a^3*b*(2*A*b + a*B)*x
^4)/4 + (10*a^2*b^2*(A*b + a*B)*x^7)/7 + (a*b^3*(A*b + 2*a*B)*x^1
0)/2 + (b^4*(A*b + 5*a*B)*x^13)/13 + (b^5*B*x^16)/16
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{2x^2} + \frac{Bb^5 x^{16}}{16} + \frac{5a^3 b x^4 (2Ab + Ba)}{4} + \frac{10a^2 b^2 x^7 (Ab + Ba)}{7} + \frac{ab^3 x^{10} (Ab + 2Ba)}{2} + \frac{b^4 x^{13} (Ab + 5Ba)}{13} + \frac{a^4 (5Ab + Ba) \int B \, dx}{B}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**3,x)
```

```
[Out] -A*a**5/(2*x**2) + B*b**5*x**16/16 + 5*a**3*b*x**4*(2*A*b + B*a)/
4 + 10*a**2*b**2*x**7*(A*b + B*a)/7 + a*b**3*x**10*(A*b + 2*B*a)/
2 + b**4*x**13*(A*b + 5*B*a)/13 + a**4*(5*A*b + B*a)*Integral(B,
x)/B
```

Mathematica [A] time = 0.062037, size = 112, normalized size = 1.

$$-\frac{a^5 A}{2x^2} + a^4 x(aB + 5Ab) + \frac{5}{4} a^3 b x^4 (aB + 2Ab) + \frac{10}{7} a^2 b^2 x^7 (aB + Ab) + \frac{1}{13} b^4 x^{13} (5aB + Ab) + \frac{1}{2} a b^3 x^{10} (2aB + Ab) + \frac{1}{16} b^5 B x^{16}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^3,x]
```

```
[Out] -(a^5*A)/(2*x^2) + a^4*(5*A*b + a*B)*x + (5*a^3*b*(2*A*b + a*B)*x
^4)/4 + (10*a^2*b^2*(A*b + a*B)*x^7)/7 + (a*b^3*(A*b + 2*a*B)*x^1
```

```
0)/2 + (b^4*(A*b + 5*a*B)*x^13)/13 + (b^5*B*x^16)/16
```

Maple [A] time = 0.005, size = 120, normalized size = 1.1

$$\frac{b^5Bx^{16}}{16}+\frac{Ax^{13}b^5}{13}+\frac{5\,Bx^{13}ab^4}{13}+\frac{Ax^{10}ab^4}{2}+Bx^{10}a^2b^3+\frac{10\,Ax^7a^2b^3}{7}+\frac{10\,Bx^7a^3b^2}{7}+\frac{5\,Ax^4a^3b^2}{2}+\frac{5\,Bx^4a^4b}{4}+5\,Axa^4b+Bxa^5-\frac{Aa^5}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^3,x)
```

```
[Out] 1/16*b^5*B*x^16+1/13*A*x^13*b^5+5/13*B*x^13*a*b^4+1/2*A*x^10*a*b^
4+B*x^10*a^2*b^3+10/7*A*x^7*a^2*b^3+10/7*B*x^7*a^3*b^2+5/2*A*x^4*
a^3*b^2+5/4*B*x^4*a^4*b+5*A*x*a^4*b+B*x*a^5-1/2*a^5*A/x^2
```

Maxima [A] time = 1.39172, size = 157, normalized size = 1.4

$$\frac{1}{16}\,Bb^5x^{16}+\frac{1}{13}\left(5\,Bab^4+Ab^5\right)x^{13}+\frac{1}{2}\left(2\,Ba^2b^3+Aab^4\right)x^{10}+\frac{10}{7}\left(Ba^3b^2+Aa^2b^3\right)x^7+\frac{5}{4}\left(Ba^4b+2\,Aa^3b^2\right)x^4-\frac{Aa^5}{2\,x^2}+\left(Ba^5+5\,Aa^4b\right)x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^3,x, algorithm="maxima")
```

```
[Out] 1/16*B*b^5*x^16 + 1/13*(5*B*a*b^4 + A*b^5)*x^13 + 1/2*(2*B*a^2*b^
3 + A*a*b^4)*x^10 + 10/7*(B*a^3*b^2 + A*a^2*b^3)*x^7 + 5/4*(B*a^4
*b + 2*A*a^3*b^2)*x^4 - 1/2*A*a^5/x^2 + (B*a^5 + 5*A*a^4*b)*x
```

Fricas [A] time = 0.212429, size = 163, normalized size = 1.46

$$\frac{91\,Bb^5x^{18}+112\left(5\,Bab^4+Ab^5\right)x^{15}+728\left(2\,Ba^2b^3+Aab^4\right)x^{12}+2080\left(Ba^3b^2+Aa^2b^3\right)x^9+1820\left(Ba^4b+2\,Aa^3b^2\right)x^6-728}{1456\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^3,x, algorithm="fricas")
```

```
[Out] 1/1456*(91*B*b^5*x^18 + 112*(5*B*a*b^4 + A*b^5)*x^15 + 728*(2*B*a
^2*b^3 + A*a*b^4)*x^12 + 2080*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 1820*
(B*a^4*b + 2*A*a^3*b^2)*x^6 - 728*A*a^5 + 1456*(B*a^5 + 5*A*a^4*b
)*x^3)/x^2
```

Sympy [A] time = 1.54518, size = 128, normalized size = 1.14

$$-\frac{Aa^5}{2x^2}+\frac{Bb^5x^{16}}{16}+x^{13}\left(\frac{Ab^5}{13}+\frac{5Bab^4}{13}\right)+x^{10}\left(\frac{Aab^4}{2}+Ba^2b^3\right)+x^7\left(\frac{10Aa^2b^3}{7}+\frac{10Ba^3b^2}{7}\right)+x^4\left(\frac{5Aa^3b^2}{2}+\frac{5Ba^4b}{4}\right)+x\left(5Aa^4b+Ba^5\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**3,x)
```

```
[Out] -A*a**5/(2*x**2) + B*b**5*x**16/16 + x**13*(A*b**5/13 + 5*B*a*b**
4/13) + x**10*(A*a*b**4/2 + B*a**2*b**3) + x**7*(10*A*a**2*b**3/7
 + 10*B*a**3*b**2/7) + x**4*(5*A*a**3*b**2/2 + 5*B*a**4*b/4) + x*
(5*A*a**4*b + B*a**5)
```

GIAC/XCAS [A] time = 0.217075, size = 161, normalized size = 1.44

$$\frac{1}{16} Bb^5x^{16} + \frac{5}{13} Bab^4x^{13} + \frac{1}{13} Ab^5x^{13} + Ba^2b^3x^{10} + \frac{1}{2} Aab^4x^{10} + \frac{10}{7} Ba^3b^2x^7 + \frac{10}{7} Aa^2b^3x^7 + \frac{5}{4} Ba^4bx^4 + \frac{5}{2} Aa^3b^2x^4 + Ba^5x + 5 Aa^4bx - \frac{Aa^5}{2 x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^3,x, algorithm="giac")
```

```
[Out] 1/16*B*b^5*x^16 + 5/13*B*a*b^4*x^13 + 1/13*A*b^5*x^13 + B*a^2*b^3
*x^10 + 1/2*A*a*b^4*x^10 + 10/7*B*a^3*b^2*x^7 + 10/7*A*a^2*b^3*x^
7 + 5/4*B*a^4*b*x^4 + 5/2*A*a^3*b^2*x^4 + B*a^5*x + 5*A*a^4*b*x -
 1/2*A*a^5/x^2
```

3.36 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^4}\,dx$

Optimal. Leaf size=113

$$-\frac{a^5A}{3x^3}+a^4\log(x)(aB+5Ab)+\frac{5}{3}a^3bx^3(aB+2Ab)+\frac{5}{3}a^2b^2x^6(aB+Ab)+\frac{1}{12}b^4x^{12}(5aB+Ab)+\frac{5}{9}ab^3x^9(2aB+Ab)+\frac{1}{15}b^5Bx^{15}$$

```
[Out] -(a^5*A)/(3*x^3) + (5*a^3*b*(2*A*b + a*B)*x^3)/3 + (5*a^2*b^2*(A*
b + a*B)*x^6)/3 + (5*a*b^3*(A*b + 2*a*B)*x^9)/9 + (b^4*(A*b + 5*a
*B)*x^12)/12 + (b^5*B*x^15)/15 + a^4*(5*A*b + a*B)*Log[x]
```

Rubi [A] time = 0.335624, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{a^5A}{3x^3}+a^4\log(x)(aB+5Ab)+\frac{5}{3}a^3bx^3(aB+2Ab)+\frac{5}{3}a^2b^2x^6(aB+Ab)+\frac{1}{12}b^4x^{12}(5aB+Ab)+\frac{5}{9}ab^3x^9(2aB+Ab)+\frac{1}{15}b^5Bx^{15}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^4,x]
```

```
[Out] -(a^5*A)/(3*x^3) + (5*a^3*b*(2*A*b + a*B)*x^3)/3 + (5*a^2*b^2*(A*
b + a*B)*x^6)/3 + (5*a*b^3*(A*b + 2*a*B)*x^9)/9 + (b^4*(A*b + 5*a
*B)*x^12)/12 + (b^5*B*x^15)/15 + a^4*(5*A*b + a*B)*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{3x^3}+\frac{Bb^5x^{15}}{15}+\frac{a^4(5Ab+Ba)\log\left(x^3\right)}{3}+\frac{5a^3bx^3(2Ab+Ba)}{3}+\frac{10a^2b^2(Ab+Ba)\int^{x^3}x\,dx}{3}+\frac{5ab^3x^9(Ab+2Ba)}{9}+\frac{b^4x^{12}(Ab+5Ba)}{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**4,x)
```

```
[Out] -A*a**5/(3*x**3) + B*b**5*x**15/15 + a**4*(5*A*b + B*a)*log(x**3)
/3 + 5*a**3*b*x**3*(2*A*b + B*a)/3 + 10*a**2*b**2*(A*b + B*a)*Int
egral(x, (x, x**3))/3 + 5*a*b**3*x**9*(A*b + 2*B*a)/9 + b**4*x**1
2*(A*b + 5*B*a)/12
```

Mathematica [A] time = 0.0803826, size = 115, normalized size = 1.02

$$-\frac{a^5A}{3x^3}+\frac{5}{3}a^3bx^3(aB+2Ab)+\frac{5}{3}a^2b^2x^6(aB+Ab)+\log(x)\left(a^5B+5a^4Ab\right)+\frac{1}{12}b^4x^{12}(5aB+Ab)+\frac{5}{9}ab^3x^9(2aB+Ab)+\frac{1}{15}b^5Bx^{15}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^4,x]
```

```
[Out] -(a^5*A)/(3*x^3) + (5*a^3*b*(2*A*b + a*B)*x^3)/3 + (5*a^2*b^2*(A*
b + a*B)*x^6)/3 + (5*a*b^3*(A*b + 2*a*B)*x^9)/9 + (b^4*(A*b + 5*a
*B)*x^12)/12 + (b^5*B*x^15)/15 + (5*a^4*A*b + a^5*B)*Log[x]
```

Maple [A] time = 0.011, size = 123, normalized size = 1.1

$$\frac{b^5Bx^{15}}{15}+\frac{Ax^{12}b^5}{12}+\frac{5\,Bx^{12}ab^4}{12}+\frac{5\,Ax^9ab^4}{9}+\frac{10\,Bx^9a^2b^3}{9}+\frac{5\,Ax^6a^2b^3}{3}+\frac{5\,Bx^6a^3b^2}{3}+\frac{10\,Ax^3a^3b^2}{3}+\frac{5\,Bx^3a^4b}{3}+5\,A\ln(x)\,a^4b+B\ln(x)\,a^5-\frac{Aa^5}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^4,x)
```

```
[Out] 1/15*b^5*B*x^15+1/12*A*x^12*b^5+5/12*B*x^12*a*b^4+5/9*A*x^9*a*b^4
+10/9*B*x^9*a^2*b^3+5/3*A*x^6*a^2*b^3+5/3*B*x^6*a^3*b^2+10/3*A*x^
3*a^3*b^2+5/3*B*x^3*a^4*b+5*A*ln(x)*a^4*b+B*ln(x)*a^5-1/3*a^5*A/x
^3
```

Maxima [A] time = 1.37017, size = 162, normalized size = 1.43

$$\frac{1}{15}\,Bb^5x^{15}+\frac{1}{12}\left(5\,Bab^4+Ab^5\right)x^{12}+\frac{5}{9}\left(2\,Ba^2b^3+Aab^4\right)x^9+\frac{5}{3}\left(Ba^3b^2+Aa^2b^3\right)x^6+\frac{5}{3}\left(Ba^4b+2\,Aa^3b^2\right)x^3-\frac{Aa^5}{3\,x^3}+\frac{1}{3}\left(Ba^5+5\,Aa^4b\right)\log\left(x^3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^4,x, algorithm="maxima")
```

```
[Out] 1/15*B*b^5*x^15 + 1/12*(5*B*a*b^4 + A*b^5)*x^12 + 5/9*(2*B*a^2*b^
3 + A*a*b^4)*x^9 + 5/3*(B*a^3*b^2 + A*a^2*b^3)*x^6 + 5/3*(B*a^4*b
 + 2*A*a^3*b^2)*x^3 - 1/3*A*a^5/x^3 + 1/3*(B*a^5 + 5*A*a^4*b)*log
(x^3)
```

Fricas [A] time = 0.235678, size = 166, normalized size = 1.47

$$\frac{12\,Bb^5x^{18}+15\left(5\,Bab^4+Ab^5\right)x^{15}+100\left(2\,Ba^2b^3+Aab^4\right)x^{12}+300\left(Ba^3b^2+Aa^2b^3\right)x^9+300\left(Ba^4b+2\,Aa^3b^2\right)x^6-60\,Aa^5}{180\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^4,x, algorithm="fricas")
```

```
[Out] 1/180*(12*B*b^5*x^18 + 15*(5*B*a*b^4 + A*b^5)*x^15 + 100*(2*B*a^2
*b^3 + A*a*b^4)*x^12 + 300*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 300*(B*a
^4*b + 2*A*a^3*b^2)*x^6 - 60*A*a^5 + 180*(B*a^5 + 5*A*a^4*b)*x^3*
log(x))/x^3
```

Sympy [A] time = 2.00845, size = 133, normalized size = 1.18

$$-\frac{Aa^5}{3x^3}+\frac{Bb^5x^{15}}{15}+a^4\left(5Ab+Ba\right)\log\left(x\right)+x^{12}\left(\frac{Ab^5}{12}+\frac{5Bab^4}{12}\right)+x^9\left(\frac{5Aab^4}{9}+\frac{10Ba^2b^3}{9}\right)+x^6\left(\frac{5Aa^2b^3}{3}+\frac{5Ba^3b^2}{3}\right)+x^3\left(\frac{10Aa^3b^2}{3}+\frac{5Ba^4b}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x**3+a)**5*(B*x**3+A)/x**4,x)
```

```
[Out] -A*a**5/(3*x**3) + B*b**5*x**15/15 + a**4*(5*A*b + B*a)*log(x) +
x**12*(A*b**5/12 + 5*B*a*b**4/12) + x**9*(5*A*a*b**4/9 + 10*B*a**
2*b**3/9) + x**6*(5*A*a**2*b**3/3 + 5*B*a**3*b**2/3) + x**3*(10*A
*a**3*b**2/3 + 5*B*a**4*b/3)
```

GIAC/XCAS [A]   time = 0.219947, size = 193, normalized size = 1.71

$$\frac{1}{15}\,Bb^5x^{15} + \frac{5}{12}\,Bab^4x^{12} + \frac{1}{12}\,Ab^5x^{12} + \frac{10}{9}\,Ba^2b^3x^9 + \frac{5}{9}\,Aab^4x^9 + \frac{5}{3}\,Ba^3b^2x^6 + \frac{5}{3}\,Aa^2b^3x^6 + \frac{5}{3}\,Ba^4bx^3 + \frac{10}{3}\,Aa^3b^2x^3 + \left(Ba^5 + 5\,Aa^4b\right)\ln\left(|x|\right) - \frac{Ba^5x^3 + 5\,Aa^4bx^3 + Aa^5}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^5/x^4,x, algorithm="giac")
```

```
[Out] 1/15*B*b^5*x^15 + 5/12*B*a*b^4*x^12 + 1/12*A*b^5*x^12 + 10/9*B*a^
2*b^3*x^9 + 5/9*A*a*b^4*x^9 + 5/3*B*a^3*b^2*x^6 + 5/3*A*a^2*b^3*x
^6 + 5/3*B*a^4*b*x^3 + 10/3*A*a^3*b^2*x^3 + (B*a^5 + 5*A*a^4*b)*l
n(abs(x)) - 1/3*(B*a^5*x^3 + 5*A*a^4*b*x^3 + A*a^5)/x^3
```

3.37 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^5}\,dx$

Optimal. Leaf size=113

$$-\frac{a^5A}{4x^4}-\frac{a^4(aB+5Ab)}{x}+\frac{5}{2}a^3bx^2(aB+2Ab)+2a^2b^2x^5(aB+Ab)+\frac{1}{11}b^4x^{11}(5aB+Ab)+\frac{5}{8}ab^3x^8(2aB+Ab)+\frac{1}{14}b^5Bx^{14}$$

```
[Out] -(a^5*A)/(4*x^4) - (a^4*(5*A*b + a*B))/x + (5*a^3*b*(2*A*b + a*B)
*x^2)/2 + 2*a^2*b^2*(A*b + a*B)*x^5 + (5*a*b^3*(A*b + 2*a*B)*x^8)
/8 + (b^4*(A*b + 5*a*B)*x^11)/11 + (b^5*B*x^14)/14
```

Rubi [A] time = 0.209665, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{4x^4}-\frac{a^4(aB+5Ab)}{x}+\frac{5}{2}a^3bx^2(aB+2Ab)+2a^2b^2x^5(aB+Ab)+\frac{1}{11}b^4x^{11}(5aB+Ab)+\frac{5}{8}ab^3x^8(2aB+Ab)+\frac{1}{14}b^5Bx^{14}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^5,x]
```

```
[Out] -(a^5*A)/(4*x^4) - (a^4*(5*A*b + a*B))/x + (5*a^3*b*(2*A*b + a*B)
*x^2)/2 + 2*a^2*b^2*(A*b + a*B)*x^5 + (5*a*b^3*(A*b + 2*a*B)*x^8)
/8 + (b^4*(A*b + 5*a*B)*x^11)/11 + (b^5*B*x^14)/14
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{4x^4}+\frac{Bb^5x^{14}}{14}-\frac{a^4\left(5Ab+Ba\right)}{x}+5a^3b\left(2Ab+Ba\right)\int x\,dx+2a^2b^2x^5\left(Ab+Ba\right)+\frac{5ab^3x^8\left(Ab+2Ba\right)}{8}+\frac{b^4x^{11}\left(Ab+5Ba\right)}{11}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**5,x)
```

```
[Out] -A*a**5/(4*x**4) + B*b**5*x**14/14 - a**4*(5*A*b + B*a)/x + 5*a**
3*b*(2*A*b + B*a)*Integral(x, x) + 2*a**2*b**2*x**5*(A*b + B*a) +
 5*a*b**3*x**8*(A*b + 2*B*a)/8 + b**4*x**11*(A*b + 5*B*a)/11
```

Mathematica [A] time = 0.0699595, size = 115, normalized size = 1.02

$$-\frac{a^5A}{4x^4}+\frac{5}{2}a^3bx^2(aB+2Ab)+2a^2b^2x^5(aB+Ab)+\frac{a^5(-B)-5a^4Ab}{x}+\frac{1}{11}b^4x^{11}(5aB+Ab)+\frac{5}{8}ab^3x^8(2aB+Ab)+\frac{1}{14}b^5Bx^{14}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^5,x]
```

```
[Out] -(a^5*A)/(4*x^4) + (-5*a^4*A*b - a^5*B)/x + (5*a^3*b*(2*A*b + a*B
)*x^2)/2 + 2*a^2*b^2*(A*b + a*B)*x^5 + (5*a*b^3*(A*b + 2*a*B)*x^8
```

```
)/8 + (b^4*(A*b + 5*a*B)*x^11)/11 + (b^5*B*x^14)/14
```

Maple [A] time = 0.009, size = 123, normalized size = 1.1

$$\frac{b^5 B x^{14}}{14} + \frac{A x^{11} b^5}{11} + \frac{5 B x^{11} a b^4}{11} + \frac{5 A x^8 a b^4}{8} + \frac{5 B x^8 a^2 b^3}{4} + 2 A x^5 a^2 b^3 + 2 B x^5 a^3 b^2 + 5 A x^2 a^3 b^2 + \frac{5 B x^2 a^4 b}{2} - \frac{A a^5}{4 x^4} - \frac{a^4 (5 A b + B a)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^5,x)
```

```
[Out] 1/14*b^5*B*x^14+1/11*A*x^11*b^5+5/11*B*x^11*a*b^4+5/8*A*x^8*a*b^4
+5/4*B*x^8*a^2*b^3+2*A*x^5*a^2*b^3+2*B*x^5*a^3*b^2+5*A*x^2*a^3*b^
2+5/2*B*x^2*a^4*b-1/4*a^5*A/x^4-a^4*(5*A*b+B*a)/x
```

Maxima [A] time = 1.36066, size = 163, normalized size = 1.44

$$\frac{1}{14} B b^5 x^{14} + \frac{1}{11} \left(5 B a b^4 + A b^5\right) x^{11} + \frac{5}{8} \left(2 B a^2 b^3 + A a b^4\right) x^8 + 2 \left(B a^3 b^2 + A a^2 b^3\right) x^5 + \frac{5}{2} \left(B a^4 b + 2 A a^3 b^2\right) x^2 - \frac{A a^5 + 4 \left(B a^5 + 5 A a^4 b\right) x^3}{4 x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^5,x, algorithm="maxima")
```

```
[Out] 1/14*B*b^5*x^14 + 1/11*(5*B*a*b^4 + A*b^5)*x^11 + 5/8*(2*B*a^2*b^
3 + A*a*b^4)*x^8 + 2*(B*a^3*b^2 + A*a^2*b^3)*x^5 + 5/2*(B*a^4*b +
 2*A*a^3*b^2)*x^2 - 1/4*(A*a^5 + 4*(B*a^5 + 5*A*a^4*b)*x^3)/x^4
```

Fricas [A] time = 0.220852, size = 163, normalized size = 1.44

$$\frac{44 B b^5 x^{18} + 56 \left(5 B a b^4 + A b^5\right) x^{15} + 385 \left(2 B a^2 b^3 + A a b^4\right) x^{12} + 1232 \left(B a^3 b^2 + A a^2 b^3\right) x^9 + 1540 \left(B a^4 b + 2 A a^3 b^2\right) x^6 - 154 A}{616 x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^5,x, algorithm="fricas")
```

```
[Out] 1/616*(44*B*b^5*x^18 + 56*(5*B*a*b^4 + A*b^5)*x^15 + 385*(2*B*a^2
*b^3 + A*a*b^4)*x^12 + 1232*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 1540*(B
*a^4*b + 2*A*a^3*b^2)*x^6 - 154*A*a^5 - 616*(B*a^5 + 5*A*a^4*b)*x
^3)/x^4
```

Sympy [A] time = 2.17528, size = 131, normalized size = 1.16

$$\frac{B b^5 x^{14}}{14} + x^{11} \left(\frac{A b^5}{11} + \frac{5 B a b^4}{11}\right) + x^8 \left(\frac{5 A a b^4}{8} + \frac{5 B a^2 b^3}{4}\right) + x^5 \left(2 A a^2 b^3 + 2 B a^3 b^2\right) + x^2 \left(5 A a^3 b^2 + \frac{5 B a^4 b}{2}\right) - \frac{A a^5 + x^3 \left(20 A a^4 b + 4 B a^5\right)}{4 x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**5,x)
```

```
[Out] B*b**5*x**14/14 + x**11*(A*b**5/11 + 5*B*a*b**4/11) + x**8*(5*A*a
*b**4/8 + 5*B*a**2*b**3/4) + x**5*(2*A*a**2*b**3 + 2*B*a**3*b**2)
 + x**2*(5*A*a**3*b**2 + 5*B*a**4*b/2) - (A*a**5 + x**3*(20*A*a**
4*b + 4*B*a**5))/(4*x**4)
```

GIAC/XCAS [A] time = 0.215891, size = 171, normalized size = 1.51

$$\frac{1}{14}Bb^5x^{14} + \frac{5}{11}Bab^4x^{11} + \frac{1}{11}Ab^5x^{11} + \frac{5}{4}Ba^2b^3x^8 + \frac{5}{8}Aab^4x^8 + 2Ba^3b^2x^5 + 2Aa^2b^3x^5 + \frac{5}{2}Ba^4bx^2 + 5Aa^3b^2x^2 - \frac{4Ba^5x^3 + 20Aa^4bx^3 + Aa^5}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^5,x, algorithm="giac")
```

```
[Out] 1/14*B*b^5*x^14 + 5/11*B*a*b^4*x^11 + 1/11*A*b^5*x^11 + 5/4*B*a^2
*b^3*x^8 + 5/8*A*a*b^4*x^8 + 2*B*a^3*b^2*x^5 + 2*A*a^2*b^3*x^5 +
5/2*B*a^4*b*x^2 + 5*A*a^3*b^2*x^2 - 1/4*(4*B*a^5*x^3 + 20*A*a^4*b
*x^3 + A*a^5)/x^4
```

3.38 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^6}\,dx$

Optimal. Leaf size=113

$$-\frac{a^5A}{5x^5}-\frac{a^4(aB+5Ab)}{2x^2}+5a^3bx(aB+2Ab)+\frac{5}{2}a^2b^2x^4(aB+Ab)+\frac{1}{10}b^4x^{10}(5aB+Ab)+\frac{5}{7}ab^3x^7(2aB+Ab)+\frac{1}{13}b^5Bx^{13}$$

```
[Out] -(a^5*A)/(5*x^5) - (a^4*(5*A*b + a*B))/(2*x^2) + 5*a^3*b*(2*A*b +
 a*B)*x + (5*a^2*b^2*(A*b + a*B)*x^4)/2 + (5*a*b^3*(A*b + 2*a*B)*
x^7)/7 + (b^4*(A*b + 5*a*B)*x^10)/10 + (b^5*B*x^13)/13
```

Rubi [A] time = 0.194612, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{5x^5}-\frac{a^4(aB+5Ab)}{2x^2}+5a^3bx(aB+2Ab)+\frac{5}{2}a^2b^2x^4(aB+Ab)+\frac{1}{10}b^4x^{10}(5aB+Ab)+\frac{5}{7}ab^3x^7(2aB+Ab)+\frac{1}{13}b^5Bx^{13}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^6,x]
```

```
[Out] -(a^5*A)/(5*x^5) - (a^4*(5*A*b + a*B))/(2*x^2) + 5*a^3*b*(2*A*b +
 a*B)*x + (5*a^2*b^2*(A*b + a*B)*x^4)/2 + (5*a*b^3*(A*b + 2*a*B)*
x^7)/7 + (b^4*(A*b + 5*a*B)*x^10)/10 + (b^5*B*x^13)/13
```

Rubi in Sympy [A] time = 25.5312, size = 110, normalized size = 0.97

$$-\frac{Aa^5}{5x^5}+\frac{Bb^5x^{13}}{13}-\frac{a^4\left(5Ab+Ba\right)}{2x^2}+5a^3bx\left(2Ab+Ba\right)+\frac{5a^2b^2x^4\left(Ab+Ba\right)}{2}+\frac{5ab^3x^7\left(Ab+2Ba\right)}{7}+\frac{b^4x^{10}\left(Ab+5Ba\right)}{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**6,x)
```

```
[Out] -A*a**5/(5*x**5) + B*b**5*x**13/13 - a**4*(5*A*b + B*a)/(2*x**2)
+ 5*a**3*b*x*(2*A*b + B*a) + 5*a**2*b**2*x**4*(A*b + B*a)/2 + 5*a
*b**3*x**7*(A*b + 2*B*a)/7 + b**4*x**10*(A*b + 5*B*a)/10
```

Mathematica [A] time = 0.0677583, size = 113, normalized size = 1.

$$-\frac{a^5A}{5x^5}-\frac{a^4(aB+5Ab)}{2x^2}+5a^3bx(aB+2Ab)+\frac{5}{2}a^2b^2x^4(aB+Ab)+\frac{1}{10}b^4x^{10}(5aB+Ab)+\frac{5}{7}ab^3x^7(2aB+Ab)+\frac{1}{13}b^5Bx^{13}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^6,x]
```

```
[Out] -(a^5*A)/(5*x^5) - (a^4*(5*A*b + a*B))/(2*x^2) + 5*a^3*b*(2*A*b +
 a*B)*x + (5*a^2*b^2*(A*b + a*B)*x^4)/2 + (5*a*b^3*(A*b + 2*a*B)*
```

```
x^7)/7 + (b^4*(A*b + 5*a*B)*x^10)/10 + (b^5*B*x^13)/13
```

Maple [A] time = 0.008, size = 119, normalized size = 1.1

$$\frac{b^5Bx^{13}}{13}+\frac{Ax^{10}b^5}{10}+\frac{Bx^{10}ab^4}{2}+\frac{5\,Ax^7ab^4}{7}+\frac{10\,Bx^7a^2b^3}{7}+\frac{5\,Ax^4a^2b^3}{2}+\frac{5\,Bx^4a^3b^2}{2}+10\,Axa^3b^2+5\,Bxa^4b-\frac{a^4\,(5\,Ab+Ba)}{2\,x^2}-\frac{Aa^5}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^6,x)
```

```
[Out] 1/13*b^5*B*x^13+1/10*A*x^10*b^5+1/2*B*x^10*a*b^4+5/7*A*x^7*a*b^4+
10/7*B*x^7*a^2*b^3+5/2*A*x^4*a^2*b^3+5/2*B*x^4*a^3*b^2+10*A*x*a^3
*b^2+5*B*x*a^4*b-1/2*a^4*(5*A*b+B*a)/x^2-1/5*a^5*A/x^5
```

Maxima [A] time = 1.40291, size = 162, normalized size = 1.43

$$\frac{1}{13}\,Bb^5x^{13}+\frac{1}{10}\left(5\,Bab^4+Ab^5\right)x^{10}+\frac{5}{7}\left(2\,Ba^2b^3+Aab^4\right)x^7+\frac{5}{2}\left(Ba^3b^2+Aa^2b^3\right)x^4+5\left(Ba^4b+2\,Aa^3b^2\right)x-\frac{2\,Aa^5+5\left(Ba^5+5\,Aa^4b\right)x^3}{10\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^6,x, algorithm="maxima")
```

```
[Out] 1/13*B*b^5*x^13 + 1/10*(5*B*a*b^4 + A*b^5)*x^10 + 5/7*(2*B*a^2*b^
3 + A*a*b^4)*x^7 + 5/2*(B*a^3*b^2 + A*a^2*b^3)*x^4 + 5*(B*a^4*b +
 2*A*a^3*b^2)*x - 1/10*(2*A*a^5 + 5*(B*a^5 + 5*A*a^4*b)*x^3)/x^5
```

Fricas [A] time = 0.218598, size = 163, normalized size = 1.44

$$\frac{70\,Bb^5x^{18}+91\left(5\,Bab^4+Ab^5\right)x^{15}+650\left(2\,Ba^2b^3+Aab^4\right)x^{12}+2275\left(Ba^3b^2+Aa^2b^3\right)x^9+4550\left(Ba^4b+2\,Aa^3b^2\right)x^6-182\,A}{910\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^6,x, algorithm="fricas")
```

```
[Out] 1/910*(70*B*b^5*x^18 + 91*(5*B*a*b^4 + A*b^5)*x^15 + 650*(2*B*a^2
*b^3 + A*a*b^4)*x^12 + 2275*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 4550*(B
*a^4*b + 2*A*a^3*b^2)*x^6 - 182*A*a^5 - 455*(B*a^5 + 5*A*a^4*b)*x
^3)/x^5
```

Sympy [A] time = 2.37458, size = 131, normalized size = 1.16

$$\frac{Bb^5x^{13}}{13}+x^{10}\left(\frac{Ab^5}{10}+\frac{Bab^4}{2}\right)+x^7\left(\frac{5Aab^4}{7}+\frac{10Ba^2b^3}{7}\right)+x^4\left(\frac{5Aa^2b^3}{2}+\frac{5Ba^3b^2}{2}\right)+x\left(10Aa^3b^2+5Ba^4b\right)-\frac{2Aa^5+x^3\left(25Aa^4b+5Ba^5\right)}{10x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**6,x)
```

```
[Out] B*b**5*x**13/13 + x**10*(A*b**5/10 + B*a*b**4/2) + x**7*(5*A*a*b*
*4/7 + 10*B*a**2*b**3/7) + x**4*(5*A*a**2*b**3/2 + 5*B*a**3*b**2/
2) + x*(10*A*a**3*b**2 + 5*B*a**4*b) - (2*A*a**5 + x**3*(25*A*a**
4*b + 5*B*a**5))/(10*x**5)
```

GIAC/XCAS [A] time = 0.216019, size = 167, normalized size = 1.48

$$\frac{1}{13}Bb^5x^{13} + \frac{1}{2}Bab^4x^{10} + \frac{1}{10}Ab^5x^{10} + \frac{10}{7}Ba^2b^3x^7 + \frac{5}{7}Aab^4x^7 + \frac{5}{2}Ba^3b^2x^4 + \frac{5}{2}Aa^2b^3x^4 + 5\,Ba^4bx + 10\,Aa^3b^2x - \frac{5\,Ba^5x^3 + 25\,Aa^4bx^3 + 2\,Aa^5}{10\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^6,x, algorithm="giac")
```

```
[Out] 1/13*B*b^5*x^13 + 1/2*B*a*b^4*x^10 + 1/10*A*b^5*x^10 + 10/7*B*a^2
*b^3*x^7 + 5/7*A*a*b^4*x^7 + 5/2*B*a^3*b^2*x^4 + 5/2*A*a^2*b^3*x^
4 + 5*B*a^4*b*x + 10*A*a^3*b^2*x - 1/10*(5*B*a^5*x^3 + 25*A*a^4*b
*x^3 + 2*A*a^5)/x^5
```

3.39 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^7}\,dx$

Optimal. Leaf size=114

$$-\frac{a^5A}{6x^6}-\frac{a^4(aB+5Ab)}{3x^3}+5a^3b\log(x)(aB+2Ab)+\frac{10}{3}a^2b^2x^3(aB+Ab)+\frac{1}{9}b^4x^9(5aB+Ab)+\frac{5}{6}ab^3x^6(2aB+Ab)+\frac{1}{12}b^5Bx^{12}$$

```
[Out] -(a^5*A)/(6*x^6) - (a^4*(5*A*b + a*B))/(3*x^3) + (10*a^2*b^2*(A*b
 + a*B)*x^3)/3 + (5*a*b^3*(A*b + 2*a*B)*x^6)/6 + (b^4*(A*b + 5*a*
B)*x^9)/9 + (b^5*B*x^12)/12 + 5*a^3*b*(2*A*b + a*B)*Log[x]
```

Rubi [A] time = 0.314711, antiderivative size = 114, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{a^5A}{6x^6}-\frac{a^4(aB+5Ab)}{3x^3}+5a^3b\log(x)(aB+2Ab)+\frac{10}{3}a^2b^2x^3(aB+Ab)+\frac{1}{9}b^4x^9(5aB+Ab)+\frac{5}{6}ab^3x^6(2aB+Ab)+\frac{1}{12}b^5Bx^{12}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^7,x]
```

```
[Out] -(a^5*A)/(6*x^6) - (a^4*(5*A*b + a*B))/(3*x^3) + (10*a^2*b^2*(A*b
 + a*B)*x^3)/3 + (5*a*b^3*(A*b + 2*a*B)*x^6)/6 + (b^4*(A*b + 5*a*
B)*x^9)/9 + (b^5*B*x^12)/12 + 5*a^3*b*(2*A*b + a*B)*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{6x^6}+\frac{Bb^5x^{12}}{12}-\frac{a^4\left(5Ab+Ba\right)}{3x^3}+\frac{5a^3b\left(2Ab+Ba\right)\log\left(x^3\right)}{3}+\frac{10a^2b^2x^3\left(Ab+Ba\right)}{3}+\frac{5ab^3\left(Ab+2Ba\right)\int^{x^3}x\,dx}{3}+\frac{b^4x^9\left(Ab+5Ba\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**7,x)
```

```
[Out] -A*a**5/(6*x**6) + B*b**5*x**12/12 - a**4*(5*A*b + B*a)/(3*x**3)
+ 5*a**3*b*(2*A*b + B*a)*log(x**3)/3 + 10*a**2*b**2*x**3*(A*b + B
*a)/3 + 5*a*b**3*(A*b + 2*B*a)*Integral(x, (x, x**3))/3 + b**4*x*
*9*(A*b + 5*B*a)/9
```

Mathematica [A] time = 0.0983266, size = 106, normalized size = 0.93

$$\frac{1}{36}\left(-\frac{6a^5A}{x^6}-\frac{12a^4(aB+5Ab)}{x^3}+180a^3b\log(x)(aB+2Ab)+120a^2b^2x^3(aB+Ab)+4b^4x^9(5aB+Ab)+30ab^3x^6(2aB+Ab)+3b^5Bx^{12}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^7,x]
```

```
[Out] ((-6*a^5*A)/x^6 - (12*a^4*(5*A*b + a*B))/x^3 + 120*a^2*b^2*(A*b +
 a*B)*x^3 + 30*a*b^3*(A*b + 2*a*B)*x^6 + 4*b^4*(A*b + 5*a*B)*x^9
+ 3*b^5*B*x^12 + 180*a^3*b*(2*A*b + a*B)*Log[x])/36
```

Maple [A] time = 0.01, size = 124, normalized size = 1.1

$$\frac{b^5Bx^{12}}{12}+\frac{Ax^9b^5}{9}+\frac{5\,Bx^9ab^4}{9}+\frac{5\,Ax^6ab^4}{6}+\frac{5\,Bx^6a^2b^3}{3}+\frac{10\,Ax^3a^2b^3}{3}+\frac{10\,Bx^3a^3b^2}{3}+10\,A\ln(x)\,a^3b^2+5\,B\ln(x)\,a^4b-\frac{Aa^5}{6\,x^6}-\frac{5\,a^4bA}{3\,x^3}-\frac{a^5B}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^7,x)
```

```
[Out] 1/12*b^5*B*x^12+1/9*A*x^9*b^5+5/9*B*x^9*a*b^4+5/6*A*x^6*a*b^4+5/3
*B*x^6*a^2*b^3+10/3*A*x^3*a^2*b^3+10/3*B*x^3*a^3*b^2+10*A*ln(x)*a
^3*b^2+5*B*ln(x)*a^4*b-1/6*a^5*A/x^6-5/3*a^4/x^3*A*b-1/3*a^5/x^3*
B
```

Maxima [A] time = 1.37918, size = 165, normalized size = 1.45

$$\frac{1}{12}\,Bb^5x^{12}+\frac{1}{9}\left(5\,Bab^4+Ab^5\right)x^9+\frac{5}{6}\left(2\,Ba^2b^3+Aab^4\right)x^6+\frac{10}{3}\left(Ba^3b^2+Aa^2b^3\right)x^3+\frac{5}{3}\left(Ba^4b+2\,Aa^3b^2\right)\log\left(x^3\right)-\frac{Aa^5+2\left(Ba^5+5\,Aa^4b\right)x^3}{6\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^7,x, algorithm="maxima")
```

```
[Out] 1/12*B*b^5*x^12 + 1/9*(5*B*a*b^4 + A*b^5)*x^9 + 5/6*(2*B*a^2*b^3
+ A*a*b^4)*x^6 + 10/3*(B*a^3*b^2 + A*a^2*b^3)*x^3 + 5/3*(B*a^4*b
+ 2*A*a^3*b^2)*log(x^3) - 1/6*(A*a^5 + 2*(B*a^5 + 5*A*a^4*b)*x^3)
/x^6
```

Fricas [A] time = 0.221172, size = 166, normalized size = 1.46

$$\frac{3\,Bb^5x^{18}+4\left(5\,Bab^4+Ab^5\right)x^{15}+30\left(2\,Ba^2b^3+Aab^4\right)x^{12}+120\left(Ba^3b^2+Aa^2b^3\right)x^9+180\left(Ba^4b+2\,Aa^3b^2\right)x^6\log(x)-6\,Aa}{36\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^7,x, algorithm="fricas")
```

```
[Out] 1/36*(3*B*b^5*x^18 + 4*(5*B*a*b^4 + A*b^5)*x^15 + 30*(2*B*a^2*b^3
 + A*a*b^4)*x^12 + 120*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 180*(B*a^4*b
 + 2*A*a^3*b^2)*x^6*log(x) - 6*A*a^5 - 12*(B*a^5 + 5*A*a^4*b)*x^3
)/x^6
```

Sympy [A] time = 4.16125, size = 129, normalized size = 1.13

$$\frac{Bb^5x^{12}}{12}+5a^3b\,(2Ab+Ba)\log(x)+x^9\left(\frac{Ab^5}{9}+\frac{5Bab^4}{9}\right)+x^6\left(\frac{5Aab^4}{6}+\frac{5Ba^2b^3}{3}\right)+x^3\left(\frac{10Aa^2b^3}{3}+\frac{10Ba^3b^2}{3}\right)-\frac{Aa^5+x^3\left(10Aa^4b+2Ba^5\right)}{6x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**7,x)
```

```
[Out] B*b**5*x**12/12 + 5*a**3*b*(2*A*b + B*a)*log(x) + x**9*(A*b**5/9
+ 5*B*a*b**4/9) + x**6*(5*A*a*b**4/6 + 5*B*a**2*b**3/3) + x**3*(1
0*A*a**2*b**3/3 + 10*B*a**3*b**2/3) - (A*a**5 + x**3*(10*A*a**4*b
 + 2*B*a**5))/(6*x**6)
```

GIAC/XCAS [A] time = 0.216595, size = 200, normalized size = 1.75

$$\frac{1}{12}Bb^5x^{12} + \frac{5}{9}Bab^4x^9 + \frac{1}{9}Ab^5x^9 + \frac{5}{3}Ba^2b^3x^6 + \frac{5}{6}Aab^4x^6 + \frac{10}{3}Ba^3b^2x^3 + \frac{10}{3}Aa^2b^3x^3 + 5\left(Ba^4b + 2Aa^3b^2\right)\ln\left(|x|\right) - \frac{15Ba^4bx^6 + 30Aa^3b^2x^6 + 2Ba^5x^3 + 10Aa^4bx^3 + Aa^5}{6x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^7,x, algorithm="giac")
```

```
[Out] 1/12*B*b^5*x^12 + 5/9*B*a*b^4*x^9 + 1/9*A*b^5*x^9 + 5/3*B*a^2*b^3
*x^6 + 5/6*A*a*b^4*x^6 + 10/3*B*a^3*b^2*x^3 + 10/3*A*a^2*b^3*x^3
+ 5*(B*a^4*b + 2*A*a^3*b^2)*ln(abs(x)) - 1/6*(15*B*a^4*b*x^6 + 30
*A*a^3*b^2*x^6 + 2*B*a^5*x^3 + 10*A*a^4*b*x^3 + A*a^5)/x^6
```

3.40 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^8} \, dx$

Optimal. Leaf size=110

$$-\frac{a^5 A}{7x^7}-\frac{a^4(aB+5Ab)}{4x^4}-\frac{5a^3b(aB+2Ab)}{x}+5a^2b^2x^2(aB+Ab)+\frac{1}{8}b^4x^8(5aB+Ab)+ab^3x^5(2aB+Ab)+\frac{1}{11}b^5Bx^{11}$$

```
[Out] -(a^5*A)/(7*x^7) - (a^4*(5*A*b + a*B))/(4*x^4) - (5*a^3*b*(2*A*b
+ a*B))/x + 5*a^2*b^2*(A*b + a*B)*x^2 + a*b^3*(A*b + 2*a*B)*x^5 +
 (b^4*(A*b + 5*a*B)*x^8)/8 + (b^5*B*x^11)/11
```

Rubi [A] time = 0.209738, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5 A}{7x^7}-\frac{a^4(aB+5Ab)}{4x^4}-\frac{5a^3b(aB+2Ab)}{x}+5a^2b^2x^2(aB+Ab)+\frac{1}{8}b^4x^8(5aB+Ab)+ab^3x^5(2aB+Ab)+\frac{1}{11}b^5Bx^{11}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^5*(A + B*x^3))/x^8,x]
```

```
[Out] -(a^5*A)/(7*x^7) - (a^4*(5*A*b + a*B))/(4*x^4) - (5*a^3*b*(2*A*b
+ a*B))/x + 5*a^2*b^2*(A*b + a*B)*x^2 + a*b^3*(A*b + 2*a*B)*x^5 +
 (b^4*(A*b + 5*a*B)*x^8)/8 + (b^5*B*x^11)/11
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{7x^7}+\frac{Bb^5x^{11}}{11}-\frac{a^4(5Ab+Ba)}{4x^4}-\frac{5a^3b(2Ab+Ba)}{x}+10a^2b^2(Ab+Ba)\int x\,dx+ab^3x^5(Ab+2Ba)+\frac{b^4x^8(Ab+5Ba)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**8,x)
```

```
[Out] -A*a**5/(7*x**7) + B*b**5*x**11/11 - a**4*(5*A*b + B*a)/(4*x**4)
- 5*a**3*b*(2*A*b + B*a)/x + 10*a**2*b**2*(A*b + B*a)*Integral(x,
 x) + a*b**3*x**5*(A*b + 2*B*a) + b**4*x**8*(A*b + 5*B*a)/8
```

Mathematica [A] time = 0.0732566, size = 110, normalized size = 1.

$$-\frac{a^5 A}{7x^7}-\frac{a^4(aB+5Ab)}{4x^4}-\frac{5a^3b(aB+2Ab)}{x}+5a^2b^2x^2(aB+Ab)+\frac{1}{8}b^4x^8(5aB+Ab)+ab^3x^5(2aB+Ab)+\frac{1}{11}b^5Bx^{11}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^5*(A + B*x^3))/x^8,x]
```

```
[Out] -(a^5*A)/(7*x^7) - (a^4*(5*A*b + a*B))/(4*x^4) - (5*a^3*b*(2*A*b
+ a*B))/x + 5*a^2*b^2*(A*b + a*B)*x^2 + a*b^3*(A*b + 2*a*B)*x^5 +
```

```
(b^4*(A*b + 5*a*B)*x^8)/8 + (b^5*B*x^11)/11
```

Maple [A] time = 0.009, size = 117, normalized size = 1.1

$$\frac{b^5 B x^{11}}{11} + \frac{A x^8 b^5}{8} + \frac{5 B x^8 a b^4}{8} + A x^5 a b^4 + 2 B x^5 a^2 b^3 + 5 A x^2 a^2 b^3 + 5 B x^2 a^3 b^2 - \frac{a^4 (5 A b + B a)}{4 x^4} - 5 \frac{a^3 b (2 A b + B a)}{x} - \frac{A a^5}{7 x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^8,x)
```

```
[Out] 1/11*b^5*B*x^11+1/8*A*x^8*b^5+5/8*B*x^8*a*b^4+A*x^5*a*b^4+2*B*x^5
*a^2*b^3+5*A*x^2*a^2*b^3+5*B*x^2*a^3*b^2-1/4*a^4*(5*A*b+B*a)/x^4-
5*a^3*b*(2*A*b+B*a)/x-1/7*a^5*A/x^7
```

Maxima [A] time = 1.38692, size = 163, normalized size = 1.48

$$\frac{1}{11} B b^5 x^{11} + \frac{1}{8} \left(5 B a b^4 + A b^5\right) x^8 + \left(2 B a^2 b^3 + A a b^4\right) x^5 + 5 \left(B a^3 b^2 + A a^2 b^3\right) x^2 - \frac{140 \left(B a^4 b + 2 A a^3 b^2\right) x^6 + 4 A a^5 + 7 \left(B a^5 + 5 A a^4 b\right) x^3}{28 x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^8,x, algorithm="maxima")
```

```
[Out] 1/11*B*b^5*x^11 + 1/8*(5*B*a*b^4 + A*b^5)*x^8 + (2*B*a^2*b^3 + A*
a*b^4)*x^5 + 5*(B*a^3*b^2 + A*a^2*b^3)*x^2 - 1/28*(140*(B*a^4*b +
 2*A*a^3*b^2)*x^6 + 4*A*a^5 + 7*(B*a^5 + 5*A*a^4*b)*x^3)/x^7
```

Fricas [A] time = 0.226102, size = 163, normalized size = 1.48

$$\frac{56 B b^5 x^{18} + 77 \left(5 B a b^4 + A b^5\right) x^{15} + 616 \left(2 B a^2 b^3 + A a b^4\right) x^{12} + 3080 \left(B a^3 b^2 + A a^2 b^3\right) x^9 - 3080 \left(B a^4 b + 2 A a^3 b^2\right) x^6 - 88 A}{616 x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^8,x, algorithm="fricas")
```

```
[Out] 1/616*(56*B*b^5*x^18 + 77*(5*B*a*b^4 + A*b^5)*x^15 + 616*(2*B*a^2
*b^3 + A*a*b^4)*x^12 + 3080*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 3080*(B
*a^4*b + 2*A*a^3*b^2)*x^6 - 88*A*a^5 - 154*(B*a^5 + 5*A*a^4*b)*x^
3)/x^7
```

Sympy [A] time = 4.73368, size = 126, normalized size = 1.15

$$\frac{B b^5 x^{11}}{11} + x^8 \left(\frac{A b^5}{8} + \frac{5 B a b^4}{8}\right) + x^5 \left(A a b^4 + 2 B a^2 b^3\right) + x^2 \left(5 A a^2 b^3 + 5 B a^3 b^2\right) - \frac{4 A a^5 + x^6 \left(280 A a^3 b^2 + 140 B a^4 b\right) + x^3 \left(35 A a^4 b + 7 B a^5\right)}{28 x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**8,x)
```

```
[Out] B*b**5*x**11/11 + x**8*(A*b**5/8 + 5*B*a*b**4/8) + x**5*(A*a*b**4
 + 2*B*a**2*b**3) + x**2*(5*A*a**2*b**3 + 5*B*a**3*b**2) - (4*A*a
**5 + x**6*(280*A*a**3*b**2 + 140*B*a**4*b) + x**3*(35*A*a**4*b +
 7*B*a**5))/(28*x**7)
```

GIAC/XCAS [A] time = 0.218368, size = 171, normalized size = 1.55

$$\frac{1}{11}Bb^5x^{11} + \frac{5}{8}Bab^4x^8 + \frac{1}{8}Ab^5x^8 + 2Ba^2b^3x^5 + Aab^4x^5 + 5Ba^3b^2x^2 + 5Aa^2b^3x^2 - \frac{140Ba^4bx^6 + 280Aa^3b^2x^6 + 7Ba^5x^3 + 35Aa^4bx^3 + 4Aa^5}{28x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^8,x, algorithm="giac")
```

```
[Out] 1/11*B*b^5*x^11 + 5/8*B*a*b^4*x^8 + 1/8*A*b^5*x^8 + 2*B*a^2*b^3*x
^5 + A*a*b^4*x^5 + 5*B*a^3*b^2*x^2 + 5*A*a^2*b^3*x^2 - 1/28*(140*
B*a^4*b*x^6 + 280*A*a^3*b^2*x^6 + 7*B*a^5*x^3 + 35*A*a^4*b*x^3 +
4*A*a^5)/x^7
```

3.41 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^9}\,dx$

Optimal. Leaf size=113

$$-\frac{a^5A}{8x^8}-\frac{a^4(aB+5Ab)}{5x^5}-\frac{5a^3b(aB+2Ab)}{2x^2}+10a^2b^2x(aB+Ab)+\frac{1}{7}b^4x^7(5aB+Ab)+\frac{5}{4}ab^3x^4(2aB+Ab)+\frac{1}{10}b^5Bx^{10}$$

```
[Out] -(a^5*A)/(8*x^8) - (a^4*(5*A*b + a*B))/(5*x^5) - (5*a^3*b*(2*A*b
+ a*B))/(2*x^2) + 10*a^2*b^2*(A*b + a*B)*x + (5*a*b^3*(A*b + 2*a*
B)*x^4)/4 + (b^4*(A*b + 5*a*B)*x^7)/7 + (b^5*B*x^10)/10
```

Rubi [A] time = 0.207752, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{8x^8}-\frac{a^4(aB+5Ab)}{5x^5}-\frac{5a^3b(aB+2Ab)}{2x^2}+10a^2b^2x(aB+Ab)+\frac{1}{7}b^4x^7(5aB+Ab)+\frac{5}{4}ab^3x^4(2aB+Ab)+\frac{1}{10}b^5Bx^{10}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^9,x]
```

```
[Out] -(a^5*A)/(8*x^8) - (a^4*(5*A*b + a*B))/(5*x^5) - (5*a^3*b*(2*A*b
+ a*B))/(2*x^2) + 10*a^2*b^2*(A*b + a*B)*x + (5*a*b^3*(A*b + 2*a*
B)*x^4)/4 + (b^4*(A*b + 5*a*B)*x^7)/7 + (b^5*B*x^10)/10
```

Rubi in Sympy [A] time = 25.7418, size = 110, normalized size = 0.97

$$-\frac{Aa^5}{8x^8}+\frac{Bb^5x^{10}}{10}-\frac{a^4\left(5Ab+Ba\right)}{5x^5}-\frac{5a^3b\left(2Ab+Ba\right)}{2x^2}+10a^2b^2x\left(Ab+Ba\right)+\frac{5ab^3x^4\left(Ab+2Ba\right)}{4}+\frac{b^4x^7\left(Ab+5Ba\right)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**9,x)
```

```
[Out] -A*a**5/(8*x**8) + B*b**5*x**10/10 - a**4*(5*A*b + B*a)/(5*x**5)
- 5*a**3*b*(2*A*b + B*a)/(2*x**2) + 10*a**2*b**2*x*(A*b + B*a) +
5*a*b**3*x**4*(A*b + 2*B*a)/4 + b**4*x**7*(A*b + 5*B*a)/7
```

Mathematica [A] time = 0.0696126, size = 113, normalized size = 1.

$$-\frac{a^5A}{8x^8}-\frac{a^4(aB+5Ab)}{5x^5}-\frac{5a^3b(aB+2Ab)}{2x^2}+10a^2b^2x(aB+Ab)+\frac{1}{7}b^4x^7(5aB+Ab)+\frac{5}{4}ab^3x^4(2aB+Ab)+\frac{1}{10}b^5Bx^{10}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^9,x]
```

```
[Out] -(a^5*A)/(8*x^8) - (a^4*(5*A*b + a*B))/(5*x^5) - (5*a^3*b*(2*A*b
+ a*B))/(2*x^2) + 10*a^2*b^2*(A*b + a*B)*x + (5*a*b^3*(A*b + 2*a*
```

```
B)*x^4)/4 + (b^4*(A*b + 5*a*B)*x^7)/7 + (b^5*B*x^10)/10
```

Maple [A] time = 0.01, size = 114, normalized size = 1.

$$\frac{b^5Bx^{10}}{10}+\frac{Ax^7b^5}{7}+\frac{5\,Bx^7ab^4}{7}+\frac{5\,Ax^4ab^4}{4}+\frac{5\,Bx^4a^2b^3}{2}+10\,Axa^2b^3+10\,Bxa^3b^2-\frac{Aa^5}{8\,x^8}-\frac{5\,a^3b\,(2\,Ab+Ba)}{2\,x^2}-\frac{a^4\,(5\,Ab+Ba)}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^9,x)
```

```
[Out] 1/10*b^5*B*x^10+1/7*A*x^7*b^5+5/7*B*x^7*a*b^4+5/4*A*x^4*a*b^4+5/2
*B*x^4*a^2*b^3+10*A*x*a^2*b^3+10*B*x*a^3*b^2-1/8*a^5*A/x^8-5/2*a^
3*b*(2*A*b+B*a)/x^2-1/5*a^4*(5*A*b+B*a)/x^5
```

Maxima [A] time = 1.36257, size = 162, normalized size = 1.43

$$\frac{1}{10}\,Bb^5x^{10}+\frac{1}{7}\,\left(5\,Bab^4+Ab^5\right)x^7+\frac{5}{4}\,\left(2\,Ba^2b^3+Aab^4\right)x^4+10\,\left(Ba^3b^2+Aa^2b^3\right)x-\frac{100\,\left(Ba^4b+2\,Aa^3b^2\right)x^6+5\,Aa^5+8\,\left(Ba^5+5\,Aa^4b\right)x^3}{40\,x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^9,x, algorithm="maxima")
```

```
[Out] 1/10*B*b^5*x^10 + 1/7*(5*B*a*b^4 + A*b^5)*x^7 + 5/4*(2*B*a^2*b^3
+ A*a*b^4)*x^4 + 10*(B*a^3*b^2 + A*a^2*b^3)*x - 1/40*(100*(B*a^4*
b + 2*A*a^3*b^2)*x^6 + 5*A*a^5 + 8*(B*a^5 + 5*A*a^4*b)*x^3)/x^8
```

Fricas [A] time = 0.225617, size = 163, normalized size = 1.44

$$\frac{28\,Bb^5x^{18}+40\,\left(5\,Bab^4+Ab^5\right)x^{15}+350\,\left(2\,Ba^2b^3+Aab^4\right)x^{12}+2800\,\left(Ba^3b^2+Aa^2b^3\right)x^9-700\,\left(Ba^4b+2\,Aa^3b^2\right)x^6-35\,Aa}{280\,x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^9,x, algorithm="fricas")
```

```
[Out] 1/280*(28*B*b^5*x^18 + 40*(5*B*a*b^4 + A*b^5)*x^15 + 350*(2*B*a^2
*b^3 + A*a*b^4)*x^12 + 2800*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 700*(B*
a^4*b + 2*A*a^3*b^2)*x^6 - 35*A*a^5 - 56*(B*a^5 + 5*A*a^4*b)*x^3)
/x^8
```

Sympy [A] time = 4.90022, size = 129, normalized size = 1.14

$$\frac{Bb^5x^{10}}{10}+x^7\left(\frac{Ab^5}{7}+\frac{5Bab^4}{7}\right)+x^4\left(\frac{5Aab^4}{4}+\frac{5Ba^2b^3}{2}\right)+x\left(10Aa^2b^3+10Ba^3b^2\right)-\frac{5Aa^5+x^6\left(200Aa^3b^2+100Ba^4b\right)+x^3\left(40Aa^4b+8Ba^5\right)}{40x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**9,x)
```

```
[Out] B*b**5*x**10/10 + x**7*(A*b**5/7 + 5*B*a*b**4/7) + x**4*(5*A*a*b*
*4/4 + 5*B*a**2*b**3/2) + x*(10*A*a**2*b**3 + 10*B*a**3*b**2) - (
5*A*a**5 + x**6*(200*A*a**3*b**2 + 100*B*a**4*b) + x**3*(40*A*a**
4*b + 8*B*a**5))/(40*x**8)
```

GIAC/XCAS [A] time = 0.217837, size = 167, normalized size = 1.48

$$\frac{1}{10} Bb^5x^{10} + \frac{5}{7} Bab^4x^7 + \frac{1}{7} Ab^5x^7 + \frac{5}{2} Ba^2b^3x^4 + \frac{5}{4} Aab^4x^4 + 10\,Ba^3b^2x + 10\,Aa^2b^3x - \frac{100\,Ba^4bx^6 + 200\,Aa^3b^2x^6 + 8\,Ba^5x^3 + 40\,Aa^4bx^3 + 5\,Aa^5}{40\,x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^9,x, algorithm="giac")
```

```
[Out] 1/10*B*b^5*x^10 + 5/7*B*a*b^4*x^7 + 1/7*A*b^5*x^7 + 5/2*B*a^2*b^3
*x^4 + 5/4*A*a*b^4*x^4 + 10*B*a^3*b^2*x + 10*A*a^2*b^3*x - 1/40*(
100*B*a^4*b*x^6 + 200*A*a^3*b^2*x^6 + 8*B*a^5*x^3 + 40*A*a^4*b*x^
3 + 5*A*a^5)/x^8
```

3.42 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^{10}} \, dx$

Optimal. Leaf size=114

$$-\frac{a^5A}{9x^9}-\frac{a^4(aB+5Ab)}{6x^6}-\frac{5a^3b(aB+2Ab)}{3x^3}+10a^2b^2\log(x)(aB+Ab)+\frac{1}{6}b^4x^6(5aB+Ab)+\frac{5}{3}ab^3x^3(2aB+Ab)+\frac{1}{9}b^5Bx^9$$

```
[Out] -(a^5*A)/(9*x^9) - (a^4*(5*A*b + a*B))/(6*x^6) - (5*a^3*b*(2*A*b
+ a*B))/(3*x^3) + (5*a*b^3*(A*b + 2*a*B)*x^3)/3 + (b^4*(A*b + 5*a
*B)*x^6)/6 + (b^5*B*x^9)/9 + 10*a^2*b^2*(A*b + a*B)*Log[x]
```

Rubi [A] time = 0.308313, antiderivative size = 114, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$-\frac{a^5A}{9x^9}-\frac{a^4(aB+5Ab)}{6x^6}-\frac{5a^3b(aB+2Ab)}{3x^3}+10a^2b^2\log(x)(aB+Ab)+\frac{1}{6}b^4x^6(5aB+Ab)+\frac{5}{3}ab^3x^3(2aB+Ab)+\frac{1}{9}b^5Bx^9$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^10,x]
```

```
[Out] -(a^5*A)/(9*x^9) - (a^4*(5*A*b + a*B))/(6*x^6) - (5*a^3*b*(2*A*b
+ a*B))/(3*x^3) + (5*a*b^3*(A*b + 2*a*B)*x^3)/3 + (b^4*(A*b + 5*a
*B)*x^6)/6 + (b^5*B*x^9)/9 + 10*a^2*b^2*(A*b + a*B)*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{9x^9}+\frac{Bb^5x^9}{9}-\frac{a^4\left(5Ab+Ba\right)}{6x^6}-\frac{5a^3b\left(2Ab+Ba\right)}{3x^3}+\frac{10a^2b^2\left(Ab+Ba\right)\log\left(x^3\right)}{3}+\frac{5ab^3x^3\left(Ab+2Ba\right)}{3}+\frac{b^4\left(Ab+5Ba\right)\int^{x^3}x\,dx}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**10,x)
```

```
[Out] -A*a**5/(9*x**9) + B*b**5*x**9/9 - a**4*(5*A*b + B*a)/(6*x**6) -
5*a**3*b*(2*A*b + B*a)/(3*x**3) + 10*a**2*b**2*(A*b + B*a)*log(x*
*3)/3 + 5*a*b**3*x**3*(A*b + 2*B*a)/3 + b**4*(A*b + 5*B*a)*Integr
al(x, (x, x**3))/3
```

Mathematica [A] time = 0.120791, size = 106, normalized size = 0.93

$$\frac{1}{18}\left(-\frac{2a^5A}{x^9}-\frac{3a^4(aB+5Ab)}{x^6}-\frac{30a^3b(aB+2Ab)}{x^3}+180a^2b^2\log(x)(aB+Ab)+3b^4x^6(5aB+Ab)+30ab^3x^3(2aB+Ab)+2b^5Bx^9\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^10,x]
```

```
[Out] ((-2*a^5*A)/x^9 - (3*a^4*(5*A*b + a*B))/x^6 - (30*a^3*b*(2*A*b +
a*B))/x^3 + 30*a*b^3*(A*b + 2*a*B)*x^3 + 3*b^4*(A*b + 5*a*B)*x^6
+ 2*b^5*B*x^9 + 180*a^2*b^2*(A*b + a*B)*Log[x])/18
```

Maple [A] time = 0.014, size = 124, normalized size = 1.1

$$\frac{b^5Bx^9}{9}+\frac{Ax^6b^5}{6}+\frac{5\,Bx^6ab^4}{6}+\frac{5\,Ax^3ab^4}{3}+\frac{10\,Bx^3a^2b^3}{3}+10\,A\ln(x)\,a^2b^3+10\,B\ln(x)\,a^3b^2-\frac{5\,a^4bA}{6\,x^6}-\frac{a^5B}{6\,x^6}-\frac{Aa^5}{9\,x^9}-\frac{10\,a^3b^2A}{3\,x^3}-\frac{5\,a^4bB}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^10,x)
```

```
[Out] 1/9*b^5*B*x^9+1/6*A*x^6*b^5+5/6*B*x^6*a*b^4+5/3*A*x^3*a*b^4+10/3*
B*x^3*a^2*b^3+10*A*ln(x)*a^2*b^3+10*B*ln(x)*a^3*b^2-5/6*a^4/x^6*A
*b-1/6*a^5/x^6*B-1/9*a^5*A/x^9-10/3*a^3*b^2/x^3*A-5/3*a^4*b/x^3*B
```

Maxima [A] time = 1.40433, size = 166, normalized size = 1.46

$$\frac{1}{9}\,Bb^5x^9+\frac{1}{6}\left(5\,Bab^4+Ab^5\right)x^6+\frac{5}{3}\left(2\,Ba^2b^3+Aab^4\right)x^3+\frac{10}{3}\left(Ba^3b^2+Aa^2b^3\right)\log\left(x^3\right)-\frac{30\left(Ba^4b+2\,Aa^3b^2\right)x^6+2\,Aa^5+3\left(Ba^5+5\,Aa^4b\right)x^3}{18\,x^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^10,x, algorithm="maxima")
```

```
[Out] 1/9*B*b^5*x^9 + 1/6*(5*B*a*b^4 + A*b^5)*x^6 + 5/3*(2*B*a^2*b^3 +
A*a*b^4)*x^3 + 10/3*(B*a^3*b^2 + A*a^2*b^3)*log(x^3) - 1/18*(30*(
B*a^4*b + 2*A*a^3*b^2)*x^6 + 2*A*a^5 + 3*(B*a^5 + 5*A*a^4*b)*x^3)
/x^9
```

Fricas [A] time = 0.222941, size = 166, normalized size = 1.46

$$\frac{2\,Bb^5x^{18}+3\left(5\,Bab^4+Ab^5\right)x^{15}+30\left(2\,Ba^2b^3+Aab^4\right)x^{12}+180\left(Ba^3b^2+Aa^2b^3\right)x^9\log(x)-30\left(Ba^4b+2\,Aa^3b^2\right)x^6-2\,Aa^5}{18\,x^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^10,x, algorithm="fricas")
```

```
[Out] 1/18*(2*B*b^5*x^18 + 3*(5*B*a*b^4 + A*b^5)*x^15 + 30*(2*B*a^2*b^3
 + A*a*b^4)*x^12 + 180*(B*a^3*b^2 + A*a^2*b^3)*x^9*log(x) - 30*(B
*a^4*b + 2*A*a^3*b^2)*x^6 - 2*A*a^5 - 3*(B*a^5 + 5*A*a^4*b)*x^3)/
x^9
```

Sympy [A] time = 9.15999, size = 126, normalized size = 1.11

$$\frac{Bb^5x^9}{9}+10a^2b^2\left(Ab+Ba\right)\log(x)+x^6\left(\frac{Ab^5}{6}+\frac{5Bab^4}{6}\right)+x^3\left(\frac{5Aab^4}{3}+\frac{10Ba^2b^3}{3}\right)-\frac{2Aa^5+x^6\left(60Aa^3b^2+30Ba^4b\right)+x^3\left(15Aa^4b+3Ba^5\right)}{18x^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**10,x)
```

```
[Out] B*b**5*x**9/9 + 10*a**2*b**2*(A*b + B*a)*log(x) + x**6*(A*b**5/6
+ 5*B*a*b**4/6) + x**3*(5*A*a*b**4/3 + 10*B*a**2*b**3/3) - (2*A*a
**5 + x**6*(60*A*a**3*b**2 + 30*B*a**4*b) + x**3*(15*A*a**4*b + 3
*B*a**5))/(18*x**9)
```

GIAC/XCAS [A] time = 0.220218, size = 203, normalized size = 1.78

$$\frac{1}{9}\,Bb^5x^9 + \frac{5}{6}\,Bab^4x^6 + \frac{1}{6}\,Ab^5x^6 + \frac{10}{3}\,Ba^2b^3x^3 + \frac{5}{3}\,Aab^4x^3 + 10\,\left(Ba^3b^2 + Aa^2b^3\right)\ln\left(|x|\right) - \frac{110\,Ba^3b^2x^9 + 110\,Aa^2b^3x^9 + 30\,Ba^4bx^6 + 60\,Aa^3b^2x^6 + 3\,Ba^5x^3 + 15\,Aa^4bx^3 + 2\,Aa^5}{18\,x^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^10,x, algorithm="giac")
```

```
[Out] 1/9*B*b^5*x^9 + 5/6*B*a*b^4*x^6 + 1/6*A*b^5*x^6 + 10/3*B*a^2*b^3*
x^3 + 5/3*A*a*b^4*x^3 + 10*(B*a^3*b^2 + A*a^2*b^3)*ln(abs(x)) - 1
/18*(110*B*a^3*b^2*x^9 + 110*A*a^2*b^3*x^9 + 30*B*a^4*b*x^6 + 60*
A*a^3*b^2*x^6 + 3*B*a^5*x^3 + 15*A*a^4*b*x^3 + 2*A*a^5)/x^9
```

3.43 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^{11}} \, dx$

Optimal. Leaf size=115

$$-\frac{a^5A}{10x^{10}}-\frac{a^4(aB+5Ab)}{7x^7}-\frac{5a^3b(aB+2Ab)}{4x^4}-\frac{10a^2b^2(aB+Ab)}{x}+\frac{1}{5}b^4x^5(5aB+Ab)+\frac{5}{2}ab^3x^2(2aB+Ab)+\frac{1}{8}b^5Bx^8$$

```
[Out] -(a^5*A)/(10*x^10) - (a^4*(5*A*b + a*B))/(7*x^7) - (5*a^3*b*(2*A*
b + a*B))/(4*x^4) - (10*a^2*b^2*(A*b + a*B))/x + (5*a*b^3*(A*b +
2*a*B)*x^2)/2 + (b^4*(A*b + 5*a*B)*x^5)/5 + (b^5*B*x^8)/8
```

Rubi [A] time = 0.212146, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{10x^{10}}-\frac{a^4(aB+5Ab)}{7x^7}-\frac{5a^3b(aB+2Ab)}{4x^4}-\frac{10a^2b^2(aB+Ab)}{x}+\frac{1}{5}b^4x^5(5aB+Ab)+\frac{5}{2}ab^3x^2(2aB+Ab)+\frac{1}{8}b^5Bx^8$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^11,x]
```

```
[Out] -(a^5*A)/(10*x^10) - (a^4*(5*A*b + a*B))/(7*x^7) - (5*a^3*b*(2*A*
b + a*B))/(4*x^4) - (10*a^2*b^2*(A*b + a*B))/x + (5*a*b^3*(A*b +
2*a*B)*x^2)/2 + (b^4*(A*b + 5*a*B)*x^5)/5 + (b^5*B*x^8)/8
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{10x^{10}}+\frac{Bb^5x^8}{8}-\frac{a^4\,(5Ab+Ba)}{7x^7}-\frac{5a^3b\,(2Ab+Ba)}{4x^4}-\frac{10a^2b^2\,(Ab+Ba)}{x}+5ab^3\,(Ab+2Ba)\int x\,dx+\frac{b^4x^5\,(Ab+5Ba)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**11,x)
```

```
[Out] -A*a**5/(10*x**10) + B*b**5*x**8/8 - a**4*(5*A*b + B*a)/(7*x**7)
- 5*a**3*b*(2*A*b + B*a)/(4*x**4) - 10*a**2*b**2*(A*b + B*a)/x +
5*a*b**3*(A*b + 2*B*a)*Integral(x, x) + b**4*x**5*(A*b + 5*B*a)/5
```

Mathematica [A] time = 0.0467742, size = 118, normalized size = 1.03

$$\frac{-4a^5\left(7A+10Bx^3\right)-50a^4bx^3\left(4A+7Bx^3\right)-700a^3b^2x^6\left(A+4Bx^3\right)+1400a^2b^3x^9\left(Bx^3-2A\right)+140ab^4x^{12}\left(5A+2Bx^3\right)+}{280x^{10}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^11,x]
```

```
[Out] (1400*a^2*b^3*x^9*(-2*A + B*x^3) + 140*a*b^4*x^12*(5*A + 2*B*x^3)
 - 700*a^3*b^2*x^6*(A + 4*B*x^3) + 7*b^5*x^15*(8*A + 5*B*x^3) - 5
0*a^4*b*x^3*(4*A + 7*B*x^3) - 4*a^5*(7*A + 10*B*x^3))/(280*x^10)
```

Maple [A] time = 0.008, size = 111, normalized size = 1.

$$\frac{b^5Bx^8}{8}+\frac{Ax^5b^5}{5}+Bx^5ab^4+\frac{5\,Ax^2ab^4}{2}+5\,Bx^2a^2b^3-\frac{5\,a^3b\,(2\,Ab+Ba)}{4\,x^4}-\frac{Aa^5}{10\,x^{10}}-10\,\frac{a^2b^2\,(Ab+Ba)}{x}-\frac{a^4\,(5\,Ab+Ba)}{7\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^11,x)
```

```
[Out] 1/8*b^5*B*x^8+1/5*A*x^5*b^5+B*x^5*a*b^4+5/2*A*x^2*a*b^4+5*B*x^2*a
^2*b^3-5/4*a^3*b*(2*A*b+B*a)/x^4-1/10*a^5*A/x^10-10*a^2*b^2*(A*b+
B*a)/x-1/7*a^4*(5*A*b+B*a)/x^7
```

Maxima [A] time = 1.43299, size = 165, normalized size = 1.43

$$\frac{1}{8}\,Bb^5x^8+\frac{1}{5}\left(5\,Bab^4+Ab^5\right)x^5+\frac{5}{2}\left(2\,Ba^2b^3+Aab^4\right)x^2-\frac{1400\left(Ba^3b^2+Aa^2b^3\right)x^9+175\left(Ba^4b+2\,Aa^3b^2\right)x^6+14\,Aa^5+20\left(Ba^5+5\,Aa^4b\right)x^3}{140\,x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^11,x, algorithm="maxima")
```

```
[Out] 1/8*B*b^5*x^8 + 1/5*(5*B*a*b^4 + A*b^5)*x^5 + 5/2*(2*B*a^2*b^3 +
A*a*b^4)*x^2 - 1/140*(1400*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 175*(B*a
^4*b + 2*A*a^3*b^2)*x^6 + 14*A*a^5 + 20*(B*a^5 + 5*A*a^4*b)*x^3)/
x^10
```

Fricas [A] time = 0.216433, size = 163, normalized size = 1.42

$$\frac{35\,Bb^5x^{18}+56\left(5\,Bab^4+Ab^5\right)x^{15}+700\left(2\,Ba^2b^3+Aab^4\right)x^{12}-2800\left(Ba^3b^2+Aa^2b^3\right)x^9-350\left(Ba^4b+2\,Aa^3b^2\right)x^6-28\,Aa}{280\,x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^11,x, algorithm="fricas")
```

```
[Out] 1/280*(35*B*b^5*x^18 + 56*(5*B*a*b^4 + A*b^5)*x^15 + 700*(2*B*a^2
*b^3 + A*a*b^4)*x^12 - 2800*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 350*(B*
a^4*b + 2*A*a^3*b^2)*x^6 - 28*A*a^5 - 40*(B*a^5 + 5*A*a^4*b)*x^3)
/x^10
```

Sympy [A] time = 11.7063, size = 126, normalized size = 1.1

$$\frac{Bb^5x^8}{8}+x^5\left(\frac{Ab^5}{5}+Bab^4\right)+x^2\left(\frac{5Aab^4}{2}+5Ba^2b^3\right)-\frac{14Aa^5+x^9\left(1400Aa^2b^3+1400Ba^3b^2\right)+x^6\left(350Aa^3b^2+175Ba^4b\right)+x^3\left(100Aa^4b+20Ba^5\right)}{140x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**11,x)
```

```
[Out] B*b**5*x**8/8 + x**5*(A*b**5/5 + B*a*b**4) + x**2*(5*A*a*b**4/2 +
 5*B*a**2*b**3) - (14*A*a**5 + x**9*(1400*A*a**2*b**3 + 1400*B*a*
*3*b**2) + x**6*(350*A*a**3*b**2 + 175*B*a**4*b) + x**3*(100*A*a*
*4*b + 20*B*a**5))/(140*x**10)
```

GIAC/XCAS [A] time = 0.218673, size = 171, normalized size = 1.49

$$\frac{1}{8}Bb^5x^8 + Bab^4x^5 + \frac{1}{5}Ab^5x^5 + 5Ba^2b^3x^2 + \frac{5}{2}Aab^4x^2 - \frac{1400Ba^3b^2x^9 + 1400Aa^2b^3x^9 + 175Ba^4bx^6 + 350Aa^3b^2x^6 + 20Ba^5x^3 + 100Aa^4bx^3 + 14Aa^5}{140x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^11,x, algorithm="giac")
```

```
[Out] 1/8*B*b^5*x^8 + B*a*b^4*x^5 + 1/5*A*b^5*x^5 + 5*B*a^2*b^3*x^2 + 5
/2*A*a*b^4*x^2 - 1/140*(1400*B*a^3*b^2*x^9 + 1400*A*a^2*b^3*x^9 +
 175*B*a^4*b*x^6 + 350*A*a^3*b^2*x^6 + 20*B*a^5*x^3 + 100*A*a^4*b
*x^3 + 14*A*a^5)/x^10
```

3.44 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^{12}}\,dx$

Optimal. Leaf size=109

$$-\frac{a^5A}{11x^{11}}-\frac{a^4(aB+5Ab)}{8x^8}-\frac{a^3b(aB+2Ab)}{x^5}-\frac{5a^2b^2(aB+Ab)}{x^2}+\frac{1}{4}b^4x^4(5aB+Ab)+5ab^3x(2aB+Ab)+\frac{1}{7}b^5Bx^7$$

```
[Out] -(a^5*A)/(11*x^11) - (a^4*(5*A*b + a*B))/(8*x^8) - (a^3*b*(2*A*b
+ a*B))/x^5 - (5*a^2*b^2*(A*b + a*B))/x^2 + 5*a*b^3*(A*b + 2*a*B)
*x + (b^4*(A*b + 5*a*B)*x^4)/4 + (b^5*B*x^7)/7
```

Rubi [A] time = 0.19607, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{11x^{11}}-\frac{a^4(aB+5Ab)}{8x^8}-\frac{a^3b(aB+2Ab)}{x^5}-\frac{5a^2b^2(aB+Ab)}{x^2}+\frac{1}{4}b^4x^4(5aB+Ab)+5ab^3x(2aB+Ab)+\frac{1}{7}b^5Bx^7$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^5*(A + B*x^3))/x^12,x]
```

```
[Out] -(a^5*A)/(11*x^11) - (a^4*(5*A*b + a*B))/(8*x^8) - (a^3*b*(2*A*b
+ a*B))/x^5 - (5*a^2*b^2*(A*b + a*B))/x^2 + 5*a*b^3*(A*b + 2*a*B)
*x + (b^4*(A*b + 5*a*B)*x^4)/4 + (b^5*B*x^7)/7
```

Rubi in Sympy [A] time = 25.0005, size = 105, normalized size = 0.96

$$-\frac{Aa^5}{11x^{11}}+\frac{Bb^5x^7}{7}-\frac{a^4\left(5Ab+Ba\right)}{8x^8}-\frac{a^3b\left(2Ab+Ba\right)}{x^5}-\frac{5a^2b^2\left(Ab+Ba\right)}{x^2}+5ab^3x\left(Ab+2Ba\right)+\frac{b^4x^4\left(Ab+5Ba\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**12,x)
```

```
[Out] -A*a**5/(11*x**11) + B*b**5*x**7/7 - a**4*(5*A*b + B*a)/(8*x**8)
- a**3*b*(2*A*b + B*a)/x**5 - 5*a**2*b**2*(A*b + B*a)/x**2 + 5*a*
b**3*x*(A*b + 2*B*a) + b**4*x**4*(A*b + 5*B*a)/4
```

Mathematica [A] time = 0.0763636, size = 109, normalized size = 1.

$$-\frac{a^5A}{11x^{11}}-\frac{a^4(aB+5Ab)}{8x^8}-\frac{a^3b(aB+2Ab)}{x^5}-\frac{5a^2b^2(aB+Ab)}{x^2}+\frac{1}{4}b^4x^4(5aB+Ab)+5ab^3x(2aB+Ab)+\frac{1}{7}b^5Bx^7$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^5*(A + B*x^3))/x^12,x]
```

```
[Out] -(a^5*A)/(11*x^11) - (a^4*(5*A*b + a*B))/(8*x^8) - (a^3*b*(2*A*b
+ a*B))/x^5 - (5*a^2*b^2*(A*b + a*B))/x^2 + 5*a*b^3*(A*b + 2*a*B)
*x + (b^4*(A*b + 5*a*B)*x^4)/4 + (b^5*B*x^7)/7
```

Maple [A] time = 0.009, size = 108, normalized size = 1.

$$\frac{b^5Bx^7}{7}+\frac{Ax^4b^5}{4}+\frac{5\,Bx^4ab^4}{4}+5\,Axab^4+10\,Bxa^2b^3-\frac{a^4\left(5\,Ab+Ba\right)}{8\,x^8}-\frac{Aa^5}{11\,x^{11}}-5\,\frac{a^2b^2\left(Ab+Ba\right)}{x^2}-\frac{a^3b\left(2\,Ab+Ba\right)}{x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^12,x)
```

```
[Out] 1/7*b^5*B*x^7+1/4*A*x^4*b^5+5/4*B*x^4*a*b^4+5*A*x*a*b^4+10*B*x*a^
2*b^3-1/8*a^4*(5*A*b+B*a)/x^8-1/11*a^5*A/x^11-5*a^2*b^2*(A*b+B*a)
/x^2-a^3*b*(2*A*b+B*a)/x^5
```

Maxima [A] time = 1.4429, size = 162, normalized size = 1.49

$$\frac{1}{7}Bb^5x^7 + \frac{1}{4}\left(5\,Bab^4 + Ab^5\right)x^4 + 5\left(2\,Ba^2b^3 + Aab^4\right)x - \frac{440\left(Ba^3b^2 + Aa^2b^3\right)x^9 + 88\left(Ba^4b + 2\,Aa^3b^2\right)x^6 + 8\,Aa^5 + 11\left(Ba^5 + 5\,Aa^4b\right)x^3}{88\,x^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^12,x, algorithm="maxima")
```

```
[Out] 1/7*B*b^5*x^7 + 1/4*(5*B*a*b^4 + A*b^5)*x^4 + 5*(2*B*a^2*b^3 + A*
a*b^4)*x - 1/88*(440*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 88*(B*a^4*b +
2*A*a^3*b^2)*x^6 + 8*A*a^5 + 11*(B*a^5 + 5*A*a^4*b)*x^3)/x^11
```

Fricas [A] time = 0.211696, size = 163, normalized size = 1.5

$$\frac{88\,Bb^5x^{18} + 154\left(5\,Bab^4 + Ab^5\right)x^{15} + 3080\left(2\,Ba^2b^3 + Aab^4\right)x^{12} - 3080\left(Ba^3b^2 + Aa^2b^3\right)x^9 - 616\left(Ba^4b + 2\,Aa^3b^2\right)x^6 - 56\,A}{616\,x^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^12,x, algorithm="fricas")
```

```
[Out] 1/616*(88*B*b^5*x^18 + 154*(5*B*a*b^4 + A*b^5)*x^15 + 3080*(2*B*a
^2*b^3 + A*a*b^4)*x^12 - 3080*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 616*(
B*a^4*b + 2*A*a^3*b^2)*x^6 - 56*A*a^5 - 77*(B*a^5 + 5*A*a^4*b)*x^
3)/x^11
```

Sympy [A] time = 13.0614, size = 126, normalized size = 1.16

$$\frac{Bb^5x^7}{7} + x^4\left(\frac{Ab^5}{4} + \frac{5Bab^4}{4}\right) + x\left(5Aab^4 + 10Ba^2b^3\right) - \frac{8Aa^5 + x^9\left(440Aa^2b^3 + 440Ba^3b^2\right) + x^6\left(176Aa^3b^2 + 88Ba^4b\right) + x^3\left(55Aa^4b + 11Ba^5\right)}{88x^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**12,x)
```

```
[Out] B*b**5*x**7/7 + x**4*(A*b**5/4 + 5*B*a*b**4/4) + x*(5*A*a*b**4 +
10*B*a**2*b**3) - (8*A*a**5 + x**9*(440*A*a**2*b**3 + 440*B*a**3*
b**2) + x**6*(176*A*a**3*b**2 + 88*B*a**4*b) + x**3*(55*A*a**4*b
+ 11*B*a**5))/(88*x**11)
```

GIAC/XCAS [A] time = 0.218003, size = 167, normalized size = 1.53

$$\frac{1}{7}Bb^5x^7 + \frac{5}{4}Bab^4x^4 + \frac{1}{4}Ab^5x^4 + 10\,Ba^2b^3x + 5\,Aab^4x - \frac{440\,Ba^3b^2x^9 + 440\,Aa^2b^3x^9 + 88\,Ba^4bx^6 + 176\,Aa^3b^2x^6 + 11\,Ba^5x^3 + 55\,Aa^4bx^3 + 8\,Aa^5}{88\,x^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^12,x, algorithm="giac")
```

```
[Out] 1/7*B*b^5*x^7 + 5/4*B*a*b^4*x^4 + 1/4*A*b^5*x^4 + 10*B*a^2*b^3*x
+ 5*A*a*b^4*x - 1/88*(440*B*a^3*b^2*x^9 + 440*A*a^2*b^3*x^9 + 88*
B*a^4*b*x^6 + 176*A*a^3*b^2*x^6 + 11*B*a^5*x^3 + 55*A*a^4*b*x^3 +
 8*A*a^5)/x^11
```

3.45 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^{13}}\,dx$

Optimal. Leaf size=114

$$-\frac{a^5A}{12x^{12}}-\frac{a^4(aB+5Ab)}{9x^9}-\frac{5a^3b(aB+2Ab)}{6x^6}-\frac{10a^2b^2(aB+Ab)}{3x^3}+\frac{1}{3}b^4x^3(5aB+Ab)+5ab^3\log(x)(2aB+Ab)+\frac{1}{6}b^5Bx^6$$

```
[Out] -(a^5*A)/(12*x^12) - (a^4*(5*A*b + a*B))/(9*x^9) - (5*a^3*b*(2*A*
b + a*B))/(6*x^6) - (10*a^2*b^2*(A*b + a*B))/(3*x^3) + (b^4*(A*b
+ 5*a*B)*x^3)/3 + (b^5*B*x^6)/6 + 5*a*b^3*(A*b + 2*a*B)*Log[x]
```

Rubi [A] time = 0.300941, antiderivative size = 114, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{a^5A}{12x^{12}}-\frac{a^4(aB+5Ab)}{9x^9}-\frac{5a^3b(aB+2Ab)}{6x^6}-\frac{10a^2b^2(aB+Ab)}{3x^3}+\frac{1}{3}b^4x^3(5aB+Ab)+5ab^3\log(x)(2aB+Ab)+\frac{1}{6}b^5Bx^6$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^13,x]
```

```
[Out] -(a^5*A)/(12*x^12) - (a^4*(5*A*b + a*B))/(9*x^9) - (5*a^3*b*(2*A*
b + a*B))/(6*x^6) - (10*a^2*b^2*(A*b + a*B))/(3*x^3) + (b^4*(A*b
+ 5*a*B)*x^3)/3 + (b^5*B*x^6)/6 + 5*a*b^3*(A*b + 2*a*B)*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{12x^{12}}+\frac{Bb^5\int^{x^3}x\,dx}{3}-\frac{a^4\left(5Ab+Ba\right)}{9x^9}-\frac{5a^3b\left(2Ab+Ba\right)}{6x^6}-\frac{10a^2b^2\left(Ab+Ba\right)}{3x^3}+\frac{5ab^3\left(Ab+2Ba\right)\log\left(x^3\right)}{3}+\frac{b^4\left(Ab+5Ba\right)\int^{x^3}A\,dx}{3A}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**13,x)
```

```
[Out] -A*a**5/(12*x**12) + B*b**5*Integral(x, (x, x**3))/3 - a**4*(5*A*
b + B*a)/(9*x**9) - 5*a**3*b*(2*A*b + B*a)/(6*x**6) - 10*a**2*b**
2*(A*b + B*a)/(3*x**3) + 5*a*b**3*(A*b + 2*B*a)*log(x**3)/3 + b**
4*(A*b + 5*B*a)*Integral(A, (x, x**3))/(3*A)
```

Mathematica [A] time = 0.0742297, size = 118, normalized size = 1.04

$$-\frac{a^5\left(3A+4Bx^3\right)+10a^4bx^3\left(2A+3Bx^3\right)+60a^3b^2x^6\left(A+2Bx^3\right)+120a^2Ab^3x^9-180ab^3x^{12}\log(x)(2aB+Ab)-60ab^4Bx^{15}}{36x^{12}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^13,x]
```

```
[Out] -(120*a^2*A*b^3*x^9 - 60*a*b^4*B*x^15 - 6*b^5*x^15*(2*A + B*x^3)
+ 60*a^3*b^2*x^6*(A + 2*B*x^3) + 10*a^4*b*x^3*(2*A + 3*B*x^3) + a
```

```
^5*(3*A + 4*B*x^3) - 180*a*b^3*(A*b + 2*a*B)*x^12*Log[x])/(36*x^1
2)
```

Maple [A] time = 0.012, size = 124, normalized size = 1.1

$$\frac{b^5Bx^6}{6}+\frac{Ax^3b^5}{3}+\frac{5\,Bx^3ab^4}{3}-\frac{Aa^5}{12\,x^{12}}+5\,A\ln(x)\,ab^4+10\,B\ln(x)\,a^2b^3-\frac{5\,a^3b^2A}{3\,x^6}-\frac{5\,a^4bB}{6\,x^6}-\frac{5\,a^4bA}{9\,x^9}-\frac{a^5B}{9\,x^9}-\frac{10\,a^2b^3A}{3\,x^3}-\frac{10\,a^3b^2B}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^13,x)
```

```
[Out] 1/6*b^5*B*x^6+1/3*A*x^3*b^5+5/3*B*x^3*a*b^4-1/12*a^5*A/x^12+5*A*l
n(x)*a*b^4+10*B*ln(x)*a^2*b^3-5/3*a^3*b^2/x^6*A-5/6*a^4*b/x^6*B-5
/9*a^4/x^9*A*b-1/9*a^5/x^9*B-10/3*a^2*b^3/x^3*A-10/3*a^3*b^2/x^3*
B
```

Maxima [A] time = 1.52177, size = 166, normalized size = 1.46

$$\frac{1}{6}\,Bb^5x^6+\frac{1}{3}\left(5\,Bab^4+Ab^5\right)x^3+\frac{5}{3}\left(2\,Ba^2b^3+Aab^4\right)\log\left(x^3\right)-\frac{120\left(Ba^3b^2+Aa^2b^3\right)x^9+30\left(Ba^4b+2\,Aa^3b^2\right)x^6+3\,Aa^5+4\left(Ba^5+5\,Aa^4b\right)x^3}{36\,x^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^13,x, algorithm="maxima")
```

```
[Out] 1/6*B*b^5*x^6 + 1/3*(5*B*a*b^4 + A*b^5)*x^3 + 5/3*(2*B*a^2*b^3 +
A*a*b^4)*log(x^3) - 1/36*(120*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 30*(B
*a^4*b + 2*A*a^3*b^2)*x^6 + 3*A*a^5 + 4*(B*a^5 + 5*A*a^4*b)*x^3)/
x^12
```

Fricas [A] time = 0.220489, size = 166, normalized size = 1.46

$$\frac{6\,Bb^5x^{18}+12\left(5\,Bab^4+Ab^5\right)x^{15}+180\left(2\,Ba^2b^3+Aab^4\right)x^{12}\log(x)-120\left(Ba^3b^2+Aa^2b^3\right)x^9-30\left(Ba^4b+2\,Aa^3b^2\right)x^6-3\,A}{36\,x^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^13,x, algorithm="fricas")
```

```
[Out] 1/36*(6*B*b^5*x^18 + 12*(5*B*a*b^4 + A*b^5)*x^15 + 180*(2*B*a^2*b
^3 + A*a*b^4)*x^12*log(x) - 120*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 30*
(B*a^4*b + 2*A*a^3*b^2)*x^6 - 3*A*a^5 - 4*(B*a^5 + 5*A*a^4*b)*x^3
)/x^12
```

Sympy [A] time = 24.3282, size = 124, normalized size = 1.09

$$\frac{Bb^5x^6}{6}+5ab^3\left(Ab+2Ba\right)\log\left(x\right)+x^3\left(\frac{Ab^5}{3}+\frac{5Bab^4}{3}\right)-\frac{3Aa^5+x^9\left(120Aa^2b^3+120Ba^3b^2\right)+x^6\left(60Aa^3b^2+30Ba^4b\right)+x^3\left(20Aa^4b+4Ba^5\right)}{36x^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**13,x)
```

```
[Out] B*b**5*x**6/6 + 5*a*b**3*(A*b + 2*B*a)*log(x) + x**3*(A*b**5/3 +
5*B*a*b**4/3) - (3*A*a**5 + x**9*(120*A*a**2*b**3 + 120*B*a**3*b*
*2) + x**6*(60*A*a**3*b**2 + 30*B*a**4*b) + x**3*(20*A*a**4*b + 4
*B*a**5))/(36*x**12)
```

GIAC/XCAS [A] time = 0.219719, size = 201, normalized size = 1.76

$$\frac{1}{6}\,Bb^5x^6+\frac{5}{3}\,Bab^4x^3+\frac{1}{3}\,Ab^5x^3+5\left(2\,Ba^2b^3+Aab^4\right)\ln\left(|x|\right)-\frac{250\,Ba^2b^3x^{12}+125\,Aab^4x^{12}+120\,Ba^3b^2x^9+120\,Aa^2b^3x^9+30\,Ba^4bx^6+60\,Aa^3b^2x^6+4\,Ba^5x^3+20\,Aa^4bx^3+3\,Aa^5}{36\,x^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^13,x, algorithm="giac")
```

```
[Out] 1/6*B*b^5*x^6 + 5/3*B*a*b^4*x^3 + 1/3*A*b^5*x^3 + 5*(2*B*a^2*b^3
+ A*a*b^4)*ln(abs(x)) - 1/36*(250*B*a^2*b^3*x^12 + 125*A*a*b^4*x^
12 + 120*B*a^3*b^2*x^9 + 120*A*a^2*b^3*x^9 + 30*B*a^4*b*x^6 + 60*
A*a^3*b^2*x^6 + 4*B*a^5*x^3 + 20*A*a^4*b*x^3 + 3*A*a^5)/x^12
```

3.46 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^{14}} dx$

Optimal. Leaf size=115

$$-\frac{a^5 A}{13x^{13}}-\frac{a^4(aB+5Ab)}{10x^{10}}-\frac{5a^3b(aB+2Ab)}{7x^7}-\frac{5a^2b^2(aB+Ab)}{2x^4}+\frac{1}{2}b^4x^2(5aB+Ab)-\frac{5ab^3(2aB+Ab)}{x}+\frac{1}{5}b^5Bx^5$$

```
[Out] -(a^5*A)/(13*x^13) - (a^4*(5*A*b + a*B))/(10*x^10) - (5*a^3*b*(2*
A*b + a*B))/(7*x^7) - (5*a^2*b^2*(A*b + a*B))/(2*x^4) - (5*a*b^3*
(A*b + 2*a*B))/x + (b^4*(A*b + 5*a*B)*x^2)/2 + (b^5*B*x^5)/5
```

Rubi [A] time = 0.215489, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5 A}{13x^{13}}-\frac{a^4(aB+5Ab)}{10x^{10}}-\frac{5a^3b(aB+2Ab)}{7x^7}-\frac{5a^2b^2(aB+Ab)}{2x^4}+\frac{1}{2}b^4x^2(5aB+Ab)-\frac{5ab^3(2aB+Ab)}{x}+\frac{1}{5}b^5Bx^5$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^14,x]
```

```
[Out] -(a^5*A)/(13*x^13) - (a^4*(5*A*b + a*B))/(10*x^10) - (5*a^3*b*(2*
A*b + a*B))/(7*x^7) - (5*a^2*b^2*(A*b + a*B))/(2*x^4) - (5*a*b^3*
(A*b + 2*a*B))/x + (b^4*(A*b + 5*a*B)*x^2)/2 + (b^5*B*x^5)/5
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{13x^{13}}+\frac{Bb^5x^5}{5}-\frac{a^4\left(5Ab+Ba\right)}{10x^{10}}-\frac{5a^3b\left(2Ab+Ba\right)}{7x^7}-\frac{5a^2b^2\left(Ab+Ba\right)}{2x^4}-\frac{5ab^3\left(Ab+2Ba\right)}{x}+b^4\left(Ab+5Ba\right)\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**14,x)
```

```
[Out] -A*a**5/(13*x**13) + B*b**5*x**5/5 - a**4*(5*A*b + B*a)/(10*x**10
) - 5*a**3*b*(2*A*b + B*a)/(7*x**7) - 5*a**2*b**2*(A*b + B*a)/(2*
x**4) - 5*a*b**3*(A*b + 2*B*a)/x + b**4*(A*b + 5*B*a)*Integral(x,
 x)
```

Mathematica [A] time = 0.0746194, size = 117, normalized size = 1.02

$$-\frac{a^5\left(70A+91Bx^3\right)+65a^4bx^3\left(7A+10Bx^3\right)+325a^3b^2x^6\left(4A+7Bx^3\right)+2275a^2b^3x^9\left(A+4Bx^3\right)-2275ab^4x^{12}\left(Bx^3-2A\right)}{910x^{13}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^14,x]
```

```
[Out] -(-2275*a*b^4*x^12*(-2*A + B*x^3) - 91*b^5*x^15*(5*A + 2*B*x^3) +
 2275*a^2*b^3*x^9*(A + 4*B*x^3) + 325*a^3*b^2*x^6*(4*A + 7*B*x^3)
 + 65*a^4*b*x^3*(7*A + 10*B*x^3) + a^5*(70*A + 91*B*x^3))/(910*x^
13)
```

Maple [A] time = 0.009, size = 107, normalized size = 0.9

$$\frac{b^5Bx^5}{5}+\frac{Ax^2b^5}{2}+\frac{5\,Bx^2ab^4}{2}-\frac{Aa^5}{13\,x^{13}}-\frac{5\,a^2b^2\,(Ab+Ba)}{2\,x^4}-\frac{a^4\,(5\,Ab+Ba)}{10\,x^{10}}-5\,\frac{ab^3\,(Ab+2\,Ba)}{x}-\frac{5\,a^3b\,(2\,Ab+Ba)}{7\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^14,x)
```

```
[Out] 1/5*b^5*B*x^5+1/2*A*x^2*b^5+5/2*B*x^2*a*b^4-1/13*a^5*A/x^13-5/2*a
^2*b^2*(A*b+B*a)/x^4-1/10*a^4*(5*A*b+B*a)/x^10-5*a*b^3*(A*b+2*B*a
)/x-5/7*a^3*b*(2*A*b+B*a)/x^7
```

Maxima [A] time = 1.45299, size = 165, normalized size = 1.43

$$\frac{1}{5}\,Bb^5x^5+\frac{1}{2}\left(5\,Bab^4+Ab^5\right)x^2-\frac{4550\left(2\,Ba^2b^3+Aab^4\right)x^{12}+2275\left(Ba^3b^2+Aa^2b^3\right)x^9+650\left(Ba^4b+2\,Aa^3b^2\right)x^6+70\,Aa^5+91\left(Ba^5+5\,Aa^4b\right)x^3}{910\,x^{13}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^14,x, algorithm="maxima")
```

```
[Out] 1/5*B*b^5*x^5 + 1/2*(5*B*a*b^4 + A*b^5)*x^2 - 1/910*(4550*(2*B*a^
2*b^3 + A*a*b^4)*x^12 + 2275*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 650*(B
*a^4*b + 2*A*a^3*b^2)*x^6 + 70*A*a^5 + 91*(B*a^5 + 5*A*a^4*b)*x^3
)/x^13
```

Fricas [A] time = 0.228634, size = 163, normalized size = 1.42

$$\frac{182\,Bb^5x^{18}+455\left(5\,Bab^4+Ab^5\right)x^{15}-4550\left(2\,Ba^2b^3+Aab^4\right)x^{12}-2275\left(Ba^3b^2+Aa^2b^3\right)x^9-650\left(Ba^4b+2\,Aa^3b^2\right)x^6-70}{910\,x^{13}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^14,x, algorithm="fricas")
```

```
[Out] 1/910*(182*B*b^5*x^18 + 455*(5*B*a*b^4 + A*b^5)*x^15 - 4550*(2*B*
a^2*b^3 + A*a*b^4)*x^12 - 2275*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 650*
(B*a^4*b + 2*A*a^3*b^2)*x^6 - 70*A*a^5 - 91*(B*a^5 + 5*A*a^4*b)*x
^3)/x^13
```

Sympy [A] time = 34.1169, size = 128, normalized size = 1.11

$$\frac{Bb^5x^5}{5}+x^2\left(\frac{Ab^5}{2}+\frac{5Bab^4}{2}\right)-\frac{70Aa^5+x^{12}\left(4550Aab^4+9100Ba^2b^3\right)+x^9\left(2275Aa^2b^3+2275Ba^3b^2\right)+x^6\left(1300Aa^3b^2+650Ba^4b\right)+x^3\left(455Aa^4b+91Ba\right.}{910x^{13}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**14,x)
```

```
[Out] B*b**5*x**5/5 + x**2*(A*b**5/2 + 5*B*a*b**4/2) - (70*A*a**5 + x**
12*(4550*A*a*b**4 + 9100*B*a**2*b**3) + x**9*(2275*A*a**2*b**3 +
```

```
2275*B*a**3*b**2) + x**6*(1300*A*a**3*b**2 + 650*B*a**4*b) + x**3
*(455*A*a**4*b + 91*B*a**5))/(910*x**13)
```

GIAC/XCAS [A] time = 0.217205, size = 173, normalized size = 1.5

$$\frac{1}{5}\,Bb^5x^5 + \frac{5}{2}\,Bab^4x^2 + \frac{1}{2}\,Ab^5x^2 - \frac{9100\,Ba^2b^3x^{12} + 4550\,Aab^4x^{12} + 2275\,Ba^3b^2x^9 + 2275\,Aa^2b^3x^9 + 650\,Ba^4bx^6 + 1300\,Aa^3b^2x^6 + 91\,Ba^5x^3 + 455\,Aa^4bx^3 + 7}{910\,x^{13}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^14,x, algorithm="giac")
```

```
[Out] 1/5*B*b^5*x^5 + 5/2*B*a*b^4*x^2 + 1/2*A*b^5*x^2 - 1/910*(9100*B*a
^2*b^3*x^12 + 4550*A*a*b^4*x^12 + 2275*B*a^3*b^2*x^9 + 2275*A*a^2
*b^3*x^9 + 650*B*a^4*b*x^6 + 1300*A*a^3*b^2*x^6 + 91*B*a^5*x^3 +
455*A*a^4*b*x^3 + 70*A*a^5)/x^13
```

3.47 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^{15}} \, dx$

Optimal. Leaf size=110

$$-\frac{a^5 A}{14x^{14}}-\frac{a^4(aB+5Ab)}{11x^{11}}-\frac{5a^3b(aB+2Ab)}{8x^8}-\frac{2a^2b^2(aB+Ab)}{x^5}+b^4x(5aB+Ab)-\frac{5ab^3(2aB+Ab)}{2x^2}+\frac{1}{4}b^5Bx^4$$

```
[Out] -(a^5*A)/(14*x^14) - (a^4*(5*A*b + a*B))/(11*x^11) - (5*a^3*b*(2*
A*b + a*B))/(8*x^8) - (2*a^2*b^2*(A*b + a*B))/x^5 - (5*a*b^3*(A*b
 + 2*a*B))/(2*x^2) + b^4*(A*b + 5*a*B)*x + (b^5*B*x^4)/4
```

Rubi [A] time = 0.217637, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5 A}{14x^{14}}-\frac{a^4(aB+5Ab)}{11x^{11}}-\frac{5a^3b(aB+2Ab)}{8x^8}-\frac{2a^2b^2(aB+Ab)}{x^5}+b^4x(5aB+Ab)-\frac{5ab^3(2aB+Ab)}{2x^2}+\frac{1}{4}b^5Bx^4$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^15,x]
```

```
[Out] -(a^5*A)/(14*x^14) - (a^4*(5*A*b + a*B))/(11*x^11) - (5*a^3*b*(2*
A*b + a*B))/(8*x^8) - (2*a^2*b^2*(A*b + a*B))/x^5 - (5*a*b^3*(A*b
 + 2*a*B))/(2*x^2) + b^4*(A*b + 5*a*B)*x + (b^5*B*x^4)/4
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{14x^{14}}+\frac{Bb^5x^4}{4}-\frac{a^4\left(5Ab+Ba\right)}{11x^{11}}-\frac{5a^3b\left(2Ab+Ba\right)}{8x^8}-\frac{2a^2b^2\left(Ab+Ba\right)}{x^5}-\frac{5ab^3\left(Ab+2Ba\right)}{2x^2}+\frac{b^4\left(Ab+5Ba\right)\int A\,dx}{A}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**15,x)
```

```
[Out] -A*a**5/(14*x**14) + B*b**5*x**4/4 - a**4*(5*A*b + B*a)/(11*x**11
) - 5*a**3*b*(2*A*b + B*a)/(8*x**8) - 2*a**2*b**2*(A*b + B*a)/x**
5 - 5*a*b**3*(A*b + 2*B*a)/(2*x**2) + b**4*(A*b + 5*B*a)*Integral
(A, x)/A
```

Mathematica [A] time = 0.0838845, size = 110, normalized size = 1.

$$-\frac{a^5 A}{14x^{14}}-\frac{a^4(aB+5Ab)}{11x^{11}}-\frac{5a^3b(aB+2Ab)}{8x^8}-\frac{2a^2b^2(aB+Ab)}{x^5}+b^4x(5aB+Ab)-\frac{5ab^3(2aB+Ab)}{2x^2}+\frac{1}{4}b^5Bx^4$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^15,x]
```

```
[Out] -(a^5*A)/(14*x^14) - (a^4*(5*A*b + a*B))/(11*x^11) - (5*a^3*b*(2*
A*b + a*B))/(8*x^8) - (2*a^2*b^2*(A*b + a*B))/x^5 - (5*a*b^3*(A*b
 + 2*a*B))/(2*x^2) + b^4*(A*b + 5*a*B)*x + (b^5*B*x^4)/4
```

Maple [A] time = 0.01, size = 102, normalized size = 0.9

$$\frac{b^5 B x^4}{4}+A x b^5+5\,B x a b^4-\frac{5\,a^3 b\,(2\,Ab+Ba)}{8\,x^8}-\frac{a^4\,(5\,Ab+Ba)}{11\,x^{11}}-\frac{Aa^5}{14\,x^{14}}-\frac{5\,ab^3\,(Ab+2\,Ba)}{2\,x^2}-2\,\frac{a^2b^2\,(Ab+Ba)}{x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^15,x)
```

```
[Out] 1/4*b^5*B*x^4+A*x*b^5+5*B*x*a*b^4-5/8*a^3*b*(2*A*b+B*a)/x^8-1/11*
a^4*(5*A*b+B*a)/x^11-1/14*a^5*A/x^14-5/2*a*b^3*(A*b+2*B*a)/x^2-2*
a^2*b^2*(A*b+B*a)/x^5
```

Maxima [A] time = 1.36994, size = 161, normalized size = 1.46

$$\frac{1}{4}\,Bb^5x^4+\left(5\,Bab^4+Ab^5\right)x-\frac{1540\,\left(2\,Ba^2b^3+Aab^4\right)x^{12}+1232\,\left(Ba^3b^2+Aa^2b^3\right)x^9+385\,\left(Ba^4b+2\,Aa^3b^2\right)x^6+44\,Aa^5+56\,\left(Ba^5+5\,Aa^4b\right)x^3}{616\,x^{14}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^15,x, algorithm="maxima")
```

```
[Out] 1/4*B*b^5*x^4 + (5*B*a*b^4 + A*b^5)*x - 1/616*(1540*(2*B*a^2*b^3
+ A*a*b^4)*x^12 + 1232*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 385*(B*a^4*b
 + 2*A*a^3*b^2)*x^6 + 44*A*a^5 + 56*(B*a^5 + 5*A*a^4*b)*x^3)/x^14
```

Fricas [A] time = 0.217464, size = 163, normalized size = 1.48

$$\frac{154\,Bb^5x^{18}+616\,\left(5\,Bab^4+Ab^5\right)x^{15}-1540\,\left(2\,Ba^2b^3+Aab^4\right)x^{12}-1232\,\left(Ba^3b^2+Aa^2b^3\right)x^9-385\,\left(Ba^4b+2\,Aa^3b^2\right)x^6-4}{616\,x^{14}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^15,x, algorithm="fricas")
```

```
[Out] 1/616*(154*B*b^5*x^18 + 616*(5*B*a*b^4 + A*b^5)*x^15 - 1540*(2*B*
a^2*b^3 + A*a*b^4)*x^12 - 1232*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 385*
(B*a^4*b + 2*A*a^3*b^2)*x^6 - 44*A*a^5 - 56*(B*a^5 + 5*A*a^4*b)*x
^3)/x^14
```

Sympy [A] time = 54.383, size = 122, normalized size = 1.11

$$\frac{Bb^5x^4}{4}+x\left(Ab^5+5Bab^4\right)-\frac{44Aa^5+x^{12}\left(1540Aab^4+3080Ba^2b^3\right)+x^9\left(1232Aa^2b^3+1232Ba^3b^2\right)+x^6\left(770Aa^3b^2+385Ba^4b\right)+x^3\left(280Aa^4b+56Ba^5\right.}{616x^{14}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**15,x)
```

```
[Out] B*b**5*x**4/4 + x*(A*b**5 + 5*B*a*b**4) - (44*A*a**5 + x**12*(154
0*A*a*b**4 + 3080*B*a**2*b**3) + x**9*(1232*A*a**2*b**3 + 1232*B*
a**3*b**2) + x**6*(770*A*a**3*b**2 + 385*B*a**4*b) + x**3*(280*A*
a**4*b + 56*B*a**5))/(616*x**14)
```

GIAC/XCAS [A] time = 0.216209, size = 166, normalized size = 1.51

$$\frac{1}{4}\,Bb^5x^4 + 5\,Bab^4x + Ab^5x - \frac{3080\,Ba^2b^3x^{12} + 1540\,Aab^4x^{12} + 1232\,Ba^3b^2x^9 + 1232\,Aa^2b^3x^9 + 385\,Ba^4bx^6 + 770\,Aa^3b^2x^6 + 56\,Ba^5x^3 + 280\,Aa^4bx^3 + 44}{616\,x^{14}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^15,x, algorithm="giac")
```

```
[Out] 1/4*B*b^5*x^4 + 5*B*a*b^4*x + A*b^5*x - 1/616*(3080*B*a^2*b^3*x^1
2 + 1540*A*a*b^4*x^12 + 1232*B*a^3*b^2*x^9 + 1232*A*a^2*b^3*x^9 +
 385*B*a^4*b*x^6 + 770*A*a^3*b^2*x^6 + 56*B*a^5*x^3 + 280*A*a^4*b
*x^3 + 44*A*a^5)/x^14
```

3.48 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^{16}} \, dx$

Optimal. Leaf size=113

$$-\frac{a^5 A}{15x^{15}}-\frac{a^4(aB+5Ab)}{12x^{12}}-\frac{5a^3b(aB+2Ab)}{9x^9}-\frac{5a^2b^2(aB+Ab)}{3x^6}+b^4\log(x)(5aB+Ab)-\frac{5ab^3(2aB+Ab)}{3x^3}+\frac{1}{3}b^5Bx^3$$

```
[Out] -(a^5*A)/(15*x^15) - (a^4*(5*A*b + a*B))/(12*x^12) - (5*a^3*b*(2*
A*b + a*B))/(9*x^9) - (5*a^2*b^2*(A*b + a*B))/(3*x^6) - (5*a*b^3*
(A*b + 2*a*B))/(3*x^3) + (b^5*B*x^3)/3 + b^4*(A*b + 5*a*B)*Log[x]
```

Rubi [A] time = 0.268039, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$-\frac{a^5 A}{15x^{15}}-\frac{a^4(aB+5Ab)}{12x^{12}}-\frac{5a^3b(aB+2Ab)}{9x^9}-\frac{5a^2b^2(aB+Ab)}{3x^6}+b^4\log(x)(5aB+Ab)-\frac{5ab^3(2aB+Ab)}{3x^3}+\frac{1}{3}b^5Bx^3$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^16,x]
```


```
[Out] -(a^5*A)/(15*x^15) - (a^4*(5*A*b + a*B))/(12*x^12) - (5*a^3*b*(2*
A*b + a*B))/(9*x^9) - (5*a^2*b^2*(A*b + a*B))/(3*x^6) - (5*a*b^3*
(A*b + 2*a*B))/(3*x^3) + (b^5*B*x^3)/3 + b^4*(A*b + 5*a*B)*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{15x^{15}}-\frac{a^4\left(5Ab+Ba\right)}{12x^{12}}-\frac{5a^3b\left(2Ab+Ba\right)}{9x^9}-\frac{5a^2b^2\left(Ab+Ba\right)}{3x^6}-\frac{5ab^3\left(Ab+2Ba\right)}{3x^3}+\frac{b^5\int^{x^3}B\,dx}{3}+\frac{b^4\left(Ab+5Ba\right)\log\left(x^3\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**16,x)
```

```
[Out] -A*a**5/(15*x**15) - a**4*(5*A*b + B*a)/(12*x**12) - 5*a**3*b*(2*
A*b + B*a)/(9*x**9) - 5*a**2*b**2*(A*b + B*a)/(3*x**6) - 5*a*b**3
*(A*b + 2*B*a)/(3*x**3) + b**5*Integral(B, (x, x**3))/3 + b**4*(A
*b + 5*B*a)*log(x**3)/3
```

Mathematica [A] time = 0.11285, size = 116, normalized size = 1.03

$$b^4\log(x)(5aB+Ab)-\frac{3a^5\left(4A+5Bx^3\right)+25a^4bx^3\left(3A+4Bx^3\right)+100a^3b^2x^6\left(2A+3Bx^3\right)+300a^2b^3x^9\left(A+2Bx^3\right)+300aAb^4x^{12}-60b^5Bx^{18}}{180x^{15}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^16,x]
```

```
[Out] -(300*a*A*b^4*x^12 - 60*b^5*B*x^18 + 300*a^2*b^3*x^9*(A + 2*B*x^3
) + 100*a^3*b^2*x^6*(2*A + 3*B*x^3) + 25*a^4*b*x^3*(3*A + 4*B*x^3
```

```
) + 3*a^5*(4*A + 5*B*x^3))/(180*x^15) + b^4*(A*b + 5*a*B)*Log[x]
```

Maple [A] time = 0.011, size = 123, normalized size = 1.1

$$\frac{b^5Bx^3}{3}-\frac{5\,a^4bA}{12\,x^{12}}-\frac{a^5B}{12\,x^{12}}-\frac{Aa^5}{15\,x^{15}}+A\ln\left(x\right)b^5+5\,B\ln\left(x\right)ab^4-\frac{5\,a^2b^3A}{3\,x^6}-\frac{5\,a^3b^2B}{3\,x^6}-\frac{10\,a^3b^2A}{9\,x^9}-\frac{5\,a^4bB}{9\,x^9}-\frac{5\,ab^4A}{3\,x^3}-\frac{10\,a^2b^3B}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^16,x)
```

```
[Out] 1/3*b^5*B*x^3-5/12*a^4/x^12*A*b-1/12*a^5/x^12*B-1/15*a^5*A/x^15+A
*ln(x)*b^5+5*B*ln(x)*a*b^4-5/3*a^2*b^3/x^6*A-5/3*a^3*b^2/x^6*B-10
/9*a^3*b^2/x^9*A-5/9*a^4*b/x^9*B-5/3*a*b^4/x^3*A-10/3*a^2*b^3/x^3
*B
```

Maxima [A] time = 1.37865, size = 166, normalized size = 1.47

$$\frac{1}{3}\,Bb^5x^3+\frac{1}{3}\left(5\,Bab^4+Ab^5\right)\log\left(x^3\right)-\frac{300\left(2\,Ba^2b^3+Aab^4\right)x^{12}+300\left(Ba^3b^2+Aa^2b^3\right)x^9+100\left(Ba^4b+2\,Aa^3b^2\right)x^6+12\,Aa^5+15\left(Ba^5+5\,Aa^4b\right)x^3}{180\,x^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^16,x, algorithm="maxima")
```

```
[Out] 1/3*B*b^5*x^3 + 1/3*(5*B*a*b^4 + A*b^5)*log(x^3) - 1/180*(300*(2*
B*a^2*b^3 + A*a*b^4)*x^12 + 300*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 100
*(B*a^4*b + 2*A*a^3*b^2)*x^6 + 12*A*a^5 + 15*(B*a^5 + 5*A*a^4*b)*
x^3)/x^15
```

Fricas [A] time = 0.224491, size = 166, normalized size = 1.47

$$\frac{60\,Bb^5x^{18}+180\left(5\,Bab^4+Ab^5\right)x^{15}\log\left(x\right)-300\left(2\,Ba^2b^3+Aab^4\right)x^{12}-300\left(Ba^3b^2+Aa^2b^3\right)x^9-100\left(Ba^4b+2\,Aa^3b^2\right)x^6-}{180\,x^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^16,x, algorithm="fricas")
```

```
[Out] 1/180*(60*B*b^5*x^18 + 180*(5*B*a*b^4 + A*b^5)*x^15*log(x) - 300*
(2*B*a^2*b^3 + A*a*b^4)*x^12 - 300*(B*a^3*b^2 + A*a^2*b^3)*x^9 -
100*(B*a^4*b + 2*A*a^3*b^2)*x^6 - 12*A*a^5 - 15*(B*a^5 + 5*A*a^4*
b)*x^3)/x^15
```

Sympy [A] time = 81.4168, size = 122, normalized size = 1.08

$$\frac{Bb^5x^3}{3}+b^4\left(Ab+5Ba\right)\log\left(x\right)-\frac{12Aa^5+x^{12}\left(300Aab^4+600Ba^2b^3\right)+x^9\left(300Aa^2b^3+300Ba^3b^2\right)+x^6\left(200Aa^3b^2+100Ba^4b\right)+x^3\left(75Aa^4b+15Ba^5\right)}{180x^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**16,x)
```

```
[Out] B*b**5*x**3/3 + b**4*(A*b + 5*B*a)*log(x) - (12*A*a**5 + x**12*(3
00*A*a*b**4 + 600*B*a**2*b**3) + x**9*(300*A*a**2*b**3 + 300*B*a*
*3*b**2) + x**6*(200*A*a**3*b**2 + 100*B*a**4*b) + x**3*(75*A*a**
4*b + 15*B*a**5))/(180*x**15)
```

GIAC/XCAS [A] time = 0.217078, size = 196, normalized size = 1.73

$$\frac{1}{3} Bb^5x^3 + \left(5 Bab^4 + Ab^5\right)\ln\left(|x|\right) - \frac{685 Bab^4x^{15} + 137 Ab^5x^{15} + 600 Ba^2b^3x^{12} + 300 Aab^4x^{12} + 300 Ba^3b^2x^9 + 300 Aa^2b^3x^9 + 100 Ba^4bx^6 + 200 Aa^3b^2x^6 + 15 B}{180 x^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^16,x, algorithm="giac")
```

```
[Out] 1/3*B*b^5*x^3 + (5*B*a*b^4 + A*b^5)*ln(abs(x)) - 1/180*(685*B*a*b
^4*x^15 + 137*A*b^5*x^15 + 600*B*a^2*b^3*x^12 + 300*A*a*b^4*x^12
+ 300*B*a^3*b^2*x^9 + 300*A*a^2*b^3*x^9 + 100*B*a^4*b*x^6 + 200*A
*a^3*b^2*x^6 + 15*B*a^5*x^3 + 75*A*a^4*b*x^3 + 12*A*a^5)/x^15
```

3.49 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^{17}}\,dx$

Optimal. Leaf size=115

$$-\frac{a^5A}{16x^{16}}-\frac{a^4(aB+5Ab)}{13x^{13}}-\frac{a^3b(aB+2Ab)}{2x^{10}}-\frac{10a^2b^2(aB+Ab)}{7x^7}-\frac{b^4(5aB+Ab)}{x}-\frac{5ab^3(2aB+Ab)}{4x^4}+\frac{1}{2}b^5Bx^2$$

```
[Out] -(a^5*A)/(16*x^16) - (a^4*(5*A*b + a*B))/(13*x^13) - (a^3*b*(2*A*
b + a*B))/(2*x^10) - (10*a^2*b^2*(A*b + a*B))/(7*x^7) - (5*a*b^3*
(A*b + 2*a*B))/(4*x^4) - (b^4*(A*b + 5*a*B))/x + (b^5*B*x^2)/2
```

Rubi [A] time = 0.214096, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{16x^{16}}-\frac{a^4(aB+5Ab)}{13x^{13}}-\frac{a^3b(aB+2Ab)}{2x^{10}}-\frac{10a^2b^2(aB+Ab)}{7x^7}-\frac{b^4(5aB+Ab)}{x}-\frac{5ab^3(2aB+Ab)}{4x^4}+\frac{1}{2}b^5Bx^2$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^17,x]
```

```
[Out] -(a^5*A)/(16*x^16) - (a^4*(5*A*b + a*B))/(13*x^13) - (a^3*b*(2*A*
b + a*B))/(2*x^10) - (10*a^2*b^2*(A*b + a*B))/(7*x^7) - (5*a*b^3*
(A*b + 2*a*B))/(4*x^4) - (b^4*(A*b + 5*a*B))/x + (b^5*B*x^2)/2
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{16x^{16}}+Bb^5\int x\,dx-\frac{a^4\left(5Ab+Ba\right)}{13x^{13}}-\frac{a^3b\left(2Ab+Ba\right)}{2x^{10}}-\frac{10a^2b^2\left(Ab+Ba\right)}{7x^7}-\frac{5ab^3\left(Ab+2Ba\right)}{4x^4}-\frac{b^4\left(Ab+5Ba\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**17,x)
```

```
[Out] -A*a**5/(16*x**16) + B*b**5*Integral(x, x) - a**4*(5*A*b + B*a)/(
13*x**13) - a**3*b*(2*A*b + B*a)/(2*x**10) - 10*a**2*b**2*(A*b +
B*a)/(7*x**7) - 5*a*b**3*(A*b + 2*B*a)/(4*x**4) - b**4*(A*b + 5*B
*a)/x
```

Mathematica [A] time = 0.063221, size = 118, normalized size = 1.03

$$-\frac{7a^5\left(13A+16Bx^3\right)+56a^4bx^3\left(10A+13Bx^3\right)+208a^3b^2x^6\left(7A+10Bx^3\right)+520a^2b^3x^9\left(4A+7Bx^3\right)+1820ab^4x^{12}\left(A+4Bx\right.}{1456x^{16}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^17,x]
```

```
[Out] -(-728*b^5*x^15*(-2*A + B*x^3) + 1820*a*b^4*x^12*(A + 4*B*x^3) +
520*a^2*b^3*x^9*(4*A + 7*B*x^3) + 208*a^3*b^2*x^6*(7*A + 10*B*x^3
) + 56*a^4*b*x^3*(10*A + 13*B*x^3) + 7*a^5*(13*A + 16*B*x^3))/(14
56*x^16)
```

Maple [A] time = 0.008, size = 104, normalized size = 0.9

$$-\frac{Aa^5}{16\,x^{16}}-\frac{a^4\,(5\,Ab+Ba)}{13\,x^{13}}-\frac{a^3b\,(2\,Ab+Ba)}{2\,x^{10}}-\frac{10\,a^2b^2\,(Ab+Ba)}{7\,x^7}-\frac{5\,ab^3\,(Ab+2\,Ba)}{4\,x^4}-\frac{b^4\,(Ab+5\,Ba)}{x}+\frac{b^5Bx^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^17,x)
```

```
[Out] -1/16*a^5*A/x^16-1/13*a^4*(5*A*b+B*a)/x^13-1/2*a^3*b*(2*A*b+B*a)/
x^10-10/7*a^2*b^2*(A*b+B*a)/x^7-5/4*a*b^3*(A*b+2*B*a)/x^4-b^4*(A*
b+5*B*a)/x+1/2*b^5*B*x^2
```

Maxima [A] time = 1.38613, size = 165, normalized size = 1.43

$$\frac{1}{2}\,Bb^5x^2-\frac{1456\left(5\,Bab^4+Ab^5\right)x^{15}+1820\left(2\,Ba^2b^3+Aab^4\right)x^{12}+2080\left(Ba^3b^2+Aa^2b^3\right)x^9+728\left(Ba^4b+2\,Aa^3b^2\right)x^6+91\,Aa^5+112}{1456\,x^{16}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^17,x, algorithm="maxima")
```

```
[Out] 1/2*B*b^5*x^2 - 1/1456*(1456*(5*B*a*b^4 + A*b^5)*x^15 + 1820*(2*B
*a^2*b^3 + A*a*b^4)*x^12 + 2080*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 728
*(B*a^4*b + 2*A*a^3*b^2)*x^6 + 91*A*a^5 + 112*(B*a^5 + 5*A*a^4*b)
*x^3)/x^16
```

Fricas [A] time = 0.21805, size = 163, normalized size = 1.42

$$\frac{728\,Bb^5x^{18}-1456\left(5\,Bab^4+Ab^5\right)x^{15}-1820\left(2\,Ba^2b^3+Aab^4\right)x^{12}-2080\left(Ba^3b^2+Aa^2b^3\right)x^9-728\left(Ba^4b+2\,Aa^3b^2\right)x^6-}{1456\,x^{16}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^17,x, algorithm="fricas")
```

```
[Out] 1/1456*(728*B*b^5*x^18 - 1456*(5*B*a*b^4 + A*b^5)*x^15 - 1820*(2*
B*a^2*b^3 + A*a*b^4)*x^12 - 2080*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 72
8*(B*a^4*b + 2*A*a^3*b^2)*x^6 - 91*A*a^5 - 112*(B*a^5 + 5*A*a^4*b
)*x^3)/x^16
```

Sympy [A] time = 129.937, size = 126, normalized size = 1.1

$$\frac{Bb^5x^2}{2}-\frac{91Aa^5+x^{15}\left(1456Ab^5+7280Bab^4\right)+x^{12}\left(1820Aab^4+3640Ba^2b^3\right)+x^9\left(2080Aa^2b^3+2080Ba^3b^2\right)+x^6\left(1456Aa^3b^2+72\right.}{1456x^{16}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**17,x)
```

```
[Out] B*b**5*x**2/2 - (91*A*a**5 + x**15*(1456*A*b**5 + 7280*B*a*b**4)
+ x**12*(1820*A*a*b**4 + 3640*B*a**2*b**3) + x**9*(2080*A*a**2*b*
*3 + 2080*B*a**3*b**2) + x**6*(1456*A*a**3*b**2 + 728*B*a**4*b) +
```

```
x**3*(560*A*a**4*b + 112*B*a**5))/(1456*x**16)
```

GIAC/XCAS [A] time = 0.214733, size = 173, normalized size = 1.5

$$\frac{1}{2}Bb^5x^2 - \frac{7280\,Bab^4x^{15} + 1456\,Ab^5x^{15} + 3640\,Ba^2b^3x^{12} + 1820\,Aab^4x^{12} + 2080\,Ba^3b^2x^9 + 2080\,Aa^2b^3x^9 + 728\,Ba^4bx^6 + 1456\,Aa^3b^2\cdots}{1456\,x^{16}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^17,x, algorithm="giac")
```

```
[Out] 1/2*B*b^5*x^2 - 1/1456*(7280*B*a*b^4*x^15 + 1456*A*b^5*x^15 + 364
0*B*a^2*b^3*x^12 + 1820*A*a*b^4*x^12 + 2080*B*a^3*b^2*x^9 + 2080*
A*a^2*b^3*x^9 + 728*B*a^4*b*x^6 + 1456*A*a^3*b^2*x^6 + 112*B*a^5*
x^3 + 560*A*a^4*b*x^3 + 91*A*a^5)/x^16
```

3.50 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^{18}}\,dx$

Optimal. Leaf size=110

$$-\frac{a^5A}{17x^{17}}-\frac{a^4(aB+5Ab)}{14x^{14}}-\frac{5a^3b(aB+2Ab)}{11x^{11}}-\frac{5a^2b^2(aB+Ab)}{4x^8}-\frac{b^4(5aB+Ab)}{2x^2}-\frac{ab^3(2aB+Ab)}{x^5}+b^5Bx$$

```
[Out] -(a^5*A)/(17*x^17) - (a^4*(5*A*b + a*B))/(14*x^14) - (5*a^3*b*(2*
A*b + a*B))/(11*x^11) - (5*a^2*b^2*(A*b + a*B))/(4*x^8) - (a*b^3*
(A*b + 2*a*B))/x^5 - (b^4*(A*b + 5*a*B))/(2*x^2) + b^5*B*x
```

Rubi [A] time = 0.199415, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{17x^{17}}-\frac{a^4(aB+5Ab)}{14x^{14}}-\frac{5a^3b(aB+2Ab)}{11x^{11}}-\frac{5a^2b^2(aB+Ab)}{4x^8}-\frac{b^4(5aB+Ab)}{2x^2}-\frac{ab^3(2aB+Ab)}{x^5}+b^5Bx$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^5*(A + B*x^3))/x^18,x]
```

```
[Out] -(a^5*A)/(17*x^17) - (a^4*(5*A*b + a*B))/(14*x^14) - (5*a^3*b*(2*
A*b + a*B))/(11*x^11) - (5*a^2*b^2*(A*b + a*B))/(4*x^8) - (a*b^3*
(A*b + 2*a*B))/x^5 - (b^4*(A*b + 5*a*B))/(2*x^2) + b^5*B*x
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{Aa^5}{17x^{17}}-\frac{a^4\left(5Ab+Ba\right)}{14x^{14}}-\frac{5a^3b\left(2Ab+Ba\right)}{11x^{11}}-\frac{5a^2b^2\left(Ab+Ba\right)}{4x^8}-\frac{ab^3\left(Ab+2Ba\right)}{x^5}+b^5\int B\,dx-\frac{b^4\left(Ab+5Ba\right)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**18,x)
```

```
[Out] -A*a**5/(17*x**17) - a**4*(5*A*b + B*a)/(14*x**14) - 5*a**3*b*(2*
A*b + B*a)/(11*x**11) - 5*a**2*b**2*(A*b + B*a)/(4*x**8) - a*b**3
*(A*b + 2*B*a)/x**5 + b**5*Integral(B, x) - b**4*(A*b + 5*B*a)/(2
*x**2)
```

Mathematica [A] time = 0.100783, size = 110, normalized size = 1.

$$-\frac{a^5A}{17x^{17}}-\frac{a^4(aB+5Ab)}{14x^{14}}-\frac{5a^3b(aB+2Ab)}{11x^{11}}-\frac{5a^2b^2(aB+Ab)}{4x^8}-\frac{b^4(5aB+Ab)}{2x^2}-\frac{ab^3(2aB+Ab)}{x^5}+b^5Bx$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^5*(A + B*x^3))/x^18,x]
```

```
[Out] -(a^5*A)/(17*x^17) - (a^4*(5*A*b + a*B))/(14*x^14) - (5*a^3*b*(2*
A*b + a*B))/(11*x^11) - (5*a^2*b^2*(A*b + a*B))/(4*x^8) - (a*b^3*
(A*b + 2*a*B))/x^5 - (b^4*(A*b + 5*a*B))/(2*x^2) + b^5*B*x
```

Maple [A] time = 0.009, size = 101, normalized size = 0.9

$$-\frac{Aa^5}{17\,x^{17}}-\frac{a^4\left(5\,Ab+Ba\right)}{14\,x^{14}}-\frac{5\,a^3b\left(2\,Ab+Ba\right)}{11\,x^{11}}-\frac{5\,a^2b^2\left(Ab+Ba\right)}{4\,x^8}-\frac{ab^3\left(Ab+2\,Ba\right)}{x^5}-\frac{b^4\left(Ab+5\,Ba\right)}{2\,x^2}+b^5Bx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^18,x)
```

```
[Out] -1/17*a^5*A/x^17-1/14*a^4*(5*A*b+B*a)/x^14-5/11*a^3*b*(2*A*b+B*a)
/x^11-5/4*a^2*b^2*(A*b+B*a)/x^8-a*b^3*(A*b+2*B*a)/x^5-1/2*b^4*(A*
b+5*B*a)/x^2+b^5*B*x
```

Maxima [A] time = 1.39531, size = 161, normalized size = 1.46

$$Bb^5x - \frac{2618\left(5\,Bab^4 + Ab^5\right)x^{15} + 5236\left(2\,Ba^2b^3 + Aab^4\right)x^{12} + 6545\left(Ba^3b^2 + Aa^2b^3\right)x^9 + 2380\left(Ba^4b + 2\,Aa^3b^2\right)x^6 + 308\,Aa^5 + 37}{5236\,x^{17}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^18,x, algorithm="maxima")
```

```
[Out] B*b^5*x - 1/5236*(2618*(5*B*a*b^4 + A*b^5)*x^15 + 5236*(2*B*a^2*b
^3 + A*a*b^4)*x^12 + 6545*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 2380*(B*a
^4*b + 2*A*a^3*b^2)*x^6 + 308*A*a^5 + 374*(B*a^5 + 5*A*a^4*b)*x^3
)/x^17
```

Fricas [A] time = 0.212468, size = 163, normalized size = 1.48

$$\frac{5236\,Bb^5x^{18} - 2618\left(5\,Bab^4 + Ab^5\right)x^{15} - 5236\left(2\,Ba^2b^3 + Aab^4\right)x^{12} - 6545\left(Ba^3b^2 + Aa^2b^3\right)x^9 - 2380\left(Ba^4b + 2\,Aa^3b^2\right)x^6}{5236\,x^{17}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^18,x, algorithm="fricas")
```

```
[Out] 1/5236*(5236*B*b^5*x^18 - 2618*(5*B*a*b^4 + A*b^5)*x^15 - 5236*(2
*B*a^2*b^3 + A*a*b^4)*x^12 - 6545*(B*a^3*b^2 + A*a^2*b^3)*x^9 - 2
380*(B*a^4*b + 2*A*a^3*b^2)*x^6 - 308*A*a^5 - 374*(B*a^5 + 5*A*a^
4*b)*x^3)/x^17
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**18,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.212127, size = 169, normalized size = 1.54

$$Bb^5x - \frac{13090\,Bab^4x^{15} + 2618\,Ab^5x^{15} + 10472\,Ba^2b^3x^{12} + 5236\,Aab^4x^{12} + 6545\,Ba^3b^2x^9 + 6545\,Aa^2b^3x^9 + 2380\,Ba^4bx^6 + 4760\,Aa}{5236\,x^{17}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^18,x, algorithm="giac")
```

```
[Out] B*b^5*x - 1/5236*(13090*B*a*b^4*x^15 + 2618*A*b^5*x^15 + 10472*B*
a^2*b^3*x^12 + 5236*A*a*b^4*x^12 + 6545*B*a^3*b^2*x^9 + 6545*A*a^
2*b^3*x^9 + 2380*B*a^4*b*x^6 + 4760*A*a^3*b^2*x^6 + 374*B*a^5*x^3
 + 1870*A*a^4*b*x^3 + 308*A*a^5)/x^17
```

3.51 $\int \frac{(a+bx^3)^5 (A+Bx^3)}{x^{19}} \, dx$

Optimal. Leaf size=91

$$-\frac{a^5 B}{15x^{15}}-\frac{5a^4 bB}{12x^{12}}-\frac{10a^3b^2B}{9x^9}-\frac{5a^2b^3B}{3x^6}-\frac{A\left(a+bx^3\right)^6}{18ax^{18}}-\frac{5ab^4B}{3x^3}+b^5B\log(x)$$

```
[Out] -(a^5*B)/(15*x^15) - (5*a^4*b*B)/(12*x^12) - (10*a^3*b^2*B)/(9*x^
9) - (5*a^2*b^3*B)/(3*x^6) - (5*a*b^4*B)/(3*x^3) - (A*(a + b*x^3)
^6)/(18*a*x^18) + b^5*B*Log[x]
```

Rubi [A] time = 0.156191, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$-\frac{a^5 B}{15x^{15}}-\frac{5a^4 bB}{12x^{12}}-\frac{10a^3b^2B}{9x^9}-\frac{5a^2b^3B}{3x^6}-\frac{A\left(a+bx^3\right)^6}{18ax^{18}}-\frac{5ab^4B}{3x^3}+b^5B\log(x)$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^19,x]
```

```
[Out] -(a^5*B)/(15*x^15) - (5*a^4*b*B)/(12*x^12) - (10*a^3*b^2*B)/(9*x^
9) - (5*a^2*b^3*B)/(3*x^6) - (5*a*b^4*B)/(3*x^3) - (A*(a + b*x^3)
^6)/(18*a*x^18) + b^5*B*Log[x]
```

Rubi in Sympy [A] time = 20.1783, size = 95, normalized size = 1.04

$$-\frac{A\left(a+bx^3\right)^6}{18ax^{18}}-\frac{Ba^5}{15x^{15}}-\frac{5Ba^4b}{12x^{12}}-\frac{10Ba^3b^2}{9x^9}-\frac{5Ba^2b^3}{3x^6}-\frac{5Bab^4}{3x^3}+\frac{Bb^5\log\left(x^3\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**19,x)
```

```
[Out] -A*(a + b*x**3)**6/(18*a*x**18) - B*a**5/(15*x**15) - 5*B*a**4*b/
(12*x**12) - 10*B*a**3*b**2/(9*x**9) - 5*B*a**2*b**3/(3*x**6) - 5
*B*a*b**4/(3*x**3) + B*b**5*log(x**3)/3
```

Mathematica [A] time = 0.079167, size = 121, normalized size = 1.33

$$-\frac{2a^5\left(5A+6Bx^3\right)+15a^4bx^3\left(4A+5Bx^3\right)+50a^3b^2x^6\left(3A+4Bx^3\right)+100a^2b^3x^9\left(2A+3Bx^3\right)+150ab^4x^{12}\left(A+2Bx^3\right)+60A}{180x^{18}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^19,x]
```

```
[Out] -(60*A*b^5*x^15 + 150*a*b^4*x^12*(A + 2*B*x^3) + 100*a^2*b^3*x^9*
(2*A + 3*B*x^3) + 50*a^3*b^2*x^6*(3*A + 4*B*x^3) + 15*a^4*b*x^3*(
4*A + 5*B*x^3) + 2*a^5*(5*A + 6*B*x^3) - 180*b^5*B*x^18*Log[x])/(
180*x^18)
```

Maple [A] time = 0.012, size = 124, normalized size = 1.4

$$-\frac{5a^{3}b^{2}A}{6x^{12}}-\frac{5a^{4}bB}{12x^{12}}-\frac{a^{4}bA}{3x^{15}}-\frac{a^{5}B}{15x^{15}}+b^{5}B\ln(x)-\frac{5ab^{4}A}{6x^{6}}-\frac{5a^{2}b^{3}B}{3x^{6}}-\frac{10a^{2}b^{3}A}{9x^{9}}-\frac{10a^{3}b^{2}B}{9x^{9}}-\frac{b^{5}A}{3x^{3}}-\frac{5ab^{4}B}{3x^{3}}-\frac{Aa^{5}}{18x^{18}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^19,x)
```

```
[Out] -5/6*a^3*b^2/x^12*A-5/12*a^4*b*B/x^12-1/3*a^4/x^15*A*b-1/15*a^5*B
/x^15+b^5*B*ln(x)-5/6*a*b^4/x^6*A-5/3*a^2*b^3*B/x^6-10/9*a^2*b^3/
x^9*A-10/9*a^3*b^2*B/x^9-1/3*b^5/x^3*A-5/3*a*b^4*B/x^3-1/18*A*a^5
/x^18
```

Maxima [A] time = 1.43841, size = 166, normalized size = 1.82

$$\frac{1}{3}Bb^{5}\log\left(x^{3}\right)-\frac{60\left(5Bab^{4}+Ab^{5}\right)x^{15}+150\left(2Ba^{2}b^{3}+Aab^{4}\right)x^{12}+200\left(Ba^{3}b^{2}+Aa^{2}b^{3}\right)x^{9}+75\left(Ba^{4}b+2Aa^{3}b^{2}\right)x^{6}+10Aa^{5}+12\left(Ba^{5}+\right.}{180x^{18}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^19,x, algorithm="maxima")
```

```
[Out] 1/3*B*b^5*log(x^3) - 1/180*(60*(5*B*a*b^4 + A*b^5)*x^15 + 150*(2*
B*a^2*b^3 + A*a*b^4)*x^12 + 200*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 75*
(B*a^4*b + 2*A*a^3*b^2)*x^6 + 10*A*a^5 + 12*(B*a^5 + 5*A*a^4*b)*x
^3)/x^18
```

Fricas [A] time = 0.225584, size = 166, normalized size = 1.82

$$\frac{180Bb^{5}x^{18}\log(x)-60\left(5Bab^{4}+Ab^{5}\right)x^{15}-150\left(2Ba^{2}b^{3}+Aab^{4}\right)x^{12}-200\left(Ba^{3}b^{2}+Aa^{2}b^{3}\right)x^{9}-75\left(Ba^{4}b+2Aa^{3}b^{2}\right)x^{6}-}{180x^{18}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^19,x, algorithm="fricas")
```

```
[Out] 1/180*(180*B*b^5*x^18*log(x) - 60*(5*B*a*b^4 + A*b^5)*x^15 - 150*
(2*B*a^2*b^3 + A*a*b^4)*x^12 - 200*(B*a^3*b^2 + A*a^2*b^3)*x^9 -
75*(B*a^4*b + 2*A*a^3*b^2)*x^6 - 10*A*a^5 - 12*(B*a^5 + 5*A*a^4*b
)*x^3)/x^18
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**19,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.214539, size = 184, normalized size = 2.02

$$B b^{5} \ln\left(|x|\right) - \frac{147 \, B b^{5} x^{18} + 300 \, B a b^{4} x^{15} + 60 \, A b^{5} x^{15} + 300 \, B a^{2} b^{3} x^{12} + 150 \, A a b^{4} x^{12} + 200 \, B a^{3} b^{2} x^{9} + 200 \, A a^{2} b^{3} x^{9} + 75 \, B a^{4} b x^{6} + 150 \, A a^{3}}{180 \, x^{18}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^19,x, algorithm="giac")
```

```
[Out] B*b^5*ln(abs(x)) - 1/180*(147*B*b^5*x^18 + 300*B*a*b^4*x^15 + 60*
A*b^5*x^15 + 300*B*a^2*b^3*x^12 + 150*A*a*b^4*x^12 + 200*B*a^3*b^
2*x^9 + 200*A*a^2*b^3*x^9 + 75*B*a^4*b*x^6 + 150*A*a^3*b^2*x^6 +
12*B*a^5*x^3 + 60*A*a^4*b*x^3 + 10*A*a^5)/x^18
```

3.52 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^{20}}\,dx$

Optimal. Leaf size=113

$$-\frac{a^5A}{19x^{19}}-\frac{a^4(aB+5Ab)}{16x^{16}}-\frac{5a^3b(aB+2Ab)}{13x^{13}}-\frac{a^2b^2(aB+Ab)}{x^{10}}-\frac{b^4(5aB+Ab)}{4x^4}-\frac{5ab^3(2aB+Ab)}{7x^7}-\frac{b^5B}{x}$$

```
[Out] -(a^5*A)/(19*x^19) - (a^4*(5*A*b + a*B))/(16*x^16) - (5*a^3*b*(2*
A*b + a*B))/(13*x^13) - (a^2*b^2*(A*b + a*B))/x^10 - (5*a*b^3*(A*
b + 2*a*B))/(7*x^7) - (b^4*(A*b + 5*a*B))/(4*x^4) - (b^5*B)/x
```

Rubi [A] time = 0.209927, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{19x^{19}}-\frac{a^4(aB+5Ab)}{16x^{16}}-\frac{5a^3b(aB+2Ab)}{13x^{13}}-\frac{a^2b^2(aB+Ab)}{x^{10}}-\frac{b^4(5aB+Ab)}{4x^4}-\frac{5ab^3(2aB+Ab)}{7x^7}-\frac{b^5B}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^5*(A + B*x^3))/x^20,x]
```

```
[Out] -(a^5*A)/(19*x^19) - (a^4*(5*A*b + a*B))/(16*x^16) - (5*a^3*b*(2*
A*b + a*B))/(13*x^13) - (a^2*b^2*(A*b + a*B))/x^10 - (5*a*b^3*(A*
b + 2*a*B))/(7*x^7) - (b^4*(A*b + 5*a*B))/(4*x^4) - (b^5*B)/x
```

Rubi in Sympy [A] time = 22.7828, size = 109, normalized size = 0.96

$$-\frac{Aa^5}{19x^{19}}-\frac{Bb^5}{x}-\frac{a^4\left(5Ab+Ba\right)}{16x^{16}}-\frac{5a^3b\left(2Ab+Ba\right)}{13x^{13}}-\frac{a^2b^2\left(Ab+Ba\right)}{x^{10}}-\frac{5ab^3\left(Ab+2Ba\right)}{7x^7}-\frac{b^4\left(Ab+5Ba\right)}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**20,x)
```

```
[Out] -A*a**5/(19*x**19) - B*b**5/x - a**4*(5*A*b + B*a)/(16*x**16) - 5
*a**3*b*(2*A*b + B*a)/(13*x**13) - a**2*b**2*(A*b + B*a)/x**10 -
5*a*b**3*(A*b + 2*B*a)/(7*x**7) - b**4*(A*b + 5*B*a)/(4*x**4)
```

Mathematica [A] time = 0.0660739, size = 119, normalized size = 1.05

$$-\frac{91a^5\left(16A+19Bx^3\right)+665a^4bx^3\left(13A+16Bx^3\right)+2128a^3b^2x^6\left(10A+13Bx^3\right)+3952a^2b^3x^9\left(7A+10Bx^3\right)+4940ab^4x^{12}\left(4\right.}{27664x^{19}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^5*(A + B*x^3))/x^20,x]
```

```
[Out] -(6916*b^5*x^15*(A + 4*B*x^3) + 4940*a*b^4*x^12*(4*A + 7*B*x^3) +
 3952*a^2*b^3*x^9*(7*A + 10*B*x^3) + 2128*a^3*b^2*x^6*(10*A + 13*
B*x^3) + 665*a^4*b*x^3*(13*A + 16*B*x^3) + 91*a^5*(16*A + 19*B*x^
3))/(27664*x^19)
```

Maple [A] time = 0.008, size = 104, normalized size = 0.9

$$-\frac{Aa^5}{19\,x^{19}}-\frac{a^4\left(5\,Ab+Ba\right)}{16\,x^{16}}-\frac{5\,a^3b\left(2\,Ab+Ba\right)}{13\,x^{13}}-\frac{a^2b^2\left(Ab+Ba\right)}{x^{10}}-\frac{5\,ab^3\left(Ab+2\,Ba\right)}{7\,x^7}-\frac{b^4\left(Ab+5\,Ba\right)}{4\,x^4}-\frac{Bb^5}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^20,x)
```

```
[Out] -1/19*a^5*A/x^19-1/16*a^4*(5*A*b+B*a)/x^16-5/13*a^3*b*(2*A*b+B*a)
/x^13-a^2*b^2*(A*b+B*a)/x^10-5/7*a*b^3*(A*b+2*B*a)/x^7-1/4*b^4*(A
*b+5*B*a)/x^4-b^5*B/x
```

Maxima [A] time = 1.37421, size = 163, normalized size = 1.44

$$-\frac{27664\,Bb^5x^{18} + 6916\left(5\,Bab^4 + Ab^5\right)x^{15} + 19760\left(2\,Ba^2b^3 + Aab^4\right)x^{12} + 27664\left(Ba^3b^2 + Aa^2b^3\right)x^9 + 10640\left(Ba^4b + 2\,Aa^3b}{27664\,x^{19}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^20,x, algorithm="maxima")
```

```
[Out] -1/27664*(27664*B*b^5*x^18 + 6916*(5*B*a*b^4 + A*b^5)*x^15 + 1976
0*(2*B*a^2*b^3 + A*a*b^4)*x^12 + 27664*(B*a^3*b^2 + A*a^2*b^3)*x^
9 + 10640*(B*a^4*b + 2*A*a^3*b^2)*x^6 + 1456*A*a^5 + 1729*(B*a^5
+ 5*A*a^4*b)*x^3)/x^19
```

Fricas [A] time = 0.215082, size = 163, normalized size = 1.44

$$-\frac{27664\,Bb^5x^{18} + 6916\left(5\,Bab^4 + Ab^5\right)x^{15} + 19760\left(2\,Ba^2b^3 + Aab^4\right)x^{12} + 27664\left(Ba^3b^2 + Aa^2b^3\right)x^9 + 10640\left(Ba^4b + 2\,Aa^3b}{27664\,x^{19}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^20,x, algorithm="fricas")
```

```
[Out] -1/27664*(27664*B*b^5*x^18 + 6916*(5*B*a*b^4 + A*b^5)*x^15 + 1976
0*(2*B*a^2*b^3 + A*a*b^4)*x^12 + 27664*(B*a^3*b^2 + A*a^2*b^3)*x^
9 + 10640*(B*a^4*b + 2*A*a^3*b^2)*x^6 + 1456*A*a^5 + 1729*(B*a^5
+ 5*A*a^4*b)*x^3)/x^19
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**20,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.213534, size = 171, normalized size = 1.51

$$-\frac{27664\,Bb^5x^{18} + 34580\,Bab^4x^{15} + 6916\,Ab^5x^{15} + 39520\,Ba^2b^3x^{12} + 19760\,Aab^4x^{12} + 27664\,Ba^3b^2x^9 + 27664\,Aa^2b^3x^9 + 106}{27664\,x^{19}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^20,x, algorithm="giac")
```

```
[Out] -1/27664*(27664*B*b^5*x^18 + 34580*B*a*b^4*x^15 + 6916*A*b^5*x^15
 + 39520*B*a^2*b^3*x^12 + 19760*A*a*b^4*x^12 + 27664*B*a^3*b^2*x^
9 + 27664*A*a^2*b^3*x^9 + 10640*B*a^4*b*x^6 + 21280*A*a^3*b^2*x^6
 + 1729*B*a^5*x^3 + 8645*A*a^4*b*x^3 + 1456*A*a^5)/x^19
```

3.53 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^{21}}\,dx$

Optimal. Leaf size=117

$$-\frac{a^5A}{20x^{20}}-\frac{a^4(aB+5Ab)}{17x^{17}}-\frac{5a^3b(aB+2Ab)}{14x^{14}}-\frac{10a^2b^2(aB+Ab)}{11x^{11}}-\frac{b^4(5aB+Ab)}{5x^5}-\frac{5ab^3(2aB+Ab)}{8x^8}-\frac{b^5B}{2x^2}$$

```
[Out] -(a^5*A)/(20*x^20) - (a^4*(5*A*b + a*B))/(17*x^17) - (5*a^3*b*(2*
A*b + a*B))/(14*x^14) - (10*a^2*b^2*(A*b + a*B))/(11*x^11) - (5*a
*b^3*(A*b + 2*a*B))/(8*x^8) - (b^4*(A*b + 5*a*B))/(5*x^5) - (b^5*
B)/(2*x^2)
```

Rubi [A] time = 0.20038, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$-\frac{a^5A}{20x^{20}}-\frac{a^4(aB+5Ab)}{17x^{17}}-\frac{5a^3b(aB+2Ab)}{14x^{14}}-\frac{10a^2b^2(aB+Ab)}{11x^{11}}-\frac{b^4(5aB+Ab)}{5x^5}-\frac{5ab^3(2aB+Ab)}{8x^8}-\frac{b^5B}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^5*(A + B*x^3))/x^21,x]
```

```
[Out] -(a^5*A)/(20*x^20) - (a^4*(5*A*b + a*B))/(17*x^17) - (5*a^3*b*(2*
A*b + a*B))/(14*x^14) - (10*a^2*b^2*(A*b + a*B))/(11*x^11) - (5*a
*b^3*(A*b + 2*a*B))/(8*x^8) - (b^4*(A*b + 5*a*B))/(5*x^5) - (b^5*
B)/(2*x^2)
```

Rubi in Sympy [A] time = 22.7601, size = 116, normalized size = 0.99

$$-\frac{Aa^5}{20x^{20}}-\frac{Bb^5}{2x^2}-\frac{a^4(5Ab+Ba)}{17x^{17}}-\frac{5a^3b(2Ab+Ba)}{14x^{14}}-\frac{10a^2b^2(Ab+Ba)}{11x^{11}}-\frac{5ab^3(Ab+2Ba)}{8x^8}-\frac{b^4(Ab+5Ba)}{5x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**21,x)
```

```
[Out] -A*a**5/(20*x**20) - B*b**5/(2*x**2) - a**4*(5*A*b + B*a)/(17*x**
17) - 5*a**3*b*(2*A*b + B*a)/(14*x**14) - 10*a**2*b**2*(A*b + B*a
)/(11*x**11) - 5*a*b**3*(A*b + 2*B*a)/(8*x**8) - b**4*(A*b + 5*B*
a)/(5*x**5)
```

Mathematica [A] time = 0.0677279, size = 121, normalized size = 1.03

$$-\frac{154a^5\left(17A+20Bx^3\right)+1100a^4bx^3\left(14A+17Bx^3\right)+3400a^3b^2x^6\left(11A+14Bx^3\right)+5950a^2b^3x^9\left(8A+11Bx^3\right)+6545ab^4x^{12}}{52360x^{20}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^5*(A + B*x^3))/x^21,x]
```

```
[Out] -(5236*b^5*x^15*(2*A + 5*B*x^3) + 6545*a*b^4*x^12*(5*A + 8*B*x^3)
 + 5950*a^2*b^3*x^9*(8*A + 11*B*x^3) + 3400*a^3*b^2*x^6*(11*A + 1
4*B*x^3) + 1100*a^4*b*x^3*(14*A + 17*B*x^3) + 154*a^5*(17*A + 20*
B*x^3))/(52360*x^20)
```

Maple [A] time = 0.009, size = 104, normalized size = 0.9

$$-\frac{Aa^5}{20\,x^{20}}-\frac{a^4\,(5\,Ab+Ba)}{17\,x^{17}}-\frac{5\,a^3b\,(2\,Ab+Ba)}{14\,x^{14}}-\frac{10\,a^2b^2\,(Ab+Ba)}{11\,x^{11}}-\frac{5\,ab^3\,(Ab+2\,Ba)}{8\,x^8}-\frac{b^4\,(Ab+5\,Ba)}{5\,x^5}-\frac{Bb^5}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^21,x)
```

```
[Out] -1/20*a^5*A/x^20-1/17*a^4*(5*A*b+B*a)/x^17-5/14*a^3*b*(2*A*b+B*a)
/x^14-10/11*a^2*b^2*(A*b+B*a)/x^11-5/8*a*b^3*(A*b+2*B*a)/x^8-1/5*
b^4*(A*b+5*B*a)/x^5-1/2*b^5*B/x^2
```

Maxima [A] time = 1.36565, size = 163, normalized size = 1.39

$$-\frac{26180\,Bb^5x^{18}+10472\,\left(5\,Bab^4+Ab^5\right)x^{15}+32725\,\left(2\,Ba^2b^3+Aab^4\right)x^{12}+47600\,\left(Ba^3b^2+Aa^2b^3\right)x^9+18700\,\left(Ba^4b+2\,Aa^3\right.}{52360\,x^{20}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^21,x, algorithm="maxima")
```

```
[Out] -1/52360*(26180*B*b^5*x^18 + 10472*(5*B*a*b^4 + A*b^5)*x^15 + 327
25*(2*B*a^2*b^3 + A*a*b^4)*x^12 + 47600*(B*a^3*b^2 + A*a^2*b^3)*x
^9 + 18700*(B*a^4*b + 2*A*a^3*b^2)*x^6 + 2618*A*a^5 + 3080*(B*a^5
 + 5*A*a^4*b)*x^3)/x^20
```

Fricas [A] time = 0.210278, size = 163, normalized size = 1.39

$$-\frac{26180\,Bb^5x^{18}+10472\,\left(5\,Bab^4+Ab^5\right)x^{15}+32725\,\left(2\,Ba^2b^3+Aab^4\right)x^{12}+47600\,\left(Ba^3b^2+Aa^2b^3\right)x^9+18700\,\left(Ba^4b+2\,Aa^3\right.}{52360\,x^{20}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^21,x, algorithm="fricas")
```

```
[Out] -1/52360*(26180*B*b^5*x^18 + 10472*(5*B*a*b^4 + A*b^5)*x^15 + 327
25*(2*B*a^2*b^3 + A*a*b^4)*x^12 + 47600*(B*a^3*b^2 + A*a^2*b^3)*x
^9 + 18700*(B*a^4*b + 2*A*a^3*b^2)*x^6 + 2618*A*a^5 + 3080*(B*a^5
 + 5*A*a^4*b)*x^3)/x^20
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**21,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.215366, size = 171, normalized size = 1.46

$$-\frac{26180\,Bb^5x^{18}+52360\,Bab^4x^{15}+10472\,Ab^5x^{15}+65450\,Ba^2b^3x^{12}+32725\,Aab^4x^{12}+47600\,Ba^3b^2x^9+47600\,Aa^2b^3x^9+18}{52360\,x^{20}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^21,x, algorithm="giac")
```

```
[Out] -1/52360*(26180*B*b^5*x^18 + 52360*B*a*b^4*x^15 + 10472*A*b^5*x^1
5 + 65450*B*a^2*b^3*x^12 + 32725*A*a*b^4*x^12 + 47600*B*a^3*b^2*x
^9 + 47600*A*a^2*b^3*x^9 + 18700*B*a^4*b*x^6 + 37400*A*a^3*b^2*x^
6 + 3080*B*a^5*x^3 + 15400*A*a^4*b*x^3 + 2618*A*a^5)/x^20
```

3.54 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^{22}}\,dx$

Optimal. Leaf size=48

$$\frac{(a+bx^3)^6(Ab-7aB)}{126a^2x^{18}}-\frac{A(a+bx^3)^6}{21ax^{21}}$$

```
[Out] -(A*(a + b*x^3)^6)/(21*a*x^21) + ((A*b - 7*a*B)*(a + b*x^3)^6)/(1
26*a^2*x^18)
```

Rubi [A] time = 0.129443, antiderivative size = 48, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$\frac{(a+bx^3)^6(Ab-7aB)}{126a^2x^{18}}-\frac{A(a+bx^3)^6}{21ax^{21}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^22,x]
```

```
[Out] -(A*(a + b*x^3)^6)/(21*a*x^21) + ((A*b - 7*a*B)*(a + b*x^3)^6)/(1
26*a^2*x^18)
```

Rubi in Sympy [A] time = 9.76328, size = 41, normalized size = 0.85

$$-\frac{A(a+bx^3)^6}{21ax^{21}}+\frac{(a+bx^3)^6(Ab-7Ba)}{126a^2x^{18}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**22,x)
```

```
[Out] -A*(a + b*x**3)**6/(21*a*x**21) + (a + b*x**3)**6*(A*b - 7*B*a)/(
126*a**2*x**18)
```

Mathematica [B] time = 0.0666825, size = 118, normalized size = 2.46

$$-\frac{a^5(6A+7Bx^3)+7a^4bx^3(5A+6Bx^3)+21a^3b^2x^6(4A+5Bx^3)+35a^2b^3x^9(3A+4Bx^3)+35ab^4x^{12}(2A+3Bx^3)+21b^5x^{1}}{126x^{21}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^22,x]
```

```
[Out] -(21*b^5*x^15*(A + 2*B*x^3) + 35*a*b^4*x^12*(2*A + 3*B*x^3) + 35*
a^2*b^3*x^9*(3*A + 4*B*x^3) + 21*a^3*b^2*x^6*(4*A + 5*B*x^3) + 7*
a^4*b*x^3*(5*A + 6*B*x^3) + a^5*(6*A + 7*B*x^3))/(126*x^21)
```

Maple [B] time = 0.009, size = 104, normalized size = 2.2

$$-\frac{5\,a^2b^2(Ab+Ba)}{6\,x^{12}}-\frac{a^3b(2\,Ab+Ba)}{3\,x^{15}}-\frac{b^4(Ab+5\,Ba)}{6\,x^6}-\frac{5\,ab^3(Ab+2\,Ba)}{9\,x^9}-\frac{Bb^5}{3\,x^3}-\frac{a^4(5\,Ab+Ba)}{18\,x^{18}}-\frac{Aa^5}{21\,x^{21}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^22,x)
```

```
[Out] -5/6*a^2*b^2*(A*b+B*a)/x^12-1/3*a^3*b*(2*A*b+B*a)/x^15-1/6*b^4*(A
*b+5*B*a)/x^6-5/9*a*b^3*(A*b+2*B*a)/x^9-1/3*B*b^5/x^3-1/18*a^4*(5
*A*b+B*a)/x^18-1/21*A*a^5/x^21
```

Maxima [A] time = 1.37313, size = 163, normalized size = 3.4

$$-\frac{42\,Bb^5x^{18} + 21\left(5\,Bab^4 + Ab^5\right)x^{15} + 70\left(2\,Ba^2b^3 + Aab^4\right)x^{12} + 105\left(Ba^3b^2 + Aa^2b^3\right)x^9 + 42\left(Ba^4b + 2\,Aa^3b^2\right)x^6 + 6\,Aa^5 + \cdots}{126\,x^{21}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^22,x, algorithm="maxima")
```

```
[Out] -1/126*(42*B*b^5*x^18 + 21*(5*B*a*b^4 + A*b^5)*x^15 + 70*(2*B*a^2
*b^3 + A*a*b^4)*x^12 + 105*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 42*(B*a^
4*b + 2*A*a^3*b^2)*x^6 + 6*A*a^5 + 7*(B*a^5 + 5*A*a^4*b)*x^3)/x^2
1
```

Fricas [A] time = 0.224056, size = 163, normalized size = 3.4

$$-\frac{42\,Bb^5x^{18} + 21\left(5\,Bab^4 + Ab^5\right)x^{15} + 70\left(2\,Ba^2b^3 + Aab^4\right)x^{12} + 105\left(Ba^3b^2 + Aa^2b^3\right)x^9 + 42\left(Ba^4b + 2\,Aa^3b^2\right)x^6 + 6\,Aa^5 + \cdots}{126\,x^{21}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^22,x, algorithm="fricas")
```

```
[Out] -1/126*(42*B*b^5*x^18 + 21*(5*B*a*b^4 + A*b^5)*x^15 + 70*(2*B*a^2
*b^3 + A*a*b^4)*x^12 + 105*(B*a^3*b^2 + A*a^2*b^3)*x^9 + 42*(B*a^
4*b + 2*A*a^3*b^2)*x^6 + 6*A*a^5 + 7*(B*a^5 + 5*A*a^4*b)*x^3)/x^2
1
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**22,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.213447, size = 171, normalized size = 3.56

$$-\frac{42\,Bb^5x^{18} + 105\,Bab^4x^{15} + 21\,Ab^5x^{15} + 140\,Ba^2b^3x^{12} + 70\,Aab^4x^{12} + 105\,Ba^3b^2x^9 + 105\,Aa^2b^3x^9 + 42\,Ba^4bx^6 + 84\,Aa^3b^2x \cdots}{126\,x^{21}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^22,x, algorithm="giac")
```

```
[Out] -1/126*(42*B*b^5*x^18 + 105*B*a*b^4*x^15 + 21*A*b^5*x^15 + 140*B*
a^2*b^3*x^12 + 70*A*a*b^4*x^12 + 105*B*a^3*b^2*x^9 + 105*A*a^2*b^
3*x^9 + 42*B*a^4*b*x^6 + 84*A*a^3*b^2*x^6 + 7*B*a^5*x^3 + 35*A*a^
4*b*x^3 + 6*A*a^5)/x^21
```

3.55 $\int \frac{(a+bx^3)^5(A+Bx^3)}{x^{23}}\,dx$

Optimal. Leaf size=117

$$-\frac{a^5A}{22x^{22}}-\frac{a^4(aB+5Ab)}{19x^{19}}-\frac{5a^3b(aB+2Ab)}{16x^{16}}-\frac{10a^2b^2(aB+Ab)}{13x^{13}}-\frac{b^4(5aB+Ab)}{7x^7}-\frac{ab^3(2aB+Ab)}{2x^{10}}-\frac{b^5B}{4x^4}$$

```
[Out] -(a^5*A)/(22*x^22) - (a^4*(5*A*b + a*B))/(19*x^19) - (5*a^3*b*(2*
A*b + a*B))/(16*x^16) - (10*a^2*b^2*(A*b + a*B))/(13*x^13) - (a*b
^3*(A*b + 2*a*B))/(2*x^10) - (b^4*(A*b + 5*a*B))/(7*x^7) - (b^5*B
)/(4*x^4)
```

Rubi [A] time = 0.208572, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$-\frac{a^5A}{22x^{22}}-\frac{a^4(aB+5Ab)}{19x^{19}}-\frac{5a^3b(aB+2Ab)}{16x^{16}}-\frac{10a^2b^2(aB+Ab)}{13x^{13}}-\frac{b^4(5aB+Ab)}{7x^7}-\frac{ab^3(2aB+Ab)}{2x^{10}}-\frac{b^5B}{4x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^5*(A + B*x^3))/x^23,x]
```

```
[Out] -(a^5*A)/(22*x^22) - (a^4*(5*A*b + a*B))/(19*x^19) - (5*a^3*b*(2*
A*b + a*B))/(16*x^16) - (10*a^2*b^2*(A*b + a*B))/(13*x^13) - (a*b
^3*(A*b + 2*a*B))/(2*x^10) - (b^4*(A*b + 5*a*B))/(7*x^7) - (b^5*B
)/(4*x^4)
```

Rubi in Sympy [A] time = 23.0413, size = 114, normalized size = 0.97

$$-\frac{Aa^5}{22x^{22}}-\frac{Bb^5}{4x^4}-\frac{a^4\,(5Ab+Ba)}{19x^{19}}-\frac{5a^3b\,(2Ab+Ba)}{16x^{16}}-\frac{10a^2b^2\,(Ab+Ba)}{13x^{13}}-\frac{ab^3\,(Ab+2Ba)}{2x^{10}}-\frac{b^4\,(Ab+5Ba)}{7x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**5*(B*x**3+A)/x**23,x)
```

```
[Out] -A*a**5/(22*x**22) - B*b**5/(4*x**4) - a**4*(5*A*b + B*a)/(19*x**
19) - 5*a**3*b*(2*A*b + B*a)/(16*x**16) - 10*a**2*b**2*(A*b + B*a
)/(13*x**13) - a*b**3*(A*b + 2*B*a)/(2*x**10) - b**4*(A*b + 5*B*a
)/(7*x**7)
```

Mathematica [A] time = 0.0955924, size = 117, normalized size = 1.

$$-\frac{a^5A}{22x^{22}}-\frac{a^4(aB+5Ab)}{19x^{19}}-\frac{5a^3b(aB+2Ab)}{16x^{16}}-\frac{10a^2b^2(aB+Ab)}{13x^{13}}-\frac{b^4(5aB+Ab)}{7x^7}-\frac{ab^3(2aB+Ab)}{2x^{10}}-\frac{b^5B}{4x^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^5*(A + B*x^3))/x^23,x]
```

```
[Out] -(a^5*A)/(22*x^22) - (a^4*(5*A*b + a*B))/(19*x^19) - (5*a^3*b*(2*
A*b + a*B))/(16*x^16) - (10*a^2*b^2*(A*b + a*B))/(13*x^13) - (a*b
^3*(A*b + 2*a*B))/(2*x^10) - (b^4*(A*b + 5*a*B))/(7*x^7) - (b^5*B
)/(4*x^4)
```

Maple [A] time = 0.008, size = 104, normalized size = 0.9

$$-\frac{Aa^{5}}{22\,x^{22}}-\frac{a^{4}\left(5\,Ab+Ba\right)}{19\,x^{19}}-\frac{5\,a^{3}b\left(2\,Ab+Ba\right)}{16\,x^{16}}-\frac{10\,a^{2}b^{2}\left(Ab+Ba\right)}{13\,x^{13}}-\frac{ab^{3}\left(Ab+2\,Ba\right)}{2\,x^{10}}-\frac{b^{4}\left(Ab+5\,Ba\right)}{7\,x^{7}}-\frac{Bb^{5}}{4\,x^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^5*(B*x^3+A)/x^23,x)
```

```
[Out] -1/22*a^5*A/x^22-1/19*a^4*(5*A*b+B*a)/x^19-5/16*a^3*b*(2*A*b+B*a)
/x^16-10/13*a^2*b^2*(A*b+B*a)/x^13-1/2*a*b^3*(A*b+2*B*a)/x^10-1/7
*b^4*(A*b+5*B*a)/x^7-1/4*b^5*B/x^4
```

Maxima [A] time = 1.37735, size = 163, normalized size = 1.39

$$-\frac{76076\,Bb^{5}x^{18}+43472\left(5\,Bab^{4}+Ab^{5}\right)x^{15}+152152\left(2\,Ba^{2}b^{3}+Aab^{4}\right)x^{12}+234080\left(Ba^{3}b^{2}+Aa^{2}b^{3}\right)x^{9}+95095\left(Ba^{4}b+2\,A\right.}{304304\,x^{22}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^23,x, algorithm="maxima")
```

```
[Out] -1/304304*(76076*B*b^5*x^18 + 43472*(5*B*a*b^4 + A*b^5)*x^15 + 15
2152*(2*B*a^2*b^3 + A*a*b^4)*x^12 + 234080*(B*a^3*b^2 + A*a^2*b^3
)*x^9 + 95095*(B*a^4*b + 2*A*a^3*b^2)*x^6 + 13832*A*a^5 + 16016*(
B*a^5 + 5*A*a^4*b)*x^3)/x^22
```

Fricas [A] time = 0.221386, size = 163, normalized size = 1.39

$$-\frac{76076\,Bb^{5}x^{18}+43472\left(5\,Bab^{4}+Ab^{5}\right)x^{15}+152152\left(2\,Ba^{2}b^{3}+Aab^{4}\right)x^{12}+234080\left(Ba^{3}b^{2}+Aa^{2}b^{3}\right)x^{9}+95095\left(Ba^{4}b+2\,A\right.}{304304\,x^{22}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^23,x, algorithm="fricas")
```

```
[Out] -1/304304*(76076*B*b^5*x^18 + 43472*(5*B*a*b^4 + A*b^5)*x^15 + 15
2152*(2*B*a^2*b^3 + A*a*b^4)*x^12 + 234080*(B*a^3*b^2 + A*a^2*b^3
)*x^9 + 95095*(B*a^4*b + 2*A*a^3*b^2)*x^6 + 13832*A*a^5 + 16016*(
B*a^5 + 5*A*a^4*b)*x^3)/x^22
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**5*(B*x**3+A)/x**23,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21254, size = 171, normalized size = 1.46

$$-\frac{76076\,Bb^{5}x^{18}+217360\,Bab^{4}x^{15}+43472\,Ab^{5}x^{15}+304304\,Ba^{2}b^{3}x^{12}+152152\,Aab^{4}x^{12}+234080\,Ba^{3}b^{2}x^{9}+234080\,Aa^{2}b^{3}x}{304304\,x^{22}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5/x^23,x, algorithm="giac")
```

```
[Out] -1/304304*(76076*B*b^5*x^18 + 217360*B*a*b^4*x^15 + 43472*A*b^5*x
^15 + 304304*B*a^2*b^3*x^12 + 152152*A*a*b^4*x^12 + 234080*B*a^3*
b^2*x^9 + 234080*A*a^2*b^3*x^9 + 95095*B*a^4*b*x^6 + 190190*A*a^3
*b^2*x^6 + 16016*B*a^5*x^3 + 80080*A*a^4*b*x^3 + 13832*A*a^5)/x^2
2
```

3.56 $\int \frac{x^6\left(A+Bx^3\right)}{a+bx^3}\,dx$

Optimal. Leaf size=183

$$-\frac{a^{4/3}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{10/3}}+\frac{a^{4/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{10/3}}-\frac{a^{4/3}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{10/3}}-\frac{ax(Ab-aB)}{b^3}+\frac{x^4(Ab-aB)}{4b^2}+\frac{Bx^7}{7b}$$

```
[Out] -((a*(A*b - a*B)*x)/b^3) + ((A*b - a*B)*x^4)/(4*b^2) + (B*x^7)/(7
*b) - (a^(4/3)*(A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3
]*a^(1/3))])/(Sqrt[3]*b^(10/3)) + (a^(4/3)*(A*b - a*B)*Log[a^(1/3
) + b^(1/3)*x])/(3*b^(10/3)) - (a^(4/3)*(A*b - a*B)*Log[a^(2/3) -
 a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(10/3))
```

Rubi [A] time = 0.381213, antiderivative size = 183, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$-\frac{a^{4/3}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{10/3}}+\frac{a^{4/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{10/3}}-\frac{a^{4/3}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{10/3}}-\frac{ax(Ab-aB)}{b^3}+\frac{x^4(Ab-aB)}{4b^2}+\frac{Bx^7}{7b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^6*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] -((a*(A*b - a*B)*x)/b^3) + ((A*b - a*B)*x^4)/(4*b^2) + (B*x^7)/(7
*b) - (a^(4/3)*(A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3
]*a^(1/3))])/(Sqrt[3]*b^(10/3)) + (a^(4/3)*(A*b - a*B)*Log[a^(1/3
) + b^(1/3)*x])/(3*b^(10/3)) - (a^(4/3)*(A*b - a*B)*Log[a^(2/3) -
 a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(10/3))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{Bx^7}{7b}+\frac{a^{\frac{4}{3}}(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{\frac{10}{3}}}-\frac{a^{\frac{4}{3}}(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6b^{\frac{10}{3}}}-\frac{\sqrt{3}a^{\frac{4}{3}}(Ab-Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3b^{\frac{10}{3}}}+\frac{x^4(Ab-Ba)}{4b^2}-\frac{(Ab-Ba)\int a\,dx}{b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**7/(7*b) + a**(4/3)*(A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(3
*b**(10/3)) - a**(4/3)*(A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/
3)*x + b**(2/3)*x**2)/(6*b**(10/3)) - sqrt(3)*a**(4/3)*(A*b - B*a
)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*b**(10/
3)) + x**4*(A*b - B*a)/(4*b**2) - (A*b - B*a)*Integral(a, x)/b**3
```

Mathematica [A] time = 0.27454, size = 171, normalized size = 0.93

$$\frac{14a^{4/3}(aB-Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-28a^{4/3}(aB-Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)+28\sqrt{3}a^{4/3}(aB-Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)+}{84b^{10/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^6*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (84*a*b^(1/3)*(-(A*b) + a*B)*x + 21*b^(4/3)*(A*b - a*B)*x^4 + 12*
b^(7/3)*B*x^7 + 28*Sqrt[3]*a^(4/3)*(-(A*b) + a*B)*ArcTan[(1 - (2*
b^(1/3)*x)/a^(1/3))/Sqrt[3]] - 28*a^(4/3)*(-(A*b) + a*B)*Log[a^(1
/3) + b^(1/3)*x] + 14*a^(4/3)*(-(A*b) + a*B)*Log[a^(2/3) - a^(1/3
)*b^(1/3)*x + b^(2/3)*x^2])/(84*b^(10/3))
```

Maple [A] time = 0.005, size = 249, normalized size = 1.4

$$\frac{Bx^7}{7b}+\frac{Ax^4}{4b}-\frac{Bx^4a}{4b^2}-\frac{aAx}{b^2}+\frac{Bxa^2}{b^3}+\frac{Aa^2}{3b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{Ba^3}{3b^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{Aa^2}{6b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{Ba^3}{6b^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{a^2\sqrt{3}A}{3b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{a^3\sqrt{3}B}{3b^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 1/7*B*x^7/b+1/4/b*A*x^4-1/4/b^2*B*x^4*a-1/b^2*A*x*a+1/b^3*B*x*a^2
+1/3*a^2/b^3/(a/b)^(2/3)*ln(x+(a/b)^(1/3))*A-1/3*a^3/b^4/(a/b)^(2
/3)*ln(x+(a/b)^(1/3))*B-1/6*a^2/b^3/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1
/3)+(a/b)^(2/3))*A+1/6*a^3/b^4/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(
a/b)^(2/3))*B+1/3*a^2/b^3/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*
(2/(a/b)^(1/3)*x-1))*A-1/3*a^3/b^4/(a/b)^(2/3)*3^(1/2)*arctan(1/3
*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.245927, size = 244, normalized size = 1.33

$$\frac{\sqrt{3}\left(14\sqrt{3}\left(Ba^2-Aab\right)\left(\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x^2-x\left(\frac{a}{b}\right)^{\frac{1}{3}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)-28\sqrt{3}\left(Ba^2-Aab\right)\left(\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)+84\left(Ba^2-Aab\right)\left(\frac{a}{b}\right)^{\frac{1}{3}}\right.}{252\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/252*sqrt(3)*(14*sqrt(3)*(B*a^2 - A*a*b)*(a/b)^(1/3)*log(x^2 - x
*(a/b)^(1/3) + (a/b)^(2/3)) - 28*sqrt(3)*(B*a^2 - A*a*b)*(a/b)^(1
/3)*log(x + (a/b)^(1/3)) + 84*(B*a^2 - A*a*b)*(a/b)^(1/3)*arctan(
-1/3*(2*sqrt(3)*x - sqrt(3)*(a/b)^(1/3))/(a/b)^(1/3)) + 3*sqrt(3)
*(4*B*b^2*x^7 - 7*(B*a*b - A*b^2)*x^4 + 28*(B*a^2 - A*a*b)*x))/b^
3
```

Sympy [A] time = 2.45915, size = 110, normalized size = 0.6

$$\frac{Bx^7}{7b} + \operatorname{RootSum}\left(27t^3b^{10} - A^3a^4b^3 + 3A^2Ba^5b^2 - 3AB^2a^6b + B^3a^7, \left(t \mapsto t\log\left(-\frac{3tb^3}{-Aab + Ba^2} + x\right)\right)\right) - \frac{x^4(-Ab + Ba)}{4b^2} + \frac{x(-Aab + Ba^2)}{b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**7/(7*b) + RootSum(27*_t**3*b**10 - A**3*a**4*b**3 + 3*A**2*B
*a**5*b**2 - 3*A*B**2*a**6*b + B**3*a**7, Lambda(_t, _t*log(-3*_t
*b**3/(-A*a*b + B*a**2) + x))) - x**4*(-A*b + B*a)/(4*b**2) + x*(
-A*a*b + B*a**2)/b**3
```

GIAC/XCAS [A] time = 0.219523, size = 293, normalized size = 1.6

$$-\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{1}{3}}Ba^2 - \left(-ab^2\right)^{\frac{1}{3}}Aab\right)\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3b^4} - \frac{\left(\left(-ab^2\right)^{\frac{1}{3}}Ba^2 - \left(-ab^2\right)^{\frac{1}{3}}Aab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6b^4} + \frac{\left(Ba^3b^4 - Aa^2b^5\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3ab^7} + \frac{4Bb^6x^7 - 7Bab^5x^4 + 7Ab^6x^4 + 28Ba^2b^4x - 28Aab^5x}{28b^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] -1/3*sqrt(3)*((-a*b^2)^(1/3)*B*a^2 - (-a*b^2)^(1/3)*A*a*b)*arctan
(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/b^4 - 1/6*((-a*b^
2)^(1/3)*B*a^2 - (-a*b^2)^(1/3)*A*a*b)*ln(x^2 + x*(-a/b)^(1/3) +
(-a/b)^(2/3))/b^4 + 1/3*(B*a^3*b^4 - A*a^2*b^5)*(-a/b)^(1/3)*ln(a
bs(x - (-a/b)^(1/3)))/(a*b^7) + 1/28*(4*B*b^6*x^7 - 7*B*a*b^5*x^4
 + 7*A*b^6*x^4 + 28*B*a^2*b^4*x - 28*A*a*b^5*x)/b^7
```

3.57 $\int \frac{x^5\left(A+Bx^3\right)}{a+bx^3}\,dx$

Optimal. Leaf size=54

$$-\frac{a(Ab-aB)\log\left(a+bx^3\right)}{3b^3}+\frac{x^3(Ab-aB)}{3b^2}+\frac{Bx^6}{6b}$$

```
[Out] ((A*b - a*B)*x^3)/(3*b^2) + (B*x^6)/(6*b) - (a*(A*b - a*B)*Log[a
+ b*x^3])/(3*b^3)
```

Rubi [A] time = 0.154003, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{a(Ab-aB)\log\left(a+bx^3\right)}{3b^3}+\frac{x^3(Ab-aB)}{3b^2}+\frac{Bx^6}{6b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] ((A*b - a*B)*x^3)/(3*b^2) + (B*x^6)/(6*b) - (a*(A*b - a*B)*Log[a
+ b*x^3])/(3*b^3)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{B\int^{x^3} x\,dx}{3b}-\frac{a\,(Ab-Ba)\log\left(a+bx^3\right)}{3b^3}+\left(\frac{Ab}{3}-\frac{Ba}{3}\right)\int^{x^3}\frac{1}{b^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*Integral(x, (x, x**3))/(3*b) - a*(A*b - B*a)*log(a + b*x**3)/(3
*b**3) + (A*b/3 - B*a/3)*Integral(b**(-2), (x, x**3))
```

Mathematica [A] time = 0.0378745, size = 47, normalized size = 0.87

$$\frac{bx^3\left(-2aB+2Ab+bBx^3\right)+2a(aB-Ab)\log\left(a+bx^3\right)}{6b^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (b*x^3*(2*A*b - 2*a*B + b*B*x^3) + 2*a*(-(A*b) + a*B)*Log[a + b*x
^3])/(6*b^3)
```

Maple [A] time = 0.005, size = 62, normalized size = 1.2

$$\frac{Bx^6}{6\,b}+\frac{Ax^3}{3\,b}-\frac{Bx^3a}{3\,b^2}-\frac{a\ln\left(bx^3+a\right)A}{3\,b^2}+\frac{a^2\ln\left(bx^3+a\right)B}{3\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 1/6*B*x^6/b+1/3/b*A*x^3-1/3/b^2*B*x^3*a-1/3*a/b^2*ln(b*x^3+a)*A+1
/3*a^2/b^3*ln(b*x^3+a)*B
```

Maxima [A] time = 1.37947, size = 68, normalized size = 1.26

$$\frac{Bbx^6 - 2\,(Ba - Ab)x^3}{6\,b^2} + \frac{\left(Ba^2 - Aab\right)\log\left(bx^3 + a\right)}{3\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] 1/6*(B*b*x^6 - 2*(B*a - A*b)*x^3)/b^2 + 1/3*(B*a^2 - A*a*b)*log(b
*x^3 + a)/b^3
```

Fricas [A] time = 0.232218, size = 69, normalized size = 1.28

$$\frac{Bb^2x^6 - 2\left(Bab - Ab^2\right)x^3 + 2\left(Ba^2 - Aab\right)\log\left(bx^3 + a\right)}{6\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/6*(B*b^2*x^6 - 2*(B*a*b - A*b^2)*x^3 + 2*(B*a^2 - A*a*b)*log(b*
x^3 + a))/b^3
```

Sympy [A] time = 2.07418, size = 44, normalized size = 0.81

$$\frac{Bx^6}{6b} + \frac{a\,(-Ab + Ba)\log\left(a + bx^3\right)}{3b^3} - \frac{x^3\,(-Ab + Ba)}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**6/(6*b) + a*(-A*b + B*a)*log(a + b*x**3)/(3*b**3) - x**3*(-A
*b + B*a)/(3*b**2)
```

GIAC/XCAS [A] time = 0.219432, size = 70, normalized size = 1.3

$$\frac{Bbx^6 - 2\,Bax^3 + 2\,Abx^3}{6\,b^2} + \frac{\left(Ba^2 - Aab\right)\ln\left(\left|bx^3 + a\right|\right)}{3\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 1/6*(B*b*x^6 - 2*B*a*x^3 + 2*A*b*x^3)/b^2 + 1/3*(B*a^2 - A*a*b)*l
n(abs(b*x^3 + a))/b^3
```

3.58 $\int \frac{x^4(A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=167

$$-\frac{a^{2/3}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{8/3}}+\frac{a^{2/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{8/3}}+\frac{a^{2/3}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{8/3}}+\frac{x^2(Ab-aB)}{2b^2}+\frac{Bx^5}{5b}$$

```
[Out] ((A*b - a*B)*x^2)/(2*b^2) + (B*x^5)/(5*b) + (a^(2/3)*(A*b - a*B)*
ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*b^(8/
3)) + (a^(2/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(3*b^(8/3))
- (a^(2/3)*(A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*
x^2])/(6*b^(8/3))
```

Rubi [A] time = 0.316466, antiderivative size = 167, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$-\frac{a^{2/3}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{8/3}}+\frac{a^{2/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{8/3}}+\frac{a^{2/3}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{8/3}}+\frac{x^2(Ab-aB)}{2b^2}+\frac{Bx^5}{5b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] ((A*b - a*B)*x^2)/(2*b^2) + (B*x^5)/(5*b) + (a^(2/3)*(A*b - a*B)*
ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*b^(8/
3)) + (a^(2/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(3*b^(8/3))
- (a^(2/3)*(A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*
x^2])/(6*b^(8/3))
```

Rubi in Sympy [A] time = 37.7182, size = 153, normalized size = 0.92

$$\frac{Bx^5}{5b}+\frac{a^{\frac{2}{3}}(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{\frac{8}{3}}}-\frac{a^{\frac{2}{3}}(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6b^{\frac{8}{3}}}+\frac{\sqrt{3}a^{\frac{2}{3}}(Ab-Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3b^{\frac{8}{3}}}+\frac{x^2(Ab-Ba)}{2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**5/(5*b) + a**(2/3)*(A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(3
*b**(8/3)) - a**(2/3)*(A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3
)*x + b**(2/3)*x**2)/(6*b**(8/3)) + sqrt(3)*a**(2/3)*(A*b - B*a)*
atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*b**(8/3))
 + x**2*(A*b - B*a)/(2*b**2)
```

Mathematica [A] time = 0.168146, size = 154, normalized size = 0.92

$$\frac{5a^{2/3}(aB-Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-10a^{2/3}(aB-Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-10\sqrt{3}a^{2/3}(aB-Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)+1}{30b^{8/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^4*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (15*b^(2/3)*(A*b - a*B)*x^2 + 6*b^(5/3)*B*x^5 - 10*Sqrt[3]*a^(2/3
)*(-(A*b) + a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] - 10
*a^(2/3)*(-(A*b) + a*B)*Log[a^(1/3) + b^(1/3)*x] + 5*a^(2/3)*(-(A
*b) + a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(30*b^
(8/3))
```

Maple [A] time = 0.006, size = 226, normalized size = 1.4

$$\frac{Bx^5}{5b}+\frac{Ax^2}{2b}-\frac{Bx^2a}{2b^2}+\frac{aA}{3b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{a^2B}{3b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{aA}{6b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{a^2B}{6b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{a\sqrt{3}A}{3b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{a^2\sqrt{3}B}{3b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 1/5*B*x^5/b+1/2/b*A*x^2-1/2/b^2*B*x^2*a+1/3*a/b^2/(a/b)^(1/3)*ln(
x+(a/b)^(1/3))*A-1/3*a^2/b^3/(a/b)^(1/3)*ln(x+(a/b)^(1/3))*B-1/6*
a/b^2/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*A+1/6*a^2/b^3
/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*B-1/3*a/b^2*3^(1/2
)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*A+1/3*a^2/b
^3*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.235575, size = 247, normalized size = 1.48

$$\frac{\sqrt{3}\left(5\sqrt{3}(Ba-Ab)\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\log\left(ax^2-bx\left(\frac{a^2}{b^2}\right)^{\frac{2}{3}}+a\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\right)-10\sqrt{3}(Ba-Ab)\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\log\left(ax+b\left(\frac{a^2}{b^2}\right)^{\frac{2}{3}}\right)-30(Ba-Ab)\left(\frac{a^2}{b^2}\right.\right.}{90b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/90*sqrt(3)*(5*sqrt(3)*(B*a - A*b)*(a^2/b^2)^(1/3)*log(a*x^2 - b
*x*(a^2/b^2)^(2/3) + a*(a^2/b^2)^(1/3)) - 10*sqrt(3)*(B*a - A*b)*
(a^2/b^2)^(1/3)*log(a*x + b*(a^2/b^2)^(2/3)) - 30*(B*a - A*b)*(a^
2/b^2)^(1/3)*arctan(-1/3*(2*sqrt(3)*a*x - sqrt(3)*b*(a^2/b^2)^(2/
3))/(b*(a^2/b^2)^(2/3))) + 3*sqrt(3)*(2*B*b*x^5 - 5*(B*a - A*b)*x
^2))/b^2
```

Sympy [A] time = 2.12063, size = 112, normalized size = 0.67

$$\frac{Bx^5}{5b} + \operatorname{RootSum}\left(27t^3b^8 - A^3a^2b^3 + 3A^2Ba^3b^2 - 3AB^2a^4b + B^3a^5, \left(t \mapsto t\log\left(\frac{9t^2b^5}{A^2ab^2 - 2ABa^2b + B^2a^3} + x\right)\right)\right) - \frac{x^2\left(-Ab + Ba\right)}{2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**5/(5*b) + RootSum(27*_t**3*b**8 - A**3*a**2*b**3 + 3*A**2*B*
a**3*b**2 - 3*A*B**2*a**4*b + B**3*a**5, Lambda(_t, _t*log(9*_t**
2*b**5/(A**2*a*b**2 - 2*A*B*a**2*b + B**2*a**3) + x))) - x**2*(-A
*b + B*a)/(2*b**2)
```

GIAC/XCAS [A] time = 0.219821, size = 279, normalized size = 1.67

$$-\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{2}{3}}Ba - \left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3b^4} + \frac{\left(\left(-ab^2\right)^{\frac{2}{3}}Ba - \left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6b^4} - \frac{\left(Ba^2b^3\left(-\frac{a}{b}\right)^{\frac{1}{3}} - Aab^4\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3ab^5} + \frac{2Bb^4x^5 - 5Bab^3x^2 + 5Ab^4x^2}{10b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] -1/3*sqrt(3)*((-a*b^2)^(2/3)*B*a - (-a*b^2)^(2/3)*A*b)*arctan(1/3
*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/b^4 + 1/6*((-a*b^2)^(
2/3)*B*a - (-a*b^2)^(2/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(
2/3))/b^4 - 1/3*(B*a^2*b^3*(-a/b)^(1/3) - A*a*b^4*(-a/b)^(1/3))*(
-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^5) + 1/10*(2*B*b^4*x^5
 - 5*B*a*b^3*x^2 + 5*A*b^4*x^2)/b^5
```

3.59 $\int \frac{x^3(A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=162

$$\frac{\sqrt[3]{a}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{7/3}}-\frac{\sqrt[3]{a}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{7/3}}+\frac{\sqrt[3]{a}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{7/3}}+\frac{x(Ab-aB)}{b^2}+\frac{Bx^4}{4b}$$

```
[Out] ((A*b - a*B)*x)/b^2 + (B*x^4)/(4*b) + (a^(1/3)*(A*b - a*B)*ArcTan
[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*b^(7/3)) -
(a^(1/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(3*b^(7/3)) + (a^(
1/3)*(A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/
(6*b^(7/3))
```

Rubi [A] time = 0.289126, antiderivative size = 162, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.4$

$$\frac{\sqrt[3]{a}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{7/3}}-\frac{\sqrt[3]{a}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{7/3}}+\frac{\sqrt[3]{a}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{7/3}}+\frac{x(Ab-aB)}{b^2}+\frac{Bx^4}{4b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] ((A*b - a*B)*x)/b^2 + (B*x^4)/(4*b) + (a^(1/3)*(A*b - a*B)*ArcTan
[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*b^(7/3)) -
(a^(1/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(3*b^(7/3)) + (a^(
1/3)*(A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/
(6*b^(7/3))
```

Rubi in Sympy [A] time = 40.1321, size = 150, normalized size = 0.93

$$\frac{Bx^4}{4b}-\frac{\sqrt[3]{a}\,(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{\frac{7}{3}}}+\frac{\sqrt[3]{a}\,(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6b^{\frac{7}{3}}}+\frac{\sqrt{3}\sqrt[3]{a}\,(Ab-Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3b^{\frac{7}{3}}}+\frac{x\,(Ab-Ba)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**4/(4*b) - a**(1/3)*(A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(3
*b**(7/3)) + a**(1/3)*(A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3
)*x + b**(2/3)*x**2)/(6*b**(7/3)) + sqrt(3)*a**(1/3)*(A*b - B*a)*
atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*b**(7/3))
 + x*(A*b - B*a)/b**2
```

Mathematica [A] time = 0.150298, size = 152, normalized size = 0.94

$$\frac{-2\sqrt[3]{a}(aB-Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)+12\sqrt[3]{b}x(Ab-aB)+4\sqrt[3]{a}(aB-Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-4\sqrt{3}\sqrt[3]{a}(aB-Ab)\tan^{-}}{12b^{7/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^3*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (12*b^(1/3)*(A*b - a*B)*x + 3*b^(4/3)*B*x^4 - 4*Sqrt[3]*a^(1/3)*(
-(A*b) + a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 4*a^(
1/3)*(-(A*b) + a*B)*Log[a^(1/3) + b^(1/3)*x] - 2*a^(1/3)*(-(A*b)
+ a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(12*b^(7/3
))
```

Maple [A] time = 0.003, size = 221, normalized size = 1.4

$$\frac{Bx^4}{4b}+\frac{Ax}{b}-\frac{Bxa}{b^2}-\frac{aA}{3b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{a^2B}{3b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{aA}{6b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{a^2B}{6b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{a\sqrt{3}A}{3b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{a^2\sqrt{3}B}{3b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 1/4*B*x^4/b+1/b*A*x-1/b^2*B*x*a-1/3*a/b^2/(a/b)^(2/3)*ln(x+(a/b)^
(1/3))*A+1/3*a^2/b^3/(a/b)^(2/3)*ln(x+(a/b)^(1/3))*B+1/6*a/b^2/(a
/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*A-1/6*a^2/b^3/(a/b)^(
2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*B-1/3*a/b^2/(a/b)^(2/3)*3^
(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*A+1/3*a^2/b^3/(a/b)
^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.236106, size = 213, normalized size = 1.31

$$\frac{\sqrt{3}\left(2\sqrt{3}(Ba-Ab)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)-4\sqrt{3}(Ba-Ab)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)+12(Ba-Ab)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\text{ar}\right.}{36b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/36*sqrt(3)*(2*sqrt(3)*(B*a - A*b)*(-a/b)^(1/3)*log(x^2 + x*(-a/
b)^(1/3) + (-a/b)^(2/3)) - 4*sqrt(3)*(B*a - A*b)*(-a/b)^(1/3)*log
(x - (-a/b)^(1/3)) + 12*(B*a - A*b)*(-a/b)^(1/3)*arctan(1/3*(2*sq
rt(3)*x + sqrt(3)*(-a/b)^(1/3))/(-a/b)^(1/3)) + 3*sqrt(3)*(B*b*x^
4 - 4*(B*a - A*b)*x))/b^2
```

Sympy [A] time = 2.26818, size = 87, normalized size = 0.54

$$\frac{Bx^4}{4b} + \operatorname{RootSum}\left(27t^3b^7 + A^3ab^3 - 3A^2Ba^2b^2 + 3AB^2a^3b - B^3a^4, \left(t \mapsto t\log\left(\frac{3tb^2}{-Ab+Ba} + x\right)\right)\right) - \frac{x\left(-Ab+Ba\right)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**4/(4*b) + RootSum(27*_t**3*b**7 + A**3*a*b**3 - 3*A**2*B*a**
2*b**2 + 3*A*B**2*a**3*b - B**3*a**4, Lambda(_t, _t*log(3*_t*b**2
/(-A*b + B*a) + x))) - x*(-A*b + B*a)/b**2
```

GIAC/XCAS [A] time = 0.216273, size = 251, normalized size = 1.55

$$\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3\,b^3} + \frac{\left(\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,b^3} - \frac{\left(Ba^2b^2 - Aab^3\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,ab^4} + \frac{Bb^3x^4 - 4\,Bab^2x + 4\,Ab^3x}{4\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 1/3*sqrt(3)*((-a*b^2)^(1/3)*B*a - (-a*b^2)^(1/3)*A*b)*arctan(1/3*
sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/b^3 + 1/6*((-a*b^2)^(1
/3)*B*a - (-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2
/3))/b^3 - 1/3*(B*a^2*b^2 - A*a*b^3)*(-a/b)^(1/3)*ln(abs(x - (-a/
b)^(1/3)))/(a*b^4) + 1/4*(B*b^3*x^4 - 4*B*a*b^2*x + 4*A*b^3*x)/b^
4
```

3.60 $\int \frac{x^2(A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=35

$$\frac{(Ab-aB)\log(a+bx^3)}{3b^2}+\frac{Bx^3}{3b}$$

```
[Out] (B*x^3)/(3*b) + ((A*b - a*B)*Log[a + b*x^3])/(3*b^2)
```

Rubi [A] time = 0.10055, antiderivative size = 35, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{(Ab-aB)\log(a+bx^3)}{3b^2}+\frac{Bx^3}{3b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (B*x^3)/(3*b) + ((A*b - a*B)*Log[a + b*x^3])/(3*b^2)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int^{x^3} B\,dx}{3b}+\frac{(Ab-Ba)\log(a+bx^3)}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] Integral(B, (x, x**3))/(3*b) + (A*b - B*a)*log(a + b*x**3)/(3*b**
2)
```

Mathematica [A] time = 0.0221723, size = 31, normalized size = 0.89

$$\frac{(Ab-aB)\log(a+bx^3)+bBx^3}{3b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (b*B*x^3 + (A*b - a*B)*Log[a + b*x^3])/(3*b^2)
```

Maple [A] time = 0.003, size = 40, normalized size = 1.1

$$\frac{Bx^3}{3\,b}+\frac{\ln(bx^3+a)\,A}{3\,b}-\frac{\ln(bx^3+a)\,Ba}{3\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 1/3*B*x^3/b+1/3/b*ln(b*x^3+a)*A-1/3/b^2*ln(b*x^3+a)*B*a
```

Maxima [A] time = 1.37096, size = 42, normalized size = 1.2

$$\frac{Bx^3}{3\,b} - \frac{(Ba - Ab)\log\left(bx^3 + a\right)}{3\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*x^2/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] 1/3*B*x^3/b - 1/3*(B*a - A*b)*log(b*x^3 + a)/b^2
```

Fricas [A] time = 0.222246, size = 41, normalized size = 1.17

$$\frac{Bbx^3 - (Ba - Ab)\log\left(bx^3 + a\right)}{3\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*x^2/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/3*(B*b*x^3 - (B*a - A*b)*log(b*x^3 + a))/b^2
```

Sympy [A] time = 1.90815, size = 27, normalized size = 0.77

$$\frac{Bx^3}{3b} - \frac{(-Ab + Ba)\log\left(a + bx^3\right)}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**3/(3*b) - (-A*b + B*a)*log(a + b*x**3)/(3*b**2)
```

GIAC/XCAS [A] time = 0.216376, size = 43, normalized size = 1.23

$$\frac{Bx^3}{3\,b} - \frac{(Ba - Ab)\ln\left(\left|bx^3 + a\right|\right)}{3\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*x^2/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 1/3*B*x^3/b - 1/3*(B*a - A*b)*ln(abs(b*x^3 + a))/b^2
```

3.61 $\int \frac{x(A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=150

$$\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6\sqrt[3]{a}b^{5/3}}-\frac{(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{a}b^{5/3}}-\frac{(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}\sqrt[3]{a}b^{5/3}}+\frac{Bx^2}{2b}$$

```
[Out] (B*x^2)/(2*b) - ((A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt
[3]*a^(1/3))])/(Sqrt[3]*a^(1/3)*b^(5/3)) - ((A*b - a*B)*Log[a^(1/
3) + b^(1/3)*x])/(3*a^(1/3)*b^(5/3)) + ((A*b - a*B)*Log[a^(2/3) -
 a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(1/3)*b^(5/3))
```

Rubi [A] time = 0.243076, antiderivative size = 150, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.389

$$\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6\sqrt[3]{a}b^{5/3}}-\frac{(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{a}b^{5/3}}-\frac{(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}\sqrt[3]{a}b^{5/3}}+\frac{Bx^2}{2b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (B*x^2)/(2*b) - ((A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt
[3]*a^(1/3))])/(Sqrt[3]*a^(1/3)*b^(5/3)) - ((A*b - a*B)*Log[a^(1/
3) + b^(1/3)*x])/(3*a^(1/3)*b^(5/3)) + ((A*b - a*B)*Log[a^(2/3) -
 a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(1/3)*b^(5/3))
```

Rubi in Sympy [A] time = 31.5533, size = 138, normalized size = 0.92

$$\frac{Bx^2}{2b}-\frac{(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{a}b^{\frac{5}{3}}}+\frac{(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6\sqrt[3]{a}b^{\frac{5}{3}}}-\frac{\sqrt{3}(Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3\sqrt[3]{a}b^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**2/(2*b) - (A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(3*a**(1/3)
*b**(5/3)) + (A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**
(2/3)*x**2)/(6*a**(1/3)*b**(5/3)) - sqrt(3)*(A*b - B*a)*atan(sqrt
(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*a**(1/3)*b**(5/3))
```

Mathematica [A] time = 0.0969011, size = 152, normalized size = 1.01

$$-\frac{(aB-Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6\sqrt[3]{a}b^{5/3}}+\frac{(aB-Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{a}b^{5/3}}-\frac{(aB-Ab)\tan^{-1}\left(\frac{2\sqrt[3]{b}x-\sqrt[3]{a}}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}\sqrt[3]{a}b^{5/3}}+\frac{Bx^2}{2b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (B*x^2)/(2*b) - ((-(A*b) + a*B)*ArcTan[(-a^(1/3) + 2*b^(1/3)*x)/(
Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(1/3)*b^(5/3)) + ((-(A*b) + a*B)*Lo
g[a^(1/3) + b^(1/3)*x])/(3*a^(1/3)*b^(5/3)) - ((-(A*b) + a*B)*Log
[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(1/3)*b^(5/3))
```

Maple [A] time = 0.004, size = 198, normalized size = 1.3

$$\frac{Bx^2}{2b}-\frac{A}{3b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{Ba}{3b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{A}{6b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{Ba}{6b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{\sqrt{3}A}{3b}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{\sqrt{3}Ba}{3b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 1/2*B*x^2/b-1/3/b/(a/b)^(1/3)*ln(x+(a/b)^(1/3))*A+1/3/b^2/(a/b)^(
1/3)*ln(x+(a/b)^(1/3))*B*a+1/6/b/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)
+(a/b)^(2/3))*A-1/6/b^2/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2
/3))*B*a+1/3/b*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1
/3)*x-1))*A-1/3/b^2*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/
b)^(1/3)*x-1))*B*a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.233774, size = 193, normalized size = 1.29

$$\frac{\sqrt{3}\left(3\sqrt{3}\left(-ab^2\right)^{\frac{1}{3}}Bx^2+\sqrt{3}(Ba-Ab)\log\left(\left(-ab^2\right)^{\frac{1}{3}}bx^2-ab+\left(-ab^2\right)^{\frac{2}{3}}x\right)-2\sqrt{3}(Ba-Ab)\log\left(ab+\left(-ab^2\right)^{\frac{2}{3}}x\right)+6\,(Ba\right.}{18\left(-ab^2\right)^{\frac{1}{3}}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(3*sqrt(3)*(-a*b^2)^(1/3)*B*x^2 + sqrt(3)*(B*a - A*b
)*log((-a*b^2)^(1/3)*b*x^2 - a*b + (-a*b^2)^(2/3)*x) - 2*sqrt(3)*
(B*a - A*b)*log(a*b + (-a*b^2)^(2/3)*x) + 6*(B*a - A*b)*arctan(-1
/3*(sqrt(3)*a*b - 2*sqrt(3)*(-a*b^2)^(2/3)*x)/(a*b)))/((-a*b^2)^(
1/3)*b)
```

Sympy [A] time = 1.92467, size = 92, normalized size = 0.61

$$\frac{Bx^2}{2b}+\operatorname{RootSum}\left(27t^3ab^5+A^3b^3-3A^2Bab^2+3AB^2a^2b-B^3a^3,\left(t\mapsto t\log\left(\frac{9t^2ab^3}{A^2b^2-2ABab+B^2a^2}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**2/(2*b) + RootSum(27*_t**3*a*b**5 + A**3*b**3 - 3*A**2*B*a*b
**2 + 3*A*B**2*a**2*b - B**3*a**3, Lambda(_t, _t*log(9*_t**2*a*b*
*3/(A**2*b**2 - 2*A*B*a*b + B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.220838, size = 247, normalized size = 1.65

$$\frac{Bx^2}{2\,b}+\frac{\left(Bab\left(-\frac{a}{b}\right)^{\frac{1}{3}}-Ab^2\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,ab^2}+\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{2}{3}}Ba-\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3\,ab^3}-\frac{\left(\left(-ab^2\right)^{\frac{2}{3}}Ba-\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,ab^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 1/2*B*x^2/b + 1/3*(B*a*b*(-a/b)^(1/3) - A*b^2*(-a/b)^(1/3))*(-a/b
)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^2) + 1/3*sqrt(3)*((-a*b^2)
^(2/3)*B*a - (-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)
^(1/3))/(-a/b)^(1/3))/(a*b^3) - 1/6*((-a*b^2)^(2/3)*B*a - (-a*b^2
)^(2/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a*b^3)
```

3.62 $\int \frac{A+Bx^3}{a+bx^3}\,dx$

Optimal. Leaf size=145

$$-\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{2/3}b^{4/3}}+\frac{(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{2/3}b^{4/3}}-\frac{(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{2/3}b^{4/3}}+\frac{Bx}{b}$$

```
[Out] (B*x)/b - ((A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^
(1/3))])/(Sqrt[3]*a^(2/3)*b^(4/3)) + ((A*b - a*B)*Log[a^(1/3) + b
^(1/3)*x])/(3*a^(2/3)*b^(4/3)) - ((A*b - a*B)*Log[a^(2/3) - a^(1/
3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(2/3)*b^(4/3))
```

Rubi [A] time = 0.19983, antiderivative size = 145, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.412$

$$-\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{2/3}b^{4/3}}+\frac{(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{2/3}b^{4/3}}-\frac{(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{2/3}b^{4/3}}+\frac{Bx}{b}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(a + b*x^3),x]
```

```
[Out] (B*x)/b - ((A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^
(1/3))])/(Sqrt[3]*a^(2/3)*b^(4/3)) + ((A*b - a*B)*Log[a^(1/3) + b
^(1/3)*x])/(3*a^(2/3)*b^(4/3)) - ((A*b - a*B)*Log[a^(2/3) - a^(1/
3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(2/3)*b^(4/3))
```

Rubi in Sympy [A] time = 31.8628, size = 134, normalized size = 0.92

$$\frac{Bx}{b}+\frac{(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{2}{3}}b^{\frac{4}{3}}}-\frac{(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{2}{3}}b^{\frac{4}{3}}}-\frac{\sqrt{3}(Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{2}{3}}b^{\frac{4}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x/b + (A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(3*a**(2/3)*b**(4/
3)) - (A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x
**2)/(6*a**(2/3)*b**(4/3)) - sqrt(3)*(A*b - B*a)*atan(sqrt(3)*(a*
*(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*a**(2/3)*b**(4/3))
```

Mathematica [A] time = 0.111741, size = 129, normalized size = 0.89

$$\frac{-(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)+6a^{2/3}\sqrt[3]{b}Bx+2(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-2\sqrt{3}(Ab-aB)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{6a^{2/3}b^{4/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(a + b*x^3),x]
```

```
[Out] (6*a^(2/3)*b^(1/3)*B*x - 2*Sqrt[3]*(A*b - a*B)*ArcTan[(1 - (2*b^(
1/3)*x)/a^(1/3))/Sqrt[3]] + 2*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x
] - (A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(
6*a^(2/3)*b^(4/3))
```

Maple [A] time = 0.003, size = 195, normalized size = 1.3

$$\frac{Bx}{b}+\frac{A}{3b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{Ba}{3b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{A}{6b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{Ba}{6b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{\sqrt{3}A}{3b}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{\sqrt{3}Ba}{3b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a),x)
```

```
[Out] B*x/b+1/3/b/(a/b)^(2/3)*ln(x+(a/b)^(1/3))*A-1/3/b^2/(a/b)^(2/3)*l
n(x+(a/b)^(1/3))*B*a-1/6/b/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)
^(2/3))*A+1/6/b^2/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*B
*a+1/3/b/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-
1))*A-1/3/b^2/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/
3)*x-1))*B*a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.23467, size = 176, normalized size = 1.21

$$\frac{\sqrt{3}\left(6\sqrt{3}\left(a^2b\right)^{\frac{1}{3}}Bx+\sqrt{3}(Ba-Ab)\log\left(\left(a^2b\right)^{\frac{2}{3}}x^2-\left(a^2b\right)^{\frac{1}{3}}ax+a^2\right)-2\sqrt{3}(Ba-Ab)\log\left(\left(a^2b\right)^{\frac{1}{3}}x+a\right)-6(Ba-Ab)\,\mathrm{ar}\right.}{18\left(a^2b\right)^{\frac{1}{3}}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(6*sqrt(3)*(a^2*b)^(1/3)*B*x + sqrt(3)*(B*a - A*b)*l
og((a^2*b)^(2/3)*x^2 - (a^2*b)^(1/3)*a*x + a^2) - 2*sqrt(3)*(B*a
- A*b)*log((a^2*b)^(1/3)*x + a) - 6*(B*a - A*b)*arctan(1/3*(2*sqr
t(3)*(a^2*b)^(1/3)*x - sqrt(3)*a)/a))/((a^2*b)^(1/3)*b)
```

Sympy [A] time = 2.02434, size = 71, normalized size = 0.49

$$\frac{Bx}{b} + \operatorname{RootSum}\left(27t^3a^2b^4 - A^3b^3 + 3A^2Bab^2 - 3AB^2a^2b + B^3a^3, \left(t \mapsto t\log\left(-\frac{3tab}{-Ab + Ba} + x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x/b + RootSum(27*_t**3*a**2*b**4 - A**3*b**3 + 3*A**2*B*a*b**2
- 3*A*B**2*a**2*b + B**3*a**3, Lambda(_t, _t*log(-3*_t*a*b/(-A*b
+ B*a) + x)))
```

GIAC/XCAS [A] time = 0.218881, size = 217, normalized size = 1.5

$$\frac{Bx}{b} + \frac{(Ba - Ab)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,ab} - \frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3\,ab^2} - \frac{\left(\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,ab^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] B*x/b + 1/3*(B*a - A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a
*b) - 1/3*sqrt(3)*((-a*b^2)^(1/3)*B*a - (-a*b^2)^(1/3)*A*b)*arcta
n(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a*b^2) - 1/6*((
-a*b^2)^(1/3)*B*a - (-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) +
 (-a/b)^(2/3))/(a*b^2)
```

3.63 $\int \frac{A+Bx^3}{x(a+bx^3)}\,dx$

Optimal. Leaf size=34

$$\frac{A\log(x)}{a}-\frac{(Ab-aB)\log\left(a+bx^3\right)}{3ab}$$

```
[Out] (A*Log[x])/a - ((A*b - a*B)*Log[a + b*x^3])/(3*a*b)
```

Rubi [A] time = 0.100573, antiderivative size = 34, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{A\log(x)}{a}-\frac{(Ab-aB)\log\left(a+bx^3\right)}{3ab}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x*(a + b*x^3)),x]

[Out] (A*Log[x])/a - ((A*b - a*B)*Log[a + b*x^3])/(3*a*b)
```

Rubi in Sympy [A] time = 12.5917, size = 29, normalized size = 0.85

$$\frac{A\log\left(x^3\right)}{3a}-\frac{(Ab-Ba)\log\left(a+bx^3\right)}{3ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x/(b*x**3+a),x)

[Out] A*log(x**3)/(3*a) - (A*b - B*a)*log(a + b*x**3)/(3*a*b)
```

Mathematica [A] time = 0.0237869, size = 34, normalized size = 1.

$$\frac{(aB-Ab)\log\left(a+bx^3\right)}{3ab}+\frac{A\log(x)}{a}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x*(a + b*x^3)),x]

[Out] (A*Log[x])/a + ((-(A*b) + a*B)*Log[a + b*x^3])/(3*a*b)
```

Maple [A] time = 0.007, size = 37, normalized size = 1.1

$$\frac{A\ln(x)}{a}-\frac{\ln\left(bx^3+a\right)A}{3a}+\frac{\ln\left(bx^3+a\right)B}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x/(b*x^3+a),x)

[Out] A*ln(x)/a-1/3/a*ln(b*x^3+a)*A+1/3/b*ln(b*x^3+a)*B
```

Maxima [A] time = 1.376, size = 47, normalized size = 1.38

$$\frac{A\log\left(x^3\right)}{3\,a}+\frac{(Ba-Ab)\log\left(bx^3+a\right)}{3\,ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x),x, algorithm="maxima")

[Out] 1/3*A*log(x^3)/a + 1/3*(B*a - A*b)*log(b*x^3 + a)/(a*b)
```

Fricas [A] time = 0.231015, size = 43, normalized size = 1.26

$$\frac{3\,Ab\log\left(x\right)+(Ba-Ab)\log\left(bx^3+a\right)}{3\,ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x),x, algorithm="fricas")

[Out] 1/3*(3*A*b*log(x) + (B*a - A*b)*log(b*x^3 + a))/(a*b)
```

Sympy [A] time = 3.10654, size = 26, normalized size = 0.76

$$\frac{A\log\left(x\right)}{a}+\frac{(-Ab+Ba)\log\left(\frac{a}{b}+x^3\right)}{3ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x/(b*x**3+a),x)

[Out] A*log(x)/a + (-A*b + B*a)*log(a/b + x**3)/(3*a*b)
```

GIAC/XCAS [A] time = 0.216665, size = 46, normalized size = 1.35

$$\frac{A\ln\left(|x|\right)}{a}+\frac{(Ba-Ab)\ln\left(\left|bx^3+a\right|\right)}{3\,ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x),x, algorithm="giac")

[Out] A*ln(abs(x))/a + 1/3*(B*a - A*b)*ln(abs(b*x^3 + a))/(a*b)
```

3.64 $\int \frac{A+Bx^3}{x^2(a+bx^3)} dx$

Optimal. Leaf size=147

$$-\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{4/3}b^{2/3}}+\frac{(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{4/3}b^{2/3}}+\frac{(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{4/3}b^{2/3}}-\frac{A}{ax}$$

```
[Out] -(A/(a*x)) + ((A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]
*a^(1/3))])/(Sqrt[3]*a^(4/3)*b^(2/3)) + ((A*b - a*B)*Log[a^(1/3)
+ b^(1/3)*x])/(3*a^(4/3)*b^(2/3)) - ((A*b - a*B)*Log[a^(2/3) - a^
(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(4/3)*b^(2/3))
```

Rubi [A] time = 0.22429, antiderivative size = 147, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.35$

$$-\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{4/3}b^{2/3}}+\frac{(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{4/3}b^{2/3}}+\frac{(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{4/3}b^{2/3}}-\frac{A}{ax}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^2*(a + b*x^3)),x]
```

```
[Out] -(A/(a*x)) + ((A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]
*a^(1/3))])/(Sqrt[3]*a^(4/3)*b^(2/3)) + ((A*b - a*B)*Log[a^(1/3)
+ b^(1/3)*x])/(3*a^(4/3)*b^(2/3)) - ((A*b - a*B)*Log[a^(2/3) - a^
(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(4/3)*b^(2/3))
```

Rubi in Sympy [A] time = 32.9253, size = 134, normalized size = 0.91

$$-\frac{A}{ax}+\frac{(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{4}{3}}b^{\frac{2}{3}}}-\frac{(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{4}{3}}b^{\frac{2}{3}}}+\frac{\sqrt{3}(Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{4}{3}}b^{\frac{2}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**2/(b*x**3+a),x)
```

```
[Out] -A/(a*x) + (A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(3*a**(4/3)*b**
(2/3)) - (A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(6*a**(4/3)*b**(2/3)) + sqrt(3)*(A*b - B*a)*atan(sqrt(3)*
(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*a**(4/3)*b**(2/3))
```

Mathematica [A] time = 0.162068, size = 134, normalized size = 0.91

$$\frac{-x(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-6\sqrt[3]{a}Ab^{2/3}+2x(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)+2\sqrt{3}x(Ab-aB)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{6a^{4/3}b^{2/3}x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^2*(a + b*x^3)),x]
```

```
[Out] (-6*a^(1/3)*A*b^(2/3) + 2*Sqrt[3]*(A*b - a*B)*x*ArcTan[(1 - (2*b^
(1/3)*x)/a^(1/3))/Sqrt[3]] + 2*(A*b - a*B)*x*Log[a^(1/3) + b^(1/3
)*x] - (A*b - a*B)*x*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^
2])/(6*a^(4/3)*b^(2/3)*x)
```

Maple [A] time = 0.005, size = 195, normalized size = 1.3

$$\frac{A}{3a}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{B}{3b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{A}{6a}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{B}{6b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{\sqrt{3}A}{3a}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{\sqrt{3}B}{3b}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{A}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^2/(b*x^3+a),x)
```

```
[Out] 1/3/a/(a/b)^(1/3)*ln(x+(a/b)^(1/3))*A-1/3/b/(a/b)^(1/3)*ln(x+(a/b
)^(1/3))*B-1/6/a/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*A+
1/6/b/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*B-1/3/a*3^(1/
2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*A+1/3*3^(1
/2)/b/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B-A/a/x
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.234715, size = 189, normalized size = 1.29

$$\frac{\sqrt{3}\left(\sqrt{3}(Ba-Ab)x\log\left(\left(ab^2\right)^{\frac{1}{3}}bx^2+ab-\left(ab^2\right)^{\frac{2}{3}}x\right)-2\sqrt{3}(Ba-Ab)x\log\left(ab+\left(ab^2\right)^{\frac{2}{3}}x\right)+6(Ba-Ab)x\arctan\left(-\frac{\sqrt{3}ab-}{}\right.\right.}{18\left(ab^2\right)^{\frac{1}{3}}ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^2),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*(B*a - A*b)*x*log((a*b^2)^(1/3)*b*x^2 + a*b
 - (a*b^2)^(2/3)*x) - 2*sqrt(3)*(B*a - A*b)*x*log(a*b + (a*b^2)^(
2/3)*x) + 6*(B*a - A*b)*x*arctan(-1/3*(sqrt(3)*a*b - 2*sqrt(3)*(a
*b^2)^(2/3)*x)/(a*b)) - 6*sqrt(3)*(a*b^2)^(1/3)*A)/((a*b^2)^(1/3)
*a*x)
```

Sympy [A] time = 2.09125, size = 90, normalized size = 0.61

$$-\frac{A}{ax}+\operatorname{RootSum}\left(27t^3a^4b^2-A^3b^3+3A^2Bab^2-3AB^2a^2b+B^3a^3,\ \left(t\mapsto t\log\left(\frac{9t^2a^3b}{A^2b^2-2ABab+B^2a^2}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**2/(b*x**3+a),x)
```

```
[Out] -A/(a*x) + RootSum(27*_t**3*a**4*b**2 - A**3*b**3 + 3*A**2*B*a*b*
*2 - 3*A*B**2*a**2*b + B**3*a**3, Lambda(_t, _t*log(9*_t**2*a**3*
b/(A**2*b**2 - 2*A*B*a*b + B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.219356, size = 239, normalized size = 1.63

$$-\frac{\left(Ba\left(-\frac{a}{b}\right)^{\frac{1}{3}}-Ab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,a^2}-\frac{A}{ax}-\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{2}{3}}Ba-\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3\,a^2b^2}+\frac{\left(\left(-ab^2\right)^{\frac{2}{3}}Ba-\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,a^2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^2),x, algorithm="giac")
```

```
[Out] -1/3*(B*a*(-a/b)^(1/3) - A*b*(-a/b)^(1/3))*(-a/b)^(1/3)*ln(abs(x
- (-a/b)^(1/3)))/a^2 - A/(a*x) - 1/3*sqrt(3)*((-a*b^2)^(2/3)*B*a
- (-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a
/b)^(1/3))/(a^2*b^2) + 1/6*((-a*b^2)^(2/3)*B*a - (-a*b^2)^(2/3)*A
*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a^2*b^2)
```

3.65 $\int \frac{A+Bx^3}{x^3(a+bx^3)}\,dx$

Optimal. Leaf size=149

$$\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{5/3}\sqrt[3]{b}}-\frac{(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{5/3}\sqrt[3]{b}}+\frac{(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{5/3}\sqrt[3]{b}}-\frac{A}{2ax^2}$$

```
[Out] -A/(2*a*x^2) + ((A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[
3]*a^(1/3))])/(Sqrt[3]*a^(5/3)*b^(1/3)) - ((A*b - a*B)*Log[a^(1/3
) + b^(1/3)*x])/(3*a^(5/3)*b^(1/3)) + ((A*b - a*B)*Log[a^(2/3) -
a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(5/3)*b^(1/3))
```

Rubi [A] time = 0.237478, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.35

$$\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{5/3}\sqrt[3]{b}}-\frac{(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{5/3}\sqrt[3]{b}}+\frac{(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{5/3}\sqrt[3]{b}}-\frac{A}{2ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^3*(a + b*x^3)),x]
```

```
[Out] -A/(2*a*x^2) + ((A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[
3]*a^(1/3))])/(Sqrt[3]*a^(5/3)*b^(1/3)) - ((A*b - a*B)*Log[a^(1/3
) + b^(1/3)*x])/(3*a^(5/3)*b^(1/3)) + ((A*b - a*B)*Log[a^(2/3) -
a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(5/3)*b^(1/3))
```

Rubi in Sympy [A] time = 33.2997, size = 138, normalized size = 0.93

$$-\frac{A}{2ax^2}-\frac{(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{5}{3}}\sqrt[3]{b}}+\frac{(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{5}{3}}\sqrt[3]{b}}+\frac{\sqrt{3}(Ab-Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{5}{3}}\sqrt[3]{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**3/(b*x**3+a),x)
```

```
[Out] -A/(2*a*x**2) - (A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(3*a**(5/3
)*b**(1/3)) + (A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b*
*(2/3)*x**2)/(6*a**(5/3)*b**(1/3)) + sqrt(3)*(A*b - B*a)*atan(sqr
t(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*a**(5/3)*b**(1/3)
)
```

Mathematica [A] time = 0.222422, size = 135, normalized size = 0.91

$$\frac{\frac{(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{\sqrt[3]{b}}-\frac{3a^{2/3}A}{x^2}+\frac{2(aB-Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[3]{b}}+\frac{2\sqrt{3}(Ab-aB)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{\sqrt[3]{b}}}{6a^{5/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^3*(a + b*x^3)),x]
```

```
[Out] ((-3*a^(2/3)*A)/x^2 + (2*Sqrt[3]*(A*b - a*B)*ArcTan[(1 - (2*b^(1/
3)*x)/a^(1/3))/Sqrt[3]])/b^(1/3) + (2*(-(A*b) + a*B)*Log[a^(1/3)
+ b^(1/3)*x])/b^(1/3) + ((A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2])/b^(1/3))/(6*a^(5/3))
```

Maple [A] time = 0.005, size = 195, normalized size = 1.3

$$-\frac{A}{3\,a}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{B}{3\,b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{A}{6\,a}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{B}{6\,b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{\sqrt{3}A}{3\,a}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{\sqrt{3}B}{3\,b}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{A}{2\,ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^3/(b*x^3+a),x)
```

```
[Out] -1/3/a/(a/b)^(2/3)*ln(x+(a/b)^(1/3))*A+1/3/b/(a/b)^(2/3)*ln(x+(a/
b)^(1/3))*B+1/6/a/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*A
-1/6/b/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*B-1/3/a/(a/b
)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*A+1/3/b/(
a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B-1/2*
A/a/x^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.252096, size = 198, normalized size = 1.33

$$\frac{\sqrt{3}\left(\sqrt{3}(Ba-Ab)x^2\log\left(\left(-a^2b\right)^{\frac{2}{3}}x^2+\left(-a^2b\right)^{\frac{1}{3}}ax+a^2\right)-2\sqrt{3}(Ba-Ab)x^2\log\left(\left(-a^2b\right)^{\frac{1}{3}}x-a\right)+6\,(Ba-Ab)x^2\arctan\left(\right.\right.}{18\,\left(-a^2b\right)^{\frac{1}{3}}ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^3),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*(B*a - A*b)*x^2*log((-a^2*b)^(2/3)*x^2 + (-
a^2*b)^(1/3)*a*x + a^2) - 2*sqrt(3)*(B*a - A*b)*x^2*log((-a^2*b)^
(1/3)*x - a) + 6*(B*a - A*b)*x^2*arctan(1/3*(2*sqrt(3)*(-a^2*b)^(
1/3)*x + sqrt(3)*a)/a) - 3*sqrt(3)*(-a^2*b)^(1/3)*A)/((-a^2*b)^(1
/3)*a*x^2)
```

Sympy [A] time = 2.32981, size = 73, normalized size = 0.49

$$-\frac{A}{2ax^2} + \operatorname{RootSum}\left(27t^3a^5b + A^3b^3 - 3A^2Bab^2 + 3AB^2a^2b - B^3a^3, \left(t \mapsto t\log\left(\frac{3ta^2}{-Ab+Ba} + x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**3/(b*x**3+a),x)
```

```
[Out] -A/(2*a*x**2) + RootSum(27*_t**3*a**5*b + A**3*b**3 - 3*A**2*B*a*
b**2 + 3*A*B**2*a**2*b - B**3*a**3, Lambda(_t, _t*log(3*_t*a**2/(
-A*b + B*a) + x)))
```

GIAC/XCAS [A] time = 0.219927, size = 217, normalized size = 1.46

$$-\frac{(Ba-Ab)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,a^2} + \frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3\,a^2b} + \frac{\left(\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,a^2b} - \frac{A}{2\,ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^3),x, algorithm="giac")
```

```
[Out] -1/3*(B*a - A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/a^2 + 1/3
*sqrt(3)*((-a*b^2)^(1/3)*B*a - (-a*b^2)^(1/3)*A*b)*arctan(1/3*sqr
t(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a^2*b) + 1/6*((-a*b^2)^(
1/3)*B*a - (-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(
2/3))/(a^2*b) - 1/2*A/(a*x^2)
```

3.66 $\int \frac{A+Bx^3}{x^4(a+bx^3)}\,dx$

Optimal. Leaf size=50

$$\frac{(Ab-aB)\log\left(a+bx^3\right)}{3a^2}-\frac{\log(x)(Ab-aB)}{a^2}-\frac{A}{3ax^3}$$

```
[Out] -A/(3*a*x^3) - ((A*b - a*B)*Log[x])/a^2 + ((A*b - a*B)*Log[a + b*
x^3])/(3*a^2)
```

Rubi [A] time = 0.138746, antiderivative size = 50, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$\frac{(Ab-aB)\log\left(a+bx^3\right)}{3a^2}-\frac{\log(x)(Ab-aB)}{a^2}-\frac{A}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^4*(a + b*x^3)),x]
```

```
[Out] -A/(3*a*x^3) - ((A*b - a*B)*Log[x])/a^2 + ((A*b - a*B)*Log[a + b*
x^3])/(3*a^2)
```

Rubi in Sympy [A] time = 14.4592, size = 44, normalized size = 0.88

$$-\frac{A}{3ax^3}-\frac{(Ab-Ba)\log\left(x^3\right)}{3a^2}+\frac{(Ab-Ba)\log\left(a+bx^3\right)}{3a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**4/(b*x**3+a),x)
```

```
[Out] -A/(3*a*x**3) - (A*b - B*a)*log(x**3)/(3*a**2) + (A*b - B*a)*log(
a + b*x**3)/(3*a**2)
```

Mathematica [A] time = 0.0380239, size = 49, normalized size = 0.98

$$\frac{(Ab-aB)\log\left(a+bx^3\right)}{3a^2}+\frac{\log(x)(aB-Ab)}{a^2}-\frac{A}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^4*(a + b*x^3)),x]
```

```
[Out] -A/(3*a*x^3) + ((-(A*b) + a*B)*Log[x])/a^2 + ((A*b - a*B)*Log[a +
 b*x^3])/(3*a^2)
```

Maple [A] time = 0.009, size = 56, normalized size = 1.1

$$-\frac{A}{3\,a{x}^{3}}-\frac{A\ln(x)\,b}{a^2}+\frac{B\ln(x)}{a}+\frac{\ln\left(b{x}^{3}+a\right)Ab}{3\,a^2}-\frac{\ln\left(b{x}^{3}+a\right)B}{3\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^4/(b*x^3+a),x)
```

```
[Out] -1/3*A/a/x^3-1/a^2*ln(x)*A*b+B/a*ln(x)+1/3/a^2*ln(b*x^3+a)*A*b-1/
3/a*ln(b*x^3+a)*B
```

Maxima [A] time = 1.38832, size = 65, normalized size = 1.3

$$-\frac{(Ba-Ab)\log\left(bx^3+a\right)}{3\,a^2}+\frac{(Ba-Ab)\log\left(x^3\right)}{3\,a^2}-\frac{A}{3\,ax^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^4),x, algorithm="maxima")
```

```
[Out] -1/3*(B*a - A*b)*log(b*x^3 + a)/a^2 + 1/3*(B*a - A*b)*log(x^3)/a^
2 - 1/3*A/(a*x^3)
```

Fricas [A] time = 0.228558, size = 63, normalized size = 1.26

$$-\frac{(Ba-Ab)x^3\log\left(bx^3+a\right)-3\,(Ba-Ab)x^3\log\left(x\right)+Aa}{3\,a^2x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^4),x, algorithm="fricas")
```

```
[Out] -1/3*((B*a - A*b)*x^3*log(b*x^3 + a) - 3*(B*a - A*b)*x^3*log(x) +
 A*a)/(a^2*x^3)
```

Sympy [A] time = 3.81643, size = 41, normalized size = 0.82

$$-\frac{A}{3ax^3}+\frac{(-Ab+Ba)\log\left(x\right)}{a^2}-\frac{(-Ab+Ba)\log\left(\frac{a}{b}+x^3\right)}{3a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**4/(b*x**3+a),x)
```

```
[Out] -A/(3*a*x**3) + (-A*b + B*a)*log(x)/a**2 - (-A*b + B*a)*log(a/b +
 x**3)/(3*a**2)
```

GIAC/XCAS [A] time = 0.217731, size = 93, normalized size = 1.86

$$\frac{(Ba-Ab)\ln\left(|x|\right)}{a^2}-\frac{\left(Bab-Ab^2\right)\ln\left(\left|bx^3+a\right|\right)}{3\,a^2b}-\frac{Bax^3-Abx^3+Aa}{3\,a^2x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^4),x, algorithm="giac")
```

```
[Out] (B*a - A*b)*ln(abs(x))/a^2 - 1/3*(B*a*b - A*b^2)*ln(abs(b*x^3 + a
))/(a^2*b) - 1/3*(B*a*x^3 - A*b*x^3 + A*a)/(a^2*x^3)
```

3.67 $\int \frac{A+Bx^3}{x^5(a+bx^3)} \, dx$

Optimal. Leaf size=165

$$\frac{\sqrt[3]{b}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{7/3}}-\frac{\sqrt[3]{b}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{7/3}}-\frac{\sqrt[3]{b}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{7/3}}+\frac{Ab-aB}{a^2x}-\frac{A}{4ax^4}$$

```
[Out] -A/(4*a*x^4) + (A*b - a*B)/(a^2*x) - (b^(1/3)*(A*b - a*B)*ArcTan[
(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(7/3)) - (
b^(1/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(7/3)) + (b^(1
/3)*(A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(
6*a^(7/3))
```

Rubi [A] time = 0.286374, antiderivative size = 165, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.4$

$$\frac{\sqrt[3]{b}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{7/3}}-\frac{\sqrt[3]{b}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{7/3}}-\frac{\sqrt[3]{b}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{7/3}}+\frac{Ab-aB}{a^2x}-\frac{A}{4ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^5*(a + b*x^3)),x]
```

```
[Out] -A/(4*a*x^4) + (A*b - a*B)/(a^2*x) - (b^(1/3)*(A*b - a*B)*ArcTan[
(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(7/3)) - (
b^(1/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(7/3)) + (b^(1
/3)*(A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(
6*a^(7/3))
```

Rubi in Sympy [A] time = 37.821, size = 150, normalized size = 0.91

$$-\frac{A}{4ax^4}+\frac{Ab-Ba}{a^2x}-\frac{\sqrt[3]{b}\,(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{7}{3}}}+\frac{\sqrt[3]{b}\,(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{7}{3}}}-\frac{\sqrt{3}\sqrt[3]{b}\,(Ab-Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{7}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**5/(b*x**3+a),x)
```

```
[Out] -A/(4*a*x**4) + (A*b - B*a)/(a**2*x) - b**(1/3)*(A*b - B*a)*log(a
**(1/3) + b**(1/3)*x)/(3*a**(7/3)) + b**(1/3)*(A*b - B*a)*log(a**
(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*a**(7/3)) - sqrt(
3)*b**(1/3)*(A*b - B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3
)/a**(1/3))/(3*a**(7/3))
```

Mathematica [A] time = 0.233049, size = 154, normalized size = 0.93

$$\frac{2\sqrt[3]{b}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{3a^{4/3}A}{x^4}+\frac{12\sqrt[3]{a}(Ab-aB)}{x}+4\sqrt[3]{b}(aB-Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-4\sqrt{3}\sqrt[3]{b}(Ab-aB)\,\mathrm{ta}}{12a^{7/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^5*(a + b*x^3)),x]
```

```
[Out] ((-3*a^(4/3)*A)/x^4 + (12*a^(1/3)*(A*b - a*B))/x - 4*Sqrt[3]*b^(1
/3)*(A*b - a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 4*b
^(1/3)*(-(A*b) + a*B)*Log[a^(1/3) + b^(1/3)*x] + 2*b^(1/3)*(A*b -
 a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(12*a^(7/3)
)
```

Maple [A] time = 0.009, size = 216, normalized size = 1.3

$$-\frac{A}{4\,ax^4}+\frac{Ab}{xa^2}-\frac{B}{ax}-\frac{Ab}{3\,a^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{B}{3\,a}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{Ab}{6\,a^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{B}{6\,a}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{b\sqrt{3}A}{3\,a^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{\sqrt{3}B}{3\,a}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^5/(b*x^3+a),x)
```

```
[Out] -1/4*A/a/x^4+1/a^2/x*A*b-B/a/x-1/3*b/a^2/(a/b)^(1/3)*ln(x+(a/b)^(
1/3))*A+1/3/a/(a/b)^(1/3)*ln(x+(a/b)^(1/3))*B+1/6*b/a^2/(a/b)^(1/
3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*A-1/6/a/(a/b)^(1/3)*ln(x^2-x
*(a/b)^(1/3)+(a/b)^(2/3))*B+1/3*b/a^2*3^(1/2)/(a/b)^(1/3)*arctan(
1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*A-1/3/a*3^(1/2)/(a/b)^(1/3)*arct
an(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^5),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.230054, size = 248, normalized size = 1.5

$$\frac{\sqrt{3}\left(2\sqrt{3}(Ba-Ab)x^4\left(-\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx^2-ax\left(-\frac{b}{a}\right)^{\frac{2}{3}}-a\left(-\frac{b}{a}\right)^{\frac{1}{3}}\right)-4\sqrt{3}(Ba-Ab)x^4\left(-\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx+a\left(-\frac{b}{a}\right)^{\frac{2}{3}}\right)-12\,(Ba-\right.}{36\,a^2x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^5),x, algorithm="fricas")
```

```
[Out] 1/36*sqrt(3)*(2*sqrt(3)*(B*a - A*b)*x^4*(-b/a)^(1/3)*log(b*x^2 -
a*x*(-b/a)^(2/3) - a*(-b/a)^(1/3)) - 4*sqrt(3)*(B*a - A*b)*x^4*(-
b/a)^(1/3)*log(b*x + a*(-b/a)^(2/3)) - 12*(B*a - A*b)*x^4*(-b/a)^
(1/3)*arctan(-1/3*(2*sqrt(3)*b*x - sqrt(3)*a*(-b/a)^(2/3))/(a*(-b
/a)^(2/3))) - 3*sqrt(3)*(4*(B*a - A*b)*x^3 + A*a))/(a^2*x^4)
```

Sympy [A] time = 2.64998, size = 112, normalized size = 0.68

$$\operatorname{RootSum}\left(27t^3a^7 + A^3b^4 - 3A^2Bab^3 + 3AB^2a^2b^2 - B^3a^3b, \left(t \mapsto t\log\left(\frac{9t^2a^5}{A^2b^3 - 2ABab^2 + B^2a^2b} + x\right)\right)\right) - \frac{Aa + x^3(-4Ab + 4Ba)}{4a^2x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**5/(b*x**3+a),x)
```

```
[Out] RootSum(27*_t**3*a**7 + A**3*b**4 - 3*A**2*B*a*b**3 + 3*A*B**2*a*
*2*b**2 - B**3*a**3*b, Lambda(_t, _t*log(9*_t**2*a**5/(A**2*b**3
- 2*A*B*a*b**2 + B**2*a**2*b) + x))) - (A*a + x**3*(-4*A*b + 4*B*
a))/(4*a**2*x**4)
```

GIAC/XCAS [A] time = 0.221523, size = 266, normalized size = 1.61

$$\frac{\left(Bab\left(-\frac{a}{b}\right)^{\frac{1}{3}} - Ab^2\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3a^3} + \frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{2}{3}}Ba - \left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3a^3b} - \frac{\left(\left(-ab^2\right)^{\frac{2}{3}}Ba - \left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6a^3b} - \frac{4Bax^3 - 4Abx^3 + Aa}{4a^2x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^5),x, algorithm="giac")
```

```
[Out] 1/3*(B*a*b*(-a/b)^(1/3) - A*b^2*(-a/b)^(1/3))*(-a/b)^(1/3)*ln(abs
(x - (-a/b)^(1/3)))/a^3 + 1/3*sqrt(3)*((-a*b^2)^(2/3)*B*a - (-a*b
^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/
3))/(a^3*b) - 1/6*((-a*b^2)^(2/3)*B*a - (-a*b^2)^(2/3)*A*b)*ln(x^
2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a^3*b) - 1/4*(4*B*a*x^3 - 4*A
*b*x^3 + A*a)/(a^2*x^4)
```

3.68 $\int \frac{A+Bx^3}{x^6(a+bx^3)}\,dx$

Optimal. Leaf size=168

$$-\frac{b^{2/3}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{8/3}}+\frac{b^{2/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{8/3}}-\frac{b^{2/3}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{8/3}}+\frac{Ab-aB}{2a^2x^2}-\frac{A}{5ax^5}$$

```
[Out] -A/(5*a*x^5) + (A*b - a*B)/(2*a^2*x^2) - (b^(2/3)*(A*b - a*B)*Arc
Tan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(8/3))
 + (b^(2/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(8/3)) - (
b^(2/3)*(A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
])/(6*a^(8/3))
```

Rubi [A] time = 0.28673, antiderivative size = 168, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$-\frac{b^{2/3}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{8/3}}+\frac{b^{2/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{8/3}}-\frac{b^{2/3}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{8/3}}+\frac{Ab-aB}{2a^2x^2}-\frac{A}{5ax^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^6*(a + b*x^3)),x]
```

```
[Out] -A/(5*a*x^5) + (A*b - a*B)/(2*a^2*x^2) - (b^(2/3)*(A*b - a*B)*Arc
Tan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(8/3))
 + (b^(2/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(8/3)) - (
b^(2/3)*(A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
])/(6*a^(8/3))
```

Rubi in Sympy [A] time = 38.7188, size = 153, normalized size = 0.91

$$-\frac{A}{5ax^5}+\frac{Ab-Ba}{2a^2x^2}+\frac{b^{\frac{2}{3}}(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{8}{3}}}-\frac{b^{\frac{2}{3}}(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{8}{3}}}-\frac{\sqrt{3}b^{\frac{2}{3}}(Ab-Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{8}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**6/(b*x**3+a),x)
```

```
[Out] -A/(5*a*x**5) + (A*b - B*a)/(2*a**2*x**2) + b**(2/3)*(A*b - B*a)*
log(a**(1/3) + b**(1/3)*x)/(3*a**(8/3)) - b**(2/3)*(A*b - B*a)*lo
g(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*a**(8/3)) -
sqrt(3)*b**(2/3)*(A*b - B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3
)*x/3)/a**(1/3))/(3*a**(8/3))
```

Mathematica [A] time = 0.2404, size = 154, normalized size = 0.92

$$\frac{5b^{2/3}(aB-Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)+\frac{15a^{2/3}(Ab-aB)}{x^2}-\frac{6a^{5/3}A}{x^5}+10b^{2/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-10\sqrt{3}b^{2/3}(Ab-}{30a^{8/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^6*(a + b*x^3)),x]
```

```
[Out] ((-6*a^(5/3)*A)/x^5 + (15*a^(2/3)*(A*b - a*B))/x^2 - 10*Sqrt[3]*b
^(2/3)*(A*b - a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] +
10*b^(2/3)*(A*b - a*B)*Log[a^(1/3) + b^(1/3)*x] + 5*b^(2/3)*(-(A*
b) + a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(30*a^(
8/3))
```

Maple [A] time = 0.011, size = 217, normalized size = 1.3

$$-\frac{A}{5\,ax^5}+\frac{Ab}{2\,a^2x^2}-\frac{B}{2\,ax^2}+\frac{Ab}{3\,a^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{B}{3\,a}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{Ab}{6\,a^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{B}{6\,a}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{b\sqrt{3}A}{3\,a^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{\sqrt{3}B}{3\,a}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^6/(b*x^3+a),x)
```

```
[Out] -1/5*A/a/x^5+1/2/a^2/x^2*A*b-1/2/a/x^2*B+1/3*b/a^2/(a/b)^(2/3)*ln
(x+(a/b)^(1/3))*A-1/3/a/(a/b)^(2/3)*ln(x+(a/b)^(1/3))*B-1/6*b/a^2
/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*A+1/6/a/(a/b)^(2/3
)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*B+1/3*b/a^2/(a/b)^(2/3)*3^(1/
2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*A-1/3/a/(a/b)^(2/3)*3^
(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^6),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.236858, size = 266, normalized size = 1.58

$$\frac{\sqrt{3}\left(5\sqrt{3}(Ba-Ab)x^5\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}\log\left(b^2x^2-abx\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}+a^2\left(\frac{b^2}{a^2}\right)^{\frac{2}{3}}\right)-10\sqrt{3}(Ba-Ab)x^5\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}\log\left(bx+a\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}\right)+30\,(Ba-\right.}{90\,a^2x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^6),x, algorithm="fricas")
```

```
[Out] 1/90*sqrt(3)*(5*sqrt(3)*(B*a - A*b)*x^5*(b^2/a^2)^(1/3)*log(b^2*x
^2 - a*b*x*(b^2/a^2)^(1/3) + a^2*(b^2/a^2)^(2/3)) - 10*sqrt(3)*(B
*a - A*b)*x^5*(b^2/a^2)^(1/3)*log(b*x + a*(b^2/a^2)^(1/3)) + 30*(
B*a - A*b)*x^5*(b^2/a^2)^(1/3)*arctan(-1/3*(2*sqrt(3)*b*x - sqrt(
3)*a*(b^2/a^2)^(1/3))/(a*(b^2/a^2)^(1/3))) - 3*sqrt(3)*(5*(B*a -
A*b)*x^3 + 2*A*a))/(a^2*x^5)
```

Sympy [A] time = 3.18139, size = 99, normalized size = 0.59

$$\operatorname{RootSum}\left(27t^3a^8 - A^3b^5 + 3A^2Bab^4 - 3AB^2a^2b^3 + B^3a^3b^2, \left(t \mapsto t\log\left(-\frac{3ta^3}{-Ab^2 + Bab} + x\right)\right)\right) - \frac{2Aa + x^3(-5Ab + 5Ba)}{10a^2x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**6/(b*x**3+a),x)
```

```
[Out] RootSum(27*_t**3*a**8 - A**3*b**5 + 3*A**2*B*a*b**4 - 3*A*B**2*a*
*2*b**3 + B**3*a**3*b**2, Lambda(_t, _t*log(-3*_t*a**3/(-A*b**2 +
 B*a*b) + x))) - (2*A*a + x**3*(-5*A*b + 5*B*a))/(10*a**2*x**5)
```

GIAC/XCAS [A] time = 0.216897, size = 238, normalized size = 1.42

$$-\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3a^3} + \frac{\left(Bab - Ab^2\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3a^3} - \frac{\left(\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6a^3} - \frac{5Bax^3 - 5Abx^3 + 2Aa}{10a^2x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^6),x, algorithm="giac")
```

```
[Out] -1/3*sqrt(3)*((-a*b^2)^(1/3)*B*a - (-a*b^2)^(1/3)*A*b)*arctan(1/3
*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/a^3 + 1/3*(B*a*b - A*
b^2)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/a^3 - 1/6*((-a*b^2)^(
1/3)*B*a - (-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(
2/3))/a^3 - 1/10*(5*B*a*x^3 - 5*A*b*x^3 + 2*A*a)/(a^2*x^5)
```

3.69 $\int \frac{A+Bx^3}{x^7(a+bx^3)}\,dx$

Optimal. Leaf size=69

$$-\frac{b(Ab-aB)\log\left(a+bx^3\right)}{3a^3}+\frac{b\log(x)(Ab-aB)}{a^3}+\frac{Ab-aB}{3a^2x^3}-\frac{A}{6ax^6}$$

```
[Out] -A/(6*a*x^6) + (A*b - a*B)/(3*a^2*x^3) + (b*(A*b - a*B)*Log[x])/a
^3 - (b*(A*b - a*B)*Log[a + b*x^3])/(3*a^3)
```

Rubi [A] time = 0.173916, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$-\frac{b(Ab-aB)\log\left(a+bx^3\right)}{3a^3}+\frac{b\log(x)(Ab-aB)}{a^3}+\frac{Ab-aB}{3a^2x^3}-\frac{A}{6ax^6}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^7*(a + b*x^3)),x]
```

```
[Out] -A/(6*a*x^6) + (A*b - a*B)/(3*a^2*x^3) + (b*(A*b - a*B)*Log[x])/a
^3 - (b*(A*b - a*B)*Log[a + b*x^3])/(3*a^3)
```

Rubi in Sympy [A] time = 17.659, size = 63, normalized size = 0.91

$$-\frac{A}{6ax^6}+\frac{Ab-Ba}{3a^2x^3}+\frac{b\left(Ab-Ba\right)\log\left(x^3\right)}{3a^3}-\frac{b\left(Ab-Ba\right)\log\left(a+bx^3\right)}{3a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**7/(b*x**3+a),x)
```

```
[Out] -A/(6*a*x**6) + (A*b - B*a)/(3*a**2*x**3) + b*(A*b - B*a)*log(x**
3)/(3*a**3) - b*(A*b - B*a)*log(a + b*x**3)/(3*a**3)
```

Mathematica [A] time = 0.0520568, size = 70, normalized size = 1.01

$$\frac{6bx^6\log(x)(Ab-aB)-a\left(aA+2aBx^3-2Abx^3\right)+2bx^6(aB-Ab)\log\left(a+bx^3\right)}{6a^3x^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^7*(a + b*x^3)),x]
```

```
[Out] (-(a*(a*A - 2*A*b*x^3 + 2*a*B*x^3)) + 6*b*(A*b - a*B)*x^6*Log[x]
+ 2*b*(-(A*b) + a*B)*x^6*Log[a + b*x^3])/(6*a^3*x^6)
```

Maple [A] time = 0.012, size = 81, normalized size = 1.2

$$-\frac{A}{6\,ax^6}+\frac{Ab}{3\,a^2x^3}-\frac{B}{3\,ax^3}+\frac{A\ln(x)\,b^2}{a^3}-\frac{bB\ln(x)}{a^2}-\frac{b^2\ln\left(bx^3+a\right)A}{3\,a^3}+\frac{b\ln\left(bx^3+a\right)B}{3\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^7/(b*x^3+a),x)
```

```
[Out] -1/6*A/a/x^6+1/3/a^2/x^3*A*b-1/3/a/x^3*B+1/a^3*b^2*ln(x)*A-1/a^2*
b*ln(x)*B-1/3*b^2/a^3*ln(b*x^3+a)*A+1/3*b/a^2*ln(b*x^3+a)*B
```

Maxima [A] time = 1.38469, size = 95, normalized size = 1.38

$$\frac{\left(Bab - Ab^2\right)\log\left(bx^3 + a\right)}{3\,a^3} - \frac{\left(Bab - Ab^2\right)\log\left(x^3\right)}{3\,a^3} - \frac{2\,(Ba - Ab)x^3 + Aa}{6\,a^2x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^7),x, algorithm="maxima")
```

```
[Out] 1/3*(B*a*b - A*b^2)*log(b*x^3 + a)/a^3 - 1/3*(B*a*b - A*b^2)*log(
x^3)/a^3 - 1/6*(2*(B*a - A*b)*x^3 + A*a)/(a^2*x^6)
```

Fricas [A] time = 0.231414, size = 99, normalized size = 1.43

$$\frac{2\left(Bab - Ab^2\right)x^6\log\left(bx^3 + a\right) - 6\left(Bab - Ab^2\right)x^6\log(x) - 2\left(Ba^2 - Aab\right)x^3 - Aa^2}{6\,a^3x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^7),x, algorithm="fricas")
```

```
[Out] 1/6*(2*(B*a*b - A*b^2)*x^6*log(b*x^3 + a) - 6*(B*a*b - A*b^2)*x^6
*log(x) - 2*(B*a^2 - A*a*b)*x^3 - A*a^2)/(a^3*x^6)
```

Sympy [A] time = 5.11497, size = 61, normalized size = 0.88

$$-\frac{Aa + x^3(-2Ab + 2Ba)}{6a^2x^6} - \frac{b(-Ab + Ba)\log(x)}{a^3} + \frac{b(-Ab + Ba)\log\left(\frac{a}{b} + x^3\right)}{3a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**7/(b*x**3+a),x)
```

```
[Out] -(A*a + x**3*(-2*A*b + 2*B*a))/(6*a**2*x**6) - b*(-A*b + B*a)*log
(x)/a**3 + b*(-A*b + B*a)*log(a/b + x**3)/(3*a**3)
```

GIAC/XCAS [A] time = 0.217367, size = 134, normalized size = 1.94

$$-\frac{\left(Bab - Ab^2\right)\ln(|x|)}{a^3} + \frac{\left(Bab^2 - Ab^3\right)\ln\left(\left|bx^3 + a\right|\right)}{3\,a^3b} + \frac{3\,Babx^6 - 3\,Ab^2x^6 - 2\,Ba^2x^3 + 2\,Aabx^3 - Aa^2}{6\,a^3x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^7),x, algorithm="giac")
```

```
[Out] -(B*a*b - A*b^2)*ln(abs(x))/a^3 + 1/3*(B*a*b^2 - A*b^3)*ln(abs(b*
x^3 + a))/(a^3*b) + 1/6*(3*B*a*b*x^6 - 3*A*b^2*x^6 - 2*B*a^2*x^3
+ 2*A*a*b*x^3 - A*a^2)/(a^3*x^6)
```

3.70 $\int \frac{A+Bx^3}{x^8(a+bx^3)}\,dx$

Optimal. Leaf size=184

$$-\frac{b^{4/3}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{10/3}}+\frac{b^{4/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{10/3}}+\frac{b^{4/3}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{10/3}}-\frac{b(Ab-aB)}{a^3x}+\frac{Ab-aB}{4a^2x^4}-\frac{A}{7ax^7}$$

```
[Out] -A/(7*a*x^7) + (A*b - a*B)/(4*a^2*x^4) - (b*(A*b - a*B))/(a^3*x)
+ (b^(4/3)*(A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^
(1/3))])/(Sqrt[3]*a^(10/3)) + (b^(4/3)*(A*b - a*B)*Log[a^(1/3) +
b^(1/3)*x])/(3*a^(10/3)) - (b^(4/3)*(A*b - a*B)*Log[a^(2/3) - a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(10/3))
```

Rubi [A] time = 0.346352, antiderivative size = 184, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$-\frac{b^{4/3}(Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{10/3}}+\frac{b^{4/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{10/3}}+\frac{b^{4/3}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{10/3}}-\frac{b(Ab-aB)}{a^3x}+\frac{Ab-aB}{4a^2x^4}-\frac{A}{7ax^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^8*(a + b*x^3)),x]
```

```
[Out] -A/(7*a*x^7) + (A*b - a*B)/(4*a^2*x^4) - (b*(A*b - a*B))/(a^3*x)
+ (b^(4/3)*(A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^
(1/3))])/(Sqrt[3]*a^(10/3)) + (b^(4/3)*(A*b - a*B)*Log[a^(1/3) +
b^(1/3)*x])/(3*a^(10/3)) - (b^(4/3)*(A*b - a*B)*Log[a^(2/3) - a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(10/3))
```

Rubi in Sympy [A] time = 43.7329, size = 167, normalized size = 0.91

$$-\frac{A}{7ax^7}+\frac{Ab-Ba}{4a^2x^4}-\frac{b\,(Ab-Ba)}{a^3x}+\frac{b^{\frac{4}{3}}\,(Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{10}{3}}}-\frac{b^{\frac{4}{3}}\,(Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{10}{3}}}+\frac{\sqrt{3}b^{\frac{4}{3}}\,(Ab-Ba)\,\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{10}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**8/(b*x**3+a),x)
```

```
[Out] -A/(7*a*x**7) + (A*b - B*a)/(4*a**2*x**4) - b*(A*b - B*a)/(a**3*x
) + b**(4/3)*(A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(3*a**(10/3))
 - b**(4/3)*(A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(
2/3)*x**2)/(6*a**(10/3)) + sqrt(3)*b**(4/3)*(A*b - B*a)*atan(sqrt
(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*a**(10/3))
```

Mathematica [A] time = 0.330165, size = 173, normalized size = 0.94

$$\frac{14b^{4/3}(aB-Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)+\frac{21a^{4/3}(Ab-aB)}{x^4}-\frac{12a^{7/3}A}{x^7}+28b^{4/3}(Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)+28\sqrt{3}b^{4/3}(Ab\cdot}{84a^{10/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^8*(a + b*x^3)),x]
```

```
[Out] ((-12*a^(7/3)*A)/x^7 + (21*a^(4/3)*(A*b - a*B))/x^4 + (84*a^(1/3)
*b*(-(A*b) + a*B))/x + 28*Sqrt[3]*b^(4/3)*(A*b - a*B)*ArcTan[(1 -
 (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 28*b^(4/3)*(A*b - a*B)*Log[a^(
1/3) + b^(1/3)*x] + 14*b^(4/3)*(-(A*b) + a*B)*Log[a^(2/3) - a^(1/
3)*b^(1/3)*x + b^(2/3)*x^2])/(84*a^(10/3))
```

Maple [A] time = 0.01, size = 247, normalized size = 1.3

$$-\frac{A}{7\,ax^7}+\frac{Ab}{4\,x^4a^2}-\frac{B}{4\,ax^4}-\frac{b^2A}{a^3x}+\frac{Bb}{xa^2}+\frac{b^2A}{3\,a^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{Bb}{3\,a^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{b^2A}{6\,a^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{Bb}{6\,a^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{b^2\sqrt{3}A}{3\,a^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{b\sqrt{3}B}{3\,a^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^8/(b*x^3+a),x)
```

```
[Out] -1/7*A/a/x^7+1/4/a^2/x^4*A*b-1/4/a/x^4*B-1/a^3*b^2/x*A+1/a^2*b/x*
B+1/3/a^3*b^2/(a/b)^(1/3)*ln(x+(a/b)^(1/3))*A-1/3/a^2*b/(a/b)^(1/
3)*ln(x+(a/b)^(1/3))*B-1/6/a^3*b^2/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/
3)+(a/b)^(2/3))*A+1/6/a^2*b/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b
)^(2/3))*B-1/3/a^3*b^2*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/
(a/b)^(1/3)*x-1))*A+1/3/a^2*b*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1
/2)*(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^8),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.230142, size = 278, normalized size = 1.51

$$\frac{\sqrt{3}\left(14\sqrt{3}(Bab-Ab^2)x^7\left(\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx^2-ax\left(\frac{b}{a}\right)^{\frac{2}{3}}+a\left(\frac{b}{a}\right)^{\frac{1}{3}}\right)-28\sqrt{3}(Bab-Ab^2)x^7\left(\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx+a\left(\frac{b}{a}\right)^{\frac{2}{3}}\right)-84\left(Bab\right.\right.}{252\,a^3x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^8),x, algorithm="fricas")
```

```
[Out] 1/252*sqrt(3)*(14*sqrt(3)*(B*a*b - A*b^2)*x^7*(b/a)^(1/3)*log(b*x
^2 - a*x*(b/a)^(2/3) + a*(b/a)^(1/3)) - 28*sqrt(3)*(B*a*b - A*b^2
)*x^7*(b/a)^(1/3)*log(b*x + a*(b/a)^(2/3)) - 84*(B*a*b - A*b^2)*x
^7*(b/a)^(1/3)*arctan(-1/3*(2*sqrt(3)*b*x - sqrt(3)*a*(b/a)^(2/3)
)/(a*(b/a)^(2/3))) + 3*sqrt(3)*(28*(B*a*b - A*b^2)*x^6 - 7*(B*a^2
 - A*a*b)*x^3 - 4*A*a^2))/(a^3*x^7)
```

Sympy [A] time = 3.9306, size = 139, normalized size = 0.76

$$\mathrm{RootSum}\left(27t^3a^{10} - A^3b^7 + 3A^2Bab^6 - 3AB^2a^2b^5 + B^3a^3b^4, \left(t \mapsto t\log\left(\frac{9t^2a^7}{A^2b^5 - 2ABab^4 + B^2a^2b^3} + x\right)\right)\right) + \frac{-4Aa^2 + x^6\left(-28Ab^2 + 28Bab\right) + x^3\left(7Aab - 7Ba^2\right)}{28a^3x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**8/(b*x**3+a),x)
```

```
[Out] RootSum(27*_t**3*a**10 - A**3*b**7 + 3*A**2*B*a*b**6 - 3*A*B**2*a
**2*b**5 + B**3*a**3*b**4, Lambda(_t, _t*log(9*_t**2*a**7/(A**2*b
**5 - 2*A*B*a*b**4 + B**2*a**2*b**3) + x))) + (-4*A*a**2 + x**6*(
-28*A*b**2 + 28*B*a*b) + x**3*(7*A*a*b - 7*B*a**2))/(28*a**3*x**7
)
```

GIAC/XCAS [A] time = 0.21815, size = 292, normalized size = 1.59

$$-\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{2}{3}}Ba - \left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{3\,a^4} - \frac{\left(Bab^2\left(-\frac{a}{b}\right)^{\frac{1}{3}} - Ab^3\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,a^4} + \frac{\left(\left(-ab^2\right)^{\frac{2}{3}}Ba - \left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,a^4} + \frac{28\,Babx^6 - 28\,Ab^2x^6 - 7\,Ba^2x^3 + 7\,Aabx^3 - 4\,Aa^2}{28\,a^3x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^8),x, algorithm="giac")
```

```
[Out] -1/3*sqrt(3)*((-a*b^2)^(2/3)*B*a - (-a*b^2)^(2/3)*A*b)*arctan(1/3
*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/a^4 - 1/3*(B*a*b^2*(-
a/b)^(1/3) - A*b^3*(-a/b)^(1/3))*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(
1/3)))/a^4 + 1/6*((-a*b^2)^(2/3)*B*a - (-a*b^2)^(2/3)*A*b)*ln(x^2
 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/a^4 + 1/28*(28*B*a*b*x^6 - 28*A
*b^2*x^6 - 7*B*a^2*x^3 + 7*A*a*b*x^3 - 4*A*a^2)/(a^3*x^7)
```

3.71 $\int \frac{x^9(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=233

$$-\frac{a^{4/3}(7Ab-10aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18b^{13/3}}+\frac{a^{4/3}(7Ab-10aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{13/3}}-\frac{a^{4/3}(7Ab-10aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}b^{13/3}}-\frac{ax(7Ab-10aB)}{3b^4}+\frac{x^4(7Ab-10aB)}{12b^3}-\frac{x^7(7Ab-10aB)}{21ab^2}+\frac{x^{10}(Ab-aB)}{3ab\,(a+bx^3)}$$

```
[Out] -(a*(7*A*b - 10*a*B)*x)/(3*b^4) + ((7*A*b - 10*a*B)*x^4)/(12*b^3)
 - ((7*A*b - 10*a*B)*x^7)/(21*a*b^2) + ((A*b - a*B)*x^10)/(3*a*b*
(a + b*x^3)) - (a^(4/3)*(7*A*b - 10*a*B)*ArcTan[(a^(1/3) - 2*b^(1
/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*b^(13/3)) + (a^(4/3)*(7*A*b
 - 10*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*b^(13/3)) - (a^(4/3)*(7*A
*b - 10*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*
b^(13/3))
```

Rubi [A] time = 0.385021, antiderivative size = 233, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$-\frac{a^{4/3}(7Ab-10aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18b^{13/3}}+\frac{a^{4/3}(7Ab-10aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{13/3}}-\frac{a^{4/3}(7Ab-10aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}b^{13/3}}-\frac{ax(7Ab-10aB)}{3b^4}+\frac{x^4(7Ab-10aB)}{12b^3}-\frac{x^7(7Ab-10aB)}{21ab^2}+\frac{x^{10}(Ab-aB)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^9*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] -(a*(7*A*b - 10*a*B)*x)/(3*b^4) + ((7*A*b - 10*a*B)*x^4)/(12*b^3)
 - ((7*A*b - 10*a*B)*x^7)/(21*a*b^2) + ((A*b - a*B)*x^10)/(3*a*b*
(a + b*x^3)) - (a^(4/3)*(7*A*b - 10*a*B)*ArcTan[(a^(1/3) - 2*b^(1
/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*b^(13/3)) + (a^(4/3)*(7*A*b
 - 10*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*b^(13/3)) - (a^(4/3)*(7*A
*b - 10*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*
b^(13/3))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{a^{\frac{4}{3}}\left(7Ab-10Ba\right)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{\frac{13}{3}}}-\frac{a^{\frac{4}{3}}\left(7Ab-10Ba\right)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18b^{\frac{13}{3}}}-\frac{\sqrt{3}a^{\frac{4}{3}}\left(7Ab-10Ba\right)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9b^{\frac{13}{3}}}+\frac{x^4\left(7Ab-10Ba\right)}{12b^3}+\frac{x^{10}\left(Ab-Ba\right)}{3ab\left(a+bx^3\right)}-\frac{x^7\left(7Ab-10Ba\right)}{21ab^2}-\frac{\left(7Ab-10Ba\right)\int a^2\,dx}{3ab^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**9*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] a**(4/3)*(7*A*b - 10*B*a)*log(a**(1/3) + b**(1/3)*x)/(9*b**(13/3)
) - a**(4/3)*(7*A*b - 10*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x
+ b**(2/3)*x**2)/(18*b**(13/3)) - sqrt(3)*a**(4/3)*(7*A*b - 10*B*
a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(9*b**(13
/3)) + x**4*(7*A*b - 10*B*a)/(12*b**3) + x**10*(A*b - B*a)/(3*a*b
*(a + b*x**3)) - x**7*(7*A*b - 10*B*a)/(21*a*b**2) - (7*A*b - 10*
B*a)*Integral(a**2, x)/(3*a*b**4)
```

Mathematica [A] time = 0.304711, size = 203, normalized size = 0.87

$$\frac{14a^{4/3}(10aB-7Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-28a^{4/3}(10aB-7Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)+28\sqrt{3}a^{4/3}(10aB-7Ab)\tan^{-1}\left(\frac{1}{\cdots}\right.}{252b^{13/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^9*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (252*a*b^(1/3)*(-2*A*b + 3*a*B)*x + 63*b^(4/3)*(A*b - 2*a*B)*x^4
+ 36*b^(7/3)*B*x^7 + (84*a^2*b^(1/3)*(-(A*b) + a*B)*x)/(a + b*x^3
) + 28*Sqrt[3]*a^(4/3)*(-7*A*b + 10*a*B)*ArcTan[(1 - (2*b^(1/3)*x
)/a^(1/3))/Sqrt[3]] - 28*a^(4/3)*(-7*A*b + 10*a*B)*Log[a^(1/3) +
b^(1/3)*x] + 14*a^(4/3)*(-7*A*b + 10*a*B)*Log[a^(2/3) - a^(1/3)*b
^(1/3)*x + b^(2/3)*x^2])/(252*b^(13/3))
```

Maple [A] time = 0.014, size = 288, normalized size = 1.2

$$\frac{Bx^7}{7\,b^2}+\frac{Ax^4}{4\,b^2}-\frac{Bx^4a}{2\,b^3}-2\,\frac{aAx}{b^3}+3\,\frac{Bxa^2}{b^4}-\frac{a^2Ax}{3\,b^3\,(bx^3+a)}+\frac{a^3xB}{3\,b^4\,(bx^3+a)}$$
$$+\frac{7\,Aa^2}{9\,b^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{7\,Aa^2}{18\,b^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{7\,Aa^2\sqrt{3}}{9\,b^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{10\,Ba^3}{9\,b^5}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{5\,Ba^3}{9\,b^5}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{10\,Ba^3\sqrt{3}}{9\,b^5}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^9*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/7/b^2*B*x^7+1/4/b^2*A*x^4-1/2/b^3*B*x^4*a-2/b^3*A*x*a+3/b^4*B*x
*a^2-1/3*a^2/b^3*x/(b*x^3+a)*A+1/3*a^3/b^4*x/(b*x^3+a)*B+7/9*a^2/
b^4*A/(a/b)^(2/3)*ln(x+(a/b)^(1/3))-7/18*a^2/b^4*A/(a/b)^(2/3)*ln
(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+7/9*a^2/b^4*A/(a/b)^(2/3)*3^(1/2)
*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))-10/9*a^3/b^5*B/(a/b)^(2/
3)*ln(x+(a/b)^(1/3))+5/9*a^3/b^5*B/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/
3)+(a/b)^(2/3))-10/9*a^3/b^5*B/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(
1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^9/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238266, size = 385, normalized size = 1.65

$$\frac{\sqrt{3}\left(14\sqrt{3}\left(10\,Ba^3 - 7\,Aa^2b + \left(10\,Ba^2b - 7\,Aab^2\right)x^3\right)\left(\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x^2 - x\left(\frac{a}{b}\right)^{\frac{1}{3}} + \left(\frac{a}{b}\right)^{\frac{2}{3}}\right) - 28\sqrt{3}\left(10\,Ba^3 - 7\,Aa^2b + \left(10\,Ba^2b \cdot\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^9/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/756*sqrt(3)*(14*sqrt(3)*(10*B*a^3 - 7*A*a^2*b + (10*B*a^2*b - 7
*A*a*b^2)*x^3)*(a/b)^(1/3)*log(x^2 - x*(a/b)^(1/3) + (a/b)^(2/3))
 - 28*sqrt(3)*(10*B*a^3 - 7*A*a^2*b + (10*B*a^2*b - 7*A*a*b^2)*x^
3)*(a/b)^(1/3)*log(x + (a/b)^(1/3)) + 84*(10*B*a^3 - 7*A*a^2*b +
(10*B*a^2*b - 7*A*a*b^2)*x^3)*(a/b)^(1/3)*arctan(-1/3*(2*sqrt(3)*
x - sqrt(3)*(a/b)^(1/3))/(a/b)^(1/3)) + 3*sqrt(3)*(12*B*b^3*x^10
- 3*(10*B*a*b^2 - 7*A*b^3)*x^7 + 21*(10*B*a^2*b - 7*A*a*b^2)*x^4
+ 28*(10*B*a^3 - 7*A*a^2*b)*x))/(b^5*x^3 + a*b^4)
```

Sympy [A] time = 4.49415, size = 153, normalized size = 0.66

$$\frac{Bx^7}{7b^2} + \frac{x\left(-Aa^2b + Ba^3\right)}{3ab^4 + 3b^5x^3} + \operatorname{RootSum}\left(729t^3b^{13} - 343A^3a^4b^3 + 1470A^2Ba^5b^2 - 2100AB^2a^6b + 1000B^3a^7, \left(t \mapsto t\log\left(-\frac{9tb^4}{-7Aab + 10Ba^2} + x\right)\right)\right) - \frac{x^4\left(-Ab + 2Ba\right)}{4b^3} + \frac{x\left(-2Aab + 3Ba^2\right)}{b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*x**7/(7*b**2) + x*(-A*a**2*b + B*a**3)/(3*a*b**4 + 3*b**5*x**3)
 + RootSum(729*_t**3*b**13 - 343*A**3*a**4*b**3 + 1470*A**2*B*a**
5*b**2 - 2100*A*B**2*a**6*b + 1000*B**3*a**7, Lambda(_t, _t*log(-
9*_t*b**4/(-7*A*a*b + 10*B*a**2) + x))) - x**4*(-A*b + 2*B*a)/(4*
b**3) + x*(-2*A*a*b + 3*B*a**2)/b**4
```

GIAC/XCAS [A] time = 0.218661, size = 329, normalized size = 1.41

$$-\frac{\sqrt{3}\left(10\left(-ab^2\right)^{\frac{1}{3}}Ba^2 - 7\left(-ab^2\right)^{\frac{1}{3}}Aab\right)\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,b^5} + \frac{\left(10\,Ba^3 - 7\,Aa^2b\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,ab^4} - \frac{\left(10\left(-ab^2\right)^{\frac{1}{3}}Ba^2 - 7\left(-ab^2\right)^{\frac{1}{3}}Aab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,b^5} + \frac{Ba^3x - Aa^2bx}{3\left(bx^3 + a\right)b^4} + \frac{4\,Bb^{12}x^7 - 14\,Bab^{11}x^4 + 7\,Ab^{12}x^4 + 84\,Ba^2b^{10}x - 56\,Aab^{11}x}{28\,b^{14}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^9/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] -1/9*sqrt(3)*(10*(-a*b^2)^(1/3)*B*a^2 - 7*(-a*b^2)^(1/3)*A*a*b)*a
rctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/b^5 + 1/9*(1
0*B*a^3 - 7*A*a^2*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^
4) - 1/18*(10*(-a*b^2)^(1/3)*B*a^2 - 7*(-a*b^2)^(1/3)*A*a*b)*ln(x
^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/b^5 + 1/3*(B*a^3*x - A*a^2*b*
x)/((b*x^3 + a)*b^4) + 1/28*(4*B*b^12*x^7 - 14*B*a*b^11*x^4 + 7*A
*b^12*x^4 + 84*B*a^2*b^10*x - 56*A*a*b^11*x)/b^14
```

3.72 $\int \frac{x^8(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=82

$$-\frac{a^2(Ab-aB)}{3b^4(a+bx^3)}-\frac{a(2Ab-3aB)\log\left(a+bx^3\right)}{3b^4}+\frac{x^3(Ab-2aB)}{3b^3}+\frac{Bx^6}{6b^2}$$

```
[Out] ((A*b - 2*a*B)*x^3)/(3*b^3) + (B*x^6)/(6*b^2) - (a^2*(A*b - a*B))
/(3*b^4*(a + b*x^3)) - (a*(2*A*b - 3*a*B)*Log[a + b*x^3])/(3*b^4)
```

Rubi [A] time = 0.252742, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{a^2(Ab-aB)}{3b^4(a+bx^3)}-\frac{a(2Ab-3aB)\log\left(a+bx^3\right)}{3b^4}+\frac{x^3(Ab-2aB)}{3b^3}+\frac{Bx^6}{6b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((A*b - 2*a*B)*x^3)/(3*b^3) + (B*x^6)/(6*b^2) - (a^2*(A*b - a*B))
/(3*b^4*(a + b*x^3)) - (a*(2*A*b - 3*a*B)*Log[a + b*x^3])/(3*b^4)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{B\int^{x^3} x\,dx}{3b^2}-\frac{a^2\left(Ab-Ba\right)}{3b^4\left(a+bx^3\right)}-\frac{a\left(2Ab-3Ba\right)\log\left(a+bx^3\right)}{3b^4}+\left(\frac{Ab}{3}-\frac{2Ba}{3}\right)\int^{x^3}\frac{1}{b^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*Integral(x, (x, x**3))/(3*b**2) - a**2*(A*b - B*a)/(3*b**4*(a +
 b*x**3)) - a*(2*A*b - 3*B*a)*log(a + b*x**3)/(3*b**4) + (A*b/3 -
 2*B*a/3)*Integral(b**(-3), (x, x**3))
```

Mathematica [A] time = 0.130167, size = 72, normalized size = 0.88

$$\frac{\frac{2a^2(aB-Ab)}{a+bx^3}+2bx^3(Ab-2aB)+2a(3aB-2Ab)\log\left(a+bx^3\right)+b^2Bx^6}{6b^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (2*b*(A*b - 2*a*B)*x^3 + b^2*B*x^6 + (2*a^2*(-(A*b) + a*B))/(a +
b*x^3) + 2*a*(-2*A*b + 3*a*B)*Log[a + b*x^3])/(6*b^4)
```

Maple [A] time = 0.008, size = 97, normalized size = 1.2

$$\frac{Bx^6}{6\,b^2}+\frac{Ax^3}{3\,b^2}-\frac{2\,Bx^3a}{3\,b^3}-\frac{2\,a\ln\left(bx^3+a\right)A}{3\,b^3}+\frac{a^2\ln\left(bx^3+a\right)B}{b^4}-\frac{Aa^2}{3\,b^3\left(bx^3+a\right)}+\frac{Ba^3}{3\,b^4\left(bx^3+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/6*B*x^6/b^2+1/3/b^2*A*x^3-2/3/b^3*B*x^3*a-2/3*a/b^3*ln(b*x^3+a)
*A+a^2/b^4*ln(b*x^3+a)*B-1/3*a^2/b^3/(b*x^3+a)*A+1/3*a^3/b^4/(b*x
^3+a)*B
```

Maxima [A] time = 1.45782, size = 111, normalized size = 1.35

$$\frac{Ba^3 - Aa^2b}{3\,(b^5x^3 + ab^4)} + \frac{Bbx^6 - 2\,(2\,Ba - Ab)x^3}{6\,b^3} + \frac{\left(3\,Ba^2 - 2\,Aab\right)\log\left(bx^3 + a\right)}{3\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] 1/3*(B*a^3 - A*a^2*b)/(b^5*x^3 + a*b^4) + 1/6*(B*b*x^6 - 2*(2*B*a
 - A*b)*x^3)/b^3 + 1/3*(3*B*a^2 - 2*A*a*b)*log(b*x^3 + a)/b^4
```

Fricas [A] time = 0.226716, size = 163, normalized size = 1.99

$$\frac{Bb^3x^9 - \left(3\,Bab^2 - 2\,Ab^3\right)x^6 + 2\,Ba^3 - 2\,Aa^2b - 2\left(2\,Ba^2b - Aab^2\right)x^3 + 2\left(3\,Ba^3 - 2\,Aa^2b + \left(3\,Ba^2b - 2\,Aab^2\right)x^3\right)\log\left(bx^3\right.}{6\,(b^5x^3 + ab^4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/6*(B*b^3*x^9 - (3*B*a*b^2 - 2*A*b^3)*x^6 + 2*B*a^3 - 2*A*a^2*b
- 2*(2*B*a^2*b - A*a*b^2)*x^3 + 2*(3*B*a^3 - 2*A*a^2*b + (3*B*a^2
*b - 2*A*a*b^2)*x^3)*log(b*x^3 + a))/(b^5*x^3 + a*b^4)
```

Sympy [A] time = 4.22927, size = 78, normalized size = 0.95

$$\frac{Bx^6}{6b^2} + \frac{a\,(-2Ab + 3Ba)\log\left(a + bx^3\right)}{3b^4} + \frac{-Aa^2b + Ba^3}{3ab^4 + 3b^5x^3} - \frac{x^3\,(-Ab + 2Ba)}{3b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*x**6/(6*b**2) + a*(-2*A*b + 3*B*a)*log(a + b*x**3)/(3*b**4) + (
-A*a**2*b + B*a**3)/(3*a*b**4 + 3*b**5*x**3) - x**3*(-A*b + 2*B*a
)/(3*b**3)
```

GIAC/XCAS [A] time = 0.218305, size = 143, normalized size = 1.74

$$\frac{\left(3\,Ba^2 - 2\,Aab\right)\ln\left(\left|bx^3 + a\right|\right)}{3\,b^4} + \frac{Bb^2x^6 - 4\,Babx^3 + 2\,Ab^2x^3}{6\,b^4} - \frac{3\,Ba^2bx^3 - 2\,Aab^2x^3 + 2\,Ba^3 - Aa^2b}{3\,(bx^3 + a)b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/3*(3*B*a^2 - 2*A*a*b)*ln(abs(b*x^3 + a))/b^4 + 1/6*(B*b^2*x^6 -
 4*B*a*b*x^3 + 2*A*b^2*x^3)/b^4 - 1/3*(3*B*a^2*b*x^3 - 2*A*a*b^2*
x^3 + 2*B*a^3 - A*a^2*b)/((b*x^3 + a)*b^4)
```

3.73 $\int \frac{x^7(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=215

$$-\frac{a^{2/3}(5Ab-8aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18b^{11/3}}+\frac{a^{2/3}(5Ab-8aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{11/3}}+\frac{a^{2/3}(5Ab-8aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}b^{11/3}}+\frac{x^2(5Ab-8aB)}{6b^3}-\frac{x^5(5Ab-8aB)}{15ab^2}+\frac{x^8(Ab-aB)}{3ab(a+bx^3)}$$

```
[Out] ((5*A*b - 8*a*B)*x^2)/(6*b^3) - ((5*A*b - 8*a*B)*x^5)/(15*a*b^2)
+ ((A*b - a*B)*x^8)/(3*a*b*(a + b*x^3)) + (a^(2/3)*(5*A*b - 8*a*B
)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*b
^(11/3)) + (a^(2/3)*(5*A*b - 8*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*
b^(11/3)) - (a^(2/3)*(5*A*b - 8*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2])/(18*b^(11/3))
```

Rubi [A] time = 0.380322, antiderivative size = 215, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.4$

$$-\frac{a^{2/3}(5Ab-8aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18b^{11/3}}+\frac{a^{2/3}(5Ab-8aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{11/3}}+\frac{a^{2/3}(5Ab-8aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}b^{11/3}}+\frac{x^2(5Ab-8aB)}{6b^3}-\frac{x^5(5Ab-8aB)}{15ab^2}+\frac{x^8(Ab-aB)}{3ab(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^7*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((5*A*b - 8*a*B)*x^2)/(6*b^3) - ((5*A*b - 8*a*B)*x^5)/(15*a*b^2)
+ ((A*b - a*B)*x^8)/(3*a*b*(a + b*x^3)) + (a^(2/3)*(5*A*b - 8*a*B
)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*b
^(11/3)) + (a^(2/3)*(5*A*b - 8*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*
b^(11/3)) - (a^(2/3)*(5*A*b - 8*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2])/(18*b^(11/3))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{a^{\frac{2}{3}}(5Ab-8Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{\frac{11}{3}}}-\frac{a^{\frac{2}{3}}(5Ab-8Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18b^{\frac{11}{3}}}+\frac{\sqrt{3}a^{\frac{2}{3}}(5Ab-8Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9b^{\frac{11}{3}}}+\frac{(5Ab-8Ba)\int x\,dx}{3b^3}+\frac{x^8(Ab-Ba)}{3ab(a+bx^3)}-\frac{x^5(5Ab-8Ba)}{15ab^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] a**(2/3)*(5*A*b - 8*B*a)*log(a**(1/3) + b**(1/3)*x)/(9*b**(11/3))
 - a**(2/3)*(5*A*b - 8*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x +
b**(2/3)*x**2)/(18*b**(11/3)) + sqrt(3)*a**(2/3)*(5*A*b - 8*B*a)*
atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(9*b**(11/3)
) + (5*A*b - 8*B*a)*Integral(x, x)/(3*b**3) + x**8*(A*b - B*a)/(3
*a*b*(a + b*x**3)) - x**5*(5*A*b - 8*B*a)/(15*a*b**2)
```

Mathematica [A] time = 0.258326, size = 185, normalized size = 0.86

$$\frac{5a^{2/3}(8aB-5Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-10a^{2/3}(8aB-5Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-10\sqrt{3}a^{2/3}(8aB-5Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{90b^{11/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^7*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (45*b^(2/3)*(A*b - 2*a*B)*x^2 + 18*b^(5/3)*B*x^5 + (30*a*b^(2/3)*
(A*b - a*B)*x^2)/(a + b*x^3) - 10*Sqrt[3]*a^(2/3)*(-5*A*b + 8*a*B
)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] - 10*a^(2/3)*(-5*A*
b + 8*a*B)*Log[a^(1/3) + b^(1/3)*x] + 5*a^(2/3)*(-5*A*b + 8*a*B)*
Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(90*b^(11/3))
```

Maple [A] time = 0.013, size = 266, normalized size = 1.2

$$\frac{Bx^5}{5\,b^2}+\frac{Ax^2}{2\,b^2}-\frac{Bx^2a}{b^3}+\frac{aAx^2}{3\,b^2\,(bx^3+a)}-\frac{Bx^2a^2}{3\,b^3\,(bx^3+a)}+\frac{5\,aA}{9\,b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{5\,aA}{18\,b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{5\,aA\sqrt{3}}{9\,b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{8\,a^2B}{9\,b^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{4\,a^2B}{9\,b^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{8\,a^2B\sqrt{3}}{9\,b^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/5/b^2*B*x^5+1/2/b^2*A*x^2-1/b^3*B*x^2*a+1/3*a/b^2*x^2/(b*x^3+a)
*A-1/3*a^2/b^3*x^2/(b*x^3+a)*B+5/9*a/b^3*A/(a/b)^(1/3)*ln(x+(a/b)
^(1/3))-5/18*a/b^3*A/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3)
)-5/9*a/b^3*A*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/
3)*x-1))-8/9*a^2/b^4*B/(a/b)^(1/3)*ln(x+(a/b)^(1/3))+4/9*a^2/b^4*
B/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+8/9*a^2/b^4*B*3^(
1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.233097, size = 375, normalized size = 1.74

$$\frac{\sqrt{3}\left(5\sqrt{3}\left(\left(8\,Bab-5\,Ab^2\right)x^3+8\,Ba^2-5\,Aab\right)\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\log\left(ax^2-bx\left(\frac{a^2}{b^2}\right)^{\frac{2}{3}}+a\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\right)-10\sqrt{3}\left(\left(8\,Bab-5\,Ab^2\right)x^3+8\,Ba^2-\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/270*sqrt(3)*(5*sqrt(3)*((8*B*a*b - 5*A*b^2)*x^3 + 8*B*a^2 - 5*A
*a*b)*(a^2/b^2)^(1/3)*log(a*x^2 - b*x*(a^2/b^2)^(2/3) + a*(a^2/b^
2)^(1/3)) - 10*sqrt(3)*((8*B*a*b - 5*A*b^2)*x^3 + 8*B*a^2 - 5*A*a
*b)*(a^2/b^2)^(1/3)*log(a*x + b*(a^2/b^2)^(2/3)) - 30*((8*B*a*b -
 5*A*b^2)*x^3 + 8*B*a^2 - 5*A*a*b)*(a^2/b^2)^(1/3)*arctan(-1/3*(2
*sqrt(3)*a*x - sqrt(3)*b*(a^2/b^2)^(2/3))/(b*(a^2/b^2)^(2/3))) +
3*sqrt(3)*(6*B*b^2*x^8 - 3*(8*B*a*b - 5*A*b^2)*x^5 - 5*(8*B*a^2 -
 5*A*a*b)*x^2))/(b^4*x^3 + a*b^3)
```

Sympy [A] time = 4.64935, size = 151, normalized size = 0.7

$$\frac{Bx^5}{5b^2}-\frac{x^2\left(-Aab+Ba^2\right)}{3ab^3+3b^4x^3}$$
$$+\operatorname{RootSum}\left(729t^3b^{11}-125A^3a^2b^3+600A^2Ba^3b^2-960AB^2a^4b+512B^3a^5,\left(t\mapsto t\log\left(\frac{81t^2b^7}{25A^2ab^2-80ABa^2b+64B^2a^3}+x\right)\right)\right)$$
$$-\frac{x^2\left(-Ab+2Ba\right)}{2b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*x**5/(5*b**2) - x**2*(-A*a*b + B*a**2)/(3*a*b**3 + 3*b**4*x**3)
 + RootSum(729*_t**3*b**11 - 125*A**3*a**2*b**3 + 600*A**2*B*a**3
*b**2 - 960*A*B**2*a**4*b + 512*B**3*a**5, Lambda(_t, _t*log(81*_
t**2*b**7/(25*A**2*a*b**2 - 80*A*B*a**2*b + 64*B**2*a**3) + x)))
- x**2*(-A*b + 2*B*a)/(2*b**3)
```

GIAC/XCAS [A] time = 0.218887, size = 319, normalized size = 1.48

$$-\frac{\left(8\,Ba^2\left(-\frac{a}{b}\right)^{\frac{1}{3}}-5\,Aab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,ab^3}$$
$$-\frac{\sqrt{3}\left(8\left(-ab^2\right)^{\frac{2}{3}}Ba-5\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,b^5}-\frac{Ba^2x^2-Aabx^2}{3\left(bx^3+a\right)b^3}$$
$$+\frac{\left(8\left(-ab^2\right)^{\frac{2}{3}}Ba-5\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,b^5}+\frac{2\,Bb^8x^5-10\,Bab^7x^2+5\,Ab^8x^2}{10\,b^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] -1/9*(8*B*a^2*(-a/b)^(1/3) - 5*A*a*b*(-a/b)^(1/3))*(-a/b)^(1/3)*l
n(abs(x - (-a/b)^(1/3)))/(a*b^3) - 1/9*sqrt(3)*(8*(-a*b^2)^(2/3)*
B*a - 5*(-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3
))/(-a/b)^(1/3))/b^5 - 1/3*(B*a^2*x^2 - A*a*b*x^2)/((b*x^3 + a)*b
```

```
^3) + 1/18*(8*(-a*b^2)^(2/3)*B*a - 5*(-a*b^2)^(2/3)*A*b)*ln(x^2 +
 x*(-a/b)^(1/3) + (-a/b)^(2/3))/b^5 + 1/10*(2*B*b^8*x^5 - 10*B*a*
b^7*x^2 + 5*A*b^8*x^2)/b^10
```

3.74 $\int \frac{x^6(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=213

$$\frac{\sqrt[3]{a}(4Ab-7aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18b^{10/3}}-\frac{\sqrt[3]{a}(4Ab-7aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{10/3}}+\frac{\sqrt[3]{a}(4Ab-7aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}b^{10/3}}+\frac{x(4Ab-7aB)}{3b^3}-\frac{x^4(4Ab-7aB)}{12ab^2}+\frac{x^7(Ab-aB)}{3ab(a+bx^3)}$$

```
[Out] ((4*A*b - 7*a*B)*x)/(3*b^3) - ((4*A*b - 7*a*B)*x^4)/(12*a*b^2) +
((A*b - a*B)*x^7)/(3*a*b*(a + b*x^3)) + (a^(1/3)*(4*A*b - 7*a*B)*
ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*b^(
10/3)) - (a^(1/3)*(4*A*b - 7*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*b^
(10/3)) + (a^(1/3)*(4*A*b - 7*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*
x + b^(2/3)*x^2])/(18*b^(10/3))
```

Rubi [A] time = 0.351085, antiderivative size = 213, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$\frac{\sqrt[3]{a}(4Ab-7aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18b^{10/3}}-\frac{\sqrt[3]{a}(4Ab-7aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{10/3}}+\frac{\sqrt[3]{a}(4Ab-7aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}b^{10/3}}+\frac{x(4Ab-7aB)}{3b^3}-\frac{x^4(4Ab-7aB)}{12ab^2}+\frac{x^7(Ab-aB)}{3ab(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^6*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((4*A*b - 7*a*B)*x)/(3*b^3) - ((4*A*b - 7*a*B)*x^4)/(12*a*b^2) +
((A*b - a*B)*x^7)/(3*a*b*(a + b*x^3)) + (a^(1/3)*(4*A*b - 7*a*B)*
ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*b^(
10/3)) - (a^(1/3)*(4*A*b - 7*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*b^
(10/3)) + (a^(1/3)*(4*A*b - 7*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*
x + b^(2/3)*x^2])/(18*b^(10/3))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\sqrt[3]{a}\,(4Ab-7Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9b^{\frac{10}{3}}}+\frac{\sqrt[3]{a}\,(4Ab-7Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18b^{\frac{10}{3}}}+\frac{\sqrt{3}\sqrt[3]{a}\,(4Ab-7Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9b^{\frac{10}{3}}}+\frac{x^7\,(Ab-Ba)}{3ab\,(a+bx^3)}-\frac{x^4\,(4Ab-7Ba)}{12ab^2}+\frac{(4Ab-7Ba)\int a\,dx}{3ab^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] -a**(1/3)*(4*A*b - 7*B*a)*log(a**(1/3) + b**(1/3)*x)/(9*b**(10/3)
) + a**(1/3)*(4*A*b - 7*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x +
 b**(2/3)*x**2)/(18*b**(10/3)) + sqrt(3)*a**(1/3)*(4*A*b - 7*B*a)
*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(9*b**(10/3
)) + x**7*(A*b - B*a)/(3*a*b*(a + b*x**3)) - x**4*(4*A*b - 7*B*a)
/(12*a*b**2) + (4*A*b - 7*B*a)*Integral(a, x)/(3*a*b**3)
```

Mathematica [A] time = 0.27194, size = 181, normalized size = 0.85

$$\frac{-2\sqrt[3]{a}(7aB-4Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)+\frac{12a\sqrt[3]{b}x(Ab-aB)}{a+bx^3}+36\sqrt[3]{b}x(Ab-2aB)+4\sqrt[3]{a}(7aB-4Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-}{36b^{10/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^6*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (36*b^(1/3)*(A*b - 2*a*B)*x + 9*b^(4/3)*B*x^4 + (12*a*b^(1/3)*(A*
b - a*B)*x)/(a + b*x^3) - 4*Sqrt[3]*a^(1/3)*(-4*A*b + 7*a*B)*ArcT
an[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 4*a^(1/3)*(-4*A*b + 7*a
*B)*Log[a^(1/3) + b^(1/3)*x] - 2*a^(1/3)*(-4*A*b + 7*a*B)*Log[a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(36*b^(10/3))
```

Maple [A] time = 0.013, size = 257, normalized size = 1.2

$$\begin{aligned}
&\frac{Bx^4}{4\,b^2}+\frac{Ax}{b^2}-2\,\frac{Bxa}{b^3}+\frac{aAx}{3\,b^2\,(bx^3+a)}-\frac{Bxa^2}{3\,b^3\,(bx^3+a)}\\
&-\frac{4\,Aa}{9\,b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{2\,Aa}{9\,b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}\\
&-\frac{4\,Aa\sqrt{3}}{9\,b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{7\,a^2B}{9\,b^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}\\
&-\frac{7\,a^2B}{18\,b^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{7\,a^2B\sqrt{3}}{9\,b^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}
\end{aligned}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/4/b^2*B*x^4+1/b^2*A*x-2/b^3*B*x*a+1/3*a/b^2*x/(b*x^3+a)*A-1/3*a
^2/b^3*x/(b*x^3+a)*B-4/9*a/b^3*A/(a/b)^(2/3)*ln(x+(a/b)^(1/3))+2/
9*a/b^3*A/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-4/9*a/b^3
*A/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+7/
9*a^2/b^4*B/(a/b)^(2/3)*ln(x+(a/b)^(1/3))-7/18*a^2/b^4*B/(a/b)^(2
/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+7/9*a^2/b^4*B/(a/b)^(2/3)*3
^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.241183, size = 343, normalized size = 1.61

$$\sqrt{3}\left(2\sqrt{3}\left(\left(7\,Bab-4\,Ab^{2}\right)x^{3}+7\,Ba^{2}-4\,Aab\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)-4\sqrt{3}\left(\left(7\,Bab-4\,Ab^{2}\right)x^{3}+7\,Ba^{2}-4\,A\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/108*sqrt(3)*(2*sqrt(3)*((7*B*a*b - 4*A*b^2)*x^3 + 7*B*a^2 - 4*A
*a*b)*(-a/b)^(1/3)*log(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3)) - 4*s
qrt(3)*((7*B*a*b - 4*A*b^2)*x^3 + 7*B*a^2 - 4*A*a*b)*(-a/b)^(1/3)
*log(x - (-a/b)^(1/3)) + 12*((7*B*a*b - 4*A*b^2)*x^3 + 7*B*a^2 -
4*A*a*b)*(-a/b)^(1/3)*arctan(1/3*(2*sqrt(3)*x + sqrt(3)*(-a/b)^(1
/3))/(-a/b)^(1/3)) + 3*sqrt(3)*(3*B*b^2*x^7 - 3*(7*B*a*b - 4*A*b^
2)*x^4 - 4*(7*B*a^2 - 4*A*a*b)*x))/(b^4*x^3 + a*b^3)
```

Sympy [A] time = 4.1506, size = 124, normalized size = 0.58

$$\frac{Bx^{4}}{4b^{2}}-\frac{x\left(-Aab+Ba^{2}\right)}{3ab^{3}+3b^{4}x^{3}}+\operatorname{RootSum}\left(729t^{3}b^{10}+64A^{3}ab^{3}-336A^{2}Ba^{2}b^{2}+588AB^{2}a^{3}b-343B^{3}a^{4},\left(t\mapsto t\log\left(\frac{9tb^{3}}{-4Ab+7Ba}+x\right)\right)\right)-\frac{x\left(-Ab+2Ba\right)}{b^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*x**4/(4*b**2) - x*(-A*a*b + B*a**2)/(3*a*b**3 + 3*b**4*x**3) +
RootSum(729*_t**3*b**10 + 64*A**3*a*b**3 - 336*A**2*B*a**2*b**2 +
 588*A*B**2*a**3*b - 343*B**3*a**4, Lambda(_t, _t*log(9*_t*b**3/(
-4*A*b + 7*B*a) + x))) - x*(-A*b + 2*B*a)/b**3
```

GIAC/XCAS [A] time = 0.218601, size = 285, normalized size = 1.34

$$\frac{\sqrt{3}\left(7\left(-ab^{2}\right)^{\frac{1}{3}}Ba-4\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,b^{4}}-\frac{\left(7\,Ba^{2}-4\,Aab\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,ab^{3}}+\frac{\left(7\left(-ab^{2}\right)^{\frac{1}{3}}Ba-4\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,b^{4}}-\frac{Ba^{2}x-Aabx}{3\left(bx^{3}+a\right)b^{3}}+\frac{Bb^{6}x^{4}-8\,Bab^{5}x+4\,Ab^{6}x}{4\,b^{8}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/9*sqrt(3)*(7*(-a*b^2)^(1/3)*B*a - 4*(-a*b^2)^(1/3)*A*b)*arctan(
1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/b^4 - 1/9*(7*B*a^2
 - 4*A*a*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^3) + 1/18
*(7*(-a*b^2)^(1/3)*B*a - 4*(-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^
(1/3) + (-a/b)^(2/3))/b^4 - 1/3*(B*a^2*x - A*a*b*x)/((b*x^3 + a)*
b^3) + 1/4*(B*b^6*x^4 - 8*B*a*b^5*x + 4*A*b^6*x)/b^8
```

3.75 $\int \frac{x^5(A+Bx^3)}{(a+bx^3)^2} dx$

Optimal. Leaf size=60

$$\frac{a(Ab-aB)}{3b^3(a+bx^3)}+\frac{(Ab-2aB)\log(a+bx^3)}{3b^3}+\frac{Bx^3}{3b^2}$$

```
[Out] (B*x^3)/(3*b^2) + (a*(A*b - a*B))/(3*b^3*(a + b*x^3)) + ((A*b - 2
*a*B)*Log[a + b*x^3])/(3*b^3)
```

Rubi [A] time = 0.178759, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{a(Ab-aB)}{3b^3(a+bx^3)}+\frac{(Ab-2aB)\log(a+bx^3)}{3b^3}+\frac{Bx^3}{3b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (B*x^3)/(3*b^2) + (a*(A*b - a*B))/(3*b^3*(a + b*x^3)) + ((A*b - 2
*a*B)*Log[a + b*x^3])/(3*b^3)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{a(Ab-Ba)}{3b^3(a+bx^3)}+\frac{\int^{x^3} B\,dx}{3b^2}+\frac{(Ab-2Ba)\log(a+bx^3)}{3b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] a*(A*b - B*a)/(3*b**3*(a + b*x**3)) + Integral(B, (x, x**3))/(3*b
**2) + (A*b - 2*B*a)*log(a + b*x**3)/(3*b**3)
```

Mathematica [A] time = 0.0661222, size = 50, normalized size = 0.83

$$\frac{\frac{a(Ab-aB)}{a+bx^3}+(Ab-2aB)\log(a+bx^3)+bBx^3}{3b^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (b*B*x^3 + (a*(A*b - a*B))/(a + b*x^3) + (A*b - 2*a*B)*Log[a + b*
x^3])/(3*b^3)
```

Maple [A] time = 0.009, size = 74, normalized size = 1.2

$$\frac{Bx^3}{3\,b^2}+\frac{\ln(bx^3+a)\,A}{3\,b^2}-\frac{2\,\ln(bx^3+a)\,Ba}{3\,b^3}+\frac{aA}{3\,b^2(bx^3+a)}-\frac{a^2B}{3\,b^3(bx^3+a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/3*B*x^3/b^2+1/3/b^2*ln(b*x^3+a)*A-2/3/b^3*ln(b*x^3+a)*B*a+1/3/b
^2*a/(b*x^3+a)*A-1/3/b^3*a^2/(b*x^3+a)*B
```

Maxima [A] time = 1.37334, size = 81, normalized size = 1.35

$$\frac{Bx^3}{3\,b^2} - \frac{Ba^2 - Aab}{3\,(b^4x^3 + ab^3)} - \frac{(2\,Ba - Ab)\log\left(bx^3 + a\right)}{3\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] 1/3*B*x^3/b^2 - 1/3*(B*a^2 - A*a*b)/(b^4*x^3 + a*b^3) - 1/3*(2*B*
a - A*b)*log(b*x^3 + a)/b^3
```

Fricas [A] time = 0.223549, size = 109, normalized size = 1.82

$$\frac{Bb^2x^6 + Babx^3 - Ba^2 + Aab - \left(\left(2\,Bab - Ab^2\right)x^3 + 2\,Ba^2 - Aab\right)\log\left(bx^3 + a\right)}{3\,(b^4x^3 + ab^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/3*(B*b^2*x^6 + B*a*b*x^3 - B*a^2 + A*a*b - ((2*B*a*b - A*b^2)*x
^3 + 2*B*a^2 - A*a*b)*log(b*x^3 + a))/(b^4*x^3 + a*b^3)
```

Sympy [A] time = 3.83167, size = 56, normalized size = 0.93

$$\frac{Bx^3}{3b^2} - \frac{-Aab + Ba^2}{3ab^3 + 3b^4x^3} - \frac{(-Ab + 2Ba)\log\left(a + bx^3\right)}{3b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*x**3/(3*b**2) - (-A*a*b + B*a**2)/(3*a*b**3 + 3*b**4*x**3) - (-
A*b + 2*B*a)*log(a + b*x**3)/(3*b**3)
```

GIAC/XCAS [A] time = 0.217873, size = 123, normalized size = 2.05

$$\frac{\frac{(bx^3+a)\,B}{b^2} + \frac{(2\,Ba-Ab)\ln\left(\frac{\left|bx^3+a\right|}{\left(bx^3+a\right)^2|b|}\right)}{b^2} - \frac{\frac{Ba^2b}{bx^3+a} - \frac{Aab^2}{bx^3+a}}{b^3}}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/3*((b*x^3 + a)*B/b^2 + (2*B*a - A*b)*ln(abs(b*x^3 + a)/((b*x^3
+ a)^2*abs(b)))/b^2 - (B*a^2*b/(b*x^3 + a) - A*a*b^2/(b*x^3 + a))
/b^3)/b
```

3.76 $\int \frac{x^4(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=196

$$\frac{(2Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18\sqrt[3]{a}b^{8/3}}-\frac{(2Ab-5aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9\sqrt[3]{a}b^{8/3}}-\frac{(2Ab-5aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}\sqrt[3]{a}b^{8/3}}-\frac{x^2(2Ab-5aB)}{6ab^2}+\frac{x^5(Ab-aB)}{3ab(a+bx^3)}$$

```
[Out] -((2*A*b - 5*a*B)*x^2)/(6*a*b^2) + ((A*b - a*B)*x^5)/(3*a*b*(a +
b*x^3)) - ((2*A*b - 5*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3
]*a^(1/3))])/(3*Sqrt[3]*a^(1/3)*b^(8/3)) - ((2*A*b - 5*a*B)*Log[a
^(1/3) + b^(1/3)*x])/(9*a^(1/3)*b^(8/3)) + ((2*A*b - 5*a*B)*Log[a
^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(1/3)*b^(8/3))
```

Rubi [A] time = 0.326517, antiderivative size = 196, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$\frac{(2Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18\sqrt[3]{a}b^{8/3}}-\frac{(2Ab-5aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9\sqrt[3]{a}b^{8/3}}-\frac{(2Ab-5aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}\sqrt[3]{a}b^{8/3}}-\frac{x^2(2Ab-5aB)}{6ab^2}+\frac{x^5(Ab-aB)}{3ab(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] -((2*A*b - 5*a*B)*x^2)/(6*a*b^2) + ((A*b - a*B)*x^5)/(3*a*b*(a +
b*x^3)) - ((2*A*b - 5*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3
]*a^(1/3))])/(3*Sqrt[3]*a^(1/3)*b^(8/3)) - ((2*A*b - 5*a*B)*Log[a
^(1/3) + b^(1/3)*x])/(9*a^(1/3)*b^(8/3)) + ((2*A*b - 5*a*B)*Log[a
^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(1/3)*b^(8/3))
```

Rubi in Sympy [A] time = 40.4904, size = 182, normalized size = 0.93

$$\frac{x^5\left(Ab-Ba\right)}{3ab\left(a+bx^3\right)}-\frac{x^2\left(2Ab-5Ba\right)}{6ab^2}-\frac{\left(2Ab-5Ba\right)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9\sqrt[3]{a}b^{\frac{8}{3}}}+\frac{\left(2Ab-5Ba\right)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18\sqrt[3]{a}b^{\frac{8}{3}}}-\frac{\sqrt{3}\left(2Ab-5Ba\right)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9\sqrt[3]{a}b^{\frac{8}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] x**5*(A*b - B*a)/(3*a*b*(a + b*x**3)) - x**2*(2*A*b - 5*B*a)/(6*a
*b**2) - (2*A*b - 5*B*a)*log(a**(1/3) + b**(1/3)*x)/(9*a**(1/3)*b
**(8/3)) + (2*A*b - 5*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b
**(2/3)*x**2)/(18*a**(1/3)*b**(8/3)) - sqrt(3)*(2*A*b - 5*B*a)*at
an(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(9*a**(1/3)*b*
*(8/3))
```

Mathematica [A] time = 0.251768, size = 165, normalized size = 0.84

$$\frac{\frac{(2Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{\sqrt[3]{a}}-\frac{6b^{2/3}x^2(Ab-aB)}{a+bx^3}+\frac{2(5aB-2Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[3]{a}}+\frac{2\sqrt{3}(5aB-2Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{\sqrt[3]{a}}+9b^{2/3}Bx^2}{18b^{8/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^4*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (9*b^(2/3)*B*x^2 - (6*b^(2/3)*(A*b - a*B)*x^2)/(a + b*x^3) + (2*S
qrt[3]*(-2*A*b + 5*a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3
]])/a^(1/3) + (2*(-2*A*b + 5*a*B)*Log[a^(1/3) + b^(1/3)*x])/a^(1/
3) + ((2*A*b - 5*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x
^2])/a^(1/3))/(18*b^(8/3))
```

Maple [A] time = 0.013, size = 235, normalized size = 1.2

$$\frac{Bx^2}{2\,b^2}-\frac{x^2A}{3\,b\,(bx^3+a)}+\frac{Bx^2a}{3\,b^2\,(bx^3+a)}+\frac{5\,Ba}{9\,b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{5\,Ba}{18\,b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{5\,Ba\sqrt{3}}{9\,b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{2\,A}{9\,b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{A}{9\,b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{2\,A\sqrt{3}}{9\,b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/2*B*x^2/b^2-1/3/b*x^2/(b*x^3+a)*A+1/3/b^2*x^2/(b*x^3+a)*B*a+5/9
/b^3*B*a/(a/b)^(1/3)*ln(x+(a/b)^(1/3))-5/18/b^3*B*a/(a/b)^(1/3)*l
n(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-5/9/b^3*B*a*3^(1/2)/(a/b)^(1/3)*
arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))-2/9/b^2*A/(a/b)^(1/3)*ln(
x+(a/b)^(1/3))+1/9/b^2*A/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(
2/3))+2/9/b^2*A*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(
1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.241338, size = 313, normalized size = 1.6

$$\frac{\sqrt{3}\left(\sqrt{3}\left(\left(5\,Bab - 2\,Ab^2\right)x^3 + 5\,Ba^2 - 2\,Aab\right)\log\left(\left(-ab^2\right)^{\frac{1}{3}}bx^2 - ab + \left(-ab^2\right)^{\frac{2}{3}}x\right) - 2\sqrt{3}\left(\left(5\,Bab - 2\,Ab^2\right)x^3 + 5\,Ba^2 - 2\,A\right.\right.}{54}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/54*sqrt(3)*(sqrt(3)*((5*B*a*b - 2*A*b^2)*x^3 + 5*B*a^2 - 2*A*a*
b)*log((-a*b^2)^(1/3)*b*x^2 - a*b + (-a*b^2)^(2/3)*x) - 2*sqrt(3)
*((5*B*a*b - 2*A*b^2)*x^3 + 5*B*a^2 - 2*A*a*b)*log(a*b + (-a*b^2)
^(2/3)*x) + 6*((5*B*a*b - 2*A*b^2)*x^3 + 5*B*a^2 - 2*A*a*b)*arcta
n(-1/3*(sqrt(3)*a*b - 2*sqrt(3)*(-a*b^2)^(2/3)*x)/(a*b)) + 3*sqrt
(3)*(3*B*b*x^5 + (5*B*a - 2*A*b)*x^2)*(-a*b^2)^(1/3))/((b^3*x^3 +
 a*b^2)*(-a*b^2)^(1/3))
```

Sympy [A] time = 4.20981, size = 126, normalized size = 0.64

$$\frac{Bx^2}{2b^2} + \frac{x^2\left(-Ab + Ba\right)}{3ab^2 + 3b^3x^3} + \operatorname{RootSum}\left(729t^3ab^8 + 8A^3b^3 - 60A^2Bab^2 + 150AB^2a^2b - 125B^3a^3, \left(t \mapsto t\log\left(\frac{81t^2ab^5}{4A^2b^2 - 20ABab + 25B^2a^2} + x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*x**2/(2*b**2) + x**2*(-A*b + B*a)/(3*a*b**2 + 3*b**3*x**3) + Ro
otSum(729*_t**3*a*b**8 + 8*A**3*b**3 - 60*A**2*B*a*b**2 + 150*A*B
**2*a**2*b - 125*B**3*a**3, Lambda(_t, _t*log(81*_t**2*a*b**5/(4*
A**2*b**2 - 20*A*B*a*b + 25*B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.220965, size = 285, normalized size = 1.45

$$\frac{Bx^2}{2\,b^2} + \frac{\left(5\,Ba\left(-\frac{a}{b}\right)^{\frac{1}{3}} - 2\,Ab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,ab^2} + \frac{Bax^2 - Abx^2}{3\left(bx^3 + a\right)b^2} + \frac{\sqrt{3}\left(5\left(-ab^2\right)^{\frac{2}{3}}Ba - 2\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,ab^4} - \frac{\left(5\left(-ab^2\right)^{\frac{2}{3}}Ba - 2\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,ab^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/2*B*x^2/b^2 + 1/9*(5*B*a*(-a/b)^(1/3) - 2*A*b*(-a/b)^(1/3))*(-a
/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^2) + 1/3*(B*a*x^2 - A*b*
x^2)/((b*x^3 + a)*b^2) + 1/9*sqrt(3)*(5*(-a*b^2)^(2/3)*B*a - 2*(-
a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^
(1/3))/(a*b^4) - 1/18*(5*(-a*b^2)^(2/3)*B*a - 2*(-a*b^2)^(2/3)*A*
b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a*b^4)
```

3.77 $\int \frac{x^3(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=190

$$-\frac{(Ab-4aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{2/3}b^{7/3}}+\frac{(Ab-4aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{2/3}b^{7/3}}-\frac{(Ab-4aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{2/3}b^{7/3}}-\frac{x(Ab-4aB)}{3ab^2}+\frac{x^4(Ab-aB)}{3ab(a+bx^3)}$$

```
[Out] -((A*b - 4*a*B)*x)/(3*a*b^2) + ((A*b - a*B)*x^4)/(3*a*b*(a + b*x^
3)) - ((A*b - 4*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1
/3))])/(3*Sqrt[3]*a^(2/3)*b^(7/3)) + ((A*b - 4*a*B)*Log[a^(1/3) +
 b^(1/3)*x])/(9*a^(2/3)*b^(7/3)) - ((A*b - 4*a*B)*Log[a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(2/3)*b^(7/3))
```

Rubi [A] time = 0.30186, antiderivative size = 190, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.4$

$$-\frac{(Ab-4aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{2/3}b^{7/3}}+\frac{(Ab-4aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{2/3}b^{7/3}}-\frac{(Ab-4aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{2/3}b^{7/3}}-\frac{x(Ab-4aB)}{3ab^2}+\frac{x^4(Ab-aB)}{3ab(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] -((A*b - 4*a*B)*x)/(3*a*b^2) + ((A*b - a*B)*x^4)/(3*a*b*(a + b*x^
3)) - ((A*b - 4*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1
/3))])/(3*Sqrt[3]*a^(2/3)*b^(7/3)) + ((A*b - 4*a*B)*Log[a^(1/3) +
 b^(1/3)*x])/(9*a^(2/3)*b^(7/3)) - ((A*b - 4*a*B)*Log[a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(2/3)*b^(7/3))
```

Rubi in Sympy [A] time = 43.0382, size = 173, normalized size = 0.91

$$\frac{x^4(Ab-Ba)}{3ab(a+bx^3)}-\frac{x(Ab-4Ba)}{3ab^2}+\frac{(Ab-4Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{\frac{2}{3}}b^{\frac{7}{3}}}-\frac{(Ab-4Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18a^{\frac{2}{3}}b^{\frac{7}{3}}}-\frac{\sqrt{3}(Ab-4Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9a^{\frac{2}{3}}b^{\frac{7}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] x**4*(A*b - B*a)/(3*a*b*(a + b*x**3)) - x*(A*b - 4*B*a)/(3*a*b**2
) + (A*b - 4*B*a)*log(a**(1/3) + b**(1/3)*x)/(9*a**(2/3)*b**(7/3)
) - (A*b - 4*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x
**2)/(18*a**(2/3)*b**(7/3)) - sqrt(3)*(A*b - 4*B*a)*atan(sqrt(3)*
(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(9*a**(2/3)*b**(7/3))
```

Mathematica [A] time = 0.240734, size = 160, normalized size = 0.84

$$\frac{\frac{(4aB-Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{2/3}}+\frac{2(Ab-4aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{2/3}}+\frac{2\sqrt{3}(4aB-Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{2/3}}-\frac{6\sqrt[3]{b}x(Ab-aB)}{a+bx^3}+18\sqrt[3]{b}Bx}{18b^{7/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^3*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (18*b^(1/3)*B*x - (6*b^(1/3)*(A*b - a*B)*x)/(a + b*x^3) + (2*Sqrt
[3]*(-(A*b) + 4*a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])
/a^(2/3) + (2*(A*b - 4*a*B)*Log[a^(1/3) + b^(1/3)*x])/a^(2/3) + (
(-(A*b) + 4*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/
a^(2/3))/(18*b^(7/3))
```

Maple [A] time = 0.011, size = 228, normalized size = 1.2

$$\frac{Bx}{b^2}-\frac{xA}{3\,b\,(bx^3+a)}+\frac{Bxa}{3\,b^2\,(bx^3+a)}-\frac{4\,Ba}{9\,b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{2\,Ba}{9\,b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{4\,Ba\sqrt{3}}{9\,b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{A}{9\,b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{A}{18\,b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{A\sqrt{3}}{9\,b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] B*x/b^2-1/3/b*x/(b*x^3+a)*A+1/3/b^2*x/(b*x^3+a)*B*a-4/9/b^3*B*a/(
a/b)^(2/3)*ln(x+(a/b)^(1/3))+2/9/b^3*B*a/(a/b)^(2/3)*ln(x^2-x*(a/
b)^(1/3)+(a/b)^(2/3))-4/9/b^3*B*a/(a/b)^(2/3)*3^(1/2)*arctan(1/3*
3^(1/2)*(2/(a/b)^(1/3)*x-1))+1/9/b^2*A/(a/b)^(2/3)*ln(x+(a/b)^(1/
3))-1/18/b^2*A/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+1/9/
b^2*A/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.237483, size = 296, normalized size = 1.56

$$\frac{\sqrt{3}\left(\sqrt{3}\left(\left(4\,Bab - Ab^2\right)x^3 + 4\,Ba^2 - Aab\right)\log\left(\left(a^2b\right)^{\frac{2}{3}}x^2 - \left(a^2b\right)^{\frac{1}{3}}ax + a^2\right) - 2\sqrt{3}\left(\left(4\,Bab - Ab^2\right)x^3 + 4\,Ba^2 - Aab\right)\log\left(\left(\right.\right.}{54\left(b^3x^3 + ab^2\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/54*sqrt(3)*(sqrt(3)*((4*B*a*b - A*b^2)*x^3 + 4*B*a^2 - A*a*b)*l
og((a^2*b)^(2/3)*x^2 - (a^2*b)^(1/3)*a*x + a^2) - 2*sqrt(3)*((4*B
*a*b - A*b^2)*x^3 + 4*B*a^2 - A*a*b)*log((a^2*b)^(1/3)*x + a) - 6
*((4*B*a*b - A*b^2)*x^3 + 4*B*a^2 - A*a*b)*arctan(1/3*(2*sqrt(3)*
(a^2*b)^(1/3)*x - sqrt(3)*a)/a) + 6*sqrt(3)*(3*B*b*x^4 + (4*B*a -
 A*b)*x)*(a^2*b)^(1/3))/((b^3*x^3 + a*b^2)*(a^2*b)^(1/3))
```

Sympy [A] time = 3.59246, size = 102, normalized size = 0.54

$$\frac{Bx}{b^2} + \frac{x\left(-Ab + Ba\right)}{3ab^2 + 3b^3x^3} + \operatorname{RootSum}\left(729t^3a^2b^7 - A^3b^3 + 12A^2Bab^2 - 48AB^2a^2b + 64B^3a^3, \left(t \mapsto t\log\left(-\frac{9tab^2}{-Ab + 4Ba} + x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*x/b**2 + x*(-A*b + B*a)/(3*a*b**2 + 3*b**3*x**3) + RootSum(729*
_t**3*a**2*b**7 - A**3*b**3 + 12*A**2*B*a*b**2 - 48*A*B**2*a**2*b
 + 64*B**3*a**3, Lambda(_t, _t*log(-9*_t*a*b**2/(-A*b + 4*B*a) +
x)))
```

GIAC/XCAS [A] time = 0.219189, size = 254, normalized size = 1.34

$$\frac{Bx}{b^2} + \frac{\left(4\,Ba - Ab\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,ab^2} - \frac{\sqrt{3}\left(4\,\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,ab^3} + \frac{Bax - Abx}{3\left(bx^3 + a\right)b^2} - \frac{\left(4\,\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,ab^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] B*x/b^2 + 1/9*(4*B*a - A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3))
)/(a*b^2) - 1/9*sqrt(3)*(4*(-a*b^2)^(1/3)*B*a - (-a*b^2)^(1/3)*A*
b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a*b^3)
 + 1/3*(B*a*x - A*b*x)/((b*x^3 + a)*b^2) - 1/18*(4*(-a*b^2)^(1/3)*
B*a - (-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))
/(a*b^3)
```

3.78 $\int \frac{x^2(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=41

$$\frac{B\log\left(a+bx^3\right)}{3b^2}-\frac{Ab-aB}{3b^2\left(a+bx^3\right)}$$

```
[Out] -(A*b - a*B)/(3*b^2*(a + b*x^3)) + (B*Log[a + b*x^3])/(3*b^2)
```

Rubi [A] time = 0.11513, antiderivative size = 41, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{B\log\left(a+bx^3\right)}{3b^2}-\frac{Ab-aB}{3b^2\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(A + B*x^3))/(a + b*x^3)^2,x]

[Out] -(A*b - a*B)/(3*b^2*(a + b*x^3)) + (B*Log[a + b*x^3])/(3*b^2)
```

Rubi in Sympy [A] time = 12.6833, size = 32, normalized size = 0.78

$$\frac{B\log\left(a+bx^3\right)}{3b^2}-\frac{Ab-Ba}{3b^2\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(B*x**3+A)/(b*x**3+a)**2,x)

[Out] B*log(a + b*x**3)/(3*b**2) - (A*b - B*a)/(3*b**2*(a + b*x**3))
```

Mathematica [A] time = 0.0269842, size = 41, normalized size = 1.

$$\frac{aB-Ab}{3b^2\left(a+bx^3\right)}+\frac{B\log\left(a+bx^3\right)}{3b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(A + B*x^3))/(a + b*x^3)^2,x]

[Out] (-(A*b) + a*B)/(3*b^2*(a + b*x^3)) + (B*Log[a + b*x^3])/(3*b^2)
```

Maple [A] time = 0.007, size = 47, normalized size = 1.2

$$\frac{B\ln\left(bx^3+a\right)}{3\,b^2}-\frac{A}{\left(3\,bx^3+3\,a\right)b}+\frac{Ba}{\left(3\,bx^3+3\,a\right)b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/3*B*ln(b*x^3+a)/b^2-1/3/(b*x^3+a)/b*A+1/3/(b*x^3+a)/b^2*B*a
```

Maxima [A] time = 1.3654, size = 54, normalized size = 1.32

$$\frac{Ba - Ab}{3\,(b^3x^3 + ab^2)} + \frac{B\log\left(bx^3 + a\right)}{3\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] 1/3*(B*a - A*b)/(b^3*x^3 + a*b^2) + 1/3*B*log(b*x^3 + a)/b^2
```

Fricas [A] time = 0.222053, size = 59, normalized size = 1.44

$$\frac{Ba - Ab + \left(Bbx^3 + Ba\right)\log\left(bx^3 + a\right)}{3\,(b^3x^3 + ab^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/3*(B*a - A*b + (B*b*x^3 + B*a)*log(b*x^3 + a))/(b^3*x^3 + a*b^2
)
```

Sympy [A] time = 2.75528, size = 36, normalized size = 0.88

$$\frac{B\log\left(a + bx^3\right)}{3b^2} + \frac{-Ab + Ba}{3ab^2 + 3b^3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] B*log(a + b*x**3)/(3*b**2) + (-A*b + B*a)/(3*a*b**2 + 3*b**3*x**3
)
```

GIAC/XCAS [A] time = 0.2184, size = 88, normalized size = 2.15

$$-\frac{B\left(\frac{\ln\left(\frac{\left|bx^3+a\right|}{\left(bx^3+a\right)^2|b|}\right)}{b} - \frac{a}{(bx^3+a)b}\right)}{3\,b} - \frac{A}{3\,(bx^3 + a)b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] -1/3*B*(ln(abs(b*x^3 + a)/((b*x^3 + a)^2*abs(b)))/b - a/((b*x^3 +
 a)*b))/b - 1/3*A/((b*x^3 + a)*b)
```

3.79 $\int \frac{x(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=171

$$\frac{(2aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{4/3}b^{5/3}}-\frac{(2aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{4/3}b^{5/3}}-\frac{(2aB+Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{4/3}b^{5/3}}+\frac{x^2(Ab-aB)}{3ab\,(a+bx^3)}$$

```
[Out] ((A*b - a*B)*x^2)/(3*a*b*(a + b*x^3)) - ((A*b + 2*a*B)*ArcTan[(a^
(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*a^(4/3)*b^(5/
3)) - ((A*b + 2*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*a^(4/3)*b^(5/3)
) + ((A*b + 2*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2]
)/(18*a^(4/3)*b^(5/3))
```

Rubi [A] time = 0.343308, antiderivative size = 171, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.389

$$\frac{(2aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{4/3}b^{5/3}}-\frac{(2aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{4/3}b^{5/3}}-\frac{(2aB+Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{4/3}b^{5/3}}+\frac{x^2(Ab-aB)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((A*b - a*B)*x^2)/(3*a*b*(a + b*x^3)) - ((A*b + 2*a*B)*ArcTan[(a^
(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*a^(4/3)*b^(5/
3)) - ((A*b + 2*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*a^(4/3)*b^(5/3)
) + ((A*b + 2*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2]
)/(18*a^(4/3)*b^(5/3))
```

Rubi in Sympy [A] time = 33.8584, size = 156, normalized size = 0.91

$$\frac{x^2\,(Ab-Ba)}{3ab\,(a+bx^3)}-\frac{(Ab+2Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{\frac{4}{3}}b^{\frac{5}{3}}}+\frac{(Ab+2Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18a^{\frac{4}{3}}b^{\frac{5}{3}}}-\frac{\sqrt{3}\,(Ab+2Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9a^{\frac{4}{3}}b^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] x**2*(A*b - B*a)/(3*a*b*(a + b*x**3)) - (A*b + 2*B*a)*log(a**(1/3
) + b**(1/3)*x)/(9*a**(4/3)*b**(5/3)) + (A*b + 2*B*a)*log(a**(2/3
) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(18*a**(4/3)*b**(5/3)) -
 sqrt(3)*(A*b + 2*B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)
/a**(1/3))/(9*a**(4/3)*b**(5/3))
```

Mathematica [A] time = 0.17991, size = 146, normalized size = 0.85

$$\frac{(2aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{6\sqrt[3]{a}b^{2/3}x^2(aB-Ab)}{a+bx^3}-2(2aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-2\sqrt{3}(2aB+Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{18a^{4/3}b^{5/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((-6*a^(1/3)*b^(2/3)*(-(A*b) + a*B)*x^2)/(a + b*x^3) - 2*Sqrt[3]*
(A*b + 2*a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] - 2*(A*
b + 2*a*B)*Log[a^(1/3) + b^(1/3)*x] + (A*b + 2*a*B)*Log[a^(2/3) -
 a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(4/3)*b^(5/3))
```

Maple [A] time = 0.012, size = 223, normalized size = 1.3

$$\frac{(Ab-Ba)x^2}{3ab(bx^3+a)}-\frac{A}{9ab}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{2B}{9b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{A}{18ab}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{B}{9b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{\sqrt{3}A}{9ab}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{2\sqrt{3}B}{9b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/3*(A*b-B*a)*x^2/a/b/(b*x^3+a)-1/9/b/a/(a/b)^(1/3)*ln(x+(a/b)^(1
/3))*A-2/9/b^2/(a/b)^(1/3)*ln(x+(a/b)^(1/3))*B+1/18/b/a/(a/b)^(1/
3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*A+1/9/b^2/(a/b)^(1/3)*ln(x^2
-x*(a/b)^(1/3)+(a/b)^(2/3))*B+1/9/b/a*3^(1/2)/(a/b)^(1/3)*arctan(
1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*A+2/9/b^2*3^(1/2)/(a/b)^(1/3)*ar
ctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238198, size = 293, normalized size = 1.71

$$-\frac{\sqrt{3}\Big(6\sqrt{3}\left(-ab^2\right)^{\frac{1}{3}}(Ba-Ab)x^2+\sqrt{3}\left(\left(2Bab+Ab^2\right)x^3+2Ba^2+Aab\right)\log\left(\left(-ab^2\right)^{\frac{1}{3}}bx^2-ab+\left(-ab^2\right)^{\frac{2}{3}}x\right)-2\sqrt{3}\big((2Ba\cdots}{54\left(ab^2x^3+a^2\cdots\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] -1/54*sqrt(3)*(6*sqrt(3)*(-a*b^2)^(1/3)*(B*a - A*b)*x^2 + sqrt(3)
*((2*B*a*b + A*b^2)*x^3 + 2*B*a^2 + A*a*b)*log((-a*b^2)^(1/3)*b*x
^2 - a*b + (-a*b^2)^(2/3)*x) - 2*sqrt(3)*((2*B*a*b + A*b^2)*x^3 +
 2*B*a^2 + A*a*b)*log(a*b + (-a*b^2)^(2/3)*x) + 6*((2*B*a*b + A*b
^2)*x^3 + 2*B*a^2 + A*a*b)*arctan(-1/3*(sqrt(3)*a*b - 2*sqrt(3)*(
-a*b^2)^(2/3)*x)/(a*b)))/((a*b^2*x^3 + a^2*b)*(-a*b^2)^(1/3))
```

Sympy [A] time = 3.02384, size = 117, normalized size = 0.68

$$-\frac{x^2(-Ab+Ba)}{3a^2b+3ab^2x^3}+\operatorname{RootSum}\left(729t^3a^4b^5+A^3b^3+6A^2Bab^2+12AB^2a^2b+8B^3a^3,\left(t\mapsto t\log\left(\frac{81t^2a^3b^3}{A^2b^2+4ABab+4B^2a^2}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] -x**2*(-A*b + B*a)/(3*a**2*b + 3*a*b**2*x**3) + RootSum(729*_t**3
*a**4*b**5 + A**3*b**3 + 6*A**2*B*a*b**2 + 12*A*B**2*a**2*b + 8*B
**3*a**3, Lambda(_t, _t*log(81*_t**2*a**3*b**3/(A**2*b**2 + 4*A*B
*a*b + 4*B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.22073, size = 273, normalized size = 1.6

$$-\frac{\left(2\,Ba\left(-\frac{a}{b}\right)^{\frac{1}{3}}+Ab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,a^2b}-\frac{Bax^2-Abx^2}{3\,(bx^3+a)ab}-\frac{\sqrt{3}\left(2\,\left(-ab^2\right)^{\frac{2}{3}}Ba+\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,a^2b^3}+\frac{\left(2\,\left(-ab^2\right)^{\frac{2}{3}}Ba+\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,a^2b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] -1/9*(2*B*a*(-a/b)^(1/3) + A*b*(-a/b)^(1/3))*(-a/b)^(1/3)*ln(abs(
x - (-a/b)^(1/3)))/(a^2*b) - 1/3*(B*a*x^2 - A*b*x^2)/((b*x^3 + a)
*a*b) - 1/9*sqrt(3)*(2*(-a*b^2)^(2/3)*B*a + (-a*b^2)^(2/3)*A*b)*a
rctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a^2*b^3) +
1/18*(2*(-a*b^2)^(2/3)*B*a + (-a*b^2)^(2/3)*A*b)*ln(x^2 + x*(-a/b
)^(1/3) + (-a/b)^(2/3))/(a^2*b^3)
```

3.80 $\int \frac{A+Bx^3}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=169

$$-\frac{(aB+2Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{5/3}b^{4/3}}+\frac{(aB+2Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{5/3}b^{4/3}}-\frac{(aB+2Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{5/3}b^{4/3}}+\frac{x(Ab-aB)}{3ab\,(a+bx^3)}$$

```
[Out] ((A*b - a*B)*x)/(3*a*b*(a + b*x^3)) - ((2*A*b + a*B)*ArcTan[(a^(1
/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*a^(5/3)*b^(4/3)
) + ((2*A*b + a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*a^(5/3)*b^(4/3))
- ((2*A*b + a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/
(18*a^(5/3)*b^(4/3))
```

Rubi [A] time = 0.223671, antiderivative size = 169, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$-\frac{(aB+2Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{5/3}b^{4/3}}+\frac{(aB+2Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{5/3}b^{4/3}}-\frac{(aB+2Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{5/3}b^{4/3}}+\frac{x(Ab-aB)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(a + b*x^3)^2,x]
```

```
[Out] ((A*b - a*B)*x)/(3*a*b*(a + b*x^3)) - ((2*A*b + a*B)*ArcTan[(a^(1
/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*a^(5/3)*b^(4/3)
) + ((2*A*b + a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*a^(5/3)*b^(4/3))
- ((2*A*b + a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/
(18*a^(5/3)*b^(4/3))
```

Rubi in Sympy [A] time = 33.5558, size = 155, normalized size = 0.92

$$\frac{x\,(Ab-Ba)}{3ab\,(a+bx^3)}+\frac{(2Ab+Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{\frac{5}{3}}b^{\frac{4}{3}}}-\frac{(2Ab+Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18a^{\frac{5}{3}}b^{\frac{4}{3}}}-\frac{\sqrt{3}\,(2Ab+Ba)\,\text{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9a^{\frac{5}{3}}b^{\frac{4}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] x*(A*b - B*a)/(3*a*b*(a + b*x**3)) + (2*A*b + B*a)*log(a**(1/3) +
 b**(1/3)*x)/(9*a**(5/3)*b**(4/3)) - (2*A*b + B*a)*log(a**(2/3) -
 a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(18*a**(5/3)*b**(4/3)) - sq
rt(3)*(2*A*b + B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a*
*(1/3))/(9*a**(5/3)*b**(4/3))
```

Mathematica [A] time = 0.179827, size = 145, normalized size = 0.86

$$-\frac{-(aB+2Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{6a^{2/3}\sqrt[3]{b}x(aB-Ab)}{a+bx^3}+2(aB+2Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-2\sqrt{3}(aB+2Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{18a^{5/3}b^{4/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(a + b*x^3)^2,x]
```

```
[Out] ((-6*a^(2/3)*b^(1/3)*(-(A*b) + a*B)*x)/(a + b*x^3) - 2*Sqrt[3]*(2
*A*b + a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 2*(2*A*
b + a*B)*Log[a^(1/3) + b^(1/3)*x] - (2*A*b + a*B)*Log[a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(5/3)*b^(4/3))
```

Maple [A] time = 0.011, size = 221, normalized size = 1.3

$$\frac{(Ab-Ba)x}{3ab(bx^3+a)}+\frac{2A}{9ab}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{B}{9b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{A}{9ab}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{B}{18b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{2\sqrt{3}A}{9ab}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{\sqrt{3}B}{9b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/3*(A*b-B*a)*x/a/b/(b*x^3+a)+2/9/b/a/(a/b)^(2/3)*ln(x+(a/b)^(1/3
))*A+1/9/b^2/(a/b)^(2/3)*ln(x+(a/b)^(1/3))*B-1/9/b/a/(a/b)^(2/3)*
ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*A-1/18/b^2/(a/b)^(2/3)*ln(x^2-x
*(a/b)^(1/3)+(a/b)^(2/3))*B+2/9/b/a/(a/b)^(2/3)*3^(1/2)*arctan(1/
3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*A+1/9/b^2/(a/b)^(2/3)*3^(1/2)*arct
an(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.234113, size = 275, normalized size = 1.63

$$-\frac{\sqrt{3}\left(6\sqrt{3}\left(a^2b\right)^{\frac{1}{3}}(Ba-Ab)x+\sqrt{3}\left(\left(Bab+2Ab^2\right)x^3+Ba^2+2Aab\right)\log\left(\left(a^2b\right)^{\frac{2}{3}}x^2-\left(a^2b\right)^{\frac{1}{3}}ax+a^2\right)-2\sqrt{3}\left(\left(Bab+2Ab\right.\right.\right.}{54\left(ab^2x^3+a^2b\right)\left(a^2\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] -1/54*sqrt(3)*(6*sqrt(3)*(a^2*b)^(1/3)*(B*a - A*b)*x + sqrt(3)*((
B*a*b + 2*A*b^2)*x^3 + B*a^2 + 2*A*a*b)*log((a^2*b)^(2/3)*x^2 - (
a^2*b)^(1/3)*a*x + a^2) - 2*sqrt(3)*((B*a*b + 2*A*b^2)*x^3 + B*a^
2 + 2*A*a*b)*log((a^2*b)^(1/3)*x + a) - 6*((B*a*b + 2*A*b^2)*x^3
+ B*a^2 + 2*A*a*b)*arctan(1/3*(2*sqrt(3)*(a^2*b)^(1/3)*x - sqrt(3
)*a)/a))/((a*b^2*x^3 + a^2*b)*(a^2*b)^(1/3))
```

Sympy [A] time = 2.69116, size = 97, normalized size = 0.57

$$-\frac{x(-Ab+Ba)}{3a^2b+3ab^2x^3} + \operatorname{RootSum}\left(729t^3a^5b^4 - 8A^3b^3 - 12A^2Bab^2 - 6AB^2a^2b - B^3a^3, \left(t \mapsto t\log\left(\frac{9ta^2b}{2Ab+Ba}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] -x*(-A*b + B*a)/(3*a**2*b + 3*a*b**2*x**3) + RootSum(729*_t**3*a*
*5*b**4 - 8*A**3*b**3 - 12*A**2*B*a*b**2 - 6*A*B**2*a**2*b - B**3
*a**3, Lambda(_t, _t*log(9*_t*a**2*b/(2*A*b + B*a) + x)))
```

GIAC/XCAS [A] time = 0.217655, size = 246, normalized size = 1.46

$$-\frac{(Ba+2Ab)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9a^2b} + \frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{1}{3}}Ba+2\left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9a^2b^2} - \frac{Bax-Abx}{3(bx^3+a)ab} + \frac{\left(\left(-ab^2\right)^{\frac{1}{3}}Ba+2\left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18a^2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] -1/9*(B*a + 2*A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a^2*b)
 + 1/9*sqrt(3)*((-a*b^2)^(1/3)*B*a + 2*(-a*b^2)^(1/3)*A*b)*arctan
(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a^2*b^2) - 1/3*(
B*a*x - A*b*x)/((b*x^3 + a)*a*b) + 1/18*((-a*b^2)^(1/3)*B*a + 2*(
-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a^2*b
^2)
```

3.81 $\int \frac{A+Bx^3}{x(a+bx^3)^2}\,dx$

Optimal. Leaf size=51

$$-\frac{A\log\left(a+bx^3\right)}{3a^2}+\frac{A\log(x)}{a^2}+\frac{Ab-aB}{3ab\left(a+bx^3\right)}$$

```
[Out] (A*b - a*B)/(3*a*b*(a + b*x^3)) + (A*Log[x])/a^2 - (A*Log[a + b*x
^3])/(3*a^2)
```

Rubi [A] time = 0.129521, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{A\log\left(a+bx^3\right)}{3a^2}+\frac{A\log(x)}{a^2}+\frac{Ab-aB}{3ab\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(A + B*x^3)/(x*(a + b*x^3)^2),x]
```

```
[Out] (A*b - a*B)/(3*a*b*(a + b*x^3)) + (A*Log[x])/a^2 - (A*Log[a + b*x
^3])/(3*a^2)
```

Rubi in Sympy [A] time = 14.7604, size = 44, normalized size = 0.86

$$\frac{A\log\left(x^3\right)}{3a^2}-\frac{A\log\left(a+bx^3\right)}{3a^2}+\frac{Ab-Ba}{3ab\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((B*x**3+A)/x/(b*x**3+a)**2,x)
```

```
[Out] A*log(x**3)/(3*a**2) - A*log(a + b*x**3)/(3*a**2) + (A*b - B*a)/(
3*a*b*(a + b*x**3))
```

Mathematica [A] time = 0.0590218, size = 46, normalized size = 0.9

$$\frac{\frac{a(Ab-aB)}{b(a+bx^3)}-A\log\left(a+bx^3\right)+3A\log(x)}{3a^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(A + B*x^3)/(x*(a + b*x^3)^2),x]
```

```
[Out] ((a*(A*b - a*B))/(b*(a + b*x^3)) + 3*A*Log[x] - A*Log[a + b*x^3])
/(3*a^2)
```

Maple [A] time = 0.012, size = 53, normalized size = 1.

$$\frac{A\ln(x)}{a^2}-\frac{A\ln\left(bx^3+a\right)}{3\,a^2}+\frac{A}{3\,a\,(bx^3+a)}-\frac{B}{3\,b\,(bx^3+a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x/(b*x^3+a)^2,x)
```

```
[Out] A*ln(x)/a^2-1/3*A*ln(b*x^3+a)/a^2+1/3/a/(b*x^3+a)*A-1/3/b/(b*x^3+
a)*B
```

Maxima [A] time = 1.37403, size = 69, normalized size = 1.35

$$-\frac{Ba - Ab}{3\,(ab^2x^3 + a^2b)} - \frac{A\log\left(bx^3 + a\right)}{3\,a^2} + \frac{A\log\left(x^3\right)}{3\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x),x, algorithm="maxima")
```

```
[Out] -1/3*(B*a - A*b)/(a*b^2*x^3 + a^2*b) - 1/3*A*log(b*x^3 + a)/a^2 +
 1/3*A*log(x^3)/a^2
```

Fricas [A] time = 0.228987, size = 95, normalized size = 1.86

$$-\frac{Ba^2 - Aab + \left(Ab^2x^3 + Aab\right)\log\left(bx^3 + a\right) - 3\left(Ab^2x^3 + Aab\right)\log\left(x\right)}{3\,(a^2b^2x^3 + a^3b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x),x, algorithm="fricas")
```

```
[Out] -1/3*(B*a^2 - A*a*b + (A*b^2*x^3 + A*a*b)*log(b*x^3 + a) - 3*(A*b
^2*x^3 + A*a*b)*log(x))/(a^2*b^2*x^3 + a^3*b)
```

Sympy [A] time = 2.69003, size = 46, normalized size = 0.9

$$\frac{A\log\left(x\right)}{a^2} - \frac{A\log\left(\frac{a}{b} + x^3\right)}{3a^2} - \frac{-Ab + Ba}{3a^2b + 3ab^2x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x/(b*x**3+a)**2,x)
```

```
[Out] A*log(x)/a**2 - A*log(a/b + x**3)/(3*a**2) - (-A*b + B*a)/(3*a**2
*b + 3*a*b**2*x**3)
```

GIAC/XCAS [A] time = 0.216502, size = 82, normalized size = 1.61

$$-\frac{A\ln\left(\left|bx^3 + a\right|\right)}{3\,a^2} + \frac{A\ln\left(\left|x\right|\right)}{a^2} + \frac{Ab^2x^3 - Ba^2 + 2\,Aab}{3\,(bx^3 + a)a^2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x),x, algorithm="giac")
```

```
[Out] -1/3*A*ln(abs(b*x^3 + a))/a^2 + A*ln(abs(x))/a^2 + 1/3*(A*b^2*x^3
 - B*a^2 + 2*A*a*b)/((b*x^3 + a)*a^2*b)
```

3.82 $\int \frac{A+Bx^3}{x^2(a+bx^3)^2} dx$

Optimal. Leaf size=196

$$-\frac{(4Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{7/3}b^{2/3}}+\frac{(4Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{7/3}b^{2/3}}+\frac{(4Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{7/3}b^{2/3}}-\frac{4Ab-aB}{3a^2bx}+\frac{Ab-aB}{3abx\left(a+bx^3\right)}$$

```
[Out] -(4*A*b - a*B)/(3*a^2*b*x) + (A*b - a*B)/(3*a*b*x*(a + b*x^3)) +
((4*A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])
/(3*Sqrt[3]*a^(7/3)*b^(2/3)) + ((4*A*b - a*B)*Log[a^(1/3) + b^(1/
3)*x])/(9*a^(7/3)*b^(2/3)) - ((4*A*b - a*B)*Log[a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(7/3)*b^(2/3))
```

Rubi [A] time = 0.295535, antiderivative size = 196, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$-\frac{(4Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{7/3}b^{2/3}}+\frac{(4Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{7/3}b^{2/3}}+\frac{(4Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{7/3}b^{2/3}}-\frac{4Ab-aB}{3a^2bx}+\frac{Ab-aB}{3abx\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^2*(a + b*x^3)^2),x]
```

```
[Out] -(4*A*b - a*B)/(3*a^2*b*x) + (A*b - a*B)/(3*a*b*x*(a + b*x^3)) +
((4*A*b - a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])
/(3*Sqrt[3]*a^(7/3)*b^(2/3)) + ((4*A*b - a*B)*Log[a^(1/3) + b^(1/
3)*x])/(9*a^(7/3)*b^(2/3)) - ((4*A*b - a*B)*Log[a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(7/3)*b^(2/3))
```

Rubi in Sympy [A] time = 39.9923, size = 172, normalized size = 0.88

$$\frac{Ab-Ba}{3abx\left(a+bx^3\right)}-\frac{4Ab-Ba}{3a^2bx}+\frac{(4Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{\frac{7}{3}}b^{\frac{2}{3}}}-\frac{(4Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18a^{\frac{7}{3}}b^{\frac{2}{3}}}+\frac{\sqrt{3}(4Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9a^{\frac{7}{3}}b^{\frac{2}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**2/(b*x**3+a)**2,x)
```

```
[Out] (A*b - B*a)/(3*a*b*x*(a + b*x**3)) - (4*A*b - B*a)/(3*a**2*b*x) +
 (4*A*b - B*a)*log(a**(1/3) + b**(1/3)*x)/(9*a**(7/3)*b**(2/3)) -
 (4*A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2
)/(18*a**(7/3)*b**(2/3)) + sqrt(3)*(4*A*b - B*a)*atan(sqrt(3)*(a*
*(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(9*a**(7/3)*b**(2/3))
```

Mathematica [A] time = 0.254926, size = 164, normalized size = 0.84

$$\frac{\frac{(aB-4Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{b^{2/3}}+\frac{2(4Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{2/3}}+\frac{2\sqrt{3}(4Ab-aB)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{b^{2/3}}+\frac{6\sqrt[3]{a}x^2(aB-Ab)}{a+bx^3}-\frac{18\sqrt[3]{a}A}{x}}{18a^{7/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^2*(a + b*x^3)^2),x]
```

```
[Out] ((-18*a^(1/3)*A)/x + (6*a^(1/3)*(-(A*b) + a*B)*x^2)/(a + b*x^3) +
 (2*Sqrt[3]*(4*A*b - a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt
[3]])/b^(2/3) + (2*(4*A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/b^(2/3
) + ((-4*A*b + a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
])/b^(2/3))/(18*a^(7/3))
```

Maple [A] time = 0.016, size = 241, normalized size = 1.2

$$-\frac{A}{xa^2}-\frac{Ax^2b}{3\,a^2\,(bx^3+a)}+\frac{x^2B}{3\,a\,(bx^3+a)}+\frac{4\,A}{9\,a^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{2\,A}{9\,a^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{4\,A\sqrt{3}}{9\,a^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{B}{9\,ab}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{B}{18\,ab}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{B\sqrt{3}}{9\,ab}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^2/(b*x^3+a)^2,x)
```

```
[Out] -A/a^2/x-1/3/a^2*x^2/(b*x^3+a)*A*b+1/3/a*x^2/(b*x^3+a)*B+4/9/a^2*
A/(a/b)^(1/3)*ln(x+(a/b)^(1/3))-2/9/a^2*A/(a/b)^(1/3)*ln(x^2-x*(a
/b)^(1/3)+(a/b)^(2/3))-4/9/a^2*A*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3
^(1/2)*(2/(a/b)^(1/3)*x-1))-1/9/a*B/b/(a/b)^(1/3)*ln(x+(a/b)^(1/3
))+1/18/a*B/b/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+1/9/a
*B*3^(1/2)/b/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.236828, size = 305, normalized size = 1.56

$$\frac{\sqrt{3}\left(\sqrt{3}\left(\left(Bab-4\,Ab^2\right)x^4+\left(Ba^2-4\,Aab\right)x\right)\log\left(\left(ab^2\right)^{\frac{1}{3}}bx^2+ab-\left(ab^2\right)^{\frac{2}{3}}x\right)-2\,\sqrt{3}\left(\left(Bab-4\,Ab^2\right)x^4+\left(Ba^2-4\,Aab\right)x\right.\right.}{54\,(a^2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^2),x, algorithm="fricas")
```

```
[Out] 1/54*sqrt(3)*(sqrt(3)*((B*a*b - 4*A*b^2)*x^4 + (B*a^2 - 4*A*a*b)*
x)*log((a*b^2)^(1/3)*b*x^2 + a*b - (a*b^2)^(2/3)*x) - 2*sqrt(3)*(
(B*a*b - 4*A*b^2)*x^4 + (B*a^2 - 4*A*a*b)*x)*log(a*b + (a*b^2)^(2
/3)*x) + 6*((B*a*b - 4*A*b^2)*x^4 + (B*a^2 - 4*A*a*b)*x)*arctan(-
1/3*(sqrt(3)*a*b - 2*sqrt(3)*(a*b^2)^(2/3)*x)/(a*b)) + 6*sqrt(3)*
((B*a - 4*A*b)*x^3 - 3*A*a)*(a*b^2)^(1/3))/((a^2*b*x^4 + a^3*x)*(
a*b^2)^(1/3))
```

Sympy [A] time = 3.18261, size = 122, normalized size = 0.62

$$\frac{-3Aa + x^3(-4Ab + Ba)}{3a^3x + 3a^2bx^4} + \operatorname{RootSum}\left(729t^3a^7b^2 - 64A^3b^3 + 48A^2Bab^2 - 12AB^2a^2b + B^3a^3, \left(t \mapsto t\log\left(\frac{81t^2a^5b}{16A^2b^2 - 8ABab + B^2a^2} + x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**2/(b*x**3+a)**2,x)
```

```
[Out] (-3*A*a + x**3*(-4*A*b + B*a))/(3*a**3*x + 3*a**2*b*x**4) + RootS
um(729*_t**3*a**7*b**2 - 64*A**3*b**3 + 48*A**2*B*a*b**2 - 12*A*B
**2*a**2*b + B**3*a**3, Lambda(_t, _t*log(81*_t**2*a**5*b/(16*A**
2*b**2 - 8*A*B*a*b + B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.216819, size = 273, normalized size = 1.39

$$-\frac{\left(Ba\left(-\frac{a}{b}\right)^{\frac{1}{3}} - 4\,Ab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,a^3} + \frac{Bax^3 - 4\,Abx^3 - 3\,Aa}{3\,(bx^4 + ax)a^2} - \frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{2}{3}}Ba - 4\,\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,a^3b^2} + \frac{\left(\left(-ab^2\right)^{\frac{2}{3}}Ba - 4\,\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,a^3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^2),x, algorithm="giac")
```

```
[Out] -1/9*(B*a*(-a/b)^(1/3) - 4*A*b*(-a/b)^(1/3))*(-a/b)^(1/3)*ln(abs(
x - (-a/b)^(1/3)))/a^3 + 1/3*(B*a*x^3 - 4*A*b*x^3 - 3*A*a)/((b*x^
4 + a*x)*a^2) - 1/9*sqrt(3)*((-a*b^2)^(2/3)*B*a - 4*(-a*b^2)^(2/3
)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a^3
*b^2) + 1/18*((-a*b^2)^(2/3)*B*a - 4*(-a*b^2)^(2/3)*A*b)*ln(x^2 +
 x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a^3*b^2)
```

3.83 $\int \frac{A+Bx^3}{x^3(a+bx^3)^2}\,dx$

Optimal. Leaf size=196

$$\frac{(5Ab-2aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{8/3}\sqrt[3]{b}}-\frac{(5Ab-2aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{8/3}\sqrt[3]{b}}+\frac{(5Ab-2aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{8/3}\sqrt[3]{b}}-\frac{5Ab-2aB}{6a^2bx^2}+\frac{Ab-aB}{3abx^2\left(a+bx^3\right)}$$

```
[Out] -(5*A*b - 2*a*B)/(6*a^2*b*x^2) + (A*b - a*B)/(3*a*b*x^2*(a + b*x^
3)) + ((5*A*b - 2*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^
(1/3))])/(3*Sqrt[3]*a^(8/3)*b^(1/3)) - ((5*A*b - 2*a*B)*Log[a^(1/
3) + b^(1/3)*x])/(9*a^(8/3)*b^(1/3)) + ((5*A*b - 2*a*B)*Log[a^(2/
3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(8/3)*b^(1/3))
```

Rubi [A] time = 0.284863, antiderivative size = 196, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$\frac{(5Ab-2aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{8/3}\sqrt[3]{b}}-\frac{(5Ab-2aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{8/3}\sqrt[3]{b}}+\frac{(5Ab-2aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{8/3}\sqrt[3]{b}}-\frac{5Ab-2aB}{6a^2bx^2}+\frac{Ab-aB}{3abx^2\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^3*(a + b*x^3)^2),x]
```

```
[Out] -(5*A*b - 2*a*B)/(6*a^2*b*x^2) + (A*b - a*B)/(3*a*b*x^2*(a + b*x^
3)) + ((5*A*b - 2*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^
(1/3))])/(3*Sqrt[3]*a^(8/3)*b^(1/3)) - ((5*A*b - 2*a*B)*Log[a^(1/
3) + b^(1/3)*x])/(9*a^(8/3)*b^(1/3)) + ((5*A*b - 2*a*B)*Log[a^(2/
3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(18*a^(8/3)*b^(1/3))
```

Rubi in Sympy [A] time = 40.9844, size = 182, normalized size = 0.93

$$\frac{Ab-Ba}{3abx^2\left(a+bx^3\right)}-\frac{5Ab-2Ba}{6a^2bx^2}-\frac{(5Ab-2Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{\frac{8}{3}}\sqrt[3]{b}}+\frac{(5Ab-2Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18a^{\frac{8}{3}}\sqrt[3]{b}}+\frac{\sqrt{3}(5Ab-2Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9a^{\frac{8}{3}}\sqrt[3]{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**3/(b*x**3+a)**2,x)
```

```
[Out] (A*b - B*a)/(3*a*b*x**2*(a + b*x**3)) - (5*A*b - 2*B*a)/(6*a**2*b
*x**2) - (5*A*b - 2*B*a)*log(a**(1/3) + b**(1/3)*x)/(9*a**(8/3)*b
**(1/3)) + (5*A*b - 2*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b
**(2/3)*x**2)/(18*a**(8/3)*b**(1/3)) + sqrt(3)*(5*A*b - 2*B*a)*at
an(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(9*a**(8/3)*b*
*(1/3))
```

Mathematica [A] time = 0.305306, size = 163, normalized size = 0.83

$$\frac{\frac{(5Ab-2aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{\sqrt[3]{b}}+\frac{6a^{2/3}x(aB-Ab)}{a+bx^3}-\frac{9a^{2/3}A}{x^2}+\frac{2(2aB-5Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[3]{b}}+\frac{2\sqrt{3}(5Ab-2aB)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{\sqrt[3]{b}}}{18a^{8/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^3*(a + b*x^3)^2),x]
```

```
[Out] ((-9*a^(2/3)*A)/x^2 + (6*a^(2/3)*(-(A*b) + a*B)*x)/(a + b*x^3) +
(2*Sqrt[3]*(5*A*b - 2*a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqr
t[3]])/b^(1/3) + (2*(-5*A*b + 2*a*B)*Log[a^(1/3) + b^(1/3)*x])/b^
(1/3) + ((5*A*b - 2*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2])/b^(1/3))/(18*a^(8/3))
```

Maple [A] time = 0.014, size = 237, normalized size = 1.2

$$-\frac{A}{2\,a^2x^2}-\frac{Axb}{3\,a^2\,(bx^3+a)}+\frac{xB}{3\,a\,(bx^3+a)}-\frac{5\,A}{9\,a^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{5\,A}{18\,a^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{5\,A\sqrt{3}}{9\,a^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{2\,B}{9\,ab}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{B}{9\,ab}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{2\,B\sqrt{3}}{9\,ab}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^3/(b*x^3+a)^2,x)
```

```
[Out] -1/2*A/a^2/x^2-1/3/a^2*x/(b*x^3+a)*A*b+1/3/a*x/(b*x^3+a)*B-5/9/a^
2*A/(a/b)^(2/3)*ln(x+(a/b)^(1/3))+5/18/a^2*A/(a/b)^(2/3)*ln(x^2-x
*(a/b)^(1/3)+(a/b)^(2/3))-5/9/a^2*A/(a/b)^(2/3)*3^(1/2)*arctan(1/
3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+2/9/a*B/b/(a/b)^(2/3)*ln(x+(a/b)^(
1/3))-1/9/a*B/b/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+2/9
/a*B/b/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1)
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240346, size = 327, normalized size = 1.67

$$\frac{\sqrt{3}\left(\sqrt{3}\left(\left(2\,Bab-5\,Ab^{2}\right)x^{5}+\left(2\,Ba^{2}-5\,Aab\right)x^{2}\right)\log\left(\left(-a^{2}b\right)^{\frac{2}{3}}x^{2}+\left(-a^{2}b\right)^{\frac{1}{3}}ax+a^{2}\right)-2\sqrt{3}\left(\left(2\,Bab-5\,Ab^{2}\right)x^{5}+\left(2\,Ba^{2}\cdots\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^3),x, algorithm="fricas")
```

```
[Out] 1/54*sqrt(3)*(sqrt(3)*((2*B*a*b - 5*A*b^2)*x^5 + (2*B*a^2 - 5*A*a
*b)*x^2)*log((-a^2*b)^(2/3)*x^2 + (-a^2*b)^(1/3)*a*x + a^2) - 2*s
qrt(3)*((2*B*a*b - 5*A*b^2)*x^5 + (2*B*a^2 - 5*A*a*b)*x^2)*log((-
a^2*b)^(1/3)*x - a) + 6*((2*B*a*b - 5*A*b^2)*x^5 + (2*B*a^2 - 5*A
*a*b)*x^2)*arctan(1/3*(2*sqrt(3)*(-a^2*b)^(1/3)*x + sqrt(3)*a)/a)
 + 3*sqrt(3)*((2*B*a - 5*A*b)*x^3 - 3*A*a)*(-a^2*b)^(1/3))/((a^2*
b*x^5 + a^3*x^2)*(-a^2*b)^(1/3))
```

Sympy [A] time = 3.63286, size = 109, normalized size = 0.56

$$\frac{-3Aa+x^{3}\left(-5Ab+2Ba\right)}{6a^{3}x^{2}+6a^{2}bx^{5}}+\operatorname{RootSum}\left(729t^{3}a^{8}b+125A^{3}b^{3}-150A^{2}Bab^{2}+60AB^{2}a^{2}b-8B^{3}a^{3},\left(t\mapsto t\log\left(\frac{9ta^{3}}{-5Ab+2Ba}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**3/(b*x**3+a)**2,x)
```

```
[Out] (-3*A*a + x**3*(-5*A*b + 2*B*a))/(6*a**3*x**2 + 6*a**2*b*x**5) +
RootSum(729*_t**3*a**8*b + 125*A**3*b**3 - 150*A**2*B*a*b**2 + 60
*A*B**2*a**2*b - 8*B**3*a**3, Lambda(_t, _t*log(9*_t*a**3/(-5*A*b
 + 2*B*a) + x)))
```

GIAC/XCAS [A] time = 0.222569, size = 254, normalized size = 1.3

$$-\frac{\left(2\,Ba-5\,Ab\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,a^{3}}+\frac{\sqrt{3}\left(2\left(-ab^{2}\right)^{\frac{1}{3}}Ba-5\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,a^{3}b}+\frac{Bax-Abx}{3\left(bx^{3}+a\right)a^{2}}+\frac{\left(2\left(-ab^{2}\right)^{\frac{1}{3}}Ba-5\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,a^{3}b}-\frac{A}{2\,a^{2}x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^3),x, algorithm="giac")
```

```
[Out] -1/9*(2*B*a - 5*A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/a^3 +
 1/9*sqrt(3)*(2*(-a*b^2)^(1/3)*B*a - 5*(-a*b^2)^(1/3)*A*b)*arctan
(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a^3*b) + 1/3*(B*
a*x - A*b*x)/((b*x^3 + a)*a^2) + 1/18*(2*(-a*b^2)^(1/3)*B*a - 5*(
-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a^3*b
) - 1/2*A/(a^2*x^2)
```

3.84 $\int \frac{A+Bx^3}{x^4(a+bx^3)^2} dx$

Optimal. Leaf size=76

$$\frac{(2Ab-aB)\log(a+bx^3)}{3a^3}-\frac{\log(x)(2Ab-aB)}{a^3}-\frac{Ab-aB}{3a^2(a+bx^3)}-\frac{A}{3a^2x^3}$$

```
[Out] -A/(3*a^2*x^3) - (A*b - a*B)/(3*a^2*(a + b*x^3)) - ((2*A*b - a*B)
*Log[x])/a^3 + ((2*A*b - a*B)*Log[a + b*x^3])/(3*a^3)
```

Rubi [A] time = 0.203712, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{(2Ab-aB)\log(a+bx^3)}{3a^3}-\frac{\log(x)(2Ab-aB)}{a^3}-\frac{Ab-aB}{3a^2(a+bx^3)}-\frac{A}{3a^2x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^4*(a + b*x^3)^2),x]
```

```
[Out] -A/(3*a^2*x^3) - (A*b - a*B)/(3*a^2*(a + b*x^3)) - ((2*A*b - a*B)
*Log[x])/a^3 + ((2*A*b - a*B)*Log[a + b*x^3])/(3*a^3)
```

Rubi in Sympy [A] time = 18.8255, size = 68, normalized size = 0.89

$$-\frac{A}{3a^2x^3}-\frac{Ab-Ba}{3a^2(a+bx^3)}-\frac{(2Ab-Ba)\log(x^3)}{3a^3}+\frac{(2Ab-Ba)\log(a+bx^3)}{3a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**4/(b*x**3+a)**2,x)
```

```
[Out] -A/(3*a**2*x**3) - (A*b - B*a)/(3*a**2*(a + b*x**3)) - (2*A*b - B
*a)*log(x**3)/(3*a**3) + (2*A*b - B*a)*log(a + b*x**3)/(3*a**3)
```

Mathematica [A] time = 0.0882648, size = 64, normalized size = 0.84

$$\frac{\frac{a(aB-Ab)}{a+bx^3}+(2Ab-aB)\log(a+bx^3)+3\log(x)(aB-2Ab)-\frac{aA}{x^3}}{3a^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^4*(a + b*x^3)^2),x]
```

```
[Out] (-((a*A)/x^3) + (a*(-(A*b) + a*B))/(a + b*x^3) + 3*(-2*A*b + a*B)
*Log[x] + (2*A*b - a*B)*Log[a + b*x^3])/(3*a^3)
```

Maple [A] time = 0.015, size = 87, normalized size = 1.1

$$-\frac{A}{3a^2x^3}-2\frac{A\ln(x)b}{a^3}+\frac{B\ln(x)}{a^2}+\frac{2b\ln(bx^3+a)A}{3a^3}-\frac{\ln(bx^3+a)B}{3a^2}-\frac{Ab}{3a^2(bx^3+a)}+\frac{B}{3a(bx^3+a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^4/(b*x^3+a)^2,x)
```

```
[Out] -1/3*A/a^2/x^3-2/a^3*ln(x)*A*b+B/a^2*ln(x)+2/3*b/a^3*ln(b*x^3+a)*
A-1/3/a^2*ln(b*x^3+a)*B-1/3*b/a^2/(b*x^3+a)*A+1/3/a/(b*x^3+a)*B
```

Maxima [A] time = 1.37388, size = 103, normalized size = 1.36

$$\frac{(Ba-2\,Ab)x^3-Aa}{3\,(a^2bx^6+a^3x^3)}-\frac{(Ba-2\,Ab)\log\left(bx^3+a\right)}{3\,a^3}+\frac{(Ba-2\,Ab)\log\left(x^3\right)}{3\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^4),x, algorithm="maxima")
```

```
[Out] 1/3*((B*a - 2*A*b)*x^3 - A*a)/(a^2*b*x^6 + a^3*x^3) - 1/3*(B*a -
2*A*b)*log(b*x^3 + a)/a^3 + 1/3*(B*a - 2*A*b)*log(x^3)/a^3
```

Fricas [A] time = 0.22906, size = 159, normalized size = 2.09

$$\frac{\left(Ba^2-2\,Aab\right)x^3-Aa^2-\left(\left(Bab-2\,Ab^2\right)x^6+\left(Ba^2-2\,Aab\right)x^3\right)\log\left(bx^3+a\right)+3\left(\left(Bab-2\,Ab^2\right)x^6+\left(Ba^2-2\,Aab\right)x^3\right)\mathrm{lo}}{3\,(a^3bx^6+a^4x^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^4),x, algorithm="fricas")
```

```
[Out] 1/3*((B*a^2 - 2*A*a*b)*x^3 - A*a^2 - ((B*a*b - 2*A*b^2)*x^6 + (B*
a^2 - 2*A*a*b)*x^3)*log(b*x^3 + a) + 3*((B*a*b - 2*A*b^2)*x^6 + (
B*a^2 - 2*A*a*b)*x^3)*log(x))/(a^3*b*x^6 + a^4*x^3)
```

Sympy [A] time = 5.5089, size = 70, normalized size = 0.92

$$\frac{-Aa+x^3\,(-2Ab+Ba)}{3a^3x^3+3a^2bx^6}+\frac{(-2Ab+Ba)\log{(x)}}{a^3}-\frac{(-2Ab+Ba)\log{\left(\frac{a}{b}+x^3\right)}}{3a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**4/(b*x**3+a)**2,x)
```

```
[Out] (-A*a + x**3*(-2*A*b + B*a))/(3*a**3*x**3 + 3*a**2*b*x**6) + (-2*
A*b + B*a)*log(x)/a**3 - (-2*A*b + B*a)*log(a/b + x**3)/(3*a**3)
```

GIAC/XCAS [A] time = 0.218866, size = 108, normalized size = 1.42

$$\frac{(Ba-2\,Ab)\ln\left(|x|\right)}{a^3}+\frac{Bax^3-2\,Abx^3-Aa}{3\,(bx^6+ax^3)a^2}-\frac{\left(Bab-2\,Ab^2\right)\ln\left(\left|bx^3+a\right|\right)}{3\,a^3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^4),x, algorithm="giac")
```

```
[Out] (B*a - 2*A*b)*ln(abs(x))/a^3 + 1/3*(B*a*x^3 - 2*A*b*x^3 - A*a)/((
b*x^6 + a*x^3)*a^2) - 1/3*(B*a*b - 2*A*b^2)*ln(abs(b*x^3 + a))/(a
^3*b)
```

3.85 $\int \frac{A+Bx^3}{x^5(a+bx^3)^2}\,dx$

Optimal. Leaf size=215

$$\frac{\sqrt[3]{b}(7Ab-4aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{10/3}}-\frac{\sqrt[3]{b}(7Ab-4aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{10/3}}-\frac{\sqrt[3]{b}(7Ab-4aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{10/3}}+\frac{7Ab-4aB}{3a^3x}-\frac{7Ab-4aB}{12a^2bx^4}+\frac{Ab-aB}{3abx^4(a+bx^3)}$$

```
[Out] -(7*A*b - 4*a*B)/(12*a^2*b*x^4) + (7*A*b - 4*a*B)/(3*a^3*x) + (A*
b - a*B)/(3*a*b*x^4*(a + b*x^3)) - (b^(1/3)*(7*A*b - 4*a*B)*ArcTa
n[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*a^(10/3)
) - (b^(1/3)*(7*A*b - 4*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*a^(10/3
)) + (b^(1/3)*(7*A*b - 4*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b
^(2/3)*x^2])/(18*a^(10/3))
```

Rubi [A] time = 0.346642, antiderivative size = 215, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$\frac{\sqrt[3]{b}(7Ab-4aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{10/3}}-\frac{\sqrt[3]{b}(7Ab-4aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{10/3}}-\frac{\sqrt[3]{b}(7Ab-4aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{10/3}}+\frac{7Ab-4aB}{3a^3x}-\frac{7Ab-4aB}{12a^2bx^4}+\frac{Ab-aB}{3abx^4(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^5*(a + b*x^3)^2),x]
```

```
[Out] -(7*A*b - 4*a*B)/(12*a^2*b*x^4) + (7*A*b - 4*a*B)/(3*a^3*x) + (A*
b - a*B)/(3*a*b*x^4*(a + b*x^3)) - (b^(1/3)*(7*A*b - 4*a*B)*ArcTa
n[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*a^(10/3)
) - (b^(1/3)*(7*A*b - 4*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*a^(10/3
)) + (b^(1/3)*(7*A*b - 4*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b
^(2/3)*x^2])/(18*a^(10/3))
```

Rubi in Sympy [A] time = 46.2675, size = 199, normalized size = 0.93

$$\frac{Ab-Ba}{3abx^4(a+bx^3)}-\frac{7Ab-4Ba}{12a^2bx^4}+\frac{7Ab-4Ba}{3a^3x}-\frac{\sqrt[3]{b}(7Ab-4Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{\frac{10}{3}}}+\frac{\sqrt[3]{b}(7Ab-4Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18a^{\frac{10}{3}}}-\frac{\sqrt{3}\sqrt[3]{b}(7Ab-4Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9a^{\frac{10}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**5/(b*x**3+a)**2,x)
```

```
[Out] (A*b - B*a)/(3*a*b*x**4*(a + b*x**3)) - (7*A*b - 4*B*a)/(12*a**2*
b*x**4) + (7*A*b - 4*B*a)/(3*a**3*x) - b**(1/3)*(7*A*b - 4*B*a)*l
og(a**(1/3) + b**(1/3)*x)/(9*a**(10/3)) + b**(1/3)*(7*A*b - 4*B*a
)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(18*a**(10/
3)) - sqrt(3)*b**(1/3)*(7*A*b - 4*B*a)*atan(sqrt(3)*(a**(1/3)/3 -
 2*b**(1/3)*x/3)/a**(1/3))/(9*a**(10/3))
```

Mathematica [A] time = 0.313893, size = 185, normalized size = 0.86

$$\frac{2\sqrt[3]{b}(7Ab-4aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{9a^{4/3}A}{x^4}-\frac{12\sqrt[3]{a}bx^2(aB-Ab)}{a+bx^3}-\frac{36\sqrt[3]{a}(aB-2Ab)}{x}+4\sqrt[3]{b}(4aB-7Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\cdots}{36a^{10/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^5*(a + b*x^3)^2),x]
```

```
[Out] ((-9*a^(4/3)*A)/x^4 - (36*a^(1/3)*(-2*A*b + a*B))/x - (12*a^(1/3)
*b*(-(A*b) + a*B)*x^2)/(a + b*x^3) - 4*Sqrt[3]*b^(1/3)*(7*A*b - 4
*a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 4*b^(1/3)*(-7
*A*b + 4*a*B)*Log[a^(1/3) + b^(1/3)*x] + 2*b^(1/3)*(7*A*b - 4*a*B
)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(36*a^(10/3))
```

Maple [A] time = 0.019, size = 257, normalized size = 1.2

$$-\frac{A}{4x^4a^2}+2\frac{Ab}{a^3x}-\frac{B}{xa^2}+\frac{Ax^2b^2}{3a^3(bx^3+a)}-\frac{bBx^2}{3a^2(bx^3+a)}-\frac{7Ab}{9a^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{7Ab}{18a^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{7Ab\sqrt{3}}{9a^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{4B}{9a^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{2B}{9a^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{4B\sqrt{3}}{9a^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^5/(b*x^3+a)^2,x)
```

```
[Out] -1/4*A/a^2/x^4+2/a^3/x*A*b-B/a^2/x+1/3*b^2/a^3*x^2/(b*x^3+a)*A-1/
3*b/a^2*x^2/(b*x^3+a)*B-7/9*b/a^3*A/(a/b)^(1/3)*ln(x+(a/b)^(1/3))
+7/18*b/a^3*A/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+7/9*b
/a^3*A*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1)
)+4/9/a^2*B/(a/b)^(1/3)*ln(x+(a/b)^(1/3))-2/9/a^2*B/(a/b)^(1/3)*l
n(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-4/9/a^2*B*3^(1/2)/(a/b)^(1/3)*ar
ctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^5),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.23171, size = 386, normalized size = 1.8

$$\frac{\sqrt{3}\left(2\,\sqrt{3}\left(\left(4\,Bab-7\,Ab^{2}\right)x^{7}+\left(4\,Ba^{2}-7\,Aab\right)x^{4}\right)\left(-\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx^{2}-ax\left(-\frac{b}{a}\right)^{\frac{2}{3}}-a\left(-\frac{b}{a}\right)^{\frac{1}{3}}\right)-4\,\sqrt{3}\left(\left(4\,Bab-7\,Ab^{2}\right)x^{7}+\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^5),x, algorithm="fricas")
```

```
[Out] 1/108*sqrt(3)*(2*sqrt(3)*((4*B*a*b - 7*A*b^2)*x^7 + (4*B*a^2 - 7*
A*a*b)*x^4)*(-b/a)^(1/3)*log(b*x^2 - a*x*(-b/a)^(2/3) - a*(-b/a)^
(1/3)) - 4*sqrt(3)*((4*B*a*b - 7*A*b^2)*x^7 + (4*B*a^2 - 7*A*a*b)
*x^4)*(-b/a)^(1/3)*log(b*x + a*(-b/a)^(2/3)) - 12*((4*B*a*b - 7*A
*b^2)*x^7 + (4*B*a^2 - 7*A*a*b)*x^4)*(-b/a)^(1/3)*arctan(-1/3*(2*
sqrt(3)*b*x - sqrt(3)*a*(-b/a)^(2/3))/(a*(-b/a)^(2/3))) - 3*sqrt(
3)*(4*(4*B*a*b - 7*A*b^2)*x^6 + 3*(4*B*a^2 - 7*A*a*b)*x^3 + 3*A*a
^2))/(a^3*b*x^7 + a^4*x^4)
```

Sympy [A] time = 5.18664, size = 153, normalized size = 0.71

$$\operatorname{RootSum}\left(729t^{3}a^{10}+343A^{3}b^{4}-588A^{2}Bab^{3}+336AB^{2}a^{2}b^{2}-64B^{3}a^{3}b,\left(t\mapsto t\log\left(\frac{81t^{2}a^{7}}{49A^{2}b^{3}-56ABab^{2}+16B^{2}a^{2}b}+x\right)\right)\right)-\frac{3Aa^{2}+x^{6}\left(-28Ab^{2}+16Bab\right)+x^{3}\left(-21Aab+12Ba^{2}\right)}{12a^{4}x^{4}+12a^{3}bx^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**5/(b*x**3+a)**2,x)
```

```
[Out] RootSum(729*_t**3*a**10 + 343*A**3*b**4 - 588*A**2*B*a*b**3 + 336
*A*B**2*a**2*b**2 - 64*B**3*a**3*b, Lambda(_t, _t*log(81*_t**2*a*
*7/(49*A**2*b**3 - 56*A*B*a*b**2 + 16*B**2*a**2*b) + x))) - (3*A*
a**2 + x**6*(-28*A*b**2 + 16*B*a*b) + x**3*(-21*A*a*b + 12*B*a**2
))/(12*a**4*x**4 + 12*a**3*b*x**7)
```

GIAC/XCAS [A] time = 0.220889, size = 312, normalized size = 1.45

$$\frac{\left(4\,Bab\left(-\frac{a}{b}\right)^{\frac{1}{3}}-7\,Ab^{2}\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,a^{4}}+\frac{\sqrt{3}\left(4\,\left(-ab^{2}\right)^{\frac{2}{3}}Ba-7\,\left(-ab^{2}\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,a^{4}b}-\frac{Babx^{2}-Ab^{2}x^{2}}{3\,(bx^{3}+a)a^{3}}-\frac{\left(4\,\left(-ab^{2}\right)^{\frac{2}{3}}Ba-7\,\left(-ab^{2}\right)^{\frac{2}{3}}Ab\right)\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,a^{4}b}-\frac{4\,Bax^{3}-8\,Abx^{3}+Aa}{4\,a^{3}x^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^5),x, algorithm="giac")
```

```
[Out] 1/9*(4*B*a*b*(-a/b)^(1/3) - 7*A*b^2*(-a/b)^(1/3))*(-a/b)^(1/3)*ln
(abs(x - (-a/b)^(1/3)))/a^4 + 1/9*sqrt(3)*(4*(-a*b^2)^(2/3)*B*a -
 7*(-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-
a/b)^(1/3))/(a^4*b) - 1/3*(B*a*b*x^2 - A*b^2*x^2)/((b*x^3 + a)*a^
3) - 1/18*(4*(-a*b^2)^(2/3)*B*a - 7*(-a*b^2)^(2/3)*A*b)*ln(x^2 +
x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a^4*b) - 1/4*(4*B*a*x^3 - 8*A*b*x
^3 + A*a)/(a^3*x^4)
```

3.86 $\int \frac{A+Bx^3}{x^6(a+bx^3)^2} dx$

Optimal. Leaf size=215

$$-\frac{b^{2/3}(8Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{11/3}}+\frac{b^{2/3}(8Ab-5aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{11/3}}-\frac{b^{2/3}(8Ab-5aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{11/3}}+\frac{8Ab-5aB}{6a^3x^2}-\frac{8Ab-5aB}{15a^2bx^5}+\frac{Ab-aB}{3abx^5(a+bx^3)}$$

```
[Out] -(8*A*b - 5*a*B)/(15*a^2*b*x^5) + (8*A*b - 5*a*B)/(6*a^3*x^2) + (
A*b - a*B)/(3*a*b*x^5*(a + b*x^3)) - (b^(2/3)*(8*A*b - 5*a*B)*Arc
Tan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*a^(11/
3)) + (b^(2/3)*(8*A*b - 5*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*a^(11
/3)) - (b^(2/3)*(8*A*b - 5*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2])/(18*a^(11/3))
```

Rubi [A] time = 0.349572, antiderivative size = 215, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.4$

$$-\frac{b^{2/3}(8Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{18a^{11/3}}+\frac{b^{2/3}(8Ab-5aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{11/3}}-\frac{b^{2/3}(8Ab-5aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{3\sqrt{3}a^{11/3}}+\frac{8Ab-5aB}{6a^3x^2}-\frac{8Ab-5aB}{15a^2bx^5}+\frac{Ab-aB}{3abx^5(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^6*(a + b*x^3)^2),x]
```

```
[Out] -(8*A*b - 5*a*B)/(15*a^2*b*x^5) + (8*A*b - 5*a*B)/(6*a^3*x^2) + (
A*b - a*B)/(3*a*b*x^5*(a + b*x^3)) - (b^(2/3)*(8*A*b - 5*a*B)*Arc
Tan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(3*Sqrt[3]*a^(11/
3)) + (b^(2/3)*(8*A*b - 5*a*B)*Log[a^(1/3) + b^(1/3)*x])/(9*a^(11
/3)) - (b^(2/3)*(8*A*b - 5*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2])/(18*a^(11/3))
```

Rubi in Sympy [A] time = 47.1074, size = 201, normalized size = 0.93

$$\frac{Ab-Ba}{3abx^5(a+bx^3)}-\frac{8Ab-5Ba}{15a^2bx^5}+\frac{8Ab-5Ba}{6a^3x^2}+\frac{b^{\frac{2}{3}}(8Ab-5Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{9a^{\frac{11}{3}}}-\frac{b^{\frac{2}{3}}(8Ab-5Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{18a^{\frac{11}{3}}}-\frac{\sqrt{3}b^{\frac{2}{3}}(8Ab-5Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{9a^{\frac{11}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**6/(b*x**3+a)**2,x)
```

```
[Out] (A*b - B*a)/(3*a*b*x**5*(a + b*x**3)) - (8*A*b - 5*B*a)/(15*a**2*
b*x**5) + (8*A*b - 5*B*a)/(6*a**3*x**2) + b**(2/3)*(8*A*b - 5*B*a
)*log(a**(1/3) + b**(1/3)*x)/(9*a**(11/3)) - b**(2/3)*(8*A*b - 5*
B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(18*a**(
11/3)) - sqrt(3)*b**(2/3)*(8*A*b - 5*B*a)*atan(sqrt(3)*(a**(1/3)/
3 - 2*b**(1/3)*x/3)/a**(1/3))/(9*a**(11/3))
```

Mathematica [A] time = 0.321587, size = 183, normalized size = 0.85

$$\frac{5b^{2/3}(5aB-8Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{30a^{2/3}bx(aB-Ab)}{a+bx^3}-\frac{45a^{2/3}(aB-2Ab)}{x^2}-\frac{18a^{5/3}A}{x^5}+10b^{2/3}(8Ab-5aB)\log\left(\sqrt[3]{a}+\right.}{90a^{11/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^6*(a + b*x^3)^2),x]
```

```
[Out] ((-18*a^(5/3)*A)/x^5 - (45*a^(2/3)*(-2*A*b + a*B))/x^2 - (30*a^(2
/3)*b*(-(A*b) + a*B)*x)/(a + b*x^3) - 10*Sqrt[3]*b^(2/3)*(8*A*b -
 5*a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 10*b^(2/3)*
(8*A*b - 5*a*B)*Log[a^(1/3) + b^(1/3)*x] + 5*b^(2/3)*(-8*A*b + 5*
a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(90*a^(11/3)
)
```

Maple [A] time = 0.018, size = 252, normalized size = 1.2

$$-\frac{A}{5\,a^2x^5}+\frac{Ab}{x^2a^3}-\frac{B}{2\,a^2x^2}+\frac{Axb^2}{3\,a^3\,(bx^3+a)}-\frac{bBx}{3\,a^2\,(bx^3+a)}+\frac{8\,Ab}{9\,a^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{4\,Ab}{9\,a^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{8\,Ab\sqrt{3}}{9\,a^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{5\,B}{9\,a^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{5\,B}{18\,a^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{5\,B\sqrt{3}}{9\,a^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^6/(b*x^3+a)^2,x)
```

```
[Out] -1/5*A/a^2/x^5+1/a^3/x^2*A*b-1/2/a^2/x^2*B+1/3*b^2/a^3*x/(b*x^3+a
)*A-1/3*b/a^2*x/(b*x^3+a)*B+8/9*b/a^3*A/(a/b)^(2/3)*ln(x+(a/b)^(1
/3))-4/9*b/a^3*A/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+8/
9*b/a^3*A/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x
-1))-5/9/a^2*B/(a/b)^(2/3)*ln(x+(a/b)^(1/3))+5/18/a^2*B/(a/b)^(2/
3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-5/9/a^2*B/(a/b)^(2/3)*3^(1/2
)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^6),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.236258, size = 402, normalized size = 1.87

$$\sqrt{3}\left(5\sqrt{3}\left(\left(5\,Bab-8\,Ab^2\right)x^8+\left(5\,Ba^2-8\,Aab\right)x^5\right)\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}\log\left(b^2x^2-abx\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}+a^2\left(\frac{b^2}{a^2}\right)^{\frac{2}{3}}\right)-10\sqrt{3}\left(\left(5\,Bab-8\,Ab^2\right)x^8+\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^6),x, algorithm="fricas")
```

```
[Out] 1/270*sqrt(3)*(5*sqrt(3)*((5*B*a*b - 8*A*b^2)*x^8 + (5*B*a^2 - 8*
A*a*b)*x^5)*(b^2/a^2)^(1/3)*log(b^2*x^2 - a*b*x*(b^2/a^2)^(1/3) +
 a^2*(b^2/a^2)^(2/3)) - 10*sqrt(3)*((5*B*a*b - 8*A*b^2)*x^8 + (5*
B*a^2 - 8*A*a*b)*x^5)*(b^2/a^2)^(1/3)*log(b*x + a*(b^2/a^2)^(1/3)
) + 30*((5*B*a*b - 8*A*b^2)*x^8 + (5*B*a^2 - 8*A*a*b)*x^5)*(b^2/a
^2)^(1/3)*arctan(-1/3*(2*sqrt(3)*b*x - sqrt(3)*a*(b^2/a^2)^(1/3))
/(a*(b^2/a^2)^(1/3))) - 3*sqrt(3)*(5*(5*B*a*b - 8*A*b^2)*x^6 + 3*
(5*B*a^2 - 8*A*a*b)*x^3 + 6*A*a^2))/(a^3*b*x^8 + a^4*x^5)
```

Sympy [A] time = 6.7474, size = 138, normalized size = 0.64

$$\operatorname{RootSum}\left(729t^3a^{11}-512A^3b^5+960A^2Bab^4-600AB^2a^2b^3+125B^3a^3b^2,\left(t\mapsto t\log\left(-\frac{9ta^4}{-8Ab^2+5Bab}+x\right)\right)\right)-\frac{6Aa^2+x^6\left(-40Ab^2+25Bab\right)+x^3\left(-24Aab+15Ba^2\right)}{30a^4x^5+30a^3bx^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**6/(b*x**3+a)**2,x)
```

```
[Out] RootSum(729*_t**3*a**11 - 512*A**3*b**5 + 960*A**2*B*a*b**4 - 600
*A*B**2*a**2*b**3 + 125*B**3*a**3*b**2, Lambda(_t, _t*log(-9*_t*a
**4/(-8*A*b**2 + 5*B*a*b) + x))) - (6*A*a**2 + x**6*(-40*A*b**2 +
 25*B*a*b) + x**3*(-24*A*a*b + 15*B*a**2))/(30*a**4*x**5 + 30*a**
3*b*x**8)
```

GIAC/XCAS [A] time = 0.219244, size = 278, normalized size = 1.29

$$-\frac{\sqrt{3}\left(5\left(-ab^2\right)^{\frac{1}{3}}Ba-8\left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{9\,a^4}+\frac{\left(5\,Bab-8\,Ab^2\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{9\,a^4}-\frac{\left(5\left(-ab^2\right)^{\frac{1}{3}}Ba-8\left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{18\,a^4}-\frac{Babx-Ab^2x}{3\left(bx^3+a\right)a^3}-\frac{5\,Bax^3-10\,Abx^3+2\,Aa}{10\,a^3x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^6),x, algorithm="giac")
```

```
[Out] -1/9*sqrt(3)*(5*(-a*b^2)^(1/3)*B*a - 8*(-a*b^2)^(1/3)*A*b)*arctan
(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/a^4 + 1/9*(5*B*a*
b - 8*A*b^2)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/a^4 - 1/18*(5
*(-a*b^2)^(1/3)*B*a - 8*(-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/
3) + (-a/b)^(2/3))/a^4 - 1/3*(B*a*b*x - A*b^2*x)/((b*x^3 + a)*a^3
) - 1/10*(5*B*a*x^3 - 10*A*b*x^3 + 2*A*a)/(a^3*x^5)
```

3.87 $\int \frac{A+Bx^3}{x^7(a+bx^3)^2}\,dx$

Optimal. Leaf size=97

$$-\frac{b(3Ab-2aB)\log\left(a+bx^3\right)}{3a^4}+\frac{b\log(x)(3Ab-2aB)}{a^4}+\frac{b(Ab-aB)}{3a^3\left(a+bx^3\right)}+\frac{2Ab-aB}{3a^3x^3}-\frac{A}{6a^2x^6}$$

```
[Out] -A/(6*a^2*x^6) + (2*A*b - a*B)/(3*a^3*x^3) + (b*(A*b - a*B))/(3*a
^3*(a + b*x^3)) + (b*(3*A*b - 2*a*B)*Log[x])/a^4 - (b*(3*A*b - 2*
a*B)*Log[a + b*x^3])/(3*a^4)
```

Rubi [A] time = 0.26378, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{b(3Ab-2aB)\log\left(a+bx^3\right)}{3a^4}+\frac{b\log(x)(3Ab-2aB)}{a^4}+\frac{b(Ab-aB)}{3a^3\left(a+bx^3\right)}+\frac{2Ab-aB}{3a^3x^3}-\frac{A}{6a^2x^6}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^7*(a + b*x^3)^2),x]
```

```
[Out] -A/(6*a^2*x^6) + (2*A*b - a*B)/(3*a^3*x^3) + (b*(A*b - a*B))/(3*a
^3*(a + b*x^3)) + (b*(3*A*b - 2*a*B)*Log[x])/a^4 - (b*(3*A*b - 2*
a*B)*Log[a + b*x^3])/(3*a^4)
```

Rubi in Sympy [A] time = 24.2102, size = 94, normalized size = 0.97

$$-\frac{A}{6a^2x^6}+\frac{b\left(Ab-Ba\right)}{3a^3\left(a+bx^3\right)}+\frac{2Ab-Ba}{3a^3x^3}+\frac{b\left(3Ab-2Ba\right)\log\left(x^3\right)}{3a^4}-\frac{b\left(3Ab-2Ba\right)\log\left(a+bx^3\right)}{3a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**7/(b*x**3+a)**2,x)
```

```
[Out] -A/(6*a**2*x**6) + b*(A*b - B*a)/(3*a**3*(a + b*x**3)) + (2*A*b -
 B*a)/(3*a**3*x**3) + b*(3*A*b - 2*B*a)*log(x**3)/(3*a**4) - b*(3
*A*b - 2*B*a)*log(a + b*x**3)/(3*a**4)
```

Mathematica [A] time = 0.182045, size = 85, normalized size = 0.88

$$-\frac{\frac{a^2A}{x^6}+\frac{2ab(aB-Ab)}{a+bx^3}+\frac{2a(aB-2Ab)}{x^3}+2b(3Ab-2aB)\log\left(a+bx^3\right)-6b\log(x)(3Ab-2aB)}{6a^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^7*(a + b*x^3)^2),x]
```

```
[Out] -((a^2*A)/x^6 + (2*a*(-2*A*b + a*B))/x^3 + (2*a*b*(-(A*b) + a*B))
/(a + b*x^3) - 6*b*(3*A*b - 2*a*B)*Log[x] + 2*b*(3*A*b - 2*a*B)*L
og[a + b*x^3])/(6*a^4)
```

Maple [A] time = 0.016, size = 116, normalized size = 1.2

$$-\frac{A}{6\,a^2x^6}+\frac{2\,Ab}{3\,a^3x^3}-\frac{B}{3\,a^2x^3}+3\,\frac{A\ln(x)\,b^2}{a^4}-2\,\frac{bB\ln(x)}{a^3}-\frac{b^2\ln\left(bx^3+a\right)A}{a^4}+\frac{2\,b\ln\left(bx^3+a\right)B}{3\,a^3}+\frac{b^2A}{3\,a^3\left(bx^3+a\right)}-\frac{Bb}{3\,a^2\left(bx^3+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^7/(b*x^3+a)^2,x)
```

```
[Out] -1/6*A/a^2/x^6+2/3/a^3/x^3*A*b-1/3/a^2/x^3*B+3*b^2/a^4*ln(x)*A-2*
b/a^3*ln(x)*B-1/a^4*b^2*ln(b*x^3+a)*A+2/3/a^3*b*ln(b*x^3+a)*B+1/3
/a^3*b^2/(b*x^3+a)*A-1/3/a^2*b/(b*x^3+a)*B
```

Maxima [A] time = 1.54896, size = 143, normalized size = 1.47

$$-\frac{2\left(2\,Bab-3\,Ab^{2}\right)x^{6}+\left(2\,Ba^{2}-3\,Aab\right)x^{3}+Aa^{2}}{6\left(a^{3}bx^{9}+a^{4}x^{6}\right)}+\frac{\left(2\,Bab-3\,Ab^{2}\right)\log\left(bx^{3}+a\right)}{3\,a^{4}}-\frac{\left(2\,Bab-3\,Ab^{2}\right)\log\left(x^{3}\right)}{3\,a^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^7),x, algorithm="maxima")
```

```
[Out] -1/6*(2*(2*B*a*b - 3*A*b^2)*x^6 + (2*B*a^2 - 3*A*a*b)*x^3 + A*a^2
)/(a^3*b*x^9 + a^4*x^6) + 1/3*(2*B*a*b - 3*A*b^2)*log(b*x^3 + a)/
a^4 - 1/3*(2*B*a*b - 3*A*b^2)*log(x^3)/a^4
```

Fricas [A] time = 0.230042, size = 208, normalized size = 2.14

$$-\frac{2\left(2\,Ba^{2}b-3\,Aab^{2}\right)x^{6}+Aa^{3}+\left(2\,Ba^{3}-3\,Aa^{2}b\right)x^{3}-2\left(\left(2\,Bab^{2}-3\,Ab^{3}\right)x^{9}+\left(2\,Ba^{2}b-3\,Aab^{2}\right)x^{6}\right)\log\left(bx^{3}+a\right)+6\left(\left(2\right.\right.}{6\left(a^{4}bx^{9}+a^{5}x^{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^7),x, algorithm="fricas")
```

```
[Out] -1/6*(2*(2*B*a^2*b - 3*A*a*b^2)*x^6 + A*a^3 + (2*B*a^3 - 3*A*a^2*
b)*x^3 - 2*((2*B*a*b^2 - 3*A*b^3)*x^9 + (2*B*a^2*b - 3*A*a*b^2)*x
^6)*log(b*x^3 + a) + 6*((2*B*a*b^2 - 3*A*b^3)*x^9 + (2*B*a^2*b -
3*A*a*b^2)*x^6)*log(x))/(a^4*b*x^9 + a^5*x^6)
```

Sympy [A] time = 10.7351, size = 100, normalized size = 1.03

$$-\frac{Aa^{2}+x^{6}\left(-6Ab^{2}+4Bab\right)+x^{3}\left(-3Aab+2Ba^{2}\right)}{6a^{4}x^{6}+6a^{3}bx^{9}}-\frac{b\left(-3Ab+2Ba\right)\log\left(x\right)}{a^{4}}+\frac{b\left(-3Ab+2Ba\right)\log\left(\frac{a}{b}+x^{3}\right)}{3a^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**7/(b*x**3+a)**2,x)
```

```
[Out] -(A*a**2 + x**6*(-6*A*b**2 + 4*B*a*b) + x**3*(-3*A*a*b + 2*B*a**2
))/(6*a**4*x**6 + 6*a**3*b*x**9) - b*(-3*A*b + 2*B*a)*log(x)/a**4
 + b*(-3*A*b + 2*B*a)*log(a/b + x**3)/(3*a**4)
```

GIAC/XCAS [A] time = 0.219737, size = 201, normalized size = 2.07

$$-\frac{\left(2\,Bab-3\,Ab^{2}\right)\ln\left(|x|\right)}{a^{4}}+\frac{\left(2\,Bab^{2}-3\,Ab^{3}\right)\ln\left(\left|bx^{3}+a\right|\right)}{3\,a^{4}b}-\frac{2\,Bab^{2}x^{3}-3\,Ab^{3}x^{3}+3\,Ba^{2}b-4\,Aab^{2}}{3\left(bx^{3}+a\right)a^{4}}+\frac{6\,Babx^{6}-9\,Ab^{2}x^{6}-2\,Ba^{2}x^{3}+4\,Aabx^{3}-Aa^{2}}{6\,a^{4}x^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^7),x, algorithm="giac")
```

```
[Out] -(2*B*a*b - 3*A*b^2)*ln(abs(x))/a^4 + 1/3*(2*B*a*b^2 - 3*A*b^3)*l
n(abs(b*x^3 + a))/(a^4*b) - 1/3*(2*B*a*b^2*x^3 - 3*A*b^3*x^3 + 3*
B*a^2*b - 4*A*a*b^2)/((b*x^3 + a)*a^4) + 1/6*(6*B*a*b*x^6 - 9*A*b
^2*x^6 - 2*B*a^2*x^3 + 4*A*a*b*x^3 - A*a^2)/(a^4*x^6)
```

3.88 $\int \frac{x^{11}(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=107

$$\frac{a^3(Ab-aB)}{6b^5(a+bx^3)^2}-\frac{a^2(3Ab-4aB)}{3b^5(a+bx^3)}-\frac{a(Ab-2aB)\log\left(a+bx^3\right)}{b^5}+\frac{x^3(Ab-3aB)}{3b^4}+\frac{Bx^6}{6b^3}$$

```
[Out] ((A*b - 3*a*B)*x^3)/(3*b^4) + (B*x^6)/(6*b^3) + (a^3*(A*b - a*B))
/(6*b^5*(a + b*x^3)^2) - (a^2*(3*A*b - 4*a*B))/(3*b^5*(a + b*x^3)
) - (a*(A*b - 2*a*B)*Log[a + b*x^3])/b^5
```

Rubi [A] time = 0.346, antiderivative size = 107, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{a^3(Ab-aB)}{6b^5(a+bx^3)^2}-\frac{a^2(3Ab-4aB)}{3b^5(a+bx^3)}-\frac{a(Ab-2aB)\log\left(a+bx^3\right)}{b^5}+\frac{x^3(Ab-3aB)}{3b^4}+\frac{Bx^6}{6b^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^11*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - 3*a*B)*x^3)/(3*b^4) + (B*x^6)/(6*b^3) + (a^3*(A*b - a*B))
/(6*b^5*(a + b*x^3)^2) - (a^2*(3*A*b - 4*a*B))/(3*b^5*(a + b*x^3)
) - (a*(A*b - 2*a*B)*Log[a + b*x^3])/b^5
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{B\int^{x^3} x\,dx}{3b^3}+\frac{a^3\left(Ab-Ba\right)}{6b^5\left(a+bx^3\right)^2}-\frac{a^2\left(3Ab-4Ba\right)}{3b^5\left(a+bx^3\right)}-\frac{a\left(Ab-2Ba\right)\log\left(a+bx^3\right)}{b^5}+\left(\frac{Ab}{3}-Ba\right)\int^{x^3}\frac{1}{b^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*Integral(x, (x, x**3))/(3*b**3) + a**3*(A*b - B*a)/(6*b**5*(a +
 b*x**3)**2) - a**2*(3*A*b - 4*B*a)/(3*b**5*(a + b*x**3)) - a*(A*
b - 2*B*a)*log(a + b*x**3)/b**5 + (A*b/3 - B*a)*Integral(b**(-4),
 (x, x**3))
```

Mathematica [A] time = 0.131595, size = 94, normalized size = 0.88

$$\frac{\frac{a^3(Ab-aB)}{(a+bx^3)^2}+\frac{2a^2(4aB-3Ab)}{a+bx^3}+2bx^3(Ab-3aB)+6a(2aB-Ab)\log\left(a+bx^3\right)+b^2Bx^6}{6b^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^11*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (2*b*(A*b - 3*a*B)*x^3 + b^2*B*x^6 + (a^3*(A*b - a*B))/(a + b*x^3
)^2 + (2*a^2*(-3*A*b + 4*a*B))/(a + b*x^3) + 6*a*(-(A*b) + 2*a*B)
*Log[a + b*x^3])/(6*b^5)
```

Maple [A] time = 0.012, size = 134, normalized size = 1.3

$$\frac{Bx^6}{6\,b^3}+\frac{Ax^3}{3\,b^3}-\frac{Bx^3a}{b^4}+\frac{Aa^3}{6\,b^4\,(bx^3+a)^2}-\frac{Ba^4}{6\,b^5\,(bx^3+a)^2}-\frac{a\ln\left(bx^3+a\right)A}{b^4}+2\,\frac{a^2\ln\left(bx^3+a\right)B}{b^5}-\frac{Aa^2}{b^4\,(bx^3+a)}+\frac{4\,Ba^3}{3\,b^5\,(bx^3+a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 1/6*B*x^6/b^3+1/3/b^3*A*x^3-1/b^4*B*x^3*a+1/6*a^3/b^4/(b*x^3+a)^2
*A-1/6*a^4/b^5/(b*x^3+a)^2*B-a/b^4*ln(b*x^3+a)*A+2*a^2/b^5*ln(b*x
^3+a)*B-a^2/b^4/(b*x^3+a)*A+4/3*a^3/b^5/(b*x^3+a)*B
```

Maxima [A] time = 1.41061, size = 155, normalized size = 1.45

$$\frac{7\,Ba^4-5\,Aa^3b+2\left(4\,Ba^3b-3\,Aa^2b^2\right)x^3}{6\,(b^7x^6+2\,ab^6x^3+a^2b^5)}+\frac{Bbx^6-2\,(3\,Ba-Ab)x^3}{6\,b^4}+\frac{\left(2\,Ba^2-Aab\right)\log\left(bx^3+a\right)}{b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^11/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] 1/6*(7*B*a^4 - 5*A*a^3*b + 2*(4*B*a^3*b - 3*A*a^2*b^2)*x^3)/(b^7*
x^6 + 2*a*b^6*x^3 + a^2*b^5) + 1/6*(B*b*x^6 - 2*(3*B*a - A*b)*x^3
)/b^4 + (2*B*a^2 - A*a*b)*log(b*x^3 + a)/b^5
```

Fricas [A] time = 0.220749, size = 242, normalized size = 2.26

$$\frac{Bb^4x^{12}-2\left(2\,Bab^3-Ab^4\right)x^9-\left(11\,Ba^2b^2-4\,Aab^3\right)x^6+7\,Ba^4-5\,Aa^3b+2\left(Ba^3b-2\,Aa^2b^2\right)x^3+6\left(\left(2\,Ba^2b^2-Aab^3\right)x^6+\right.}{6\,(b^7x^6+2\,ab^6x^3+a^2b^5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^11/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/6*(B*b^4*x^12 - 2*(2*B*a*b^3 - A*b^4)*x^9 - (11*B*a^2*b^2 - 4*A
*a*b^3)*x^6 + 7*B*a^4 - 5*A*a^3*b + 2*(B*a^3*b - 2*A*a^2*b^2)*x^3
 + 6*((2*B*a^2*b^2 - A*a*b^3)*x^6 + 2*B*a^4 - A*a^3*b + 2*(2*B*a^
3*b - A*a^2*b^2)*x^3)*log(b*x^3 + a))/(b^7*x^6 + 2*a*b^6*x^3 + a^
2*b^5)
```

Sympy [A] time = 10.6876, size = 112, normalized size = 1.05

$$\frac{Bx^6}{6b^3}+\frac{a\,(-Ab+2Ba)\log\left(a+bx^3\right)}{b^5}+\frac{-5Aa^3b+7Ba^4+x^3\left(-6Aa^2b^2+8Ba^3b\right)}{6a^2b^5+12ab^6x^3+6b^7x^6}-\frac{x^3\,(-Ab+3Ba)}{3b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*x**6/(6*b**3) + a*(-A*b + 2*B*a)*log(a + b*x**3)/b**5 + (-5*A*a
**3*b + 7*B*a**4 + x**3*(-6*A*a**2*b**2 + 8*B*a**3*b))/(6*a**2*b*
*5 + 12*a*b**6*x**3 + 6*b**7*x**6) - x**3*(-A*b + 3*B*a)/(3*b**4)
```

GIAC/XCAS [A] time = 0.221361, size = 177, normalized size = 1.65

$$\frac{\left(2\,Ba^{2}-Aab\right)\ln\left(\left|bx^{3}+a\right|\right)}{b^{5}}+\frac{Bb^{3}x^{6}-6\,Bab^{2}x^{3}+2\,Ab^{3}x^{3}}{6\,b^{6}}-\frac{18\,Ba^{2}b^{2}x^{6}-9\,Aab^{3}x^{6}+28\,Ba^{3}bx^{3}-12\,Aa^{2}b^{2}x^{3}+11\,Ba^{4}-4\,Aa^{3}b}{6\,(bx^{3}+a)^{2}b^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^11/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] (2*B*a^2 - A*a*b)*ln(abs(b*x^3 + a))/b^5 + 1/6*(B*b^3*x^6 - 6*B*a
*b^2*x^3 + 2*A*b^3*x^3)/b^6 - 1/6*(18*B*a^2*b^2*x^6 - 9*A*a*b^3*x
^6 + 28*B*a^3*b*x^3 - 12*A*a^2*b^2*x^3 + 11*B*a^4 - 4*A*a^3*b)/((
b*x^3 + a)^2*b^5)
```

3.89 $\int \frac{x^8(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=88

$$-\frac{a^2(Ab-aB)}{6b^4(a+bx^3)^2}+\frac{a(2Ab-3aB)}{3b^4(a+bx^3)}+\frac{(Ab-3aB)\log(a+bx^3)}{3b^4}+\frac{Bx^3}{3b^3}$$

```
[Out] (B*x^3)/(3*b^3) - (a^2*(A*b - a*B))/(6*b^4*(a + b*x^3)^2) + (a*(2
*A*b - 3*a*B))/(3*b^4*(a + b*x^3)) + ((A*b - 3*a*B)*Log[a + b*x^3
])/(3*b^4)
```

Rubi [A] time = 0.25443, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{a^2(Ab-aB)}{6b^4(a+bx^3)^2}+\frac{a(2Ab-3aB)}{3b^4(a+bx^3)}+\frac{(Ab-3aB)\log(a+bx^3)}{3b^4}+\frac{Bx^3}{3b^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (B*x^3)/(3*b^3) - (a^2*(A*b - a*B))/(6*b^4*(a + b*x^3)^2) + (a*(2
*A*b - 3*a*B))/(3*b^4*(a + b*x^3)) + ((A*b - 3*a*B)*Log[a + b*x^3
])/(3*b^4)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^2(Ab-Ba)}{6b^4(a+bx^3)^2}+\frac{a(2Ab-3Ba)}{3b^4(a+bx^3)}+\frac{\int^{x^3} B\,dx}{3b^3}+\frac{(Ab-3Ba)\log(a+bx^3)}{3b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] -a**2*(A*b - B*a)/(6*b**4*(a + b*x**3)**2) + a*(2*A*b - 3*B*a)/(3
*b**4*(a + b*x**3)) + Integral(B, (x, x**3))/(3*b**3) + (A*b - 3*
B*a)*log(a + b*x**3)/(3*b**4)
```

Mathematica [A] time = 0.0681161, size = 92, normalized size = 1.05

$$\frac{2aAb-3a^2B}{3b^4(a+bx^3)}+\frac{a^3B-a^2Ab}{6b^4(a+bx^3)^2}+\frac{(Ab-3aB)\log(a+bx^3)}{3b^4}+\frac{Bx^3}{3b^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (B*x^3)/(3*b^3) + (-(a^2*A*b) + a^3*B)/(6*b^4*(a + b*x^3)^2) + (2
*a*A*b - 3*a^2*B)/(3*b^4*(a + b*x^3)) + ((A*b - 3*a*B)*Log[a + b*
x^3])/(3*b^4)
```

Maple [A] time = 0.009, size = 110, normalized size = 1.3

$$\frac{Bx^3}{3b^3}-\frac{Aa^2}{6b^3(bx^3+a)^2}+\frac{Ba^3}{6b^4(bx^3+a)^2}+\frac{\ln(bx^3+a)A}{3b^3}-\frac{\ln(bx^3+a)Ba}{b^4}+\frac{2aA}{3b^3(bx^3+a)}-\frac{a^2B}{b^4(bx^3+a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 1/3*B*x^3/b^3-1/6/b^3*a^2/(b*x^3+a)^2*A+1/6/b^4*a^3/(b*x^3+a)^2*B
+1/3/b^3*ln(b*x^3+a)*A-1/b^4*ln(b*x^3+a)*B*a+2/3/b^3*a/(b*x^3+a)*
A-1/b^4*a^2/(b*x^3+a)*B
```

Maxima [A] time = 1.37337, size = 127, normalized size = 1.44

$$\frac{Bx^3}{3\,b^3} - \frac{5\,Ba^3 - 3\,Aa^2b + 2\,\left(3\,Ba^2b - 2\,Aab^2\right)x^3}{6\,\left(b^6x^6 + 2\,ab^5x^3 + a^2b^4\right)} - \frac{\left(3\,Ba - Ab\right)\log\left(bx^3 + a\right)}{3\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] 1/3*B*x^3/b^3 - 1/6*(5*B*a^3 - 3*A*a^2*b + 2*(3*B*a^2*b - 2*A*a*b
^2)*x^3)/(b^6*x^6 + 2*a*b^5*x^3 + a^2*b^4) - 1/3*(3*B*a - A*b)*lo
g(b*x^3 + a)/b^4
```

Fricas [A] time = 0.223666, size = 192, normalized size = 2.18

$$\frac{2\,Bb^3x^9 + 4\,Bab^2x^6 - 5\,Ba^3 + 3\,Aa^2b - 4\,\left(Ba^2b - Aab^2\right)x^3 - 2\,\left(\left(3\,Bab^2 - Ab^3\right)x^6 + 3\,Ba^3 - Aa^2b + 2\,\left(3\,Ba^2b - Aab^2\right)x^3\right)\,l}{6\,\left(b^6x^6 + 2\,ab^5x^3 + a^2b^4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/6*(2*B*b^3*x^9 + 4*B*a*b^2*x^6 - 5*B*a^3 + 3*A*a^2*b - 4*(B*a^2
*b - A*a*b^2)*x^3 - 2*((3*B*a*b^2 - A*b^3)*x^6 + 3*B*a^3 - A*a^2*
b + 2*(3*B*a^2*b - A*a*b^2)*x^3)*log(b*x^3 + a))/(b^6*x^6 + 2*a*b
^5*x^3 + a^2*b^4)
```

Sympy [A] time = 9.18242, size = 94, normalized size = 1.07

$$\frac{Bx^3}{3b^3} - \frac{-3Aa^2b + 5Ba^3 + x^3\left(-4Aab^2 + 6Ba^2b\right)}{6a^2b^4 + 12ab^5x^3 + 6b^6x^6} - \frac{\left(-Ab + 3Ba\right)\log\left(a + bx^3\right)}{3b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*x**3/(3*b**3) - (-3*A*a**2*b + 5*B*a**3 + x**3*(-4*A*a*b**2 + 6
*B*a**2*b))/(6*a**2*b**4 + 12*a*b**5*x**3 + 6*b**6*x**6) - (-A*b
+ 3*B*a)*log(a + b*x**3)/(3*b**4)
```

GIAC/XCAS [A] time = 0.218129, size = 126, normalized size = 1.43

$$\frac{Bx^3}{3\,b^3} - \frac{\left(3\,Ba - Ab\right)\ln\left(\left|bx^3 + a\right|\right)}{3\,b^4} + \frac{9\,Bab^2x^6 - 3\,Ab^3x^6 + 12\,Ba^2bx^3 - 2\,Aab^2x^3 + 4\,Ba^3}{6\,\left(bx^3 + a\right)^2b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] 1/3*B*x^3/b^3 - 1/3*(3*B*a - A*b)*ln(abs(b*x^3 + a))/b^4 + 1/6*(9
*B*a*b^2*x^6 - 3*A*b^3*x^6 + 12*B*a^2*b*x^3 - 2*A*a*b^2*x^3 + 4*B
*a^3)/((b*x^3 + a)^2*b^4)
```

3.90 $\int \frac{x^5(A+Bx^3)}{(a+bx^3)^3} dx$

Optimal. Leaf size=66

$$-\frac{Ab-2aB}{3b^3(a+bx^3)}+\frac{a(Ab-aB)}{6b^3(a+bx^3)^2}+\frac{B\log(a+bx^3)}{3b^3}$$

```
[Out] (a*(A*b - a*B))/(6*b^3*(a + b*x^3)^2) - (A*b - 2*a*B)/(3*b^3*(a +
 b*x^3)) + (B*Log[a + b*x^3])/(3*b^3)
```

Rubi [A] time = 0.17726, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{Ab-2aB}{3b^3(a+bx^3)}+\frac{a(Ab-aB)}{6b^3(a+bx^3)^2}+\frac{B\log(a+bx^3)}{3b^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (a*(A*b - a*B))/(6*b^3*(a + b*x^3)^2) - (A*b - 2*a*B)/(3*b^3*(a +
 b*x^3)) + (B*Log[a + b*x^3])/(3*b^3)
```

Rubi in Sympy [A] time = 18.4061, size = 56, normalized size = 0.85

$$\frac{B\log(a+bx^3)}{3b^3}+\frac{a(Ab-Ba)}{6b^3(a+bx^3)^2}-\frac{Ab-2Ba}{3b^3(a+bx^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*log(a + b*x**3)/(3*b**3) + a*(A*b - B*a)/(6*b**3*(a + b*x**3)**
2) - (A*b - 2*B*a)/(3*b**3*(a + b*x**3))
```

Mathematica [A] time = 0.0454318, size = 64, normalized size = 0.97

$$\frac{3a^2B-ab(A-4Bx^3)+2B(a+bx^3)^2\log(a+bx^3)-2Ab^2x^3}{6b^3(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (3*a^2*B - 2*A*b^2*x^3 - a*b*(A - 4*B*x^3) + 2*B*(a + b*x^3)^2*Lo
g[a + b*x^3])/(6*b^3*(a + b*x^3)^2)
```

Maple [A] time = 0.008, size = 81, normalized size = 1.2

$$\frac{aA}{6\,b^2(bx^3+a)^2}-\frac{a^2B}{6\,b^3(bx^3+a)^2}+\frac{B\ln(bx^3+a)}{3\,b^3}-\frac{A}{3\,b^2(bx^3+a)}+\frac{2\,Ba}{3\,b^3(bx^3+a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 1/6*a/b^2/(b*x^3+a)^2*A-1/6*a^2/b^3/(b*x^3+a)^2*B+1/3*B*ln(b*x^3+
a)/b^3-1/3/b^2/(b*x^3+a)*A+2/3/b^3/(b*x^3+a)*B*a
```

Maxima [A] time = 1.40649, size = 97, normalized size = 1.47

$$\frac{2\left(2\,Bab-Ab^{2}\right)x^{3}+3\,Ba^{2}-Aab}{6\left(b^{5}x^{6}+2\,ab^{4}x^{3}+a^{2}b^{3}\right)}+\frac{B\log\left(bx^{3}+a\right)}{3\,b^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] 1/6*(2*(2*B*a*b - A*b^2)*x^3 + 3*B*a^2 - A*a*b)/(b^5*x^6 + 2*a*b^
4*x^3 + a^2*b^3) + 1/3*B*log(b*x^3 + a)/b^3
```

Fricas [A] time = 0.22667, size = 120, normalized size = 1.82

$$\frac{2\left(2\,Bab-Ab^{2}\right)x^{3}+3\,Ba^{2}-Aab+2\left(Bb^{2}x^{6}+2\,Babx^{3}+Ba^{2}\right)\log\left(bx^{3}+a\right)}{6\left(b^{5}x^{6}+2\,ab^{4}x^{3}+a^{2}b^{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/6*(2*(2*B*a*b - A*b^2)*x^3 + 3*B*a^2 - A*a*b + 2*(B*b^2*x^6 + 2
*B*a*b*x^3 + B*a^2)*log(b*x^3 + a))/(b^5*x^6 + 2*a*b^4*x^3 + a^2*
b^3)
```

Sympy [A] time = 7.11545, size = 70, normalized size = 1.06

$$\frac{B\log\left(a+bx^{3}\right)}{3b^{3}}+\frac{-Aab+3Ba^{2}+x^{3}\left(-2Ab^{2}+4Bab\right)}{6a^{2}b^{3}+12ab^{4}x^{3}+6b^{5}x^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*log(a + b*x**3)/(3*b**3) + (-A*a*b + 3*B*a**2 + x**3*(-2*A*b**2
 + 4*B*a*b))/(6*a**2*b**3 + 12*a*b**4*x**3 + 6*b**5*x**6)
```

GIAC/XCAS [A] time = 0.219721, size = 82, normalized size = 1.24

$$\frac{B\ln\left(\left|bx^{3}+a\right|\right)}{3\,b^{3}}+\frac{2\,(2\,Ba-Ab)x^{3}+\frac{3\,Ba^{2}-Aab}{b}}{6\left(bx^{3}+a\right)^{2}b^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] 1/3*B*ln(abs(b*x^3 + a))/b^3 + 1/6*(2*(2*B*a - A*b)*x^3 + (3*B*a^
2 - A*a*b)/b)/((b*x^3 + a)^2*b^2)
```

3.91 $\int \frac{x^2(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=32

$$-\frac{(A+Bx^3)^2}{6(a+bx^3)^2(Ab-aB)}$$

```
[Out] -(A + B*x^3)^2/(6*(A*b - a*B)*(a + b*x^3)^2)
```

Rubi [A] time = 0.08007, antiderivative size = 32, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$-\frac{(A+Bx^3)^2}{6(a+bx^3)^2(Ab-aB)}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(A + B*x^3))/(a + b*x^3)^3,x]

[Out] -(A + B*x^3)^2/(6*(A*b - a*B)*(a + b*x^3)^2)
```

Rubi in Sympy [A] time = 8.11514, size = 26, normalized size = 0.81

$$-\frac{(A+Bx^3)^2}{6(a+bx^3)^2(Ab-Ba)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**2*(B*x**3+A)/(b*x**3+a)**3,x)

[Out] -(A + B*x**3)**2/(6*(a + b*x**3)**2*(A*b - B*a))
```

Mathematica [A] time = 0.0263372, size = 30, normalized size = 0.94

$$-\frac{B(a+2bx^3)+Ab}{6b^2(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(A + B*x^3))/(a + b*x^3)^3,x]

[Out] -(A*b + B*(a + 2*b*x^3))/(6*b^2*(a + b*x^3)^2)
```

Maple [A] time = 0.007, size = 39, normalized size = 1.2

$$-\frac{Ab-Ba}{6b^2(bx^3+a)^2}-\frac{B}{(3bx^3+3a)b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] -1/6*(A*b-B*a)/b^2/(b*x^3+a)^2-1/3*B/(b*x^3+a)/b^2
```

Maxima [A] time = 1.36835, size = 57, normalized size = 1.78

$$-\frac{2\,Bbx^3 + Ba + Ab}{6\,(b^4x^6 + 2\,ab^3x^3 + a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] -1/6*(2*B*b*x^3 + B*a + A*b)/(b^4*x^6 + 2*a*b^3*x^3 + a^2*b^2)
```

Fricas [A] time = 0.216746, size = 57, normalized size = 1.78

$$-\frac{2\,Bbx^3 + Ba + Ab}{6\,(b^4x^6 + 2\,ab^3x^3 + a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] -1/6*(2*B*b*x^3 + B*a + A*b)/(b^4*x^6 + 2*a*b^3*x^3 + a^2*b^2)
```

Sympy [A] time = 4.34779, size = 42, normalized size = 1.31

$$-\frac{Ab + Ba + 2Bbx^3}{6a^2b^2 + 12ab^3x^3 + 6b^4x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] -(A*b + B*a + 2*B*b*x**3)/(6*a**2*b**2 + 12*a*b**3*x**3 + 6*b**4*
x**6)
```

GIAC/XCAS [A] time = 0.219386, size = 38, normalized size = 1.19

$$-\frac{2\,Bbx^3 + Ba + Ab}{6\,(bx^3 + a)^2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] -1/6*(2*B*b*x^3 + B*a + A*b)/((b*x^3 + a)^2*b^2)
```

3.92 $\int \frac{A+Bx^3}{x(a+bx^3)^3} \, dx$

Optimal. Leaf size=68

$$-\frac{A\log\left(a+bx^3\right)}{3a^3}+\frac{A\log(x)}{a^3}+\frac{A}{3a^2\left(a+bx^3\right)}+\frac{Ab-aB}{6ab\left(a+bx^3\right)^2}$$

```
[Out] (A*b - a*B)/(6*a*b*(a + b*x^3)^2) + A/(3*a^2*(a + b*x^3)) + (A*Lo
g[x])/a^3 - (A*Log[a + b*x^3])/(3*a^3)
```

Rubi [A] time = 0.160286, antiderivative size = 68, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$-\frac{A\log\left(a+bx^3\right)}{3a^3}+\frac{A\log(x)}{a^3}+\frac{A}{3a^2\left(a+bx^3\right)}+\frac{Ab-aB}{6ab\left(a+bx^3\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x*(a + b*x^3)^3),x]
```

```
[Out] (A*b - a*B)/(6*a*b*(a + b*x^3)^2) + A/(3*a^2*(a + b*x^3)) + (A*Lo
g[x])/a^3 - (A*Log[a + b*x^3])/(3*a^3)
```

Rubi in Sympy [A] time = 18.227, size = 60, normalized size = 0.88

$$\frac{A}{3a^2\left(a+bx^3\right)}+\frac{A\log\left(x^3\right)}{3a^3}-\frac{A\log\left(a+bx^3\right)}{3a^3}+\frac{Ab-Ba}{6ab\left(a+bx^3\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x/(b*x**3+a)**3,x)
```

```
[Out] A/(3*a**2*(a + b*x**3)) + A*log(x**3)/(3*a**3) - A*log(a + b*x**3
)/(3*a**3) + (A*b - B*a)/(6*a*b*(a + b*x**3)**2)
```

Mathematica [A] time = 0.0846259, size = 59, normalized size = 0.87

$$\frac{\frac{a\left(-a^2B+3aAb+2Ab^2x^3\right)}{b\left(a+bx^3\right)^2}-2A\log\left(a+bx^3\right)+6A\log(x)}{6a^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x*(a + b*x^3)^3),x]
```

```
[Out] ((a*(3*a*A*b - a^2*B + 2*A*b^2*x^3))/(b*(a + b*x^3)^2) + 6*A*Log[
x] - 2*A*Log[a + b*x^3])/(6*a^3)
```

Maple [A] time = 0.012, size = 68, normalized size = 1.

$$\frac{A\ln(x)}{a^3}+\frac{A}{6\,a\left(bx^3+a\right)^2}-\frac{B}{6\,b\left(bx^3+a\right)^2}-\frac{A\ln\left(bx^3+a\right)}{3\,a^3}+\frac{A}{3\,a^2\left(bx^3+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x/(b*x^3+a)^3,x)
```

```
[Out] A*ln(x)/a^3+1/6/a/(b*x^3+a)^2*A-1/6/b/(b*x^3+a)^2*B-1/3*A*ln(b*x^
3+a)/a^3+1/3*A/a^2/(b*x^3+a)
```

Maxima [A] time = 1.36782, size = 104, normalized size = 1.53

$$\frac{2\,Ab^2x^3 - Ba^2 + 3\,Aab}{6\,(a^2b^3x^6 + 2\,a^3b^2x^3 + a^4b)} - \frac{A\log\left(bx^3 + a\right)}{3\,a^3} + \frac{A\log\left(x^3\right)}{3\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x),x, algorithm="maxima")
```

```
[Out] 1/6*(2*A*b^2*x^3 - B*a^2 + 3*A*a*b)/(a^2*b^3*x^6 + 2*a^3*b^2*x^3
+ a^4*b) - 1/3*A*log(b*x^3 + a)/a^3 + 1/3*A*log(x^3)/a^3
```

Fricas [A] time = 0.236833, size = 161, normalized size = 2.37

$$\frac{2\,Aab^2x^3 - Ba^3 + 3\,Aa^2b - 2\,\left(Ab^3x^6 + 2\,Aab^2x^3 + Aa^2b\right)\log\left(bx^3 + a\right) + 6\,\left(Ab^3x^6 + 2\,Aab^2x^3 + Aa^2b\right)\log\left(x\right)}{6\,(a^3b^3x^6 + 2\,a^4b^2x^3 + a^5b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x),x, algorithm="fricas")
```

```
[Out] 1/6*(2*A*a*b^2*x^3 - B*a^3 + 3*A*a^2*b - 2*(A*b^3*x^6 + 2*A*a*b^2
*x^3 + A*a^2*b)*log(b*x^3 + a) + 6*(A*b^3*x^6 + 2*A*a*b^2*x^3 + A
*a^2*b)*log(x))/(a^3*b^3*x^6 + 2*a^4*b^2*x^3 + a^5*b)
```

Sympy [A] time = 4.47451, size = 75, normalized size = 1.1

$$\frac{A\log\left(x\right)}{a^3} - \frac{A\log\left(\frac{a}{b} + x^3\right)}{3a^3} + \frac{3Aab + 2Ab^2x^3 - Ba^2}{6a^4b + 12a^3b^2x^3 + 6a^2b^3x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x/(b*x**3+a)**3,x)
```

```
[Out] A*log(x)/a**3 - A*log(a/b + x**3)/(3*a**3) + (3*A*a*b + 2*A*b**2*
x**3 - B*a**2)/(6*a**4*b + 12*a**3*b**2*x**3 + 6*a**2*b**3*x**6)
```

GIAC/XCAS [A] time = 0.219573, size = 100, normalized size = 1.47

$$-\frac{A\ln\left(\left|bx^3 + a\right|\right)}{3\,a^3} + \frac{A\ln\left(\left|x\right|\right)}{a^3} + \frac{3\,Ab^3x^6 + 8\,Aab^2x^3 - Ba^3 + 6\,Aa^2b}{6\,\left(bx^3 + a\right)^2a^3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x),x, algorithm="giac")
```

```
[Out] -1/3*A*ln(abs(b*x^3 + a))/a^3 + A*ln(abs(x))/a^3 + 1/6*(3*A*b^3*x
^6 + 8*A*a*b^2*x^3 - B*a^3 + 6*A*a^2*b)/((b*x^3 + a)^2*a^3*b)
```

3.93 $\int \frac{A+Bx^3}{x^4(a+bx^3)^3}\,dx$

Optimal. Leaf size=101

$$\frac{(3Ab-aB)\log\left(a+bx^3\right)}{3a^4}-\frac{\log(x)(3Ab-aB)}{a^4}-\frac{2Ab-aB}{3a^3\left(a+bx^3\right)}-\frac{A}{3a^3x^3}-\frac{Ab-aB}{6a^2\left(a+bx^3\right)^2}$$

```
[Out] -A/(3*a^3*x^3) - (A*b - a*B)/(6*a^2*(a + b*x^3)^2) - (2*A*b - a*B
)/(3*a^3*(a + b*x^3)) - ((3*A*b - a*B)*Log[x])/a^4 + ((3*A*b - a*
B)*Log[a + b*x^3])/(3*a^4)
```

Rubi [A] time = 0.268282, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{(3Ab-aB)\log\left(a+bx^3\right)}{3a^4}-\frac{\log(x)(3Ab-aB)}{a^4}-\frac{2Ab-aB}{3a^3\left(a+bx^3\right)}-\frac{A}{3a^3x^3}-\frac{Ab-aB}{6a^2\left(a+bx^3\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^4*(a + b*x^3)^3),x]
```

```
[Out] -A/(3*a^3*x^3) - (A*b - a*B)/(6*a^2*(a + b*x^3)^2) - (2*A*b - a*B
)/(3*a^3*(a + b*x^3)) - ((3*A*b - a*B)*Log[x])/a^4 + ((3*A*b - a*
B)*Log[a + b*x^3])/(3*a^4)
```

Rubi in Sympy [A] time = 23.4111, size = 90, normalized size = 0.89

$$-\frac{A}{3a^3x^3}-\frac{Ab-Ba}{6a^2\left(a+bx^3\right)^2}-\frac{2Ab-Ba}{3a^3\left(a+bx^3\right)}-\frac{(3Ab-Ba)\log\left(x^3\right)}{3a^4}+\frac{(3Ab-Ba)\log\left(a+bx^3\right)}{3a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**4/(b*x**3+a)**3,x)
```

```
[Out] -A/(3*a**3*x**3) - (A*b - B*a)/(6*a**2*(a + b*x**3)**2) - (2*A*b
- B*a)/(3*a**3*(a + b*x**3)) - (3*A*b - B*a)*log(x**3)/(3*a**4) +
 (3*A*b - B*a)*log(a + b*x**3)/(3*a**4)
```

Mathematica [A] time = 0.110146, size = 87, normalized size = 0.86

$$\frac{\frac{a^2(aB-Ab)}{\left(a+bx^3\right)^2}+\frac{2a(aB-2Ab)}{a+bx^3}+2(3Ab-aB)\log\left(a+bx^3\right)+6\log(x)(aB-3Ab)-\frac{2aA}{x^3}}{6a^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^4*(a + b*x^3)^3),x]
```

```
[Out] ((-2*a*A)/x^3 + (a^2*(-(A*b) + a*B))/(a + b*x^3)^2 + (2*a*(-2*A*b
 + a*B))/(a + b*x^3) + 6*(-3*A*b + a*B)*Log[x] + 2*(3*A*b - a*B)*
Log[a + b*x^3])/(6*a^4)
```

Maple [A] time = 0.016, size = 117, normalized size = 1.2

$$-\frac{A}{3\,a^{3}x^{3}}-3\,\frac{A\ln\left(x\right)b}{a^{4}}+\frac{B\ln\left(x\right)}{a^{3}}-\frac{Ab}{6\,a^{2}\left(bx^{3}+a\right)^{2}}+\frac{B}{6\,a\left(bx^{3}+a\right)^{2}}+\frac{b\ln\left(bx^{3}+a\right)A}{a^{4}}-\frac{\ln\left(bx^{3}+a\right)B}{3\,a^{3}}-\frac{2\,Ab}{3\,a^{3}\left(bx^{3}+a\right)}+\frac{B}{3\,a^{2}\left(bx^{3}+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^4/(b*x^3+a)^3,x)
```

```
[Out] -1/3*A/a^3/x^3-3/a^4*ln(x)*A*b+B/a^3*ln(x)-1/6/a^2*b/(b*x^3+a)^2*
A+1/6/a/(b*x^3+a)^2*B+1/a^4*b*ln(b*x^3+a)*A-1/3/a^3*ln(b*x^3+a)*B
-2/3/a^3*b*A/(b*x^3+a)+1/3/a^2/(b*x^3+a)*B
```

Maxima [A] time = 1.37408, size = 147, normalized size = 1.46

$$\frac{2\left(Bab-3\,Ab^{2}\right)x^{6}+3\left(Ba^{2}-3\,Aab\right)x^{3}-2\,Aa^{2}}{6\left(a^{3}b^{2}x^{9}+2\,a^{4}bx^{6}+a^{5}x^{3}\right)}-\frac{\left(Ba-3\,Ab\right)\log\left(bx^{3}+a\right)}{3\,a^{4}}+\frac{\left(Ba-3\,Ab\right)\log\left(x^{3}\right)}{3\,a^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^4),x, algorithm="maxima")
```

```
[Out] 1/6*(2*(B*a*b - 3*A*b^2)*x^6 + 3*(B*a^2 - 3*A*a*b)*x^3 - 2*A*a^2)
/(a^3*b^2*x^9 + 2*a^4*b*x^6 + a^5*x^3) - 1/3*(B*a - 3*A*b)*log(b*
x^3 + a)/a^4 + 1/3*(B*a - 3*A*b)*log(x^3)/a^4
```

Fricas [A] time = 0.227793, size = 266, normalized size = 2.63

$$\frac{2\left(Ba^{2}b-3\,Aab^{2}\right)x^{6}-2\,Aa^{3}+3\left(Ba^{3}-3\,Aa^{2}b\right)x^{3}-2\left(\left(Bab^{2}-3\,Ab^{3}\right)x^{9}+2\left(Ba^{2}b-3\,Aab^{2}\right)x^{6}+\left(Ba^{3}-3\,Aa^{2}b\right)x^{3}\right)\log}{6\left(a^{4}b^{2}x^{9}+2\,a^{5}bx^{6}+a^{6}x^{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^4),x, algorithm="fricas")
```

```
[Out] 1/6*(2*(B*a^2*b - 3*A*a*b^2)*x^6 - 2*A*a^3 + 3*(B*a^3 - 3*A*a^2*b
)*x^3 - 2*((B*a*b^2 - 3*A*b^3)*x^9 + 2*(B*a^2*b - 3*A*a*b^2)*x^6
+ (B*a^3 - 3*A*a^2*b)*x^3)*log(b*x^3 + a) + 6*((B*a*b^2 - 3*A*b^3
)*x^9 + 2*(B*a^2*b - 3*A*a*b^2)*x^6 + (B*a^3 - 3*A*a^2*b)*x^3)*lo
g(x))/(a^4*b^2*x^9 + 2*a^5*b*x^6 + a^6*x^3)
```

Sympy [A] time = 13.358, size = 107, normalized size = 1.06

$$\frac{-2Aa^{2}+x^{6}\left(-6Ab^{2}+2Bab\right)+x^{3}\left(-9Aab+3Ba^{2}\right)}{6a^{5}x^{3}+12a^{4}bx^{6}+6a^{3}b^{2}x^{9}}+\frac{\left(-3Ab+Ba\right)\log\left(x\right)}{a^{4}}-\frac{\left(-3Ab+Ba\right)\log\left(\frac{a}{b}+x^{3}\right)}{3a^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**4/(b*x**3+a)**3,x)
```

```
[Out] (-2*A*a**2 + x**6*(-6*A*b**2 + 2*B*a*b) + x**3*(-9*A*a*b + 3*B*a*
*2))/(6*a**5*x**3 + 12*a**4*b*x**6 + 6*a**3*b**2*x**9) + (-3*A*b
+ B*a)*log(x)/a**4 - (-3*A*b + B*a)*log(a/b + x**3)/(3*a**4)
```

GIAC/XCAS [A] time = 0.218881, size = 184, normalized size = 1.82

$$\frac{(Ba-3\,Ab)\ln\left(|x|\right)}{a^4}-\frac{\left(Bab-3\,Ab^2\right)\ln\left(\left|bx^3+a\right|\right)}{3\,a^4b}+\frac{3\,Bab^2x^6-9\,Ab^3x^6+8\,Ba^2bx^3-22\,Aab^2x^3+6\,Ba^3-14\,Aa^2b}{6\,\left(bx^3+a\right)^2a^4}-\frac{Bax^3-3\,Abx^3+Aa}{3\,a^4x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^4),x, algorithm="giac")
```

```
[Out] (B*a - 3*A*b)*ln(abs(x))/a^4 - 1/3*(B*a*b - 3*A*b^2)*ln(abs(b*x^3
 + a))/(a^4*b) + 1/6*(3*B*a*b^2*x^6 - 9*A*b^3*x^6 + 8*B*a^2*b*x^3
 - 22*A*a*b^2*x^3 + 6*B*a^3 - 14*A*a^2*b)/((b*x^3 + a)^2*a^4) - 1
/3*(B*a*x^3 - 3*A*b*x^3 + A*a)/(a^4*x^3)
```

3.94 $\int \frac{A+Bx^3}{x^7(a+bx^3)^3}\,dx$

Optimal. Leaf size=122

$$-\frac{b(2Ab-aB)\log\left(a+bx^3\right)}{a^5}+\frac{3b\log(x)(2Ab-aB)}{a^5}+\frac{b(3Ab-2aB)}{3a^4\left(a+bx^3\right)}+\frac{3Ab-aB}{3a^4x^3}+\frac{b(Ab-aB)}{6a^3\left(a+bx^3\right)^2}-\frac{A}{6a^3x^6}$$

```
[Out] -A/(6*a^3*x^6) + (3*A*b - a*B)/(3*a^4*x^3) + (b*(A*b - a*B))/(6*a
^3*(a + b*x^3)^2) + (b*(3*A*b - 2*a*B))/(3*a^4*(a + b*x^3)) + (3*
b*(2*A*b - a*B)*Log[x])/a^5 - (b*(2*A*b - a*B)*Log[a + b*x^3])/a^
5
```

Rubi [A] time = 0.329296, antiderivative size = 122, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{b(2Ab-aB)\log\left(a+bx^3\right)}{a^5}+\frac{3b\log(x)(2Ab-aB)}{a^5}+\frac{b(3Ab-2aB)}{3a^4\left(a+bx^3\right)}+\frac{3Ab-aB}{3a^4x^3}+\frac{b(Ab-aB)}{6a^3\left(a+bx^3\right)^2}-\frac{A}{6a^3x^6}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^7*(a + b*x^3)^3),x]
```

```
[Out] -A/(6*a^3*x^6) + (3*A*b - a*B)/(3*a^4*x^3) + (b*(A*b - a*B))/(6*a
^3*(a + b*x^3)^2) + (b*(3*A*b - 2*a*B))/(3*a^4*(a + b*x^3)) + (3*
b*(2*A*b - a*B)*Log[x])/a^5 - (b*(2*A*b - a*B)*Log[a + b*x^3])/a^
5
```

Rubi in Sympy [A] time = 29.8639, size = 112, normalized size = 0.92

$$-\frac{A}{6a^3x^6}+\frac{b\left(Ab-Ba\right)}{6a^3\left(a+bx^3\right)^2}+\frac{b\left(3Ab-2Ba\right)}{3a^4\left(a+bx^3\right)}+\frac{3Ab-Ba}{3a^4x^3}+\frac{b\left(2Ab-Ba\right)\log\left(x^3\right)}{a^5}-\frac{b\left(2Ab-Ba\right)\log\left(a+bx^3\right)}{a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**7/(b*x**3+a)**3,x)
```

```
[Out] -A/(6*a**3*x**6) + b*(A*b - B*a)/(6*a**3*(a + b*x**3)**2) + b*(3*
A*b - 2*B*a)/(3*a**4*(a + b*x**3)) + (3*A*b - B*a)/(3*a**4*x**3)
+ b*(2*A*b - B*a)*log(x**3)/a**5 - b*(2*A*b - B*a)*log(a + b*x**3
)/a**5
```

Mathematica [A] time = 0.150936, size = 108, normalized size = 0.89

$$\frac{\frac{a^2b(Ab-aB)}{(a+bx^3)^2}-\frac{a^2A}{x^6}+\frac{2ab(3Ab-2aB)}{a+bx^3}-\frac{2a(aB-3Ab)}{x^3}+6b(aB-2Ab)\log\left(a+bx^3\right)+18b\log(x)(2Ab-aB)}{6a^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^7*(a + b*x^3)^3),x]
```

```
[Out] (-((a^2*A)/x^6) - (2*a*(-3*A*b + a*B))/x^3 + (a^2*b*(A*b - a*B))/
(a + b*x^3)^2 + (2*a*b*(3*A*b - 2*a*B))/(a + b*x^3) + 18*b*(2*A*b
 - a*B)*Log[x] + 6*b*(-2*A*b + a*B)*Log[a + b*x^3])/(6*a^5)
```

Maple [A] time = 0.016, size = 147, normalized size = 1.2

$$-\frac{A}{6\,a^{3}x^{6}}+\frac{Ab}{x^{3}a^{4}}-\frac{B}{3\,a^{3}x^{3}}+6\,\frac{A\ln\left(x\right)b^{2}}{a^{5}}-3\,\frac{bB\ln\left(x\right)}{a^{4}}+\frac{b^{2}A}{6\,a^{3}\left(bx^{3}+a\right)^{2}}-\frac{Bb}{6\,a^{2}\left(bx^{3}+a\right)^{2}}-2\,\frac{b^{2}\ln\left(bx^{3}+a\right)A}{a^{5}}+\frac{b\ln\left(bx^{3}+a\right)B}{a^{4}}+\frac{b^{2}A}{a^{4}\left(bx^{3}+a\right)}-\frac{2\,Bb}{3\,a^{3}\left(bx^{3}+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^7/(b*x^3+a)^3,x)
```

```
[Out] -1/6*A/a^3/x^6+1/x^3/a^4*A*b-1/3/x^3/a^3*B+6*b^2/a^5*ln(x)*A-3*b/
a^4*ln(x)*B+1/6/a^3*b^2/(b*x^3+a)^2*A-1/6/a^2*b/(b*x^3+a)^2*B-2/a
^5*b^2*ln(b*x^3+a)*A+1/a^4*b*ln(b*x^3+a)*B+1/a^4*b^2*A/(b*x^3+a)-
2/3/a^3*b/(b*x^3+a)*B
```

Maxima [A] time = 1.36906, size = 184, normalized size = 1.51

$$-\frac{6\left(Bab^{2}-2\,Ab^{3}\right)x^{9}+9\left(Ba^{2}b-2\,Aab^{2}\right)x^{6}+Aa^{3}+2\left(Ba^{3}-2\,Aa^{2}b\right)x^{3}}{6\left(a^{4}b^{2}x^{12}+2\,a^{5}bx^{9}+a^{6}x^{6}\right)}+\frac{\left(Bab-2\,Ab^{2}\right)\log\left(bx^{3}+a\right)}{a^{5}}-\frac{\left(Bab-2\,Ab^{2}\right)\log\left(x^{3}\right)}{a^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^7),x, algorithm="maxima")
```

```
[Out] -1/6*(6*(B*a*b^2 - 2*A*b^3)*x^9 + 9*(B*a^2*b - 2*A*a*b^2)*x^6 + A
*a^3 + 2*(B*a^3 - 2*A*a^2*b)*x^3)/(a^4*b^2*x^12 + 2*a^5*b*x^9 + a
^6*x^6) + (B*a*b - 2*A*b^2)*log(b*x^3 + a)/a^5 - (B*a*b - 2*A*b^2
)*log(x^3)/a^5
```

Fricas [A] time = 0.231908, size = 309, normalized size = 2.53

$$-\frac{6\left(Ba^{2}b^{2}-2\,Aab^{3}\right)x^{9}+9\left(Ba^{3}b-2\,Aa^{2}b^{2}\right)x^{6}+Aa^{4}+2\left(Ba^{4}-2\,Aa^{3}b\right)x^{3}-6\left(\left(Bab^{3}-2\,Ab^{4}\right)x^{12}+2\left(Ba^{2}b^{2}-2\,Aab^{3}\right)x\right.}{6\left(a^{5}b^{2}x^{12}+2\,a\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^7),x, algorithm="fricas")
```

```
[Out] -1/6*(6*(B*a^2*b^2 - 2*A*a*b^3)*x^9 + 9*(B*a^3*b - 2*A*a^2*b^2)*x
^6 + A*a^4 + 2*(B*a^4 - 2*A*a^3*b)*x^3 - 6*((B*a*b^3 - 2*A*b^4)*x
^12 + 2*(B*a^2*b^2 - 2*A*a*b^3)*x^9 + (B*a^3*b - 2*A*a^2*b^2)*x^6
)*log(b*x^3 + a) + 18*((B*a*b^3 - 2*A*b^4)*x^12 + 2*(B*a^2*b^2 -
2*A*a*b^3)*x^9 + (B*a^3*b - 2*A*a^2*b^2)*x^6)*log(x))/(a^5*b^2*x^
12 + 2*a^6*b*x^9 + a^7*x^6)
```

Sympy [A] time = 44.0813, size = 133, normalized size = 1.09

$$-\frac{Aa^{3}+x^{9}\left(-12Ab^{3}+6Bab^{2}\right)+x^{6}\left(-18Aab^{2}+9Ba^{2}b\right)+x^{3}\left(-4Aa^{2}b+2Ba^{3}\right)}{6a^{6}x^{6}+12a^{5}bx^{9}+6a^{4}b^{2}x^{12}}-\frac{3b\left(-2Ab+Ba\right)\log\left(x\right)}{a^{5}}+\frac{b\left(-2Ab+Ba\right)\log\left(\frac{a}{b}+x^{3}\right)}{a^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**7/(b*x**3+a)**3,x)
```

```
[Out] -(A*a**3 + x**9*(-12*A*b**3 + 6*B*a*b**2) + x**6*(-18*A*a*b**2 +
9*B*a**2*b) + x**3*(-4*A*a**2*b + 2*B*a**3))/(6*a**6*x**6 + 12*a*
*5*b*x**9 + 6*a**4*b**2*x**12) - 3*b*(-2*A*b + B*a)*log(x)/a**5 +
 b*(-2*A*b + B*a)*log(a/b + x**3)/a**5
```

GIAC/XCAS [A] time = 0.220601, size = 177, normalized size = 1.45

$$-\frac{3\left(Bab-2\,Ab^2\right)\ln\left(|x|\right)}{a^5}+\frac{\left(Bab^2-2\,Ab^3\right)\ln\left(\left|bx^3+a\right|\right)}{a^5b}-\frac{6\,Bab^2x^9-12\,Ab^3x^9+9\,Ba^2bx^6-18\,Aab^2x^6+2\,Ba^3x^3-4\,Aa^2bx^3+Aa^3}{6\left(bx^6+ax^3\right)^2a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^7),x, algorithm="giac")
```

```
[Out] -3*(B*a*b - 2*A*b^2)*ln(abs(x))/a^5 + (B*a*b^2 - 2*A*b^3)*ln(abs(
b*x^3 + a))/(a^5*b) - 1/6*(6*B*a*b^2*x^9 - 12*A*b^3*x^9 + 9*B*a^2
*b*x^6 - 18*A*a*b^2*x^6 + 2*B*a^3*x^3 - 4*A*a^2*b*x^3 + A*a^3)/((
b*x^6 + a*x^3)^2*a^4)
```

3.95 $\int \frac{x^{10}(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=246

$$-\frac{2a^{2/3}(5Ab-11aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{27b^{14/3}}+\frac{4a^{2/3}(5Ab-11aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27b^{14/3}}+\frac{4a^{2/3}(5Ab-11aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}b^{14/3}}+\frac{2x^2(5Ab-11aB)}{9b^4}-\frac{4x^5(5Ab-11aB)}{45ab^3}+\frac{x^8(5Ab-11aB)}{18ab^2(a+bx^3)}+\frac{x^{11}(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] (2*(5*A*b - 11*a*B)*x^2)/(9*b^4) - (4*(5*A*b - 11*a*B)*x^5)/(45*a
*b^3) + ((A*b - a*B)*x^11)/(6*a*b*(a + b*x^3)^2) + ((5*A*b - 11*a
*B)*x^8)/(18*a*b^2*(a + b*x^3)) + (4*a^(2/3)*(5*A*b - 11*a*B)*Arc
Tan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*b^(14/
3)) + (4*a^(2/3)*(5*A*b - 11*a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*b
^(14/3)) - (2*a^(2/3)*(5*A*b - 11*a*B)*Log[a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2])/(27*b^(14/3))
```

Rubi [A] time = 0.448386, antiderivative size = 246, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.45$

$$-\frac{2a^{2/3}(5Ab-11aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{27b^{14/3}}+\frac{4a^{2/3}(5Ab-11aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27b^{14/3}}+\frac{4a^{2/3}(5Ab-11aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}b^{14/3}}+\frac{2x^2(5Ab-11aB)}{9b^4}-\frac{4x^5(5Ab-11aB)}{45ab^3}+\frac{x^8(5Ab-11aB)}{18ab^2(a+bx^3)}+\frac{x^{11}(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^10*(A + B*x^3))/(a + b*x^3)^3,x]
```


```
[Out] (2*(5*A*b - 11*a*B)*x^2)/(9*b^4) - (4*(5*A*b - 11*a*B)*x^5)/(45*a
*b^3) + ((A*b - a*B)*x^11)/(6*a*b*(a + b*x^3)^2) + ((5*A*b - 11*a
*B)*x^8)/(18*a*b^2*(a + b*x^3)) + (4*a^(2/3)*(5*A*b - 11*a*B)*Arc
Tan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*b^(14/
3)) + (4*a^(2/3)*(5*A*b - 11*a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*b
^(14/3)) - (2*a^(2/3)*(5*A*b - 11*a*B)*Log[a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2])/(27*b^(14/3))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{4a^{\frac{2}{3}}(5Ab-11Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27b^{\frac{14}{3}}}-\frac{2a^{\frac{2}{3}}(5Ab-11Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{27b^{\frac{14}{3}}}+\frac{4\sqrt{3}a^{\frac{2}{3}}(5Ab-11Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27b^{\frac{14}{3}}}+\frac{4(5Ab-11Ba)\int x\,dx}{9b^4}+\frac{x^{11}(Ab-Ba)}{6ab(a+bx^3)^2}+\frac{x^8(5Ab-11Ba)}{18ab^2(a+bx^3)}-\frac{4x^5(5Ab-11Ba)}{45ab^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**10*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] 4*a**(2/3)*(5*A*b - 11*B*a)*log(a**(1/3) + b**(1/3)*x)/(27*b**(14
/3)) - 2*a**(2/3)*(5*A*b - 11*B*a)*log(a**(2/3) - a**(1/3)*b**(1/
3)*x + b**(2/3)*x**2)/(27*b**(14/3)) + 4*sqrt(3)*a**(2/3)*(5*A*b
- 11*B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(2
7*b**(14/3)) + 4*(5*A*b - 11*B*a)*Integral(x, x)/(9*b**4) + x**11
*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) + x**8*(5*A*b - 11*B*a)/(18*
a*b**2*(a + b*x**3)) - 4*x**5*(5*A*b - 11*B*a)/(45*a*b**3)
```

Mathematica [A] time = 0.335251, size = 216, normalized size = 0.88

$$\frac{20a^{2/3}(11aB-5Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-40a^{2/3}(11aB-5Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-40\sqrt{3}a^{2/3}(11aB-5Ab)\tan^{-1}\left(\ldots\right.}{270b^{14/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^10*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (135*b^(2/3)*(A*b - 3*a*B)*x^2 + 54*b^(5/3)*B*x^5 + (45*a^2*b^(2/
3)*(-(A*b) + a*B)*x^2)/(a + b*x^3)^2 + (30*a*b^(2/3)*(7*A*b - 10*
a*B)*x^2)/(a + b*x^3) - 40*Sqrt[3]*a^(2/3)*(-5*A*b + 11*a*B)*ArcT
an[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] - 40*a^(2/3)*(-5*A*b + 11
*a*B)*Log[a^(1/3) + b^(1/3)*x] + 20*a^(2/3)*(-5*A*b + 11*a*B)*Log
[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(270*b^(14/3))
```

Maple [A] time = 0.019, size = 308, normalized size = 1.3

$$\frac{Bx^5}{5b^3}+\frac{Ax^2}{2b^3}-\frac{3Bx^2a}{2b^4}+\frac{7aAx^5}{9b^2(bx^3+a)^2}-\frac{10a^2Bx^5}{9b^3(bx^3+a)^2}+\frac{11a^2Ax^2}{18b^3(bx^3+a)^2}$$
$$-\frac{17Ba^3x^2}{18b^4(bx^3+a)^2}+\frac{20aA}{27b^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{10aA}{27b^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{20aA\sqrt{3}}{27b^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{44a^2B}{27b^5}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{22a^2B}{27b^5}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{44a^2B\sqrt{3}}{27b^5}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^10*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 1/5/b^3*B*x^5+1/2/b^3*A*x^2-3/2/b^4*B*x^2*a+7/9*a/b^2/(b*x^3+a)^2
*A*x^5-10/9*a^2/b^3/(b*x^3+a)^2*B*x^5+11/18*a^2/b^3/(b*x^3+a)^2*A
*x^2-17/18*a^3/b^4/(b*x^3+a)^2*B*x^2+20/27*a/b^4*A/(a/b)^(1/3)*ln
(x+(a/b)^(1/3))-10/27*a/b^4*A/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a
/b)^(2/3))-20/27*a/b^4*A*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(
2/(a/b)^(1/3)*x-1))-44/27*a^2/b^5*B/(a/b)^(1/3)*ln(x+(a/b)^(1/3))
+22/27*a^2/b^5*B/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+44
/27*a^2/b^5*B*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/
3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^10/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240893, size = 520, normalized size = 2.11

$$\frac{\sqrt{3}\left(20\sqrt{3}\left(\left(11\,Bab^2-5\,Ab^3\right)x^6+11\,Ba^3-5\,Aa^2b+2\left(11\,Ba^2b-5\,Aab^2\right)x^3\right)\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\log\left(ax^2-bx\left(\frac{a^2}{b^2}\right)^{\frac{2}{3}}+a\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\right)-40}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^10/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/810*sqrt(3)*(20*sqrt(3)*((11*B*a*b^2 - 5*A*b^3)*x^6 + 11*B*a^3
- 5*A*a^2*b + 2*(11*B*a^2*b - 5*A*a*b^2)*x^3)*(a^2/b^2)^(1/3)*log
(a*x^2 - b*x*(a^2/b^2)^(2/3) + a*(a^2/b^2)^(1/3)) - 40*sqrt(3)*((
11*B*a*b^2 - 5*A*b^3)*x^6 + 11*B*a^3 - 5*A*a^2*b + 2*(11*B*a^2*b
- 5*A*a*b^2)*x^3)*(a^2/b^2)^(1/3)*log(a*x + b*(a^2/b^2)^(2/3)) -
120*((11*B*a*b^2 - 5*A*b^3)*x^6 + 11*B*a^3 - 5*A*a^2*b + 2*(11*B*
a^2*b - 5*A*a*b^2)*x^3)*(a^2/b^2)^(1/3)*arctan(-1/3*(2*sqrt(3)*a*
x - sqrt(3)*b*(a^2/b^2)^(2/3))/(b*(a^2/b^2)^(2/3))) + 3*sqrt(3)*(
18*B*b^3*x^11 - 9*(11*B*a*b^2 - 5*A*b^3)*x^8 - 32*(11*B*a^2*b - 5
*A*a*b^2)*x^5 - 20*(11*B*a^3 - 5*A*a^2*b)*x^2))/(b^6*x^6 + 2*a*b^
5*x^3 + a^2*b^4)
```

Sympy [A] time = 12.6246, size = 189, normalized size = 0.77

$$\frac{Bx^5}{5b^3}-\frac{x^5\left(-14Aab^2+20Ba^2b\right)+x^2\left(-11Aa^2b+17Ba^3\right)}{18a^2b^4+36ab^5x^3+18b^6x^6}$$
$$+\operatorname{RootSum}\left(19683t^3b^{14}-8000A^3a^2b^3+52800A^2Ba^3b^2-116160AB^2a^4b+85184B^3a^5,\left(t\mapsto t\log\left(\frac{729t^2b^9}{400A^2ab^2-1760ABa^2b}\right.\right.\right.$$
$$-\frac{x^2\left(-Ab+3Ba\right)}{2b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**10*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*x**5/(5*b**3) - (x**5*(-14*A*a*b**2 + 20*B*a**2*b) + x**2*(-11*
A*a**2*b + 17*B*a**3))/(18*a**2*b**4 + 36*a*b**5*x**3 + 18*b**6*x
**6) + RootSum(19683*_t**3*b**14 - 8000*A**3*a**2*b**3 + 52800*A*
*2*B*a**3*b**2 - 116160*A*B**2*a**4*b + 85184*B**3*a**5, Lambda(_
t, _t*log(729*_t**2*b**9/(400*A**2*a*b**2 - 1760*A*B*a**2*b + 193
6*B**2*a**3) + x))) - x**2*(-A*b + 3*B*a)/(2*b**4)
```

GIAC/XCAS [A] time = 0.223844, size = 350, normalized size = 1.42

$$-\frac{4\left(11\,Ba^{2}\left(-\frac{a}{b}\right)^{\frac{1}{3}}-5\,Aab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,ab^{4}}-\frac{4\,\sqrt{3}\left(11\,\left(-ab^{2}\right)^{\frac{2}{3}}Ba-5\,\left(-ab^{2}\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,b^{6}}+\frac{2\left(11\,\left(-ab^{2}\right)^{\frac{2}{3}}Ba-5\,\left(-ab^{2}\right)^{\frac{2}{3}}Ab\right)\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{27\,b^{6}}-\frac{20\,Ba^{2}bx^{5}-14\,Aab^{2}x^{5}+17\,Ba^{3}x^{2}-11\,Aa^{2}bx^{2}}{18\,(bx^{3}+a)^{2}b^{4}}+\frac{2\,Bb^{12}x^{5}-15\,Bab^{11}x^{2}+5\,Ab^{12}x^{2}}{10\,b^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^10/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] -4/27*(11*B*a^2*(-a/b)^(1/3) - 5*A*a*b*(-a/b)^(1/3))*(-a/b)^(1/3)
*ln(abs(x - (-a/b)^(1/3)))/(a*b^4) - 4/27*sqrt(3)*(11*(-a*b^2)^(2
/3)*B*a - 5*(-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^
(1/3))/(-a/b)^(1/3))/b^6 + 2/27*(11*(-a*b^2)^(2/3)*B*a - 5*(-a*b^
2)^(2/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/b^6 - 1/18*
(20*B*a^2*b*x^5 - 14*A*a*b^2*x^5 + 17*B*a^3*x^2 - 11*A*a^2*b*x^2)
/((b*x^3 + a)^2*b^4) + 1/10*(2*B*b^12*x^5 - 15*B*a*b^11*x^2 + 5*A
*b^12*x^2)/b^15
```

3.96 $\int \frac{x^9(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=244

$$\frac{7\sqrt[3]{a}(2Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54b^{13/3}}-\frac{7\sqrt[3]{a}(2Ab-5aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27b^{13/3}}+\frac{7\sqrt[3]{a}(2Ab-5aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}b^{13/3}}+\frac{7x(2Ab-5aB)}{9b^4}-\frac{7x^4(2Ab-5aB)}{36ab^3}+\frac{x^7(2Ab-5aB)}{9ab^2(a+bx^3)}+\frac{x^{10}(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] (7*(2*A*b - 5*a*B)*x)/(9*b^4) - (7*(2*A*b - 5*a*B)*x^4)/(36*a*b^3
) + ((A*b - a*B)*x^10)/(6*a*b*(a + b*x^3)^2) + ((2*A*b - 5*a*B)*x
^7)/(9*a*b^2*(a + b*x^3)) + (7*a^(1/3)*(2*A*b - 5*a*B)*ArcTan[(a^
(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*b^(13/3)) - (
7*a^(1/3)*(2*A*b - 5*a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*b^(13/3))
 + (7*a^(1/3)*(2*A*b - 5*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b
^(2/3)*x^2])/(54*b^(13/3))
```

Rubi [A] time = 0.44012, antiderivative size = 244, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.45$

$$\frac{7\sqrt[3]{a}(2Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54b^{13/3}}-\frac{7\sqrt[3]{a}(2Ab-5aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27b^{13/3}}+\frac{7\sqrt[3]{a}(2Ab-5aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}b^{13/3}}+\frac{7x(2Ab-5aB)}{9b^4}-\frac{7x^4(2Ab-5aB)}{36ab^3}+\frac{x^7(2Ab-5aB)}{9ab^2(a+bx^3)}+\frac{x^{10}(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^9*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (7*(2*A*b - 5*a*B)*x)/(9*b^4) - (7*(2*A*b - 5*a*B)*x^4)/(36*a*b^3
) + ((A*b - a*B)*x^10)/(6*a*b*(a + b*x^3)^2) + ((2*A*b - 5*a*B)*x
^7)/(9*a*b^2*(a + b*x^3)) + (7*a^(1/3)*(2*A*b - 5*a*B)*ArcTan[(a^
(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*b^(13/3)) - (
7*a^(1/3)*(2*A*b - 5*a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*b^(13/3))
 + (7*a^(1/3)*(2*A*b - 5*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b
^(2/3)*x^2])/(54*b^(13/3))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{7\sqrt[3]{a}\,(2Ab-5Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27b^{\frac{13}{3}}}+\frac{7\sqrt[3]{a}\,(2Ab-5Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{54b^{\frac{13}{3}}}+\frac{7\sqrt{3}\sqrt[3]{a}\,(2Ab-5Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27b^{\frac{13}{3}}}+\frac{x^{10}\,(Ab-Ba)}{6ab\,(a+bx^3)^2}+\frac{x^7\,(2Ab-5Ba)}{9ab^2\,(a+bx^3)}-\frac{7x^4\,(2Ab-5Ba)}{36ab^3}+\frac{7\,(2Ab-5Ba)\int a\,dx}{9ab^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**9*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] -7*a**(1/3)*(2*A*b - 5*B*a)*log(a**(1/3) + b**(1/3)*x)/(27*b**(13
/3)) + 7*a**(1/3)*(2*A*b - 5*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3
)*x + b**(2/3)*x**2)/(54*b**(13/3)) + 7*sqrt(3)*a**(1/3)*(2*A*b -
 5*B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*
b**(13/3)) + x**10*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) + x**7*(2*
A*b - 5*B*a)/(9*a*b**2*(a + b*x**3)) - 7*x**4*(2*A*b - 5*B*a)/(36
*a*b**3) + 7*(2*A*b - 5*B*a)*Integral(a, x)/(9*a*b**4)
```

Mathematica [A] time = 0.31591, size = 210, normalized size = 0.86

$$\frac{-14\sqrt[3]{a}(5aB-2Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)+\frac{18a^2\sqrt[3]{b}x(aB-Ab)}{(a+bx^3)^2}+\frac{6a\sqrt[3]{b}x(13Ab-19aB)}{a+bx^3}+108\sqrt[3]{b}x(Ab-3aB)+28\sqrt[3]{a}(5aB-}{108b^{13/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^9*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (108*b^(1/3)*(A*b - 3*a*B)*x + 27*b^(4/3)*B*x^4 + (18*a^2*b^(1/3)
*(-(A*b) + a*B)*x)/(a + b*x^3)^2 + (6*a*b^(1/3)*(13*A*b - 19*a*B)
*x)/(a + b*x^3) - 28*Sqrt[3]*a^(1/3)*(-2*A*b + 5*a*B)*ArcTan[(1 -
 (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 28*a^(1/3)*(-2*A*b + 5*a*B)*Lo
g[a^(1/3) + b^(1/3)*x] - 14*a^(1/3)*(-2*A*b + 5*a*B)*Log[a^(2/3)
- a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(108*b^(13/3))
```

Maple [A] time = 0.018, size = 299, normalized size = 1.2

$$\frac{Bx^4}{4b^3}+\frac{Ax}{b^3}-3\frac{Bxa}{b^4}+\frac{13Aax^4}{18b^2(bx^3+a)^2}-\frac{19a^2Bx^4}{18b^3(bx^3+a)^2}+\frac{5a^2Ax}{9b^3(bx^3+a)^2}-\frac{8Ba^3x}{9b^4(bx^3+a)^2}-\frac{14Aa}{27b^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{7Aa}{27b^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{14Aa\sqrt{3}}{27b^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{35a^2B}{27b^5}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{35a^2B}{54b^5}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{35a^2B\sqrt{3}}{27b^5}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^9*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 1/4/b^3*B*x^4+1/b^3*A*x-3/b^4*B*x*a+13/18*a/b^2/(b*x^3+a)^2*A*x^4
-19/18*a^2/b^3/(b*x^3+a)^2*B*x^4+5/9*a^2/b^3/(b*x^3+a)^2*A*x-8/9*
a^3/b^4/(b*x^3+a)^2*B*x-14/27*a/b^4*A/(a/b)^(2/3)*ln(x+(a/b)^(1/3
))+7/27*a/b^4*A/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-14/
27*a/b^4*A/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*
x-1))+35/27*a^2/b^5*B/(a/b)^(2/3)*ln(x+(a/b)^(1/3))-35/54*a^2/b^5
*B/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+35/27*a^2/b^5*B/
(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^9/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.241562, size = 487, normalized size = 2.

$$\frac{\sqrt{3}\left(14\,\sqrt{3}\left(\left(5\,Bab^2-2\,Ab^3\right)x^6+5\,Ba^3-2\,Aa^2b+2\,\left(5\,Ba^2b-2\,Aab^2\right)x^3\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)-28\,\sqrt{3}\left(\left(5\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^9/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/324*sqrt(3)*(14*sqrt(3)*((5*B*a*b^2 - 2*A*b^3)*x^6 + 5*B*a^3 -
2*A*a^2*b + 2*(5*B*a^2*b - 2*A*a*b^2)*x^3)*(-a/b)^(1/3)*log(x^2 +
 x*(-a/b)^(1/3) + (-a/b)^(2/3)) - 28*sqrt(3)*((5*B*a*b^2 - 2*A*b^
3)*x^6 + 5*B*a^3 - 2*A*a^2*b + 2*(5*B*a^2*b - 2*A*a*b^2)*x^3)*(-a
/b)^(1/3)*log(x - (-a/b)^(1/3)) + 84*((5*B*a*b^2 - 2*A*b^3)*x^6 +
 5*B*a^3 - 2*A*a^2*b + 2*(5*B*a^2*b - 2*A*a*b^2)*x^3)*(-a/b)^(1/3
)*arctan(1/3*(2*sqrt(3)*x + sqrt(3)*(-a/b)^(1/3))/(-a/b)^(1/3)) +
 3*sqrt(3)*(9*B*b^3*x^10 - 18*(5*B*a*b^2 - 2*A*b^3)*x^7 - 49*(5*B
*a^2*b - 2*A*a*b^2)*x^4 - 28*(5*B*a^3 - 2*A*a^2*b)*x))/(b^6*x^6 +
 2*a*b^5*x^3 + a^2*b^4)
```

Sympy [A] time = 9.29287, size = 162, normalized size = 0.66

$$\frac{Bx^4}{4b^3}-\frac{x^4\left(-13Aab^2+19Ba^2b\right)+x\left(-10Aa^2b+16Ba^3\right)}{18a^2b^4+36ab^5x^3+18b^6x^6}$$
$$+\mathrm{RootSum}\left(19683t^3b^{13}+2744A^3ab^3-20580A^2Ba^2b^2+51450AB^2a^3b-42875B^3a^4,\left(t\mapsto t\log\left(\frac{27tb^4}{-14Ab+35Ba}+x\right)\right)\right)$$
$$-\frac{x\left(-Ab+3Ba\right)}{b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*x**4/(4*b**3) - (x**4*(-13*A*a*b**2 + 19*B*a**2*b) + x*(-10*A*a
**2*b + 16*B*a**3))/(18*a**2*b**4 + 36*a*b**5*x**3 + 18*b**6*x**6
) + RootSum(19683*_t**3*b**13 + 2744*A**3*a*b**3 - 20580*A**2*B*a
**2*b**2 + 51450*A*B**2*a**3*b - 42875*B**3*a**4, Lambda(_t, _t*l
og(27*_t*b**4/(-14*A*b + 35*B*a) + x))) - x*(-A*b + 3*B*a)/b**4
```

GIAC/XCAS [A] time = 0.222218, size = 316, normalized size = 1.3

$$\frac{7\sqrt{3}\left(5\left(-ab^{2}\right)^{\frac{1}{3}}Ba-2\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27b^{5}}-\frac{7\left(5Ba^{2}-2Aab\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27ab^{4}}+\frac{7\left(5\left(-ab^{2}\right)^{\frac{1}{3}}Ba-2\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{54b^{5}}-\frac{19Ba^{2}bx^{4}-13Aab^{2}x^{4}+16Ba^{3}x-10Aa^{2}bx}{18\left(bx^{3}+a\right)^{2}b^{4}}+\frac{Bb^{9}x^{4}-12Bab^{8}x+4Ab^{9}x}{4b^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^9/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] 7/27*sqrt(3)*(5*(-a*b^2)^(1/3)*B*a - 2*(-a*b^2)^(1/3)*A*b)*arctan
(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/b^5 - 7/27*(5*B*a
^2 - 2*A*a*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^4) + 7/
54*(5*(-a*b^2)^(1/3)*B*a - 2*(-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b
)^(1/3) + (-a/b)^(2/3))/b^5 - 1/18*(19*B*a^2*b*x^4 - 13*A*a*b^2*x
^4 + 16*B*a^3*x - 10*A*a^2*b*x)/((b*x^3 + a)^2*b^4) + 1/4*(B*b^9*
x^4 - 12*B*a*b^8*x + 4*A*b^9*x)/b^12
```

3.97 $\int \frac{x^7(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=222

$$\frac{5(Ab-4aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54\sqrt[3]{a}b^{11/3}}-\frac{5(Ab-4aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27\sqrt[3]{a}b^{11/3}}-\frac{5(Ab-4aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}\sqrt[3]{a}b^{11/3}}-\frac{5x^2(Ab-4aB)}{18ab^3}+\frac{x^5(Ab-4aB)}{9ab^2(a+bx^3)}+\frac{x^8(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] (-5*(A*b - 4*a*B)*x^2)/(18*a*b^3) + ((A*b - a*B)*x^8)/(6*a*b*(a +
 b*x^3)^2) + ((A*b - 4*a*B)*x^5)/(9*a*b^2*(a + b*x^3)) - (5*(A*b
- 4*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sq
rt[3]*a^(1/3)*b^(11/3)) - (5*(A*b - 4*a*B)*Log[a^(1/3) + b^(1/3)*
x])/(27*a^(1/3)*b^(11/3)) + (5*(A*b - 4*a*B)*Log[a^(2/3) - a^(1/3
)*b^(1/3)*x + b^(2/3)*x^2])/(54*a^(1/3)*b^(11/3))
```

Rubi [A] time = 0.39914, antiderivative size = 222, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.45$

$$\frac{5(Ab-4aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54\sqrt[3]{a}b^{11/3}}-\frac{5(Ab-4aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27\sqrt[3]{a}b^{11/3}}-\frac{5(Ab-4aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}\sqrt[3]{a}b^{11/3}}-\frac{5x^2(Ab-4aB)}{18ab^3}+\frac{x^5(Ab-4aB)}{9ab^2(a+bx^3)}+\frac{x^8(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^7*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (-5*(A*b - 4*a*B)*x^2)/(18*a*b^3) + ((A*b - a*B)*x^8)/(6*a*b*(a +
 b*x^3)^2) + ((A*b - 4*a*B)*x^5)/(9*a*b^2*(a + b*x^3)) - (5*(A*b
- 4*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sq
rt[3]*a^(1/3)*b^(11/3)) - (5*(A*b - 4*a*B)*Log[a^(1/3) + b^(1/3)*
x])/(27*a^(1/3)*b^(11/3)) + (5*(A*b - 4*a*B)*Log[a^(2/3) - a^(1/3
)*b^(1/3)*x + b^(2/3)*x^2])/(54*a^(1/3)*b^(11/3))
```

Rubi in Sympy [A] time = 47.4581, size = 209, normalized size = 0.94

$$\frac{x^8(Ab-Ba)}{6ab(a+bx^3)^2}+\frac{x^5(Ab-4Ba)}{9ab^2(a+bx^3)}-\frac{5x^2(Ab-4Ba)}{18ab^3}-\frac{5(Ab-4Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27\sqrt[3]{a}b^{\frac{11}{3}}}+\frac{5(Ab-4Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{54\sqrt[3]{a}b^{\frac{11}{3}}}-\frac{5\sqrt{3}(Ab-4Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27\sqrt[3]{a}b^{\frac{11}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] x**8*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) + x**5*(A*b - 4*B*a)/(9*
a*b**2*(a + b*x**3)) - 5*x**2*(A*b - 4*B*a)/(18*a*b**3) - 5*(A*b
- 4*B*a)*log(a**(1/3) + b**(1/3)*x)/(27*a**(1/3)*b**(11/3)) + 5*(
A*b - 4*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(54*a**(1/3)*b**(11/3)) - 5*sqrt(3)*(A*b - 4*B*a)*atan(sqrt(3)*(a
```

```
**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*a**(1/3)*b**(11/3))
```

Mathematica [A] time = 0.342959, size = 194, normalized size = 0.87

$$\frac{\frac{5(Ab-4aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{\sqrt[3]{a}}-\frac{6b^{2/3}x^2(4Ab-7aB)}{a+bx^3}+\frac{9ab^{2/3}x^2(Ab-aB)}{(a+bx^3)^2}+\frac{10(4aB-Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[3]{a}}+\frac{10\sqrt{3}(4aB-Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{\sqrt[3]{a}}}{54b^{11/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^7*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (27*b^(2/3)*B*x^2 + (9*a*b^(2/3)*(A*b - a*B)*x^2)/(a + b*x^3)^2 -
 (6*b^(2/3)*(4*A*b - 7*a*B)*x^2)/(a + b*x^3) + (10*Sqrt[3]*(-(A*b
) + 4*a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/a^(1/3) +
 (10*(-(A*b) + 4*a*B)*Log[a^(1/3) + b^(1/3)*x])/a^(1/3) + (5*(A*b
 - 4*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/a^(1/3)
)/(54*b^(11/3))
```

Maple [A] time = 0.014, size = 275, normalized size = 1.2

$$\frac{Bx^2}{2\,b^3}-\frac{4\,Ax^5}{9\,b\,(bx^3+a)^2}+\frac{7\,Bx^5a}{9\,b^2\,(bx^3+a)^2}-\frac{5\,aAx^2}{18\,b^2\,(bx^3+a)^2}+\frac{11\,Bx^2a^2}{18\,b^3\,(bx^3+a)^2}$$
$$-\frac{5\,A}{27\,b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{5\,A}{54\,b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{5\,A\sqrt{3}}{27\,b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{20\,Ba}{27\,b^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{10\,Ba}{27\,b^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{20\,Ba\sqrt{3}}{27\,b^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 1/2*B*x^2/b^3-4/9/b/(b*x^3+a)^2*A*x^5+7/9/b^2/(b*x^3+a)^2*B*x^5*a
-5/18/b^2/(b*x^3+a)^2*A*x^2*a+11/18/b^3/(b*x^3+a)^2*B*x^2*a^2-5/2
7/b^3*A/(a/b)^(1/3)*ln(x+(a/b)^(1/3))+5/54/b^3*A/(a/b)^(1/3)*ln(x
^2-x*(a/b)^(1/3)+(a/b)^(2/3))+5/27/b^3*A*3^(1/2)/(a/b)^(1/3)*arct
an(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+20/27/b^4*B*a/(a/b)^(1/3)*ln(
x+(a/b)^(1/3))-10/27/b^4*B*a/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/
b)^(2/3))-20/27/b^4*B*a*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2
/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.234363, size = 458, normalized size = 2.06

$$\frac{\sqrt{3}\left(5\sqrt{3}\left(\left(4\,Bab^2-Ab^3\right)x^6+4\,Ba^3-Aa^2b+2\left(4\,Ba^2b-Aab^2\right)x^3\right)\log\left(\left(-ab^2\right)^{\frac{1}{3}}bx^2-ab+\left(-ab^2\right)^{\frac{2}{3}}x\right)-10\sqrt{3}\left(\left(4\,Bab^2\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/162*sqrt(3)*(5*sqrt(3)*((4*B*a*b^2 - A*b^3)*x^6 + 4*B*a^3 - A*a
^2*b + 2*(4*B*a^2*b - A*a*b^2)*x^3)*log((-a*b^2)^(1/3)*b*x^2 - a*
b + (-a*b^2)^(2/3)*x) - 10*sqrt(3)*((4*B*a*b^2 - A*b^3)*x^6 + 4*B
*a^3 - A*a^2*b + 2*(4*B*a^2*b - A*a*b^2)*x^3)*log(a*b + (-a*b^2)^
(2/3)*x) + 30*((4*B*a*b^2 - A*b^3)*x^6 + 4*B*a^3 - A*a^2*b + 2*(4
*B*a^2*b - A*a*b^2)*x^3)*arctan(-1/3*(sqrt(3)*a*b - 2*sqrt(3)*(-a
*b^2)^(2/3)*x)/(a*b)) + 3*sqrt(3)*(9*B*b^2*x^8 + 8*(4*B*a*b - A*b
^2)*x^5 + 5*(4*B*a^2 - A*a*b)*x^2)*(-a*b^2)^(1/3))/((b^5*x^6 + 2*
a*b^4*x^3 + a^2*b^3)*(-a*b^2)^(1/3))
```

Sympy [A] time = 11.4758, size = 162, normalized size = 0.73

$$\frac{Bx^2}{2b^3}+\frac{x^5\left(-8Ab^2+14Bab\right)+x^2\left(-5Aab+11Ba^2\right)}{18a^2b^3+36ab^4x^3+18b^5x^6}$$
$$+\operatorname{RootSum}\left(19683t^3ab^{11}+125A^3b^3-1500A^2Bab^2+6000AB^2a^2b-8000B^3a^3,\left(t\mapsto t\log\left(\frac{729t^2ab^7}{25A^2b^2-200ABab+400B^2a^2}+\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*x**2/(2*b**3) + (x**5*(-8*A*b**2 + 14*B*a*b) + x**2*(-5*A*a*b +
 11*B*a**2))/(18*a**2*b**3 + 36*a*b**4*x**3 + 18*b**5*x**6) + Roo
tSum(19683*_t**3*a*b**11 + 125*A**3*b**3 - 1500*A**2*B*a*b**2 + 6
000*A*B**2*a**2*b - 8000*B**3*a**3, Lambda(_t, _t*log(729*_t**2*a
*b**7/(25*A**2*b**2 - 200*A*B*a*b + 400*B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.222259, size = 313, normalized size = 1.41

$$\frac{Bx^2}{2\,b^3}+\frac{5\left(4\,Ba\left(-\frac{a}{b}\right)^{\frac{1}{3}}-Ab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,ab^3}$$
$$+\frac{5\sqrt{3}\left(4\left(-ab^2\right)^{\frac{2}{3}}Ba-\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,ab^5}$$
$$+\frac{14\,Babx^5-8\,Ab^2x^5+11\,Ba^2x^2-5\,Aabx^2}{18\left(bx^3+a\right)^2b^3}$$
$$-\frac{5\left(4\left(-ab^2\right)^{\frac{2}{3}}Ba-\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{54\,ab^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] 1/2*B*x^2/b^3 + 5/27*(4*B*a*(-a/b)^(1/3) - A*b*(-a/b)^(1/3))*(-a/
b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^3) + 5/27*sqrt(3)*(4*(-a*
b^2)^(2/3)*B*a - (-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-
a/b)^(1/3))/(-a/b)^(1/3))/(a*b^5) + 1/18*(14*B*a*b*x^5 - 8*A*b^2*
x^5 + 11*B*a^2*x^2 - 5*A*a*b*x^2)/((b*x^3 + a)^2*b^3) - 5/54*(4*(
-a*b^2)^(2/3)*B*a - (-a*b^2)^(2/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) +
 (-a/b)^(2/3))/(a*b^5)
```

3.98 $\int \frac{x^6(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=220

$$-\frac{(Ab-7aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{27a^{2/3}b^{10/3}}+\frac{2(Ab-7aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{2/3}b^{10/3}}-\frac{2(Ab-7aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{2/3}b^{10/3}}-\frac{2x(Ab-7aB)}{9ab^3}+\frac{x^4(Ab-7aB)}{18ab^2(a+bx^3)}+\frac{x^7(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] (-2*(A*b - 7*a*B)*x)/(9*a*b^3) + ((A*b - a*B)*x^7)/(6*a*b*(a + b*
x^3)^2) + ((A*b - 7*a*B)*x^4)/(18*a*b^2*(a + b*x^3)) - (2*(A*b -
7*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt
[3]*a^(2/3)*b^(10/3)) + (2*(A*b - 7*a*B)*Log[a^(1/3) + b^(1/3)*x]
)/(27*a^(2/3)*b^(10/3)) - ((A*b - 7*a*B)*Log[a^(2/3) - a^(1/3)*b^
(1/3)*x + b^(2/3)*x^2])/(27*a^(2/3)*b^(10/3))
```

Rubi [A] time = 0.356503, antiderivative size = 220, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.45

$$-\frac{(Ab-7aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{27a^{2/3}b^{10/3}}+\frac{2(Ab-7aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{2/3}b^{10/3}}-\frac{2(Ab-7aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{2/3}b^{10/3}}-\frac{2x(Ab-7aB)}{9ab^3}+\frac{x^4(Ab-7aB)}{18ab^2(a+bx^3)}+\frac{x^7(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^6*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (-2*(A*b - 7*a*B)*x)/(9*a*b^3) + ((A*b - a*B)*x^7)/(6*a*b*(a + b*
x^3)^2) + ((A*b - 7*a*B)*x^4)/(18*a*b^2*(a + b*x^3)) - (2*(A*b -
7*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt
[3]*a^(2/3)*b^(10/3)) + (2*(A*b - 7*a*B)*Log[a^(1/3) + b^(1/3)*x]
)/(27*a^(2/3)*b^(10/3)) - ((A*b - 7*a*B)*Log[a^(2/3) - a^(1/3)*b^
(1/3)*x + b^(2/3)*x^2])/(27*a^(2/3)*b^(10/3))
```

Rubi in Sympy [A] time = 48.5323, size = 206, normalized size = 0.94

$$\frac{x^7(Ab-Ba)}{6ab(a+bx^3)^2}+\frac{x^4(Ab-7Ba)}{18ab^2(a+bx^3)}-\frac{2x(Ab-7Ba)}{9ab^3}+\frac{2(Ab-7Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{2}{3}}b^{\frac{10}{3}}}-\frac{(Ab-7Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{27a^{\frac{2}{3}}b^{\frac{10}{3}}}-\frac{2\sqrt{3}(Ab-7Ba)\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{2}{3}}b^{\frac{10}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] x**7*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) + x**4*(A*b - 7*B*a)/(18
*a*b**2*(a + b*x**3)) - 2*x*(A*b - 7*B*a)/(9*a*b**3) + 2*(A*b - 7
*B*a)*log(a**(1/3) + b**(1/3)*x)/(27*a**(2/3)*b**(10/3)) - (A*b -
 7*B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(27*a
**(2/3)*b**(10/3)) - 2*sqrt(3)*(A*b - 7*B*a)*atan(sqrt(3)*(a**(1/
3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*a**(2/3)*b**(10/3))
```

Mathematica [A] time = 0.351913, size = 188, normalized size = 0.85

$$\frac{\frac{2(7aB-Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{2/3}}+\frac{4(Ab-7aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{2/3}}+\frac{4\sqrt{3}(7aB-Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{2/3}}-\frac{3\sqrt[3]{b}x(7Ab-13aB)}{a+bx^3}+\frac{9a\sqrt[3]{b}x(Ab-aB)}{(a+bx^3)^2}+}{54b^{10/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^6*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (54*b^(1/3)*B*x + (9*a*b^(1/3)*(A*b - a*B)*x)/(a + b*x^3)^2 - (3*
b^(1/3)*(7*A*b - 13*a*B)*x)/(a + b*x^3) + (4*Sqrt[3]*(-(A*b) + 7*
a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/a^(2/3) + (4*(A
*b - 7*a*B)*Log[a^(1/3) + b^(1/3)*x])/a^(2/3) + (2*(-(A*b) + 7*a*
B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/a^(2/3))/(54*b
^(10/3))
```

Maple [A] time = 0.017, size = 268, normalized size = 1.2

$$\frac{Bx}{b^3}-\frac{7\,Ax^4}{18\,b\,(bx^3+a)^2}+\frac{13\,Bx^4a}{18\,b^2\,(bx^3+a)^2}-\frac{2\,aAx}{9\,b^2\,(bx^3+a)^2}+\frac{5\,Bxa^2}{9\,b^3\,(bx^3+a)^2}$$
$$+\frac{2\,A}{27\,b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{A}{27\,b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{2\,A\sqrt{3}}{27\,b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{14\,Ba}{27\,b^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{7\,Ba}{27\,b^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{14\,Ba\sqrt{3}}{27\,b^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] B*x/b^3-7/18/b/(b*x^3+a)^2*A*x^4+13/18/b^2/(b*x^3+a)^2*B*x^4*a-2/
9/b^2/(b*x^3+a)^2*A*x*a+5/9/b^3/(b*x^3+a)^2*B*x*a^2+2/27/b^3*A/(a
/b)^(2/3)*ln(x+(a/b)^(1/3))-1/27/b^3*A/(a/b)^(2/3)*ln(x^2-x*(a/b)
^(1/3)+(a/b)^(2/3))+2/27/b^3*A/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(
1/2)*(2/(a/b)^(1/3)*x-1))-14/27/b^4*B*a/(a/b)^(2/3)*ln(x+(a/b)^(1
/3))+7/27/b^4*B*a/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-1
4/27/b^4*B*a/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3
)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238091, size = 440, normalized size = 2.

$$\frac{\sqrt{3}\left(2\sqrt{3}\left(\left(7\,Bab^2 - Ab^3\right)x^6 + 7\,Ba^3 - Aa^2b + 2\left(7\,Ba^2b - Aab^2\right)x^3\right)\log\left(\left(a^2b\right)^{\frac{2}{3}}x^2 - \left(a^2b\right)^{\frac{1}{3}}ax + a^2\right) - 4\sqrt{3}\left(\left(7\,Bab^2 - A\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/162*sqrt(3)*(2*sqrt(3)*((7*B*a*b^2 - A*b^3)*x^6 + 7*B*a^3 - A*a
^2*b + 2*(7*B*a^2*b - A*a*b^2)*x^3)*log((a^2*b)^(2/3)*x^2 - (a^2*
b)^(1/3)*a*x + a^2) - 4*sqrt(3)*((7*B*a*b^2 - A*b^3)*x^6 + 7*B*a^
3 - A*a^2*b + 2*(7*B*a^2*b - A*a*b^2)*x^3)*log((a^2*b)^(1/3)*x +
a) - 12*((7*B*a*b^2 - A*b^3)*x^6 + 7*B*a^3 - A*a^2*b + 2*(7*B*a^2
*b - A*a*b^2)*x^3)*arctan(1/3*(2*sqrt(3)*(a^2*b)^(1/3)*x - sqrt(3
)*a)/a) + 3*sqrt(3)*(18*B*b^2*x^7 + 7*(7*B*a*b - A*b^2)*x^4 + 4*(
7*B*a^2 - A*a*b)*x)*(a^2*b)^(1/3))/((b^5*x^6 + 2*a*b^4*x^3 + a^2*
b^3)*(a^2*b)^(1/3))
```

Sympy [A] time = 7.83489, size = 141, normalized size = 0.64

$$\frac{Bx}{b^3} + \frac{x^4\left(-7Ab^2 + 13Bab\right) + x\left(-4Aab + 10Ba^2\right)}{18a^2b^3 + 36ab^4x^3 + 18b^5x^6} + \operatorname{RootSum}\left(19683t^3a^2b^{10} - 8A^3b^3 + 168A^2Bab^2 - 1176AB^2a^2b + 2744B^3a^3, \left(t \mapsto t\log\left(-\frac{27tab^3}{-2Ab + 14Ba} + x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] B*x/b**3 + (x**4*(-7*A*b**2 + 13*B*a*b) + x*(-4*A*a*b + 10*B*a**2
))/(18*a**2*b**3 + 36*a*b**4*x**3 + 18*b**5*x**6) + RootSum(19683
*_t**3*a**2*b**10 - 8*A**3*b**3 + 168*A**2*B*a*b**2 - 1176*A*B**2
*a**2*b + 2744*B**3*a**3, Lambda(_t, _t*log(-27*_t*a*b**3/(-2*A*b
 + 14*B*a) + x)))
```

GIAC/XCAS [A] time = 0.223261, size = 282, normalized size = 1.28

$$\frac{Bx}{b^3} + \frac{2\,(7\,Ba - Ab)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,ab^3} - \frac{2\sqrt{3}\left(7\,\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,ab^4} - \frac{\left(7\,\left(-ab^2\right)^{\frac{1}{3}}Ba - \left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{27\,ab^4} + \frac{13\,Babx^4 - 7\,Ab^2x^4 + 10\,Ba^2x - 4\,Aabx}{18\left(bx^3 + a\right)^2b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] B*x/b^3 + 2/27*(7*B*a - A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)
))/(a*b^3) - 2/27*sqrt(3)*(7*(-a*b^2)^(1/3)*B*a - (-a*b^2)^(1/3)*
```

```
A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a*b^4
) - 1/27*(7*(-a*b^2)^(1/3)*B*a - (-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(
-a/b)^(1/3) + (-a/b)^(2/3))/(a*b^4) + 1/18*(13*B*a*b*x^4 - 7*A*b^
2*x^4 + 10*B*a^2*x - 4*A*a*b*x)/((b*x^3 + a)^2*b^3)
```

3.99 $\int \frac{x^4(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=201

$$\frac{(5aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{4/3}b^{8/3}}-\frac{(5aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{4/3}b^{8/3}}-\frac{(5aB+Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{4/3}b^{8/3}}-\frac{x^2(5aB+Ab)}{18ab^2(a+bx^3)}+\frac{x^5(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*x^5)/(6*a*b*(a + b*x^3)^2) - ((A*b + 5*a*B)*x^2)/(18
*a*b^2*(a + b*x^3)) - ((A*b + 5*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*
x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(4/3)*b^(8/3)) - ((A*b + 5*a*
B)*Log[a^(1/3) + b^(1/3)*x]])/(27*a^(4/3)*b^(8/3)) + ((A*b + 5*a*B
)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2]])/(54*a^(4/3)*b^(
8/3))
```

Rubi [A] time = 0.30396, antiderivative size = 201, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.4$

$$\frac{(5aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{4/3}b^{8/3}}-\frac{(5aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{4/3}b^{8/3}}-\frac{(5aB+Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{4/3}b^{8/3}}-\frac{x^2(5aB+Ab)}{18ab^2(a+bx^3)}+\frac{x^5(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - a*B)*x^5)/(6*a*b*(a + b*x^3)^2) - ((A*b + 5*a*B)*x^2)/(18
*a*b^2*(a + b*x^3)) - ((A*b + 5*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*
x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(4/3)*b^(8/3)) - ((A*b + 5*a*
B)*Log[a^(1/3) + b^(1/3)*x]])/(27*a^(4/3)*b^(8/3)) + ((A*b + 5*a*B
)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2]])/(54*a^(4/3)*b^(
8/3))
```

Rubi in Sympy [A] time = 40.8409, size = 184, normalized size = 0.92

$$\frac{x^5(Ab-Ba)}{6ab(a+bx^3)^2}-\frac{x^2(Ab+5Ba)}{18ab^2(a+bx^3)}-\frac{(Ab+5Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{4}{3}}b^{\frac{8}{3}}}+\frac{(Ab+5Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{54a^{\frac{4}{3}}b^{\frac{8}{3}}}-\frac{\sqrt{3}(Ab+5Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{4}{3}}b^{\frac{8}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] x**5*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) - x**2*(A*b + 5*B*a)/(18
*a*b**2*(a + b*x**3)) - (A*b + 5*B*a)*log(a**(1/3) + b**(1/3)*x)/
(27*a**(4/3)*b**(8/3)) + (A*b + 5*B*a)*log(a**(2/3) - a**(1/3)*b*
*(1/3)*x + b**(2/3)*x**2)/(54*a**(4/3)*b**(8/3)) - sqrt(3)*(A*b +
 5*B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*
a**(4/3)*b**(8/3))
```

Mathematica [A] time = 0.338836, size = 181, normalized size = 0.9

$$\frac{\frac{(5aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{4/3}}-\frac{2(5aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{4/3}}-\frac{2\sqrt{3}(5aB+Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{4/3}}+\frac{6b^{2/3}x^2(Ab-4aB)}{a(a+bx^3)}-\frac{9b^{2/3}x^2(Ab-aB)}{(a+bx^3)^2}}{54b^{8/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^4*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((-9*b^(2/3)*(A*b - a*B)*x^2)/(a + b*x^3)^2 + (6*b^(2/3)*(A*b - 4
*a*B)*x^2)/(a*(a + b*x^3)) - (2*Sqrt[3]*(A*b + 5*a*B)*ArcTan[(1 -
 (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/a^(4/3) - (2*(A*b + 5*a*B)*Log[
a^(1/3) + b^(1/3)*x])/a^(4/3) + ((A*b + 5*a*B)*Log[a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2])/a^(4/3))/(54*b^(8/3))
```

Maple [A] time = 0.014, size = 241, normalized size = 1.2

$$\frac{1}{(bx^3+a)^2}\left(\frac{(Ab-4\,Ba)\,x^5}{9\,ab}-\frac{(Ab+5\,Ba)\,x^2}{18\,b^2}\right)-\frac{A}{27\,ab^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{5\,B}{27\,b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{A}{54\,ab^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{5\,B}{54\,b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{\sqrt{3}A}{27\,ab^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{5\,\sqrt{3}B}{27\,b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] (1/9*(A*b-4*B*a)/a/b*x^5-1/18*(A*b+5*B*a)/b^2*x^2)/(b*x^3+a)^2-1/
27/b^2/a/(a/b)^(1/3)*ln(x+(a/b)^(1/3))*A-5/27/b^3/(a/b)^(1/3)*ln(
x+(a/b)^(1/3))*B+1/54/b^2/a/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b
)^(2/3))*A+5/54/b^3/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))
*B+1/27/b^2/a*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/
3)*x-1))*A+5/27/b^3*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/
b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238096, size = 433, normalized size = 2.15

$$-\frac{\sqrt{3}\left(\sqrt{3}\left(\left(5\,Bab^{2}+Ab^{3}\right)x^{6}+5\,Ba^{3}+Aa^{2}b+2\,\left(5\,Ba^{2}b+Aab^{2}\right)x^{3}\right)\log\left(\left(-ab^{2}\right)^{\frac{1}{3}}bx^{2}-ab+\left(-ab^{2}\right)^{\frac{2}{3}}x\right)-2\,\sqrt{3}\left(\left(5\,Bab^{2}+\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] -1/162*sqrt(3)*(sqrt(3)*((5*B*a*b^2 + A*b^3)*x^6 + 5*B*a^3 + A*a^
2*b + 2*(5*B*a^2*b + A*a*b^2)*x^3)*log((-a*b^2)^(1/3)*b*x^2 - a*b
 + (-a*b^2)^(2/3)*x) - 2*sqrt(3)*((5*B*a*b^2 + A*b^3)*x^6 + 5*B*a
^3 + A*a^2*b + 2*(5*B*a^2*b + A*a*b^2)*x^3)*log(a*b + (-a*b^2)^(2
/3)*x) + 6*((5*B*a*b^2 + A*b^3)*x^6 + 5*B*a^3 + A*a^2*b + 2*(5*B*
a^2*b + A*a*b^2)*x^3)*arctan(-1/3*(sqrt(3)*a*b - 2*sqrt(3)*(-a*b^
2)^(2/3)*x)/(a*b)) + 3*sqrt(3)*(2*(4*B*a*b - A*b^2)*x^5 + (5*B*a^
2 + A*a*b)*x^2)*(-a*b^2)^(1/3))/((a*b^4*x^6 + 2*a^2*b^3*x^3 + a^3
*b^2)*(-a*b^2)^(1/3))
```

Sympy [A] time = 8.02935, size = 153, normalized size = 0.76

$$-\frac{x^{5}\left(-2Ab^{2}+8Bab\right)+x^{2}\left(Aab+5Ba^{2}\right)}{18a^{3}b^{2}+36a^{2}b^{3}x^{3}+18ab^{4}x^{6}}+\operatorname{RootSum}\left(19683t^{3}a^{4}b^{8}+A^{3}b^{3}+15A^{2}Bab^{2}+75AB^{2}a^{2}b+125B^{3}a^{3},\left(t\mapsto t\log\left(\frac{729t^{2}a^{3}b^{5}}{A^{2}b^{2}+10ABab+25B^{2}a^{2}}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] -(x**5*(-2*A*b**2 + 8*B*a*b) + x**2*(A*a*b + 5*B*a**2))/(18*a**3*
b**2 + 36*a**2*b**3*x**3 + 18*a*b**4*x**6) + RootSum(19683*_t**3*
a**4*b**8 + A**3*b**3 + 15*A**2*B*a*b**2 + 75*A*B**2*a**2*b + 125
*B**3*a**3, Lambda(_t, _t*log(729*_t**2*a**3*b**5/(A**2*b**2 + 10
*A*B*a*b + 25*B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.224988, size = 300, normalized size = 1.49

$$-\frac{\left(5\,Ba\left(-\frac{a}{b}\right)^{\frac{1}{3}}+Ab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,a^{2}b^{2}}-\frac{\sqrt{3}\left(5\,\left(-ab^{2}\right)^{\frac{2}{3}}Ba+\left(-ab^{2}\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,a^{2}b^{4}}-\frac{8\,Babx^{5}-2\,Ab^{2}x^{5}+5\,Ba^{2}x^{2}+Aabx^{2}}{18\,(bx^{3}+a)^{2}ab^{2}}+\frac{\left(5\,\left(-ab^{2}\right)^{\frac{2}{3}}Ba+\left(-ab^{2}\right)^{\frac{2}{3}}Ab\right)\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{54\,a^{2}b^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] -1/27*(5*B*a*(-a/b)^(1/3) + A*b*(-a/b)^(1/3))*(-a/b)^(1/3)*ln(abs
(x - (-a/b)^(1/3)))/(a^2*b^2) - 1/27*sqrt(3)*(5*(-a*b^2)^(2/3)*B*
```

```
a + (-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(
-a/b)^(1/3))/(a^2*b^4) - 1/18*(8*B*a*b*x^5 - 2*A*b^2*x^5 + 5*B*a^
2*x^2 + A*a*b*x^2)/((b*x^3 + a)^2*a*b^2) + 1/54*(5*(-a*b^2)^(2/3)
*B*a + (-a*b^2)^(2/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3)
)/(a^2*b^4)
```

3.100 $\int \frac{x^3(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=199

$$-\frac{(2aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{5/3}b^{7/3}}+\frac{(2aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{5/3}b^{7/3}}-\frac{(2aB+Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{5/3}b^{7/3}}-\frac{x(2aB+Ab)}{9ab^2(a+bx^3)}+\frac{x^4(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*x^4)/(6*a*b*(a + b*x^3)^2) - ((A*b + 2*a*B)*x)/(9*a*
b^2*(a + b*x^3)) - ((A*b + 2*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/
(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(5/3)*b^(7/3)) + ((A*b + 2*a*B)*
Log[a^(1/3) + b^(1/3)*x])/(27*a^(5/3)*b^(7/3)) - ((A*b + 2*a*B)*L
og[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(54*a^(5/3)*b^(7/3
))
```

Rubi [A] time = 0.317874, antiderivative size = 199, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4

$$-\frac{(2aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{5/3}b^{7/3}}+\frac{(2aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{5/3}b^{7/3}}-\frac{(2aB+Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{5/3}b^{7/3}}-\frac{x(2aB+Ab)}{9ab^2(a+bx^3)}+\frac{x^4(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - a*B)*x^4)/(6*a*b*(a + b*x^3)^2) - ((A*b + 2*a*B)*x)/(9*a*
b^2*(a + b*x^3)) - ((A*b + 2*a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/
(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(5/3)*b^(7/3)) + ((A*b + 2*a*B)*
Log[a^(1/3) + b^(1/3)*x])/(27*a^(5/3)*b^(7/3)) - ((A*b + 2*a*B)*L
og[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(54*a^(5/3)*b^(7/3
))
```

Rubi in Sympy [A] time = 42.4002, size = 182, normalized size = 0.91

$$\frac{x^4(Ab-Ba)}{6ab(a+bx^3)^2}-\frac{x(Ab+2Ba)}{9ab^2(a+bx^3)}+\frac{(Ab+2Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{5}{3}}b^{\frac{7}{3}}}-\frac{(Ab+2Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{54a^{\frac{5}{3}}b^{\frac{7}{3}}}-\frac{\sqrt{3}(Ab+2Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{5}{3}}b^{\frac{7}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] x**4*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) - x*(A*b + 2*B*a)/(9*a*b
**2*(a + b*x**3)) + (A*b + 2*B*a)*log(a**(1/3) + b**(1/3)*x)/(27*
a**(5/3)*b**(7/3)) - (A*b + 2*B*a)*log(a**(2/3) - a**(1/3)*b**(1/
3)*x + b**(2/3)*x**2)/(54*a**(5/3)*b**(7/3)) - sqrt(3)*(A*b + 2*B
*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*a**(
5/3)*b**(7/3))
```

Mathematica [A] time = 0.345429, size = 178, normalized size = 0.89

$$-\frac{-\frac{(2aB+Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{5/3}}+\frac{2(2aB+Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{5/3}}-\frac{2\sqrt{3}(2aB+Ab)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{5/3}}+\frac{3\sqrt[3]{b}x(Ab-7aB)}{a(a+bx^3)}-\frac{9\sqrt[3]{b}x(Ab-aB)}{(a+bx^3)^2}}{54b^{7/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^3*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((-9*b^(1/3)*(A*b - a*B)*x)/(a + b*x^3)^2 + (3*b^(1/3)*(A*b - 7*a
*B)*x)/(a*(a + b*x^3)) - (2*Sqrt[3]*(A*b + 2*a*B)*ArcTan[(1 - (2*
b^(1/3)*x)/a^(1/3))/Sqrt[3]])/a^(5/3) + (2*(A*b + 2*a*B)*Log[a^(1
/3) + b^(1/3)*x])/a^(5/3) - ((A*b + 2*a*B)*Log[a^(2/3) - a^(1/3)*
b^(1/3)*x + b^(2/3)*x^2])/a^(5/3))/(54*b^(7/3))
```

Maple [A] time = 0.015, size = 239, normalized size = 1.2

$$\frac{1}{(bx^3+a)^2}\left(\frac{(Ab-7Ba)x^4}{18ab}-\frac{(Ab+2Ba)x}{9b^2}\right)+\frac{A}{27ab^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{2B}{27b^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{A}{54ab^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{B}{27b^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{\sqrt{3}A}{27ab^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{2\sqrt{3}B}{27b^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] (1/18*(A*b-7*B*a)/a/b*x^4-1/9*(A*b+2*B*a)/b^2*x)/(b*x^3+a)^2+1/27
/b^2/a/(a/b)^(2/3)*ln(x+(a/b)^(1/3))*A+2/27/b^3/(a/b)^(2/3)*ln(x+
(a/b)^(1/3))*B-1/54/b^2/a/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^
(2/3))*A-1/27/b^3/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))*B
+1/27/b^2/a/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)
*x-1))*A+2/27/b^3/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)
^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238126, size = 416, normalized size = 2.09

$$-\frac{\sqrt{3}\left(\sqrt{3}\left(\left(2\,Bab^{2}+Ab^{3}\right)x^{6}+2\,Ba^{3}+Aa^{2}b+2\,\left(2\,Ba^{2}b+Aab^{2}\right)x^{3}\right)\log\left(\left(a^{2}b\right)^{\frac{2}{3}}x^{2}-\left(a^{2}b\right)^{\frac{1}{3}}ax+a^{2}\right)-2\,\sqrt{3}\left(\left(2\,Bab^{2}+Ab\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] -1/162*sqrt(3)*(sqrt(3)*((2*B*a*b^2 + A*b^3)*x^6 + 2*B*a^3 + A*a^
2*b + 2*(2*B*a^2*b + A*a*b^2)*x^3)*log((a^2*b)^(2/3)*x^2 - (a^2*b
)^(1/3)*a*x + a^2) - 2*sqrt(3)*((2*B*a*b^2 + A*b^3)*x^6 + 2*B*a^3
 + A*a^2*b + 2*(2*B*a^2*b + A*a*b^2)*x^3)*log((a^2*b)^(1/3)*x + a
) - 6*((2*B*a*b^2 + A*b^3)*x^6 + 2*B*a^3 + A*a^2*b + 2*(2*B*a^2*b
 + A*a*b^2)*x^3)*arctan(1/3*(2*sqrt(3)*(a^2*b)^(1/3)*x - sqrt(3)*
a)/a) + 3*sqrt(3)*((7*B*a*b - A*b^2)*x^4 + 2*(2*B*a^2 + A*a*b)*x)
*(a^2*b)^(1/3))/((a*b^4*x^6 + 2*a^2*b^3*x^3 + a^3*b^2)*(a^2*b)^(1
/3))
```

Sympy [A] time = 5.46619, size = 134, normalized size = 0.67

$$-\frac{x^{4}\left(-Ab^{2}+7Bab\right)+x\left(2Aab+4Ba^{2}\right)}{18a^{3}b^{2}+36a^{2}b^{3}x^{3}+18ab^{4}x^{6}}+\operatorname{RootSum}\left(19683t^{3}a^{5}b^{7}-A^{3}b^{3}-6A^{2}Bab^{2}-12AB^{2}a^{2}b-8B^{3}a^{3},\left(t\mapsto t\log\left(\frac{27ta^{2}b^{2}}{Ab+2Ba}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] -(x**4*(-A*b**2 + 7*B*a*b) + x*(2*A*a*b + 4*B*a**2))/(18*a**3*b**
2 + 36*a**2*b**3*x**3 + 18*a*b**4*x**6) + RootSum(19683*_t**3*a**
5*b**7 - A**3*b**3 - 6*A**2*B*a*b**2 - 12*A*B**2*a**2*b - 8*B**3*
a**3, Lambda(_t, _t*log(27*_t*a**2*b**2/(A*b + 2*B*a) + x)))
```

GIAC/XCAS [A] time = 0.222972, size = 274, normalized size = 1.38

$$-\frac{\left(2\,Ba+Ab\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,a^{2}b^{2}}+\frac{\sqrt{3}\left(2\,\left(-ab^{2}\right)^{\frac{1}{3}}Ba+\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,a^{2}b^{3}}+\frac{\left(2\,\left(-ab^{2}\right)^{\frac{1}{3}}Ba+\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{54\,a^{2}b^{3}}-\frac{7\,Babx^{4}-Ab^{2}x^{4}+4\,Ba^{2}x+2\,Aabx}{18\,\left(bx^{3}+a\right)^{2}ab^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] -1/27*(2*B*a + A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a^2*b
^2) + 1/27*sqrt(3)*(2*(-a*b^2)^(1/3)*B*a + (-a*b^2)^(1/3)*A*b)*ar
ctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a^2*b^3) + 1
/54*(2*(-a*b^2)^(1/3)*B*a + (-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)
^(1/3) + (-a/b)^(2/3))/(a^2*b^3) - 1/18*(7*B*a*b*x^4 - A*b^2*x^4
+ 4*B*a^2*x + 2*A*a*b*x)/((b*x^3 + a)^2*a*b^2)
```

3.101 $\int \frac{x(A+Bx^3)}{(a+bx^3)^3} dx$

Optimal. Leaf size=201

$$\frac{(aB+2Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{7/3}b^{5/3}}-\frac{(aB+2Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{7/3}b^{5/3}}-\frac{(aB+2Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{7/3}b^{5/3}}+\frac{x^2(aB+2Ab)}{9a^2b(a+bx^3)}+\frac{x^2(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*x^2)/(6*a*b*(a + b*x^3)^2) + ((2*A*b + a*B)*x^2)/(9*
a^2*b*(a + b*x^3)) - ((2*A*b + a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x
)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(7/3)*b^(5/3)) - ((2*A*b + a*B
)*Log[a^(1/3) + b^(1/3)*x])/(27*a^(7/3)*b^(5/3)) + ((2*A*b + a*B)
*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(54*a^(7/3)*b^(5
/3))
```

Rubi [A] time = 0.304704, antiderivative size = 201, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.444

$$\frac{(aB+2Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{7/3}b^{5/3}}-\frac{(aB+2Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{7/3}b^{5/3}}-\frac{(aB+2Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{7/3}b^{5/3}}+\frac{x^2(aB+2Ab)}{9a^2b(a+bx^3)}+\frac{x^2(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - a*B)*x^2)/(6*a*b*(a + b*x^3)^2) + ((2*A*b + a*B)*x^2)/(9*
a^2*b*(a + b*x^3)) - ((2*A*b + a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x
)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(7/3)*b^(5/3)) - ((2*A*b + a*B
)*Log[a^(1/3) + b^(1/3)*x])/(27*a^(7/3)*b^(5/3)) + ((2*A*b + a*B)
*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(54*a^(7/3)*b^(5
/3))
```

Rubi in Sympy [A] time = 39.5477, size = 184, normalized size = 0.92

$$\frac{x^2(Ab-Ba)}{6ab(a+bx^3)^2}+\frac{x^2(2Ab+Ba)}{9a^2b(a+bx^3)}-\frac{(2Ab+Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{7}{3}}b^{\frac{5}{3}}}+\frac{(2Ab+Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{54a^{\frac{7}{3}}b^{\frac{5}{3}}}-\frac{\sqrt{3}(2Ab+Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{7}{3}}b^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] x**2*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) + x**2*(2*A*b + B*a)/(9*
a**2*b*(a + b*x**3)) - (2*A*b + B*a)*log(a**(1/3) + b**(1/3)*x)/(
27*a**(7/3)*b**(5/3)) + (2*A*b + B*a)*log(a**(2/3) - a**(1/3)*b**
(1/3)*x + b**(2/3)*x**2)/(54*a**(7/3)*b**(5/3)) - sqrt(3)*(2*A*b
+ B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*a
**(7/3)*b**(5/3))
```

Mathematica [A] time = 0.290272, size = 178, normalized size = 0.89

$$\frac{(aB+2Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{9a^{4/3}b^{2/3}x^2(aB-Ab)}{(a+bx^3)^2}+\frac{6\sqrt[3]{a}b^{2/3}x^2(aB+2Ab)}{a+bx^3}-2(aB+2Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-2\sqrt{3}(aB}{54a^{7/3}b^{5/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((-9*a^(4/3)*b^(2/3)*(-(A*b) + a*B)*x^2)/(a + b*x^3)^2 + (6*a^(1/
3)*b^(2/3)*(2*A*b + a*B)*x^2)/(a + b*x^3) - 2*Sqrt[3]*(2*A*b + a*
B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] - 2*(2*A*b + a*B)*
Log[a^(1/3) + b^(1/3)*x] + (2*A*b + a*B)*Log[a^(2/3) - a^(1/3)*b^
(1/3)*x + b^(2/3)*x^2])/(54*a^(7/3)*b^(5/3))
```

Maple [A] time = 0.013, size = 251, normalized size = 1.3

$$\frac{1}{(bx^3+a)^2}\left(\frac{(2Ab+Ba)x^5}{9a^2}+\frac{(7Ab-Ba)x^2}{18ab}\right)-\frac{2A}{27a^2b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{B}{27ab^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{A}{27a^2b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{B}{54ab^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{2\sqrt{3}A}{27a^2b}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{\sqrt{3}B}{27ab^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] (1/9*(2*A*b+B*a)/a^2*x^5+1/18*(7*A*b-B*a)/a/b*x^2)/(b*x^3+a)^2-2/
27/a^2/b/(a/b)^(1/3)*ln(x+(a/b)^(1/3))*A-1/27/a/b^2/(a/b)^(1/3)*l
n(x+(a/b)^(1/3))*B+1/27/a^2/b/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a
/b)^(2/3))*A+1/54/a/b^2/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2
/3))*B+2/27/a^2/b*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)
^(1/3)*x-1))*A+1/27/a/b^2*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*
(2/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.235225, size = 433, normalized size = 2.15

$$-\frac{\sqrt{3}\left(\sqrt{3}\left(\left(Bab^2+2\,Ab^3\right)x^6+Ba^3+2\,Aa^2b+2\,\left(Ba^2b+2\,Aab^2\right)x^3\right)\log\left(\left(-ab^2\right)^{\frac{1}{3}}bx^2-ab+\left(-ab^2\right)^{\frac{2}{3}}x\right)-2\,\sqrt{3}\left(\left(Bab^2+2\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] -1/162*sqrt(3)*(sqrt(3)*((B*a*b^2 + 2*A*b^3)*x^6 + B*a^3 + 2*A*a^
2*b + 2*(B*a^2*b + 2*A*a*b^2)*x^3)*log((-a*b^2)^(1/3)*b*x^2 - a*b
 + (-a*b^2)^(2/3)*x) - 2*sqrt(3)*((B*a*b^2 + 2*A*b^3)*x^6 + B*a^3
 + 2*A*a^2*b + 2*(B*a^2*b + 2*A*a*b^2)*x^3)*log(a*b + (-a*b^2)^(2
/3)*x) + 6*((B*a*b^2 + 2*A*b^3)*x^6 + B*a^3 + 2*A*a^2*b + 2*(B*a^
2*b + 2*A*a*b^2)*x^3)*arctan(-1/3*(sqrt(3)*a*b - 2*sqrt(3)*(-a*b^
2)^(2/3)*x)/(a*b)) - 3*sqrt(3)*(2*(B*a*b + 2*A*b^2)*x^5 - (B*a^2
- 7*A*a*b)*x^2)*(-a*b^2)^(1/3))/((a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a
^4*b)*(-a*b^2)^(1/3))
```

Sympy [A] time = 4.63911, size = 153, normalized size = 0.76

$$\frac{x^5\left(4Ab^2+2Bab\right)+x^2\left(7Aab-Ba^2\right)}{18a^4b+36a^3b^2x^3+18a^2b^3x^6}+\operatorname{RootSum}\left(19683t^3a^7b^5+8A^3b^3+12A^2Bab^2+6AB^2a^2b+B^3a^3,\left(t\mapsto t\log\left(\frac{729t^2a^5b^3}{4A^2b^2+4ABab+B^2a^2}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] (x**5*(4*A*b**2 + 2*B*a*b) + x**2*(7*A*a*b - B*a**2))/(18*a**4*b
+ 36*a**3*b**2*x**3 + 18*a**2*b**3*x**6) + RootSum(19683*_t**3*a*
*7*b**5 + 8*A**3*b**3 + 12*A**2*B*a*b**2 + 6*A*B**2*a**2*b + B**3
*a**3, Lambda(_t, _t*log(729*_t**2*a**5*b**3/(4*A**2*b**2 + 4*A*B
*a*b + B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.221142, size = 301, normalized size = 1.5

$$-\frac{\left(Ba\left(-\frac{a}{b}\right)^{\frac{1}{3}}+2\,Ab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,a^3b}-\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{2}{3}}Ba+2\,\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,a^3b^3}+\frac{2\,Babx^5+4\,Ab^2x^5-Ba^2x^2+7\,Aabx^2}{18\,(bx^3+a)^2a^2b}+\frac{\left(\left(-ab^2\right)^{\frac{2}{3}}Ba+2\,\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{54\,a^3b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] -1/27*(B*a*(-a/b)^(1/3) + 2*A*b*(-a/b)^(1/3))*(-a/b)^(1/3)*ln(abs
(x - (-a/b)^(1/3)))/(a^3*b) - 1/27*sqrt(3)*((-a*b^2)^(2/3)*B*a +
```

```
2*(-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a
/b)^(1/3))/(a^3*b^3) + 1/18*(2*B*a*b*x^5 + 4*A*b^2*x^5 - B*a^2*x^
2 + 7*A*a*b*x^2)/((b*x^3 + a)^2*a^2*b) + 1/54*((-a*b^2)^(2/3)*B*a
 + 2*(-a*b^2)^(2/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/
(a^3*b^3)
```

3.102 $\int \frac{A+Bx^3}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=197

$$-\frac{(aB+5Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{8/3}b^{4/3}}+\frac{(aB+5Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{8/3}b^{4/3}}-\frac{(aB+5Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{8/3}b^{4/3}}+\frac{x(aB+5Ab)}{18a^2b\,(a+bx^3)}+\frac{x(Ab-aB)}{6ab\,(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*x)/(6*a*b*(a + b*x^3)^2) + ((5*A*b + a*B)*x)/(18*a^2
*b*(a + b*x^3)) - ((5*A*b + a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(
Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(8/3)*b^(4/3)) + ((5*A*b + a*B)*L
og[a^(1/3) + b^(1/3)*x])/(27*a^(8/3)*b^(4/3)) - ((5*A*b + a*B)*Lo
g[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(54*a^(8/3)*b^(4/3)
)
```

Rubi [A] time = 0.260993, antiderivative size = 197, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.471$

$$-\frac{(aB+5Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{8/3}b^{4/3}}+\frac{(aB+5Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{8/3}b^{4/3}}-\frac{(aB+5Ab)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{8/3}b^{4/3}}+\frac{x(aB+5Ab)}{18a^2b\,(a+bx^3)}+\frac{x(Ab-aB)}{6ab\,(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - a*B)*x)/(6*a*b*(a + b*x^3)^2) + ((5*A*b + a*B)*x)/(18*a^2
*b*(a + b*x^3)) - ((5*A*b + a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(
Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(8/3)*b^(4/3)) + ((5*A*b + a*B)*L
og[a^(1/3) + b^(1/3)*x])/(27*a^(8/3)*b^(4/3)) - ((5*A*b + a*B)*Lo
g[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(54*a^(8/3)*b^(4/3)
)
```

Rubi in Sympy [A] time = 38.1519, size = 180, normalized size = 0.91

$$\frac{x\,(Ab-Ba)}{6ab\,(a+bx^3)^2}+\frac{x\,(5Ab+Ba)}{18a^2b\,(a+bx^3)}+\frac{(5Ab+Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{8}{3}}b^{\frac{4}{3}}}-\frac{(5Ab+Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{54a^{\frac{8}{3}}b^{\frac{4}{3}}}-\frac{\sqrt{3}\,(5Ab+Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{8}{3}}b^{\frac{4}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] x*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) + x*(5*A*b + B*a)/(18*a**2*
b*(a + b*x**3)) + (5*A*b + B*a)*log(a**(1/3) + b**(1/3)*x)/(27*a*
*(8/3)*b**(4/3)) - (5*A*b + B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)
*x + b**(2/3)*x**2)/(54*a**(8/3)*b**(4/3)) - sqrt(3)*(5*A*b + B*a
)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*a**(8/
3)*b**(4/3))
```

Mathematica [A] time = 0.257669, size = 175, normalized size = 0.89

$$\frac{-(aB+5Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{9a^{5/3}\sqrt[3]{b}x(aB-Ab)}{(a+bx^3)^2}+\frac{3a^{2/3}\sqrt[3]{b}x(aB+5Ab)}{a+bx^3}+2(aB+5Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)-2\sqrt{3}(aB}{54a^{8/3}b^{4/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(a + b*x^3)^3,x]
```

```
[Out] ((-9*a^(5/3)*b^(1/3)*(-(A*b) + a*B)*x)/(a + b*x^3)^2 + (3*a^(2/3)
*b^(1/3)*(5*A*b + a*B)*x)/(a + b*x^3) - 2*Sqrt[3]*(5*A*b + a*B)*A
rcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 2*(5*A*b + a*B)*Log[
a^(1/3) + b^(1/3)*x] - (5*A*b + a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2])/(54*a^(8/3)*b^(4/3))
```

Maple [A] time = 0.014, size = 249, normalized size = 1.3

$$\frac{1}{(bx^3+a)^2}\left(\frac{(5Ab+Ba)x^4}{18a^2}+\frac{(4Ab-Ba)x}{9ab}\right)+\frac{5A}{27a^2b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{B}{27ab^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{5A}{54a^2b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{B}{54ab^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{5\sqrt{3}A}{27a^2b}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{\sqrt{3}B}{27ab^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] (1/18*(5*A*b+B*a)/a^2*x^4+1/9*(4*A*b-B*a)/a/b*x)/(b*x^3+a)^2+5/27
/a^2/b/(a/b)^(2/3)*ln(x+(a/b)^(1/3))*A+1/27/a/b^2/(a/b)^(2/3)*ln(
x+(a/b)^(1/3))*B-5/54/a^2/b/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b
)^(2/3))*A-1/54/a/b^2/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3
))*B+5/27/a^2/b/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(
1/3)*x-1))*A+1/27/a/b^2/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2
/(a/b)^(1/3)*x-1))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240919, size = 414, normalized size = 2.1

$$-\frac{\sqrt{3}\left(\sqrt{3}\left(\left(Bab^2+5\,Ab^3\right)x^6+Ba^3+5\,Aa^2b+2\,\left(Ba^2b+5\,Aab^2\right)x^3\right)\log\left(\left(a^2b\right)^{\frac{2}{3}}x^2-\left(a^2b\right)^{\frac{1}{3}}ax+a^2\right)-2\,\sqrt{3}\left(\left(Bab^2+5\,Ab\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] -1/162*sqrt(3)*(sqrt(3)*((B*a*b^2 + 5*A*b^3)*x^6 + B*a^3 + 5*A*a^
2*b + 2*(B*a^2*b + 5*A*a*b^2)*x^3)*log((a^2*b)^(2/3)*x^2 - (a^2*b
)^(1/3)*a*x + a^2) - 2*sqrt(3)*((B*a*b^2 + 5*A*b^3)*x^6 + B*a^3 +
 5*A*a^2*b + 2*(B*a^2*b + 5*A*a*b^2)*x^3)*log((a^2*b)^(1/3)*x + a
) - 6*((B*a*b^2 + 5*A*b^3)*x^6 + B*a^3 + 5*A*a^2*b + 2*(B*a^2*b +
 5*A*a*b^2)*x^3)*arctan(1/3*(2*sqrt(3)*(a^2*b)^(1/3)*x - sqrt(3)*
a)/a) - 3*sqrt(3)*((B*a*b + 5*A*b^2)*x^4 - 2*(B*a^2 - 4*A*a*b)*x)
*(a^2*b)^(1/3))/((a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a^4*b)*(a^2*b)^(1
/3))
```

Sympy [A] time = 3.85969, size = 133, normalized size = 0.68

$$\frac{x^4\left(5Ab^2+Bab\right)+x\left(8Aab-2Ba^2\right)}{18a^4b+36a^3b^2x^3+18a^2b^3x^6}+\operatorname{RootSum}\left(19683t^3a^8b^4-125A^3b^3-75A^2Bab^2-15AB^2a^2b-B^3a^3,\left(t\mapsto t\log\left(\frac{27ta^3b}{5Ab+Ba}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] (x**4*(5*A*b**2 + B*a*b) + x*(8*A*a*b - 2*B*a**2))/(18*a**4*b + 3
6*a**3*b**2*x**3 + 18*a**2*b**3*x**6) + RootSum(19683*_t**3*a**8*
b**4 - 125*A**3*b**3 - 75*A**2*B*a*b**2 - 15*A*B**2*a**2*b - B**3
*a**3, Lambda(_t, _t*log(27*_t*a**3*b/(5*A*b + B*a) + x)))
```

GIAC/XCAS [A] time = 0.220958, size = 273, normalized size = 1.39

$$-\frac{(Ba+5\,Ab)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,a^3b}+\frac{\sqrt{3}\left(\left(-ab^2\right)^{\frac{1}{3}}Ba+5\,\left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,a^3b^2}+\frac{\left(\left(-ab^2\right)^{\frac{1}{3}}Ba+5\,\left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{54\,a^3b^2}+\frac{Babx^4+5\,Ab^2x^4-2\,Ba^2x+8\,Aabx}{18\,(bx^3+a)^2a^2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] -1/27*(B*a + 5*A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a^3*b
) + 1/27*sqrt(3)*((-a*b^2)^(1/3)*B*a + 5*(-a*b^2)^(1/3)*A*b)*arct
an(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a^3*b^2) + 1/5
4*((-a*b^2)^(1/3)*B*a + 5*(-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(
1/3) + (-a/b)^(2/3))/(a^3*b^2) + 1/18*(B*a*b*x^4 + 5*A*b^2*x^4 -
2*B*a^2*x + 8*A*a*b*x)/((b*x^3 + a)^2*a^2*b)
```

3.103 $\int \frac{A+Bx^3}{x^2(a+bx^3)^3}\,dx$

Optimal. Leaf size=227

$$-\frac{(7Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{27a^{10/3}b^{2/3}}+\frac{2(7Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{10/3}b^{2/3}}+\frac{2(7Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{10/3}b^{2/3}}-\frac{2(7Ab-aB)}{9a^3bx}+\frac{7Ab-aB}{18a^2bx(a+bx^3)}+\frac{Ab-aB}{6abx(a+bx^3)^2}$$

```
[Out] (-2*(7*A*b - a*B))/(9*a^3*b*x) + (A*b - a*B)/(6*a*b*x*(a + b*x^3)
^2) + (7*A*b - a*B)/(18*a^2*b*x*(a + b*x^3)) + (2*(7*A*b - a*B)*A
rcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(1
0/3)*b^(2/3)) + (2*(7*A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*a^
(10/3)*b^(2/3)) - ((7*A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2])/(27*a^(10/3)*b^(2/3))
```

Rubi [A] time = 0.335766, antiderivative size = 227, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.45$

$$-\frac{(7Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{27a^{10/3}b^{2/3}}+\frac{2(7Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{10/3}b^{2/3}}+\frac{2(7Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{10/3}b^{2/3}}-\frac{2(7Ab-aB)}{9a^3bx}+\frac{7Ab-aB}{18a^2bx(a+bx^3)}+\frac{Ab-aB}{6abx(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^2*(a + b*x^3)^3),x]
```

```
[Out] (-2*(7*A*b - a*B))/(9*a^3*b*x) + (A*b - a*B)/(6*a*b*x*(a + b*x^3)
^2) + (7*A*b - a*B)/(18*a^2*b*x*(a + b*x^3)) + (2*(7*A*b - a*B)*A
rcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(1
0/3)*b^(2/3)) + (2*(7*A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*a^
(10/3)*b^(2/3)) - ((7*A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2])/(27*a^(10/3)*b^(2/3))
```

Rubi in Sympy [A] time = 46.4679, size = 202, normalized size = 0.89

$$\frac{Ab-Ba}{6abx(a+bx^3)^2}+\frac{7Ab-Ba}{18a^2bx(a+bx^3)}-\frac{2(7Ab-Ba)}{9a^3bx}+\frac{2(7Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{10}{3}}b^{\frac{2}{3}}}-\frac{(7Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{27a^{\frac{10}{3}}b^{\frac{2}{3}}}+\frac{2\sqrt{3}(7Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{10}{3}}b^{\frac{2}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**2/(b*x**3+a)**3,x)
```

```
[Out] (A*b - B*a)/(6*a*b*x*(a + b*x**3)**2) + (7*A*b - B*a)/(18*a**2*b*
x*(a + b*x**3)) - 2*(7*A*b - B*a)/(9*a**3*b*x) + 2*(7*A*b - B*a)*
log(a**(1/3) + b**(1/3)*x)/(27*a**(10/3)*b**(2/3)) - (7*A*b - B*a
)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(27*a**(10/
3)*b**(2/3)) + 2*sqrt(3)*(7*A*b - B*a)*atan(sqrt(3)*(a**(1/3)/3 -
 2*b**(1/3)*x/3)/a**(1/3))/(27*a**(10/3)*b**(2/3))
```

Mathematica [A] time = 0.326996, size = 193, normalized size = 0.85

$$\frac{\frac{2(aB-7Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{b^{2/3}}+\frac{9a^{4/3}x^2(aB-Ab)}{(a+bx^3)^2}+\frac{4(7Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{2/3}}+\frac{4\sqrt{3}(7Ab-aB)\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{b^{2/3}}+\frac{6\sqrt[3]{a}x^2(2aB-5Ab)}{a+bx^3}-}{54a^{10/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^2*(a + b*x^3)^3),x]
```

```
[Out] ((-54*a^(1/3)*A)/x + (9*a^(4/3)*(-(A*b) + a*B)*x^2)/(a + b*x^3)^2
 + (6*a^(1/3)*(-5*A*b + 2*a*B)*x^2)/(a + b*x^3) + (4*Sqrt[3]*(7*A
*b - a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/b^(2/3) +
(4*(7*A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/b^(2/3) + (2*(-7*A*b +
 a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/b^(2/3))/(5
4*a^(10/3))
```

Maple [A] time = 0.018, size = 281, normalized size = 1.2

$$-\frac{A}{a^3x}-\frac{5\,Ax^5b^2}{9\,a^3\,(bx^3+a)^2}+\frac{2\,bBx^5}{9\,a^2\,(bx^3+a)^2}-\frac{13\,Ax^2b}{18\,a^2\,(bx^3+a)^2}+\frac{7\,Bx^2}{18\,a\,(bx^3+a)^2}+\frac{14\,A}{27\,a^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{7\,A}{27\,a^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{14\,A\sqrt{3}}{27\,a^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{2\,B}{27\,a^2b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{B}{27\,a^2b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{2\,B\sqrt{3}}{27\,a^2b}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^2/(b*x^3+a)^3,x)
```

```
[Out] -A/a^3/x-5/9/a^3/(b*x^3+a)^2*A*x^5*b^2+2/9/a^2/(b*x^3+a)^2*B*x^5*
b-13/18/a^2/(b*x^3+a)^2*A*x^2*b+7/18/a/(b*x^3+a)^2*B*x^2+14/27/a^
3*A/(a/b)^(1/3)*ln(x+(a/b)^(1/3))-7/27/a^3*A/(a/b)^(1/3)*ln(x^2-x
*(a/b)^(1/3)+(a/b)^(2/3))-14/27/a^3*A*3^(1/2)/(a/b)^(1/3)*arctan(
1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))-2/27/a^2*B/b/(a/b)^(1/3)*ln(x+(a
/b)^(1/3))+1/27/a^2*B/b/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2
/3))+2/27/a^2*B*3^(1/2)/b/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)
^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.244597, size = 444, normalized size = 1.96

$$\sqrt{3}\left(2\sqrt{3}\left(\left(Bab^2-7Ab^3\right)x^7+2\left(Ba^2b-7Aab^2\right)x^4+\left(Ba^3-7Aa^2b\right)x\right)\log\left(\left(ab^2\right)^{\frac{1}{3}}bx^2+ab-\left(ab^2\right)^{\frac{2}{3}}x\right)-4\sqrt{3}\left(\left(Bab^2-\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^2),x, algorithm="fricas")
```

```
[Out] 1/162*sqrt(3)*(2*sqrt(3)*((B*a*b^2 - 7*A*b^3)*x^7 + 2*(B*a^2*b -
7*A*a*b^2)*x^4 + (B*a^3 - 7*A*a^2*b)*x)*log((a*b^2)^(1/3)*b*x^2 +
 a*b - (a*b^2)^(2/3)*x) - 4*sqrt(3)*((B*a*b^2 - 7*A*b^3)*x^7 + 2*
(B*a^2*b - 7*A*a*b^2)*x^4 + (B*a^3 - 7*A*a^2*b)*x)*log(a*b + (a*b
^2)^(2/3)*x) + 12*((B*a*b^2 - 7*A*b^3)*x^7 + 2*(B*a^2*b - 7*A*a*b
^2)*x^4 + (B*a^3 - 7*A*a^2*b)*x)*arctan(-1/3*(sqrt(3)*a*b - 2*sqr
t(3)*(a*b^2)^(2/3)*x)/(a*b)) + 3*sqrt(3)*(4*(B*a*b - 7*A*b^2)*x^6
 + 7*(B*a^2 - 7*A*a*b)*x^3 - 18*A*a^2)*(a*b^2)^(1/3))/((a^3*b^2*x
^7 + 2*a^4*b*x^4 + a^5*x)*(a*b^2)^(1/3))
```

Sympy [A] time = 6.30941, size = 162, normalized size = 0.71

$$\frac{-18Aa^2+x^6\left(-28Ab^2+4Bab\right)+x^3\left(-49Aab+7Ba^2\right)}{18a^5x+36a^4bx^4+18a^3b^2x^7}+\operatorname{RootSum}\left(19683t^3a^{10}b^2-2744A^3b^3+1176A^2Bab^2-168AB^2a^2b+8B^3a^3,\left(t\mapsto t\log\left(\frac{729t^2a^7b}{196A^2b^2-56ABab+4B^2a^2}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**2/(b*x**3+a)**3,x)
```

```
[Out] (-18*A*a**2 + x**6*(-28*A*b**2 + 4*B*a*b) + x**3*(-49*A*a*b + 7*B
*a**2))/(18*a**5*x + 36*a**4*b*x**4 + 18*a**3*b**2*x**7) + RootSu
m(19683*_t**3*a**10*b**2 - 2744*A**3*b**3 + 1176*A**2*B*a*b**2 -
168*A*B**2*a**2*b + 8*B**3*a**3, Lambda(_t, _t*log(729*_t**2*a**7
*b/(196*A**2*b**2 - 56*A*B*a*b + 4*B**2*a**2) + x)))
```

GIAC/XCAS [A] time = 0.222318, size = 305, normalized size = 1.34

$$-\frac{2\left(Ba\left(-\frac{a}{b}\right)^{\frac{1}{3}}-7Ab\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27a^4}-\frac{A}{a^3x}-\frac{2\sqrt{3}\left(\left(-ab^2\right)^{\frac{2}{3}}Ba-7\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27a^4b^2}+\frac{4Babx^5-10Ab^2x^5+7Ba^2x^2-13Aabx^2}{18\left(bx^3+a\right)^2a^3}+\frac{\left(\left(-ab^2\right)^{\frac{2}{3}}Ba-7\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{27a^4b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^2),x, algorithm="giac")
```

```
[Out] -2/27*(B*a*(-a/b)^(1/3) - 7*A*b*(-a/b)^(1/3))*(-a/b)^(1/3)*ln(abs
(x - (-a/b)^(1/3)))/a^4 - A/(a^3*x) - 2/27*sqrt(3)*((-a*b^2)^(2/3
```

```
)*B*a - 7*(-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1
/3))/(-a/b)^(1/3))/(a^4*b^2) + 1/18*(4*B*a*b*x^5 - 10*A*b^2*x^5 +
 7*B*a^2*x^2 - 13*A*a*b*x^2)/((b*x^3 + a)^2*a^3) + 1/27*((-a*b^2)
^(2/3)*B*a - 7*(-a*b^2)^(2/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/
b)^(2/3))/(a^4*b^2)
```

3.104 $\int \frac{A+Bx^3}{x^3(a+bx^3)^3}\,dx$

Optimal. Leaf size=227

$$\frac{5(4Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{11/3}\sqrt[3]{b}}-\frac{5(4Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{11/3}\sqrt[3]{b}}+\frac{5(4Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{11/3}\sqrt[3]{b}}-\frac{5(4Ab-aB)}{18a^3bx^2}+\frac{4Ab-aB}{9a^2bx^2(a+bx^3)}+\frac{Ab-aB}{6abx^2(a+bx^3)^2}$$

```
[Out] (-5*(4*A*b - a*B))/(18*a^3*b*x^2) + (A*b - a*B)/(6*a*b*x^2*(a + b
*x^3)^2) + (4*A*b - a*B)/(9*a^2*b*x^2*(a + b*x^3)) + (5*(4*A*b -
a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3
]*a^(11/3)*b^(1/3)) - (5*(4*A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/
(27*a^(11/3)*b^(1/3)) + (5*(4*A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^
(1/3)*x + b^(2/3)*x^2])/(54*a^(11/3)*b^(1/3))
```

Rubi [A] time = 0.362378, antiderivative size = 227, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.45

$$\frac{5(4Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{11/3}\sqrt[3]{b}}-\frac{5(4Ab-aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{11/3}\sqrt[3]{b}}+\frac{5(4Ab-aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{11/3}\sqrt[3]{b}}-\frac{5(4Ab-aB)}{18a^3bx^2}+\frac{4Ab-aB}{9a^2bx^2(a+bx^3)}+\frac{Ab-aB}{6abx^2(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^3*(a + b*x^3)^3),x]
```

```
[Out] (-5*(4*A*b - a*B))/(18*a^3*b*x^2) + (A*b - a*B)/(6*a*b*x^2*(a + b
*x^3)^2) + (4*A*b - a*B)/(9*a^2*b*x^2*(a + b*x^3)) + (5*(4*A*b -
a*B)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3
]*a^(11/3)*b^(1/3)) - (5*(4*A*b - a*B)*Log[a^(1/3) + b^(1/3)*x])/
(27*a^(11/3)*b^(1/3)) + (5*(4*A*b - a*B)*Log[a^(2/3) - a^(1/3)*b^
(1/3)*x + b^(2/3)*x^2])/(54*a^(11/3)*b^(1/3))
```

Rubi in Sympy [A] time = 47.4783, size = 209, normalized size = 0.92

$$\frac{Ab-Ba}{6abx^2(a+bx^3)^2}+\frac{4Ab-Ba}{9a^2bx^2(a+bx^3)}-\frac{5(4Ab-Ba)}{18a^3bx^2}-\frac{5(4Ab-Ba)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{11}{3}}\sqrt[3]{b}}+\frac{5(4Ab-Ba)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{54a^{\frac{11}{3}}\sqrt[3]{b}}+\frac{5\sqrt{3}(4Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{11}{3}}\sqrt[3]{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**3/(b*x**3+a)**3,x)
```

```
[Out] (A*b - B*a)/(6*a*b*x**2*(a + b*x**3)**2) + (4*A*b - B*a)/(9*a**2*
b*x**2*(a + b*x**3)) - 5*(4*A*b - B*a)/(18*a**3*b*x**2) - 5*(4*A*
b - B*a)*log(a**(1/3) + b**(1/3)*x)/(27*a**(11/3)*b**(1/3)) + 5*(
4*A*b - B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(54*a**(11/3)*b**(1/3)) + 5*sqrt(3)*(4*A*b - B*a)*atan(sqrt(3)*(a
```

```
**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*a**(11/3)*b**(1/3))
```

Mathematica [A] time = 0.350573, size = 189, normalized size = 0.83

$$\frac{\frac{5(4Ab-aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{\sqrt[3]{b}}+\frac{9a^{5/3}x(aB-Ab)}{(a+bx^3)^2}+\frac{3a^{2/3}x(5aB-11Ab)}{a+bx^3}-\frac{27a^{2/3}A}{x^2}+\frac{10(aB-4Ab)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[3]{b}}+\frac{10\sqrt{3}(4Ab-aB)\tan^{-1}\left(1-\cdots\right)}{\sqrt[3]{b}}}{54a^{11/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^3*(a + b*x^3)^3),x]
```

```
[Out] ((-27*a^(2/3)*A)/x^2 + (9*a^(5/3)*(-(A*b) + a*B)*x)/(a + b*x^3)^2
 + (3*a^(2/3)*(-11*A*b + 5*a*B)*x)/(a + b*x^3) + (10*Sqrt[3]*(4*A
*b - a*B)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/b^(1/3) +
(10*(-4*A*b + a*B)*Log[a^(1/3) + b^(1/3)*x])/b^(1/3) + (5*(4*A*b
- a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/b^(1/3))/(
54*a^(11/3))
```

Maple [A] time = 0.019, size = 277, normalized size = 1.2

$$-\frac{A}{2\,x^2a^3}-\frac{11\,Ax^4b^2}{18\,a^3\,(bx^3+a)^2}+\frac{5\,bBx^4}{18\,a^2\,(bx^3+a)^2}-\frac{7\,Axb}{9\,a^2\,(bx^3+a)^2}+\frac{4\,Bx}{9\,a\,(bx^3+a)^2}$$
$$-\frac{20\,A}{27\,a^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{10\,A}{27\,a^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{20\,A\sqrt{3}}{27\,a^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{5\,B}{27\,a^2b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{5\,B}{54\,a^2b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{5\,B\sqrt{3}}{27\,a^2b}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^3/(b*x^3+a)^3,x)
```

```
[Out] -1/2*A/a^3/x^2-11/18/a^3/(b*x^3+a)^2*A*x^4*b^2+5/18/a^2/(b*x^3+a)
^2*B*x^4*b-7/9/a^2/(b*x^3+a)^2*A*x*b+4/9/a/(b*x^3+a)^2*B*x-20/27/
a^3*A/(a/b)^(2/3)*ln(x+(a/b)^(1/3))+10/27/a^3*A/(a/b)^(2/3)*ln(x^
2-x*(a/b)^(1/3)+(a/b)^(2/3))-20/27/a^3*A/(a/b)^(2/3)*3^(1/2)*arct
an(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+5/27/a^2*B/b/(a/b)^(2/3)*ln(x
+(a/b)^(1/3))-5/54/a^2*B/b/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)
^(2/3))+5/27/a^2*B/b/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a
/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240154, size = 456, normalized size = 2.01

$$\frac{\sqrt{3}\left(5\sqrt{3}\left(\left(Bab^2-4Ab^3\right)x^8+2\left(Ba^2b-4Aab^2\right)x^5+\left(Ba^3-4Aa^2b\right)x^2\right)\log\left(\left(-a^2b\right)^{\frac{2}{3}}x^2+\left(-a^2b\right)^{\frac{1}{3}}ax+a^2\right)-10\sqrt{3}\left(\left(Ba\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^3),x, algorithm="fricas")
```

```
[Out] 1/162*sqrt(3)*(5*sqrt(3)*((B*a*b^2 - 4*A*b^3)*x^8 + 2*(B*a^2*b -
4*A*a*b^2)*x^5 + (B*a^3 - 4*A*a^2*b)*x^2)*log((-a^2*b)^(2/3)*x^2
+ (-a^2*b)^(1/3)*a*x + a^2) - 10*sqrt(3)*((B*a*b^2 - 4*A*b^3)*x^8
 + 2*(B*a^2*b - 4*A*a*b^2)*x^5 + (B*a^3 - 4*A*a^2*b)*x^2)*log((-a
^2*b)^(1/3)*x - a) + 30*((B*a*b^2 - 4*A*b^3)*x^8 + 2*(B*a^2*b - 4
*A*a*b^2)*x^5 + (B*a^3 - 4*A*a^2*b)*x^2)*arctan(1/3*(2*sqrt(3)*(-
a^2*b)^(1/3)*x + sqrt(3)*a)/a) + 3*sqrt(3)*(5*(B*a*b - 4*A*b^2)*x
^6 + 8*(B*a^2 - 4*A*a*b)*x^3 - 9*A*a^2)*(-a^2*b)^(1/3))/((a^3*b^2
*x^8 + 2*a^4*b*x^5 + a^5*x^2)*(-a^2*b)^(1/3))
```

Sympy [A] time = 8.22282, size = 143, normalized size = 0.63

$$\frac{-9Aa^2+x^6\left(-20Ab^2+5Bab\right)+x^3\left(-32Aab+8Ba^2\right)}{18a^5x^2+36a^4bx^5+18a^3b^2x^8} + \operatorname{RootSum}\left(19683t^3a^{11}b+8000A^3b^3-6000A^2Bab^2+1500AB^2a^2b-125B^3a^3,\left(t\mapsto t\log\left(\frac{27ta^4}{-20Ab+5Ba}+x\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**3/(b*x**3+a)**3,x)
```

```
[Out] (-9*A*a**2 + x**6*(-20*A*b**2 + 5*B*a*b) + x**3*(-32*A*a*b + 8*B*
a**2))/(18*a**5*x**2 + 36*a**4*b*x**5 + 18*a**3*b**2*x**8) + Root
Sum(19683*_t**3*a**11*b + 8000*A**3*b**3 - 6000*A**2*B*a*b**2 + 1
500*A*B**2*a**2*b - 125*B**3*a**3, Lambda(_t, _t*log(27*_t*a**4/(
-20*A*b + 5*B*a) + x)))
```

GIAC/XCAS [A] time = 0.219063, size = 282, normalized size = 1.24

$$-\frac{5\left(Ba-4Ab\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27a^4}+\frac{5\sqrt{3}\left(\left(-ab^2\right)^{\frac{1}{3}}Ba-4\left(-ab^2\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27a^4b}+\frac{5\left(\left(-ab^2\right)^{\frac{1}{3}}Ba-4\left(-ab^2\right)^{\frac{1}{3}}Ab\right)\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{54a^4b}+\frac{5Babx^6-20Ab^2x^6+8Ba^2x^3-32Aabx^3-9Aa^2}{18\left(bx^4+ax\right)^2a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^3),x, algorithm="giac")
```

```
[Out] -5/27*(B*a - 4*A*b)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/a^4 +
5/27*sqrt(3)*((-a*b^2)^(1/3)*B*a - 4*(-a*b^2)^(1/3)*A*b)*arctan(1
/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(a^4*b) + 5/54*((-a
*b^2)^(1/3)*B*a - 4*(-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) +
 (-a/b)^(2/3))/(a^4*b) + 1/18*(5*B*a*b*x^6 - 20*A*b^2*x^6 + 8*B*a
^2*x^3 - 32*A*a*b*x^3 - 9*A*a^2)/((b*x^4 + a*x)^2*a^3)
```

3.105 $\int \frac{A+Bx^3}{x^5(a+bx^3)^3}\,dx$

Optimal. Leaf size=246

$$\frac{7\sqrt[3]{b}(5Ab-2aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{13/3}}-\frac{7\sqrt[3]{b}(5Ab-2aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{13/3}}-\frac{7\sqrt[3]{b}(5Ab-2aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{13/3}}+\frac{7(5Ab-2aB)}{9a^4x}-\frac{7(5Ab-2aB)}{36a^3bx^4}+\frac{5Ab-2aB}{9a^2bx^4(a+bx^3)}+\frac{Ab-aB}{6abx^4(a+bx^3)^2}$$

```
[Out] (-7*(5*A*b - 2*a*B))/(36*a^3*b*x^4) + (7*(5*A*b - 2*a*B))/(9*a^4*
x) + (A*b - a*B)/(6*a*b*x^4*(a + b*x^3)^2) + (5*A*b - 2*a*B)/(9*a
^2*b*x^4*(a + b*x^3)) - (7*b^(1/3)*(5*A*b - 2*a*B)*ArcTan[(a^(1/3
) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(13/3)) - (7*b^
(1/3)*(5*A*b - 2*a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*a^(13/3)) + (
7*b^(1/3)*(5*A*b - 2*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2])/(54*a^(13/3))
```

Rubi [A] time = 0.424296, antiderivative size = 246, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.45$

$$\frac{7\sqrt[3]{b}(5Ab-2aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{54a^{13/3}}-\frac{7\sqrt[3]{b}(5Ab-2aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{13/3}}-\frac{7\sqrt[3]{b}(5Ab-2aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{13/3}}+\frac{7(5Ab-2aB)}{9a^4x}-\frac{7(5Ab-2aB)}{36a^3bx^4}+\frac{5Ab-2aB}{9a^2bx^4(a+bx^3)}+\frac{Ab-aB}{6abx^4(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^5*(a + b*x^3)^3),x]
```

```
[Out] (-7*(5*A*b - 2*a*B))/(36*a^3*b*x^4) + (7*(5*A*b - 2*a*B))/(9*a^4*
x) + (A*b - a*B)/(6*a*b*x^4*(a + b*x^3)^2) + (5*A*b - 2*a*B)/(9*a
^2*b*x^4*(a + b*x^3)) - (7*b^(1/3)*(5*A*b - 2*a*B)*ArcTan[(a^(1/3
) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(13/3)) - (7*b^
(1/3)*(5*A*b - 2*a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*a^(13/3)) + (
7*b^(1/3)*(5*A*b - 2*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2])/(54*a^(13/3))
```

Rubi in Sympy [A] time = 52.9256, size = 233, normalized size = 0.95

$$\frac{Ab-Ba}{6abx^4\left(a+bx^3\right)^2}+\frac{5Ab-2Ba}{9a^2bx^4\left(a+bx^3\right)}-\frac{7\left(5Ab-2Ba\right)}{36a^3bx^4}+\frac{7\left(5Ab-2Ba\right)}{9a^4x}-\frac{7\sqrt[3]{b}\left(5Ab-2Ba\right)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{13}{3}}}+\frac{7\sqrt[3]{b}\left(5Ab-2Ba\right)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{54a^{\frac{13}{3}}}-\frac{7\sqrt{3}\sqrt[3]{b}\left(5Ab-2Ba\right)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{13}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**5/(b*x**3+a)**3,x)
```

```
[Out] (A*b - B*a)/(6*a*b*x**4*(a + b*x**3)**2) + (5*A*b - 2*B*a)/(9*a**
2*b*x**4*(a + b*x**3)) - 7*(5*A*b - 2*B*a)/(36*a**3*b*x**4) + 7*(
5*A*b - 2*B*a)/(9*a**4*x) - 7*b**(1/3)*(5*A*b - 2*B*a)*log(a**(1/
3) + b**(1/3)*x)/(27*a**(13/3)) + 7*b**(1/3)*(5*A*b - 2*B*a)*log(
a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(54*a**(13/3)) -
7*sqrt(3)*b**(1/3)*(5*A*b - 2*B*a)*atan(sqrt(3)*(a**(1/3)/3 - 2*b
**(1/3)*x/3)/a**(1/3))/(27*a**(13/3))
```

Mathematica [A] time = 0.367947, size = 214, normalized size = 0.87

$$\frac{14\sqrt[3]{b}(5Ab-2aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{18a^{4/3}bx^2(aB-Ab)}{(a+bx^3)^2}-\frac{27a^{4/3}A}{x^4}-\frac{12\sqrt[3]{a}bx^2(5aB-8Ab)}{a+bx^3}-\frac{108\sqrt[3]{a}(aB-3Ab)}{x}+28\sqrt[3]{b}(2\ldots}{108a^{13/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^5*(a + b*x^3)^3),x]
```

```
[Out] ((-27*a^(4/3)*A)/x^4 - (108*a^(1/3)*(-3*A*b + a*B))/x - (18*a^(4/
3)*b*(-(A*b) + a*B)*x^2)/(a + b*x^3)^2 - (12*a^(1/3)*b*(-8*A*b +
5*a*B)*x^2)/(a + b*x^3) - 28*Sqrt[3]*b^(1/3)*(5*A*b - 2*a*B)*ArcT
an[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 28*b^(1/3)*(-5*A*b + 2*
a*B)*Log[a^(1/3) + b^(1/3)*x] + 14*b^(1/3)*(5*A*b - 2*a*B)*Log[a^
(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(108*a^(13/3))
```

Maple [A] time = 0.025, size = 299, normalized size = 1.2

$$-\frac{A}{4\,a^3x^4}+3\,\frac{Ab}{xa^4}-\frac{B}{a^3x}+\frac{8\,b^3Ax^5}{9\,a^4\,(bx^3+a)^2}-\frac{5\,b^2Bx^5}{9\,a^3\,(bx^3+a)^2}+\frac{19\,Ax^2b^2}{18\,a^3\,(bx^3+a)^2}$$
$$-\frac{13\,bBx^2}{18\,a^2\,(bx^3+a)^2}-\frac{35\,Ab}{27\,a^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{35\,Ab}{54\,a^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{35\,Ab\sqrt{3}}{27\,a^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{14\,B}{27\,a^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{7\,B}{27\,a^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{14\,B\sqrt{3}}{27\,a^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^5/(b*x^3+a)^3,x)
```

```
[Out] -1/4*A/a^3/x^4+3/x/a^4*A*b-B/a^3/x+8/9/a^4*b^3/(b*x^3+a)^2*A*x^5-
5/9/a^3*b^2/(b*x^3+a)^2*B*x^5+19/18/a^3*b^2/(b*x^3+a)^2*A*x^2-13/
18/a^2*b/(b*x^3+a)^2*B*x^2-35/27/a^4*b*A/(a/b)^(1/3)*ln(x+(a/b)^(
1/3))+35/54/a^4*b*A/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))
+35/27/a^4*b*A*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1
/3)*x-1))+14/27/a^3*B/(a/b)^(1/3)*ln(x+(a/b)^(1/3))-7/27/a^3*B/(a
/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-14/27/a^3*B*3^(1/2)/(
a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^5),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240957, size = 531, normalized size = 2.16

$$\frac{\sqrt{3}\left(14\,\sqrt{3}\left(\left(2\,Bab^{2}-5\,Ab^{3}\right)x^{10}+2\,\left(2\,Ba^{2}b-5\,Aab^{2}\right)x^{7}+\left(2\,Ba^{3}-5\,Aa^{2}b\right)x^{4}\right)\left(-\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx^{2}-ax\left(-\frac{b}{a}\right)^{\frac{2}{3}}-a\left(-\frac{b}{a}\right)^{\frac{1}{3}}\right)\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^5),x, algorithm="fricas")
```

```
[Out] 1/324*sqrt(3)*(14*sqrt(3)*((2*B*a*b^2 - 5*A*b^3)*x^10 + 2*(2*B*a^
2*b - 5*A*a*b^2)*x^7 + (2*B*a^3 - 5*A*a^2*b)*x^4)*(-b/a)^(1/3)*lo
g(b*x^2 - a*x*(-b/a)^(2/3) - a*(-b/a)^(1/3)) - 28*sqrt(3)*((2*B*a
*b^2 - 5*A*b^3)*x^10 + 2*(2*B*a^2*b - 5*A*a*b^2)*x^7 + (2*B*a^3 -
 5*A*a^2*b)*x^4)*(-b/a)^(1/3)*log(b*x + a*(-b/a)^(2/3)) - 84*((2*
B*a*b^2 - 5*A*b^3)*x^10 + 2*(2*B*a^2*b - 5*A*a*b^2)*x^7 + (2*B*a^
3 - 5*A*a^2*b)*x^4)*(-b/a)^(1/3)*arctan(-1/3*(2*sqrt(3)*b*x - sqr
t(3)*a*(-b/a)^(2/3))/(a*(-b/a)^(2/3))) - 3*sqrt(3)*(28*(2*B*a*b^2
 - 5*A*b^3)*x^9 + 49*(2*B*a^2*b - 5*A*a*b^2)*x^6 + 9*A*a^3 + 18*(
2*B*a^3 - 5*A*a^2*b)*x^3))/(a^4*b^2*x^10 + 2*a^5*b*x^7 + a^6*x^4)
```

Sympy [A] time = 18.2187, size = 189, normalized size = 0.77

$$\operatorname{RootSum}\left(19683t^{3}a^{13}+42875A^{3}b^{4}-51450A^{2}Bab^{3}+20580AB^{2}a^{2}b^{2}-2744B^{3}a^{3}b,\left(t\mapsto t\log\left(\frac{729t^{2}a^{9}}{1225A^{2}b^{3}-980ABab^{2}+19\ldots}\right.\right.\right.$$

$$-\frac{9Aa^{3}+x^{9}\left(-140Ab^{3}+56Bab^{2}\right)+x^{6}\left(-245Aab^{2}+98Ba^{2}b\right)+x^{3}\left(-90Aa^{2}b+36Ba^{3}\right)}{36a^{6}x^{4}+72a^{5}bx^{7}+36a^{4}b^{2}x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**5/(b*x**3+a)**3,x)
```

```
[Out] RootSum(19683*_t**3*a**13 + 42875*A**3*b**4 - 51450*A**2*B*a*b**3
 + 20580*A*B**2*a**2*b**2 - 2744*B**3*a**3*b, Lambda(_t, _t*log(7
29*_t**2*a**9/(1225*A**2*b**3 - 980*A*B*a*b**2 + 196*B**2*a**2*b)
 + x))) - (9*A*a**3 + x**9*(-140*A*b**3 + 56*B*a*b**2) + x**6*(-2
45*A*a*b**2 + 98*B*a**2*b) + x**3*(-90*A*a**2*b + 36*B*a**3))/(36
*a**6*x**4 + 72*a**5*b*x**7 + 36*a**4*b**2*x**10)
```

GIAC/XCAS [A] time = 0.220985, size = 343, normalized size = 1.39

$$\frac{7\left(2\,Bab\left(-\frac{a}{b}\right)^{\frac{1}{3}} - 5\,Ab^2\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,a^5} + \frac{7\,\sqrt{3}\left(2\,\left(-ab^2\right)^{\frac{2}{3}}Ba - 5\,\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,a^5b} - \frac{7\left(2\,\left(-ab^2\right)^{\frac{2}{3}}Ba - 5\,\left(-ab^2\right)^{\frac{2}{3}}Ab\right)\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{54\,a^5b} - \frac{10\,Bab^2x^5 - 16\,Ab^3x^5 + 13\,Ba^2bx^2 - 19\,Aab^2x^2}{18\,\left(bx^3+a\right)^2a^4} - \frac{4\,Bax^3 - 12\,Abx^3 + Aa}{4\,a^4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^5),x, algorithm="giac")
```

```
[Out] 7/27*(2*B*a*b*(-a/b)^(1/3) - 5*A*b^2*(-a/b)^(1/3))*(-a/b)^(1/3)*l
n(abs(x - (-a/b)^(1/3)))/a^5 + 7/27*sqrt(3)*(2*(-a*b^2)^(2/3)*B*a
 - 5*(-a*b^2)^(2/3)*A*b)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/
(-a/b)^(1/3))/(a^5*b) - 7/54*(2*(-a*b^2)^(2/3)*B*a - 5*(-a*b^2)^(
2/3)*A*b)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/(a^5*b) - 1/18*
(10*B*a*b^2*x^5 - 16*A*b^3*x^5 + 13*B*a^2*b*x^2 - 19*A*a*b^2*x^2)
/((b*x^3 + a)^2*a^4) - 1/4*(4*B*a*x^3 - 12*A*b*x^3 + A*a)/(a^4*x^
4)
```

3.106 $\int \frac{A+Bx^3}{x^6(a+bx^3)^3}\,dx$

Optimal. Leaf size=246

$$-\frac{2b^{2/3}(11Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{27a^{14/3}}+\frac{4b^{2/3}(11Ab-5aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{14/3}}-\frac{4b^{2/3}(11Ab-5aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{14/3}}+\frac{2(11Ab-5aB)}{9a^4x^2}-\frac{4(11Ab-5aB)}{45a^3bx^5}+\frac{11Ab-5aB}{18a^2bx^5\left(a+bx^3\right)}+\frac{Ab-aB}{6abx^5\left(a+bx^3\right)^2}$$

```
[Out] (-4*(11*A*b - 5*a*B))/(45*a^3*b*x^5) + (2*(11*A*b - 5*a*B))/(9*a^
4*x^2) + (A*b - a*B)/(6*a*b*x^5*(a + b*x^3)^2) + (11*A*b - 5*a*B)
/(18*a^2*b*x^5*(a + b*x^3)) - (4*b^(2/3)*(11*A*b - 5*a*B)*ArcTan[
(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(14/3))
+ (4*b^(2/3)*(11*A*b - 5*a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*a^(14
/3)) - (2*b^(2/3)*(11*A*b - 5*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*
x + b^(2/3)*x^2])/(27*a^(14/3))
```

Rubi [A] time = 0.392378, antiderivative size = 246, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.45

$$-\frac{2b^{2/3}(11Ab-5aB)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{27a^{14/3}}+\frac{4b^{2/3}(11Ab-5aB)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{14/3}}-\frac{4b^{2/3}(11Ab-5aB)\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{9\sqrt{3}a^{14/3}}+\frac{2(11Ab-5aB)}{9a^4x^2}-\frac{4(11Ab-5aB)}{45a^3bx^5}+\frac{11Ab-5aB}{18a^2bx^5\left(a+bx^3\right)}+\frac{Ab-aB}{6abx^5\left(a+bx^3\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^6*(a + b*x^3)^3),x]
```


```
[Out] (-4*(11*A*b - 5*a*B))/(45*a^3*b*x^5) + (2*(11*A*b - 5*a*B))/(9*a^
4*x^2) + (A*b - a*B)/(6*a*b*x^5*(a + b*x^3)^2) + (11*A*b - 5*a*B)
/(18*a^2*b*x^5*(a + b*x^3)) - (4*b^(2/3)*(11*A*b - 5*a*B)*ArcTan[
(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(9*Sqrt[3]*a^(14/3))
+ (4*b^(2/3)*(11*A*b - 5*a*B)*Log[a^(1/3) + b^(1/3)*x])/(27*a^(14
/3)) - (2*b^(2/3)*(11*A*b - 5*a*B)*Log[a^(2/3) - a^(1/3)*b^(1/3)*
x + b^(2/3)*x^2])/(27*a^(14/3))
```

Rubi in Sympy [A] time = 54.2734, size = 235, normalized size = 0.96

$$\frac{Ab-Ba}{6abx^5\left(a+bx^3\right)^2}+\frac{11Ab-5Ba}{18a^2bx^5\left(a+bx^3\right)}-\frac{4\left(11Ab-5Ba\right)}{45a^3bx^5}+\frac{2\left(11Ab-5Ba\right)}{9a^4x^2}+\frac{4b^{\frac{2}{3}}\left(11Ab-5Ba\right)\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{27a^{\frac{14}{3}}}-\frac{2b^{\frac{2}{3}}\left(11Ab-5Ba\right)\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{27a^{\frac{14}{3}}}-\frac{4\sqrt{3}b^{\frac{2}{3}}\left(11Ab-5Ba\right)\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{27a^{\frac{14}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**6/(b*x**3+a)**3,x)
```

```
[Out] (A*b - B*a)/(6*a*b*x**5*(a + b*x**3)**2) + (11*A*b - 5*B*a)/(18*a
**2*b*x**5*(a + b*x**3)) - 4*(11*A*b - 5*B*a)/(45*a**3*b*x**5) +
2*(11*A*b - 5*B*a)/(9*a**4*x**2) + 4*b**(2/3)*(11*A*b - 5*B*a)*lo
g(a**(1/3) + b**(1/3)*x)/(27*a**(14/3)) - 2*b**(2/3)*(11*A*b - 5*
B*a)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(27*a**(
14/3)) - 4*sqrt(3)*b**(2/3)*(11*A*b - 5*B*a)*atan(sqrt(3)*(a**(1/
3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(27*a**(14/3))
```

Mathematica [A] time = 0.358666, size = 210, normalized size = 0.85

$$\frac{20b^{2/3}(5aB-11Ab)\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)-\frac{45a^{5/3}bx(aB-Ab)}{(a+bx^3)^2}-\frac{15a^{2/3}bx(11aB-17Ab)}{a+bx^3}-\frac{135a^{2/3}(aB-3Ab)}{x^2}-\frac{54a^{5/3}A}{x^5}+40b^{2/\cdots}}{270a^{14/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^6*(a + b*x^3)^3),x]
```

```
[Out] ((-54*a^(5/3)*A)/x^5 - (135*a^(2/3)*(-3*A*b + a*B))/x^2 - (45*a^(
5/3)*b*(-(A*b) + a*B)*x)/(a + b*x^3)^2 - (15*a^(2/3)*b*(-17*A*b +
 11*a*B)*x)/(a + b*x^3) - 40*Sqrt[3]*b^(2/3)*(11*A*b - 5*a*B)*Arc
Tan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]] + 40*b^(2/3)*(11*A*b - 5
*a*B)*Log[a^(1/3) + b^(1/3)*x] + 20*b^(2/3)*(-11*A*b + 5*a*B)*Log
[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(270*a^(14/3))
```

Maple [A] time = 0.023, size = 295, normalized size = 1.2

$$-\frac{A}{5a^3x^5}+\frac{3Ab}{2a^4x^2}-\frac{B}{2x^2a^3}+\frac{17b^3Ax^4}{18a^4(bx^3+a)^2}-\frac{11b^2Bx^4}{18a^3(bx^3+a)^2}+\frac{10Axb^2}{9a^3(bx^3+a)^2}-\frac{7bBx}{9a^2(bx^3+a)^2}+\frac{44Ab}{27a^4}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{22Ab}{27a^4}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{44Ab\sqrt{3}}{27a^4}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{20B}{27a^3}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{10B}{27a^3}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{20B\sqrt{3}}{27a^3}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^6/(b*x^3+a)^3,x)
```

```
[Out] -1/5*A/a^3/x^5+3/2/a^4/x^2*A*b-1/2/a^3/x^2*B+17/18/a^4*b^3/(b*x^3
+a)^2*A*x^4-11/18/a^3*b^2/(b*x^3+a)^2*B*x^4+10/9/a^3*b^2/(b*x^3+a
)^2*A*x-7/9/a^2*b/(b*x^3+a)^2*B*x+44/27/a^4*b*A/(a/b)^(2/3)*ln(x+
(a/b)^(1/3))-22/27/a^4*b*A/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)
^(2/3))+44/27/a^4*b*A/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(
a/b)^(1/3)*x-1))-20/27/a^3*B/(a/b)^(2/3)*ln(x+(a/b)^(1/3))+10/27/
a^3*B/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-20/27/a^3*B/(
a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^6),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.237807, size = 547, normalized size = 2.22

$$\frac{\sqrt{3}\left(20\sqrt{3}\left(\left(5\,Bab^2-11\,Ab^3\right)x^{11}+2\left(5\,Ba^2b-11\,Aab^2\right)x^8+\left(5\,Ba^3-11\,Aa^2b\right)x^5\right)\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}\log\left(b^2x^2-abx\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}+a^2\left(\frac{b^2}{a^2}\right)\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^6),x, algorithm="fricas")
```

```
[Out] 1/810*sqrt(3)*(20*sqrt(3)*((5*B*a*b^2 - 11*A*b^3)*x^11 + 2*(5*B*a
^2*b - 11*A*a*b^2)*x^8 + (5*B*a^3 - 11*A*a^2*b)*x^5)*(b^2/a^2)^(1
/3)*log(b^2*x^2 - a*b*x*(b^2/a^2)^(1/3) + a^2*(b^2/a^2)^(2/3)) -
40*sqrt(3)*((5*B*a*b^2 - 11*A*b^3)*x^11 + 2*(5*B*a^2*b - 11*A*a*b
^2)*x^8 + (5*B*a^3 - 11*A*a^2*b)*x^5)*(b^2/a^2)^(1/3)*log(b*x + a
*(b^2/a^2)^(1/3)) + 120*((5*B*a*b^2 - 11*A*b^3)*x^11 + 2*(5*B*a^2
*b - 11*A*a*b^2)*x^8 + (5*B*a^3 - 11*A*a^2*b)*x^5)*(b^2/a^2)^(1/3
)*arctan(-1/3*(2*sqrt(3)*b*x - sqrt(3)*a*(b^2/a^2)^(1/3))/(a*(b^2
/a^2)^(1/3))) - 3*sqrt(3)*(20*(5*B*a*b^2 - 11*A*b^3)*x^9 + 32*(5*
B*a^2*b - 11*A*a*b^2)*x^6 + 18*A*a^3 + 9*(5*B*a^3 - 11*A*a^2*b)*x
^3))/(a^4*b^2*x^11 + 2*a^5*b*x^8 + a^6*x^5)
```

Sympy [A] time = 27.74, size = 173, normalized size = 0.7

$$\operatorname{RootSum}\left(19683t^3a^{14}-85184A^3b^5+116160A^2Bab^4-52800AB^2a^2b^3+8000B^3a^3b^2,\left(t\mapsto t\log\left(-\frac{27ta^5}{-44Ab^2+20Bab}+x\right)\right)\right)-\frac{18Aa^3+x^9\left(-220Ab^3+100Bab^2\right)+x^6\left(-352Aab^2+160Ba^2b\right)+x^3\left(-99Aa^2b+45Ba^3\right)}{90a^6x^5+180a^5bx^8+90a^4b^2x^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**6/(b*x**3+a)**3,x)
```

```
[Out] RootSum(19683*_t**3*a**14 - 85184*A**3*b**5 + 116160*A**2*B*a*b**
4 - 52800*A*B**2*a**2*b**3 + 8000*B**3*a**3*b**2, Lambda(_t, _t*l
og(-27*_t*a**5/(-44*A*b**2 + 20*B*a*b) + x))) - (18*A*a**3 + x**9
*(-220*A*b**3 + 100*B*a*b**2) + x**6*(-352*A*a*b**2 + 160*B*a**2*
b) + x**3*(-99*A*a**2*b + 45*B*a**3))/(90*a**6*x**5 + 180*a**5*b*
x**8 + 90*a**4*b**2*x**11)
```

GIAC/XCAS [A] time = 0.222518, size = 309, normalized size = 1.26

$$-\frac{4\,\sqrt{3}\left(5\,\left(-ab^{2}\right)^{\frac{1}{3}}Ba-11\,\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{27\,a^{5}}+\frac{4\,\left(5\,Bab-11\,Ab^{2}\right)\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{27\,a^{5}}-\frac{2\left(5\,\left(-ab^{2}\right)^{\frac{1}{3}}Ba-11\,\left(-ab^{2}\right)^{\frac{1}{3}}Ab\right)\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{27\,a^{5}}-\frac{11\,Bab^{2}x^{4}-17\,Ab^{3}x^{4}+14\,Ba^{2}bx-20\,Aab^{2}x}{18\,\left(bx^{3}+a\right)^{2}a^{4}}-\frac{5\,Bax^{3}-15\,Abx^{3}+2\,Aa}{10\,a^{4}x^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^6),x, algorithm="giac")
```

```
[Out] -4/27*sqrt(3)*(5*(-a*b^2)^(1/3)*B*a - 11*(-a*b^2)^(1/3)*A*b)*arct
an(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/a^5 + 4/27*(5*B
*a*b - 11*A*b^2)*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/a^5 - 2/2
7*(5*(-a*b^2)^(1/3)*B*a - 11*(-a*b^2)^(1/3)*A*b)*ln(x^2 + x*(-a/b
)^(1/3) + (-a/b)^(2/3))/a^5 - 1/18*(11*B*a*b^2*x^4 - 17*A*b^3*x^4
 + 14*B*a^2*b*x - 20*A*a*b^2*x)/((b*x^3 + a)^2*a^4) - 1/10*(5*B*a
*x^3 - 15*A*b*x^3 + 2*A*a)/(a^4*x^5)
```

3.107 $\int \frac{x^8}{(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=70

$$\frac{a^2\log\left(a+bx^3\right)}{3b^2(bc-ad)}-\frac{c^2\log\left(c+dx^3\right)}{3d^2(bc-ad)}+\frac{x^3}{3bd}$$

```
[Out] x^3/(3*b*d) + (a^2*Log[a + b*x^3])/(3*b^2*(b*c - a*d)) - (c^2*Log
[c + d*x^3])/(3*d^2*(b*c - a*d))
```

Rubi [A] time = 0.191154, antiderivative size = 70, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{a^2\log\left(a+bx^3\right)}{3b^2(bc-ad)}-\frac{c^2\log\left(c+dx^3\right)}{3d^2(bc-ad)}+\frac{x^3}{3bd}$$

Antiderivative was successfully verified.

```
[In] Int[x^8/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] x^3/(3*b*d) + (a^2*Log[a + b*x^3])/(3*b^2*(b*c - a*d)) - (c^2*Log
[c + d*x^3])/(3*d^2*(b*c - a*d))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^2\log\left(a+bx^3\right)}{3b^2\left(ad-bc\right)}+\frac{c^2\log\left(c+dx^3\right)}{3d^2\left(ad-bc\right)}+\frac{\int^{x^3}\frac{1}{b}\,dx}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**8/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -a**2*log(a + b*x**3)/(3*b**2*(a*d - b*c)) + c**2*log(c + d*x**3)
/(3*d**2*(a*d - b*c)) + Integral(1/b, (x, x**3))/(3*d)
```

Mathematica [A] time = 0.0605949, size = 66, normalized size = 0.94

$$\frac{a^2d^2\log\left(a+bx^3\right)-b\left(dx^3(ad-bc)+bc^2\log\left(c+dx^3\right)\right)}{3b^2d^2(bc-ad)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^8/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] (a^2*d^2*Log[a + b*x^3] - b*(d*(-(b*c) + a*d)*x^3 + b*c^2*Log[c +
 d*x^3]))/(3*b^2*d^2*(b*c - a*d))
```

Maple [A] time = 0.011, size = 65, normalized size = 0.9

$$\frac{x^3}{3\,bd}-\frac{a^2\ln\left(bx^3+a\right)}{(3\,ad-3\,bc)\,b^2}+\frac{c^2\ln\left(dx^3+c\right)}{(3\,ad-3\,bc)\,d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] 1/3*x^3/b/d-1/3*a^2/(a*d-b*c)/b^2*ln(b*x^3+a)+1/3*c^2/(a*d-b*c)/d
^2*ln(d*x^3+c)
```

Maxima [A] time = 1.4123, size = 92, normalized size = 1.31

$$\frac{a^2 \log\left(bx^3 + a\right)}{3\left(b^3c - ab^2d\right)} - \frac{c^2 \log\left(dx^3 + c\right)}{3\left(bcd^2 - ad^3\right)} + \frac{x^3}{3\,bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] 1/3*a^2*log(b*x^3 + a)/(b^3*c - a*b^2*d) - 1/3*c^2*log(d*x^3 + c)
/(b*c*d^2 - a*d^3) + 1/3*x^3/(b*d)
```

Fricas [A] time = 0.418073, size = 97, normalized size = 1.39

$$\frac{a^2d^2 \log\left(bx^3 + a\right) - b^2c^2 \log\left(dx^3 + c\right) + \left(b^2cd - abd^2\right)x^3}{3\left(b^3cd^2 - ab^2d^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/3*(a^2*d^2*log(b*x^3 + a) - b^2*c^2*log(d*x^3 + c) + (b^2*c*d -
 a*b*d^2)*x^3)/(b^3*c*d^2 - a*b^2*d^3)
```

Sympy [A] time = 18.1025, size = 201, normalized size = 2.87

$$-\frac{a^2 \log\left(x^3 + \frac{\frac{a^4d^3}{b(ad-bc)} - \frac{2a^3cd^2}{ad-bc} + \frac{a^2bc^2d}{ad-bc} + a^2cd + abc^2}{a^2d^2+b^2c^2}\right)}{3b^2\left(ad - bc\right)} + \frac{c^2 \log\left(x^3 + \frac{-\frac{a^2bc^2d}{ad-bc} + a^2cd + \frac{2ab^2c^3}{ad-bc} + abc^2 - \frac{b^3c^4}{d(ad-bc)}}{a^2d^2+b^2c^2}\right)}{3d^2\left(ad - bc\right)} + \frac{x^3}{3bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -a**2*log(x**3 + (a**4*d**3/(b*(a*d - b*c)) - 2*a**3*c*d**2/(a*d
- b*c) + a**2*b*c**2*d/(a*d - b*c) + a**2*c*d + a*b*c**2)/(a**2*d
**2 + b**2*c**2))/(3*b**2*(a*d - b*c)) + c**2*log(x**3 + (-a**2*b
*c**2*d/(a*d - b*c) + a**2*c*d + 2*a*b**2*c**3/(a*d - b*c) + a*b*
c**2 - b**3*c**4/(d*(a*d - b*c)))/(a**2*d**2 + b**2*c**2))/(3*d**
2*(a*d - b*c)) + x**3/(3*b*d)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.108 $\int \frac{x^7}{(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=301

$$\frac{a^{5/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{5/3}(bc-ad)}-\frac{a^{5/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{5/3}(bc-ad)}-\frac{a^{5/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{5/3}(bc-ad)}-\frac{c^{5/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6d^{5/3}(bc-ad)}+\frac{c^{5/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{5/3}(bc-ad)}+\frac{c^{5/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}d^{5/3}(bc-ad)}+\frac{x^2}{2bd}$$

```
[Out] x^2/(2*b*d) - (a^(5/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^
(1/3))])/(Sqrt[3]*b^(5/3)*(b*c - a*d)) + (c^(5/3)*ArcTan[(c^(1/3)
 - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*d^(5/3)*(b*c - a*d))
 - (a^(5/3)*Log[a^(1/3) + b^(1/3)*x])/(3*b^(5/3)*(b*c - a*d)) + (
c^(5/3)*Log[c^(1/3) + d^(1/3)*x])/(3*d^(5/3)*(b*c - a*d)) + (a^(5
/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(5/3)*(b
*c - a*d)) - (c^(5/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x
^2])/(6*d^(5/3)*(b*c - a*d))
```

Rubi [A] time = 0.728367, antiderivative size = 301, normalized size of antiderivative = 1., number of steps used = 15, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$\frac{a^{5/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{5/3}(bc-ad)}-\frac{a^{5/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{5/3}(bc-ad)}-\frac{a^{5/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{5/3}(bc-ad)}-\frac{c^{5/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6d^{5/3}(bc-ad)}+\frac{c^{5/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{5/3}(bc-ad)}+\frac{c^{5/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}d^{5/3}(bc-ad)}+\frac{x^2}{2bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] x^2/(2*b*d) - (a^(5/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^
(1/3))])/(Sqrt[3]*b^(5/3)*(b*c - a*d)) + (c^(5/3)*ArcTan[(c^(1/3)
 - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*d^(5/3)*(b*c - a*d))
 - (a^(5/3)*Log[a^(1/3) + b^(1/3)*x])/(3*b^(5/3)*(b*c - a*d)) + (
c^(5/3)*Log[c^(1/3) + d^(1/3)*x])/(3*d^(5/3)*(b*c - a*d)) + (a^(5
/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(5/3)*(b
*c - a*d)) - (c^(5/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x
^2])/(6*d^(5/3)*(b*c - a*d))
```

Rubi in Sympy [A] time = 114.541, size = 269, normalized size = 0.89

$$\frac{a^{\frac{5}{3}}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{\frac{5}{3}}(ad-bc)}-\frac{a^{\frac{5}{3}}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6b^{\frac{5}{3}}(ad-bc)}+\frac{\sqrt{3}a^{\frac{5}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3b^{\frac{5}{3}}(ad-bc)}-\frac{c^{\frac{5}{3}}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{\frac{5}{3}}(ad-bc)}+\frac{c^{\frac{5}{3}}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6d^{\frac{5}{3}}(ad-bc)}-\frac{\sqrt{3}c^{\frac{5}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3d^{\frac{5}{3}}(ad-bc)}+\frac{x^2}{2bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] a**(5/3)*log(a**(1/3) + b**(1/3)*x)/(3*b**(5/3)*(a*d - b*c)) - a*
*(5/3)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*b**
(5/3)*(a*d - b*c)) + sqrt(3)*a**(5/3)*atan(sqrt(3)*(a**(1/3)/3 -
2*b**(1/3)*x/3)/a**(1/3))/(3*b**(5/3)*(a*d - b*c)) - c**(5/3)*log
(c**(1/3) + d**(1/3)*x)/(3*d**(5/3)*(a*d - b*c)) + c**(5/3)*log(c
**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*d**(5/3)*(a*d -
 b*c)) - sqrt(3)*c**(5/3)*atan(sqrt(3)*(c**(1/3)/3 - 2*d**(1/3)*x
/3)/c**(1/3))/(3*d**(5/3)*(a*d - b*c)) + x**2/(2*b*d)
```

Mathematica [A] time = 0.278244, size = 242, normalized size = 0.8

$$\frac{\frac{a^{5/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{b^{5/3}}-\frac{2a^{5/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{5/3}}-\frac{2\sqrt{3}a^{5/3}\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{b^{5/3}}-\frac{3ax^2}{b}-\frac{c^{5/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{d^{5/3}}+\frac{2c^{5/3}\log\left(\sqrt[3]{c}+\cdots\right.}{d^{5/3}}}{6bc-6ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((-3*a*x^2)/b + (3*c*x^2)/d - (2*Sqrt[3]*a^(5/3)*ArcTan[(1 - (2*b
^(1/3)*x)/a^(1/3))/Sqrt[3]])/b^(5/3) + (2*Sqrt[3]*c^(5/3)*ArcTan[
(1 - (2*d^(1/3)*x)/c^(1/3))/Sqrt[3]])/d^(5/3) - (2*a^(5/3)*Log[a^
(1/3) + b^(1/3)*x])/b^(5/3) + (2*c^(5/3)*Log[c^(1/3) + d^(1/3)*x]
)/d^(5/3) + (a^(5/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^
2])/b^(5/3) - (c^(5/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*
x^2])/d^(5/3))/(6*b*c - 6*a*d)
```

Maple [A] time = 0.011, size = 269, normalized size = 0.9

$$\frac{x^2}{2\,bd}+\frac{a^2}{(3\,ad-3\,bc)\,b^2}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{a^2}{(6\,ad-6\,bc)\,b^2}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{a^2\sqrt{3}}{(3\,ad-3\,bc)\,b^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{c^2}{(3\,ad-3\,bc)\,d^2}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$
$$+\frac{c^2}{(6\,ad-6\,bc)\,d^2}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}+\frac{c^2\sqrt{3}}{(3\,ad-3\,bc)\,d^2}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] 1/2*x^2/b/d+1/3*a^2/(a*d-b*c)/b^2/(a/b)^(1/3)*ln(x+(a/b)^(1/3))-1
/6*a^2/(a*d-b*c)/b^2/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3)
)-1/3*a^2/(a*d-b*c)/b^2*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2
/(a/b)^(1/3)*x-1))-1/3*c^2/(a*d-b*c)/d^2/(c/d)^(1/3)*ln(x+(c/d)^(
1/3))+1/6*c^2/(a*d-b*c)/d^2/(c/d)^(1/3)*ln(x^2-x*(c/d)^(1/3)+(c/d
)^(2/3))+1/3*c^2/(a*d-b*c)/d^2*3^(1/2)/(c/d)^(1/3)*arctan(1/3*3^(
1/2)*(2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.486651, size = 412, normalized size = 1.37

$$\sqrt{3}\left(\sqrt{3}ad\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\log\left(ax^2-bx\left(\frac{a^2}{b^2}\right)^{\frac{2}{3}}+a\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\right)+\sqrt{3}bc\left(-\frac{c^2}{d^2}\right)^{\frac{1}{3}}\log\left(cx^2-dx\left(-\frac{c^2}{d^2}\right)^{\frac{2}{3}}-c\left(-\frac{c^2}{d^2}\right)^{\frac{1}{3}}\right)-2\sqrt{3}ad\left(\frac{a^2}{b^2}\right)^{\frac{1}{3}}\log\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*a*d*(a^2/b^2)^(1/3)*log(a*x^2 - b*x*(a^2/b^
2)^(2/3) + a*(a^2/b^2)^(1/3)) + sqrt(3)*b*c*(-c^2/d^2)^(1/3)*log(
c*x^2 - d*x*(-c^2/d^2)^(2/3) - c*(-c^2/d^2)^(1/3)) - 2*sqrt(3)*a*
d*(a^2/b^2)^(1/3)*log(a*x + b*(a^2/b^2)^(2/3)) - 2*sqrt(3)*b*c*(-
c^2/d^2)^(1/3)*log(c*x + d*(-c^2/d^2)^(2/3)) + 3*sqrt(3)*(b*c - a
*d)*x^2 - 6*a*d*(a^2/b^2)^(1/3)*arctan(-1/3*(2*sqrt(3)*a*x - sqrt
(3)*b*(a^2/b^2)^(2/3))/(b*(a^2/b^2)^(2/3))) - 6*b*c*(-c^2/d^2)^(1
/3)*arctan(-1/3*(2*sqrt(3)*c*x - sqrt(3)*d*(-c^2/d^2)^(2/3))/(d*(
-c^2/d^2)^(2/3))))/(b^2*c*d - a*b*d^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.228266, size = 436, normalized size = 1.45

$$\frac{\left(-ab^2\right)^{\frac{2}{3}}a^2b\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\left(ab^5c-a^2b^4d\right)}-\frac{\left(-cd^2\right)^{\frac{2}{3}}c^2d\ln\left(x^2+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\left(bc^2d^4-acd^5\right)}-\frac{a^2\left(-\frac{a}{b}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\left(ab^2c-a^2bd\right)}+\frac{c^2\left(-\frac{c}{d}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\left(bc^2d-acd^2\right)}-\frac{\left(-ab^2\right)^{\frac{2}{3}}a\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}b^4c-\sqrt{3}ab^3d}+\frac{\left(-cd^2\right)^{\frac{2}{3}}c\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bcd^3-\sqrt{3}ad^4}+\frac{x^2}{2bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 1/6*(-a*b^2)^(2/3)*a^2*b*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))/
(a*b^5*c - a^2*b^4*d) - 1/6*(-c*d^2)^(2/3)*c^2*d*ln(x^2 + x*(-c/d
)^(1/3) + (-c/d)^(2/3))/(b*c^2*d^4 - a*c*d^5) - 1/3*a^2*(-a/b)^(2
```

```
/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^2*c - a^2*b*d) + 1/3*c^2*(-c/d
)^(2/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^2*d - a*c*d^2) - (-a*b^2)^
(2/3)*a*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/(sq
rt(3)*b^4*c - sqrt(3)*a*b^3*d) + (-c*d^2)^(2/3)*c*arctan(1/3*sqrt
(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*b*c*d^3 - sqrt(3)
*a*d^4) + 1/2*x^2/(b*d)
```

3.109 $\int \frac{x^6}{(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=296

$$-\frac{a^{4/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{4/3}(bc-ad)}+\frac{a^{4/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{4/3}(bc-ad)}-\frac{a^{4/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{4/3}(bc-ad)}+\frac{c^{4/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6d^{4/3}(bc-ad)}-\frac{c^{4/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{4/3}(bc-ad)}+\frac{c^{4/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}d^{4/3}(bc-ad)}+\frac{x}{bd}$$

```
[Out] x/(b*d) - (a^(4/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3
))])/(Sqrt[3]*b^(4/3)*(b*c - a*d)) + (c^(4/3)*ArcTan[(c^(1/3) - 2
*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*d^(4/3)*(b*c - a*d)) + (
a^(4/3)*Log[a^(1/3) + b^(1/3)*x])/(3*b^(4/3)*(b*c - a*d)) - (c^(4
/3)*Log[c^(1/3) + d^(1/3)*x])/(3*d^(4/3)*(b*c - a*d)) - (a^(4/3)*
Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(4/3)*(b*c -
 a*d)) + (c^(4/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])
/(6*d^(4/3)*(b*c - a*d))
```

Rubi [A] time = 0.643533, antiderivative size = 296, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$-\frac{a^{4/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{4/3}(bc-ad)}+\frac{a^{4/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{4/3}(bc-ad)}-\frac{a^{4/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{4/3}(bc-ad)}+\frac{c^{4/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6d^{4/3}(bc-ad)}-\frac{c^{4/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{4/3}(bc-ad)}+\frac{c^{4/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}d^{4/3}(bc-ad)}+\frac{x}{bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] x/(b*d) - (a^(4/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3
))])/(Sqrt[3]*b^(4/3)*(b*c - a*d)) + (c^(4/3)*ArcTan[(c^(1/3) - 2
*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*d^(4/3)*(b*c - a*d)) + (
a^(4/3)*Log[a^(1/3) + b^(1/3)*x])/(3*b^(4/3)*(b*c - a*d)) - (c^(4
/3)*Log[c^(1/3) + d^(1/3)*x])/(3*d^(4/3)*(b*c - a*d)) - (a^(4/3)*
Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(4/3)*(b*c -
 a*d)) + (c^(4/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])
/(6*d^(4/3)*(b*c - a*d))
```

Rubi in Sympy [A] time = 96.8317, size = 265, normalized size = 0.9

$$-\frac{a^{\frac{4}{3}}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{\frac{4}{3}}\left(ad-bc\right)}+\frac{a^{\frac{4}{3}}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6b^{\frac{4}{3}}\left(ad-bc\right)}+\frac{\sqrt{3}a^{\frac{4}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3b^{\frac{4}{3}}\left(ad-bc\right)}+\frac{c^{\frac{4}{3}}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{\frac{4}{3}}\left(ad-bc\right)}-\frac{c^{\frac{4}{3}}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6d^{\frac{4}{3}}\left(ad-bc\right)}-\frac{\sqrt{3}c^{\frac{4}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3d^{\frac{4}{3}}\left(ad-bc\right)}+\frac{x}{bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -a**(4/3)*log(a**(1/3) + b**(1/3)*x)/(3*b**(4/3)*(a*d - b*c)) + a
**(4/3)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*b*
*(4/3)*(a*d - b*c)) + sqrt(3)*a**(4/3)*atan(sqrt(3)*(a**(1/3)/3 -
 2*b**(1/3)*x/3)/a**(1/3))/(3*b**(4/3)*(a*d - b*c)) + c**(4/3)*lo
g(c**(1/3) + d**(1/3)*x)/(3*d**(4/3)*(a*d - b*c)) - c**(4/3)*log(
c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*d**(4/3)*(a*d
- b*c)) - sqrt(3)*c**(4/3)*atan(sqrt(3)*(c**(1/3)/3 - 2*d**(1/3)*
x/3)/c**(1/3))/(3*d**(4/3)*(a*d - b*c)) + x/(b*d)
```

Mathematica [A] time = 0.253131, size = 238, normalized size = 0.8

$$\frac{-\frac{a^{4/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{b^{4/3}}+\frac{2a^{4/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{4/3}}-\frac{2\sqrt{3}a^{4/3}\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{b^{4/3}}-\frac{6ax}{b}+\frac{c^{4/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{d^{4/3}}-\frac{2c^{4/3}\log\left(\sqrt[3]{c}+\right.}{d^{4/3}}}{6bc-6ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^6/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((-6*a*x)/b + (6*c*x)/d - (2*Sqrt[3]*a^(4/3)*ArcTan[(1 - (2*b^(1/
3)*x)/a^(1/3))/Sqrt[3]])/b^(4/3) + (2*Sqrt[3]*c^(4/3)*ArcTan[(1 -
 (2*d^(1/3)*x)/c^(1/3))/Sqrt[3]])/d^(4/3) + (2*a^(4/3)*Log[a^(1/3
) + b^(1/3)*x])/b^(4/3) - (2*c^(4/3)*Log[c^(1/3) + d^(1/3)*x])/d^
(4/3) - (a^(4/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/
b^(4/3) + (c^(4/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2]
)/d^(4/3))/(6*b*c - 6*a*d)
```

Maple [A] time = 0.011, size = 266, normalized size = 0.9

$$\frac{x}{bd}-\frac{a^2}{3\,b^2\,(ad-bc)}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{a^2}{6\,b^2\,(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{a^2\sqrt{3}}{3\,b^2\,(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{c^2}{3\,d^2\,(ad-bc)}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$
$$-\frac{c^2}{6\,d^2\,(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}+\frac{c^2\sqrt{3}}{3\,d^2\,(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] x/b/d-1/3/b^2*a^2/(a*d-b*c)/(a/b)^(2/3)*ln(x+(a/b)^(1/3))+1/6/b^2
*a^2/(a*d-b*c)/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-1/3/
b^2*a^2/(a*d-b*c)/(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)
^(1/3)*x-1))+1/3/d^2*c^2/(a*d-b*c)/(c/d)^(2/3)*ln(x+(c/d)^(1/3))-
1/6/d^2*c^2/(a*d-b*c)/(c/d)^(2/3)*ln(x^2-x*(c/d)^(1/3)+(c/d)^(2/3
))+1/3/d^2*c^2/(a*d-b*c)/(c/d)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(
2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.263067, size = 327, normalized size = 1.1

$$\frac{\sqrt{3}\left(\sqrt{3}ad\left(-\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)+\sqrt{3}bc\left(\frac{c}{d}\right)^{\frac{1}{3}}\log\left(x^2-x\left(\frac{c}{d}\right)^{\frac{1}{3}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)-2\sqrt{3}ad\left(-\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)\right.}{18\,(b^2ca}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*a*d*(-a/b)^(1/3)*log(x^2 + x*(-a/b)^(1/3) +
 (-a/b)^(2/3)) + sqrt(3)*b*c*(c/d)^(1/3)*log(x^2 - x*(c/d)^(1/3)
+ (c/d)^(2/3)) - 2*sqrt(3)*a*d*(-a/b)^(1/3)*log(x - (-a/b)^(1/3))
 - 2*sqrt(3)*b*c*(c/d)^(1/3)*log(x + (c/d)^(1/3)) + 6*a*d*(-a/b)^
(1/3)*arctan(1/3*(2*sqrt(3)*x + sqrt(3)*(-a/b)^(1/3))/(-a/b)^(1/3
)) + 6*b*c*(c/d)^(1/3)*arctan(-1/3*(2*sqrt(3)*x - sqrt(3)*(c/d)^(
1/3))/(c/d)^(1/3)) + 6*sqrt(3)*(b*c - a*d)*x)/(b^2*c*d - a*b*d^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.228377, size = 416, normalized size = 1.41

$$-\frac{a^2\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,(ab^2c-a^2bd)}+\frac{c^2\left(-\frac{c}{d}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\,(bc^2d-acd^2)}+\frac{\left(-ab^2\right)^{\frac{1}{3}}a\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}b^3c-\sqrt{3}ab^2d}-\frac{\left(-cd^2\right)^{\frac{1}{3}}c\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bcd^2-\sqrt{3}ad^3}+\frac{\left(-ab^2\right)^{\frac{1}{3}}a\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,(b^3c-ab^2d)}-\frac{\left(-cd^2\right)^{\frac{1}{3}}c\ln\left(x^2+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\,(bcd^2-ad^3)}+\frac{x}{bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] -1/3*a^2*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b^2*c - a^2*b*
d) + 1/3*c^2*(-c/d)^(1/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^2*d - a*
c*d^2) + (-a*b^2)^(1/3)*a*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))
/(-a/b)^(1/3))/(sqrt(3)*b^3*c - sqrt(3)*a*b^2*d) - (-c*d^2)^(1/3)
*c*arctan(1/3*sqrt(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)
*b*c*d^2 - sqrt(3)*a*d^3) + 1/6*(-a*b^2)^(1/3)*a*ln(x^2 + x*(-a/b
)^(1/3) + (-a/b)^(2/3))/(b^3*c - a*b^2*d) - 1/6*(-c*d^2)^(1/3)*c*
ln(x^2 + x*(-c/d)^(1/3) + (-c/d)^(2/3))/(b*c*d^2 - a*d^3) + x/(b*
d)
```

3.110 $\int \frac{x^5}{(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=53

$$\frac{c\log\left(c+dx^3\right)}{3d(bc-ad)}-\frac{a\log\left(a+bx^3\right)}{3b(bc-ad)}$$

```
[Out] -(a*Log[a + b*x^3])/(3*b*(b*c - a*d)) + (c*Log[c + d*x^3])/(3*d*(
b*c - a*d))
```

Rubi [A] time = 0.144342, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{c\log\left(c+dx^3\right)}{3d(bc-ad)}-\frac{a\log\left(a+bx^3\right)}{3b(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -(a*Log[a + b*x^3])/(3*b*(b*c - a*d)) + (c*Log[c + d*x^3])/(3*d*(
b*c - a*d))
```

Rubi in Sympy [A] time = 18.2898, size = 39, normalized size = 0.74

$$\frac{a\log\left(a+bx^3\right)}{3b\,(ad-bc)}-\frac{c\log\left(c+dx^3\right)}{3d\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] a*log(a + b*x**3)/(3*b*(a*d - b*c)) - c*log(c + d*x**3)/(3*d*(a*d
 - b*c))
```

Mathematica [A] time = 0.03819, size = 43, normalized size = 0.81

$$-\frac{ad\log\left(a+bx^3\right)-bc\log\left(c+dx^3\right)}{3b^2cd-3abd^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -((a*d*Log[a + b*x^3] - b*c*Log[c + d*x^3])/(3*b^2*c*d - 3*a*b*d^
2))
```

Maple [A] time = 0.009, size = 50, normalized size = 0.9

$$\frac{a\ln\left(bx^3+a\right)}{(3\,ad-3\,bc)\,b}-\frac{c\ln\left(dx^3+c\right)}{(3\,ad-3\,bc)\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^3+a)/(d*x^3+c),x)

[Out] 1/3*a/(a*d-b*c)/b*ln(b*x^3+a)-1/3*c/(a*d-b*c)/d*ln(d*x^3+c)
```

Maxima [A] time = 1.37486, size = 66, normalized size = 1.25

$$-\frac{a\log\left(bx^3+a\right)}{3\left(b^2c-abd\right)}+\frac{c\log\left(dx^3+c\right)}{3\left(bcd-ad^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")

[Out] -1/3*a*log(b*x^3 + a)/(b^2*c - a*b*d) + 1/3*c*log(d*x^3 + c)/(b*c
*d - a*d^2)
```

Fricas [A] time = 0.285619, size = 57, normalized size = 1.08

$$-\frac{ad\log\left(bx^3+a\right)-bc\log\left(dx^3+c\right)}{3\left(b^2cd-abd^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")

[Out] -1/3*(a*d*log(b*x^3 + a) - b*c*log(d*x^3 + c))/(b^2*c*d - a*b*d^2
)
```

Sympy [A] time = 10.4572, size = 144, normalized size = 2.72

$$\frac{a\log\left(x^3+\frac{\frac{a^3d^2}{b(ad-bc)}-\frac{2a^2cd}{ad-bc}+\frac{abc^2}{ad-bc}+2ac}{ad+bc}\right)}{3b\left(ad-bc\right)}-\frac{c\log\left(x^3+\frac{-\frac{a^2cd}{ad-bc}+\frac{2abc^2}{ad-bc}+2ac-\frac{b^2c^3}{d(ad-bc)}}{ad+bc}\right)}{3d\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a)/(d*x**3+c),x)

[Out] a*log(x**3 + (a**3*d**2/(b*(a*d - b*c)) - 2*a**2*c*d/(a*d - b*c)
+ a*b*c**2/(a*d - b*c) + 2*a*c)/(a*d + b*c))/(3*b*(a*d - b*c)) -
c*log(x**3 + (-a**2*c*d/(a*d - b*c) + 2*a*b*c**2/(a*d - b*c) + 2*
a*c - b**2*c**3/(d*(a*d - b*c)))/(a*d + b*c))/(3*d*(a*d - b*c))
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")

[Out] Exception raised: NotImplementedError
```

3.111 $\int \frac{x^4}{(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=288

$$-\frac{a^{2/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{2/3}(bc-ad)}+\frac{a^{2/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{2/3}(bc-ad)}+\frac{a^{2/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{2/3}(bc-ad)}+\frac{c^{2/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6d^{2/3}(bc-ad)}-\frac{c^{2/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{2/3}(bc-ad)}-\frac{c^{2/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}d^{2/3}(bc-ad)}$$

```
[Out] (a^(2/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt
[3]*b^(2/3)*(b*c - a*d)) - (c^(2/3)*ArcTan[(c^(1/3) - 2*d^(1/3)*x
)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*d^(2/3)*(b*c - a*d)) + (a^(2/3)*Lo
g[a^(1/3) + b^(1/3)*x])/(3*b^(2/3)*(b*c - a*d)) - (c^(2/3)*Log[c^
(1/3) + d^(1/3)*x])/(3*d^(2/3)*(b*c - a*d)) - (a^(2/3)*Log[a^(2/3
) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(2/3)*(b*c - a*d)) + (
c^(2/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*d^(2/3
)*(b*c - a*d))
```

Rubi [A] time = 0.39722, antiderivative size = 288, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.318

$$-\frac{a^{2/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6b^{2/3}(bc-ad)}+\frac{a^{2/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{2/3}(bc-ad)}+\frac{a^{2/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}b^{2/3}(bc-ad)}+\frac{c^{2/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6d^{2/3}(bc-ad)}-\frac{c^{2/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{2/3}(bc-ad)}-\frac{c^{2/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}d^{2/3}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] (a^(2/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt
[3]*b^(2/3)*(b*c - a*d)) - (c^(2/3)*ArcTan[(c^(1/3) - 2*d^(1/3)*x
)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*d^(2/3)*(b*c - a*d)) + (a^(2/3)*Lo
g[a^(1/3) + b^(1/3)*x])/(3*b^(2/3)*(b*c - a*d)) - (c^(2/3)*Log[c^
(1/3) + d^(1/3)*x])/(3*d^(2/3)*(b*c - a*d)) - (a^(2/3)*Log[a^(2/3
) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(2/3)*(b*c - a*d)) + (
c^(2/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*d^(2/3
)*(b*c - a*d))
```

Rubi in Sympy [A] time = 67.069, size = 260, normalized size = 0.9

$$-\frac{a^{\frac{2}{3}}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3b^{\frac{2}{3}}\left(ad-bc\right)}+\frac{a^{\frac{2}{3}}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6b^{\frac{2}{3}}\left(ad-bc\right)}-\frac{\sqrt{3}a^{\frac{2}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3b^{\frac{2}{3}}\left(ad-bc\right)}+\frac{c^{\frac{2}{3}}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3d^{\frac{2}{3}}\left(ad-bc\right)}-\frac{c^{\frac{2}{3}}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6d^{\frac{2}{3}}\left(ad-bc\right)}+\frac{\sqrt{3}c^{\frac{2}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3d^{\frac{2}{3}}\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -a**(2/3)*log(a**(1/3) + b**(1/3)*x)/(3*b**(2/3)*(a*d - b*c)) + a
**(2/3)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*b*
*(2/3)*(a*d - b*c)) - sqrt(3)*a**(2/3)*atan(sqrt(3)*(a**(1/3)/3 -
 2*b**(1/3)*x/3)/a**(1/3))/(3*b**(2/3)*(a*d - b*c)) + c**(2/3)*lo
g(c**(1/3) + d**(1/3)*x)/(3*d**(2/3)*(a*d - b*c)) - c**(2/3)*log(
c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*d**(2/3)*(a*d
- b*c)) + sqrt(3)*c**(2/3)*atan(sqrt(3)*(c**(1/3)/3 - 2*d**(1/3)*
x/3)/c**(1/3))/(3*d**(2/3)*(a*d - b*c))
```

Mathematica [A] time = 0.194368, size = 224, normalized size = 0.78

$$\frac{-\frac{a^{2/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{b^{2/3}}+\frac{2a^{2/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{2/3}}+\frac{2\sqrt{3}a^{2/3}\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{b^{2/3}}+\frac{c^{2/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{d^{2/3}}-\frac{2c^{2/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{d^{2/3}}-}{6bc-6ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((2*Sqrt[3]*a^(2/3)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/
b^(2/3) - (2*Sqrt[3]*c^(2/3)*ArcTan[(1 - (2*d^(1/3)*x)/c^(1/3))/S
qrt[3]])/d^(2/3) + (2*a^(2/3)*Log[a^(1/3) + b^(1/3)*x])/b^(2/3) -
 (2*c^(2/3)*Log[c^(1/3) + d^(1/3)*x])/d^(2/3) - (a^(2/3)*Log[a^(2
/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/b^(2/3) + (c^(2/3)*Log[c^
(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/d^(2/3))/(6*b*c - 6*a*d
)
```

Maple [A] time = 0.01, size = 246, normalized size = 0.9

$$-\frac{a}{(3ad-3bc)b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{a}{(6ad-6bc)b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{a\sqrt{3}}{(3ad-3bc)b}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{c}{(3ad-3bc)d}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}-\frac{c}{(6ad-6bc)d}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}-\frac{c\sqrt{3}}{(3ad-3bc)d}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/3*a/(a*d-b*c)/b/(a/b)^(1/3)*ln(x+(a/b)^(1/3))+1/6*a/(a*d-b*c)/
b/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+1/3*a/(a*d-b*c)*3
^(1/2)/b/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+1/3*
c/(a*d-b*c)/d/(c/d)^(1/3)*ln(x+(c/d)^(1/3))-1/6*c/(a*d-b*c)/d/(c/
d)^(1/3)*ln(x^2-x*(c/d)^(1/3)+(c/d)^(2/3))-1/3*c/(a*d-b*c)*3^(1/2
)/d/(c/d)^(1/3)*arctan(1/3*3^(1/2)*(2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.273086, size = 366, normalized size = 1.27

$$\frac{\sqrt{3}\left(\sqrt{3}\left(-\frac{a^2}{b^2}\right)^{\frac{1}{3}}\log\left(ax^2 - bx\left(-\frac{a^2}{b^2}\right)^{\frac{2}{3}} - a\left(-\frac{a^2}{b^2}\right)^{\frac{1}{3}}\right) + \sqrt{3}\left(\frac{c^2}{d^2}\right)^{\frac{1}{3}}\log\left(cx^2 - dx\left(\frac{c^2}{d^2}\right)^{\frac{2}{3}} + c\left(\frac{c^2}{d^2}\right)^{\frac{1}{3}}\right) - 2\sqrt{3}\left(-\frac{a^2}{b^2}\right)^{\frac{1}{3}}\log\left(ax + \cdots\right.\right.}{18\,(\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*(-a^2/b^2)^(1/3)*log(a*x^2 - b*x*(-a^2/b^2)
^(2/3) - a*(-a^2/b^2)^(1/3)) + sqrt(3)*(c^2/d^2)^(1/3)*log(c*x^2
- d*x*(c^2/d^2)^(2/3) + c*(c^2/d^2)^(1/3)) - 2*sqrt(3)*(-a^2/b^2)
^(1/3)*log(a*x + b*(-a^2/b^2)^(2/3)) - 2*sqrt(3)*(c^2/d^2)^(1/3)*
log(c*x + d*(c^2/d^2)^(2/3)) - 6*(-a^2/b^2)^(1/3)*arctan(-1/3*(2*
sqrt(3)*a*x - sqrt(3)*b*(-a^2/b^2)^(2/3))/(b*(-a^2/b^2)^(2/3))) -
 6*(c^2/d^2)^(1/3)*arctan(-1/3*(2*sqrt(3)*c*x - sqrt(3)*d*(c^2/d^
2)^(2/3))/(d*(c^2/d^2)^(2/3))))/(b*c - a*d)
```

Sympy [A] time = 29.973, size = 573, normalized size = 1.99

$$\operatorname{RootSum}\left(t^3\left(27a^3d^5 - 81a^2bcd^4 + 81ab^2c^2d^3 - 27b^3c^3d^2\right) - c^2, \left(t \mapsto t\log\left(x + \frac{243t^5a^6b^2d^8 - 1458t^5a^5b^3cd^7 + 3645t^5a^4b\cdots}{\cdots}\right.\right.\right.$$
$$+\operatorname{RootSum}\left(t^3\left(27a^3b^2d^3 - 81a^2b^3cd^2 + 81ab^4c^2d - 27b^5c^3\right) + a^2, \left(t \mapsto t\log\left(x + \frac{243t^5a^6b^2d^8 - 1458t^5a^5b^3cd^7 + 3645t^5a^4\cdots}{\cdots}\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] RootSum(_t**3*(27*a**3*d**5 - 81*a**2*b*c*d**4 + 81*a*b**2*c**2*d
**3 - 27*b**3*c**3*d**2) - c**2, Lambda(_t, _t*log(x + (243*_t**5
*a**6*b**2*d**8 - 1458*_t**5*a**5*b**3*c*d**7 + 3645*_t**5*a**4*b
**4*c**2*d**6 - 4860*_t**5*a**3*b**5*c**3*d**5 + 3645*_t**5*a**2*
b**6*c**4*d**4 - 1458*_t**5*a*b**7*c**5*d**3 + 243*_t**5*b**8*c**
6*d**2 + 9*_t**2*a**5*d**5 - 18*_t**2*a**4*b*c*d**4 + 9*_t**2*a**
3*b**2*c**2*d**3 + 9*_t**2*a**2*b**3*c**3*d**2 - 18*_t**2*a*b**4*
c**4*d + 9*_t**2*b**5*c**5)/(a**3*c*d**2 + a*b**2*c**3)))) + Root
Sum(_t**3*(27*a**3*b**2*d**3 - 81*a**2*b**3*c*d**2 + 81*a*b**4*c*
*2*d - 27*b**5*c**3) + a**2, Lambda(_t, _t*log(x + (243*_t**5*a**
6*b**2*d**8 - 1458*_t**5*a**5*b**3*c*d**7 + 3645*_t**5*a**4*b**4*
c**2*d**6 - 4860*_t**5*a**3*b**5*c**3*d**5 + 3645*_t**5*a**2*b**6
*c**4*d**4 - 1458*_t**5*a*b**7*c**5*d**3 + 243*_t**5*b**8*c**6*d*
*2 + 9*_t**2*a**5*d**5 - 18*_t**2*a**4*b*c*d**4 + 9*_t**2*a**3*b*
*2*c**2*d**3 + 9*_t**2*a**2*b**3*c**3*d**2 - 18*_t**2*a*b**4*c**4
*d + 9*_t**2*b**5*c**5)/(a**3*c*d**2 + a*b**2*c**3))))
```

GIAC/XCAS [A] time = 0.230233, size = 386, normalized size = 1.34

$$\frac{a\left(-\frac{a}{b}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,(abc-a^2d)}-\frac{c\left(-\frac{c}{d}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\,(bc^2-acd)}+\frac{\left(-ab^2\right)^{\frac{2}{3}}\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}b^3c-\sqrt{3}ab^2d}-\frac{\left(-cd^2\right)^{\frac{2}{3}}\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bcd^2-\sqrt{3}ad^3}-\frac{\left(-ab^2\right)^{\frac{2}{3}}\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,(b^3c-ab^2d)}+\frac{\left(-cd^2\right)^{\frac{2}{3}}\ln\left(x^2+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\,(bcd^2-ad^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 1/3*a*(-a/b)^(2/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b*c - a^2*d) - 1/
3*c*(-c/d)^(2/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^2 - a*c*d) + (-a*
b^2)^(2/3)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/
(sqrt(3)*b^3*c - sqrt(3)*a*b^2*d) - (-c*d^2)^(2/3)*arctan(1/3*sqr
t(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*b*c*d^2 - sqrt(3
)*a*d^3) - 1/6*(-a*b^2)^(2/3)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2
/3))/(b^3*c - a*b^2*d) + 1/6*(-c*d^2)^(2/3)*ln(x^2 + x*(-c/d)^(1/
3) + (-c/d)^(2/3))/(b*c*d^2 - a*d^3)
```

3.112 $\int \frac{x^3}{(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=288

$$\frac{\sqrt[3]{a}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6\sqrt[3]{b}(bc-ad)}-\frac{\sqrt[3]{c}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6\sqrt[3]{d}(bc-ad)}-\frac{\sqrt[3]{a}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{b}(bc-ad)}+\frac{\sqrt[3]{c}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3\sqrt[3]{d}(bc-ad)}+\frac{\sqrt[3]{a}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}\sqrt[3]{b}(bc-ad)}-\frac{\sqrt[3]{c}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}\sqrt[3]{d}(bc-ad)}$$

```
[Out] (a^(1/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt
[3]*b^(1/3)*(b*c - a*d)) - (c^(1/3)*ArcTan[(c^(1/3) - 2*d^(1/3)*x
)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*d^(1/3)*(b*c - a*d)) - (a^(1/3)*Lo
g[a^(1/3) + b^(1/3)*x])/(3*b^(1/3)*(b*c - a*d)) + (c^(1/3)*Log[c^
(1/3) + d^(1/3)*x])/(3*d^(1/3)*(b*c - a*d)) + (a^(1/3)*Log[a^(2/3
) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(1/3)*(b*c - a*d)) - (
c^(1/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*d^(1/3
)*(b*c - a*d))
```

Rubi [A] time = 0.382143, antiderivative size = 288, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.318

$$\frac{\sqrt[3]{a}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6\sqrt[3]{b}(bc-ad)}-\frac{\sqrt[3]{c}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6\sqrt[3]{d}(bc-ad)}-\frac{\sqrt[3]{a}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{b}(bc-ad)}+\frac{\sqrt[3]{c}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3\sqrt[3]{d}(bc-ad)}+\frac{\sqrt[3]{a}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}\sqrt[3]{b}(bc-ad)}-\frac{\sqrt[3]{c}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}\sqrt[3]{d}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] (a^(1/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt
[3]*b^(1/3)*(b*c - a*d)) - (c^(1/3)*ArcTan[(c^(1/3) - 2*d^(1/3)*x
)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*d^(1/3)*(b*c - a*d)) - (a^(1/3)*Lo
g[a^(1/3) + b^(1/3)*x])/(3*b^(1/3)*(b*c - a*d)) + (c^(1/3)*Log[c^
(1/3) + d^(1/3)*x])/(3*d^(1/3)*(b*c - a*d)) + (a^(1/3)*Log[a^(2/3
) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*b^(1/3)*(b*c - a*d)) - (
c^(1/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*d^(1/3
)*(b*c - a*d))
```

Rubi in Sympy [A] time = 70.1417, size = 260, normalized size = 0.9

$$\frac{\sqrt[3]{a}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{b}\,(ad-bc)}-\frac{\sqrt[3]{a}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6\sqrt[3]{b}\,(ad-bc)}-\frac{\sqrt{3}\sqrt[3]{a}\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3\sqrt[3]{b}\,(ad-bc)}-\frac{\sqrt[3]{c}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3\sqrt[3]{d}\,(ad-bc)}+\frac{\sqrt[3]{c}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6\sqrt[3]{d}\,(ad-bc)}+\frac{\sqrt{3}\sqrt[3]{c}\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3\sqrt[3]{d}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] a**(1/3)*log(a**(1/3) + b**(1/3)*x)/(3*b**(1/3)*(a*d - b*c)) - a*
*(1/3)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*b**
(1/3)*(a*d - b*c)) - sqrt(3)*a**(1/3)*atan(sqrt(3)*(a**(1/3)/3 -
2*b**(1/3)*x/3)/a**(1/3))/(3*b**(1/3)*(a*d - b*c)) - c**(1/3)*log
(c**(1/3) + d**(1/3)*x)/(3*d**(1/3)*(a*d - b*c)) + c**(1/3)*log(c
**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*d**(1/3)*(a*d -
 b*c)) + sqrt(3)*c**(1/3)*atan(sqrt(3)*(c**(1/3)/3 - 2*d**(1/3)*x
/3)/c**(1/3))/(3*d**(1/3)*(a*d - b*c))
```

Mathematica [A] time = 0.186623, size = 224, normalized size = 0.78

$$\frac{\frac{\sqrt[3]{a}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{\sqrt[3]{b}}-\frac{2\sqrt[3]{a}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[3]{b}}+\frac{2\sqrt{3}\sqrt[3]{a}\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{\sqrt[3]{b}}-\frac{\sqrt[3]{c}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{\sqrt[3]{d}}+\frac{2\sqrt[3]{c}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt[3]{d}}-}{6bc-6ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((2*Sqrt[3]*a^(1/3)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/
b^(1/3) - (2*Sqrt[3]*c^(1/3)*ArcTan[(1 - (2*d^(1/3)*x)/c^(1/3))/S
qrt[3]])/d^(1/3) - (2*a^(1/3)*Log[a^(1/3) + b^(1/3)*x])/b^(1/3) +
 (2*c^(1/3)*Log[c^(1/3) + d^(1/3)*x])/d^(1/3) + (a^(1/3)*Log[a^(2
/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/b^(1/3) - (c^(1/3)*Log[c^
(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/d^(1/3))/(6*b*c - 6*a*d
)
```

Maple [A] time = 0.008, size = 246, normalized size = 0.9

$$\frac{a}{(3\,ad-3\,bc)\,b}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{a}{(6\,ad-6\,bc)\,b}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{a\sqrt{3}}{(3\,ad-3\,bc)\,b}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{c}{(3\,ad-3\,bc)\,d}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}+\frac{c}{(6\,ad-6\,bc)\,d}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$
$$-\frac{c\sqrt{3}}{(3\,ad-3\,bc)\,d}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] 1/3*a/(a*d-b*c)/b/(a/b)^(2/3)*ln(x+(a/b)^(1/3))-1/6*a/(a*d-b*c)/b
/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+1/3*a/(a*d-b*c)/b/
(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))-1/3*c
/(a*d-b*c)/d/(c/d)^(2/3)*ln(x+(c/d)^(1/3))+1/6*c/(a*d-b*c)/d/(c/d
)^(2/3)*ln(x^2-x*(c/d)^(1/3)+(c/d)^(2/3))-1/3*c/(a*d-b*c)/d/(c/d)
^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.24978, size = 284, normalized size = 0.99

$$\frac{\sqrt{3}\left(\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x^2 - x\left(\frac{a}{b}\right)^{\frac{1}{3}} + \left(\frac{a}{b}\right)^{\frac{2}{3}}\right) + \sqrt{3}\left(-\frac{c}{d}\right)^{\frac{1}{3}}\log\left(x^2 + x\left(-\frac{c}{d}\right)^{\frac{1}{3}} + \left(-\frac{c}{d}\right)^{\frac{2}{3}}\right) - 2\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{3}}\log\left(x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right) - 2\sqrt{3}\left(-\frac{c}{d}\right.}{18\,(bc - ad)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*(a/b)^(1/3)*log(x^2 - x*(a/b)^(1/3) + (a/b)
^(2/3)) + sqrt(3)*(-c/d)^(1/3)*log(x^2 + x*(-c/d)^(1/3) + (-c/d)^
(2/3)) - 2*sqrt(3)*(a/b)^(1/3)*log(x + (a/b)^(1/3)) - 2*sqrt(3)*(
-c/d)^(1/3)*log(x - (-c/d)^(1/3)) + 6*(a/b)^(1/3)*arctan(-1/3*(2*
sqrt(3)*x - sqrt(3)*(a/b)^(1/3))/(a/b)^(1/3)) + 6*(-c/d)^(1/3)*ar
ctan(1/3*(2*sqrt(3)*x + sqrt(3)*(-c/d)^(1/3))/(-c/d)^(1/3)))/(b*c
 - a*d)
```

Sympy [A] time = 38.6851, size = 342, normalized size = 1.19

$$\operatorname{RootSum}\left(t^3\left(27a^3d^4 - 81a^2bcd^3 + 81ab^2c^2d^2 - 27b^3c^3d\right) + c, \left(t \mapsto t\log\left(x + \frac{162t^4a^4bd^5 - 648t^4a^3b^2cd^4 + 972t^4a^2b^3c^2d^3}{}\right.\right.\right.$$
$$+\operatorname{RootSum}\left(t^3\left(27a^3bd^3 - 81a^2b^2cd^2 + 81ab^3c^2d - 27b^4c^3\right) - a, \left(t \mapsto t\log\left(x + \frac{162t^4a^4bd^5 - 648t^4a^3b^2cd^4 + 972t^4a^2b^3c^2}{}\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] RootSum(_t**3*(27*a**3*d**4 - 81*a**2*b*c*d**3 + 81*a*b**2*c**2*d
**2 - 27*b**3*c**3*d) + c, Lambda(_t, _t*log(x + (162*_t**4*a**4*
b*d**5 - 648*_t**4*a**3*b**2*c*d**4 + 972*_t**4*a**2*b**3*c**2*d*
*3 - 648*_t**4*a*b**4*c**3*d**2 + 162*_t**4*b**5*c**4*d - 3*_t*a*
*2*d**2 + 6*_t*a*b*c*d - 3*_t*b**2*c**2)/(a*d + b*c)))) + RootSum
(_t**3*(27*a**3*b*d**3 - 81*a**2*b**2*c*d**2 + 81*a*b**3*c**2*d -
 27*b**4*c**3) - a, Lambda(_t, _t*log(x + (162*_t**4*a**4*b*d**5
- 648*_t**4*a**3*b**2*c*d**4 + 972*_t**4*a**2*b**3*c**2*d**3 - 64
8*_t**4*a*b**4*c**3*d**2 + 162*_t**4*b**5*c**4*d - 3*_t*a**2*d**2
 + 6*_t*a*b*c*d - 3*_t*b**2*c**2)/(a*d + b*c))))
```

GIAC/XCAS [A] time = 0.227858, size = 375, normalized size = 1.3

$$\frac{a\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,(abc - a^2d)} - \frac{c\left(-\frac{c}{d}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\,(bc^2 - acd)}$$
$$- \frac{\left(-ab^2\right)^{\frac{1}{3}}\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}b^2c - \sqrt{3}abd} + \frac{\left(-cd^2\right)^{\frac{1}{3}}\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bcd - \sqrt{3}ad^2}$$
$$- \frac{\left(-ab^2\right)^{\frac{1}{3}}\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,(b^2c - abd)} + \frac{\left(-cd^2\right)^{\frac{1}{3}}\ln\left(x^2 + x\left(-\frac{c}{d}\right)^{\frac{1}{3}} + \left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\,(bcd - ad^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 1/3*a*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b*c - a^2*d) - 1/
3*c*(-c/d)^(1/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^2 - a*c*d) - (-a*
b^2)^(1/3)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))/
(sqrt(3)*b^2*c - sqrt(3)*a*b*d) + (-c*d^2)^(1/3)*arctan(1/3*sqrt(
3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*b*c*d - sqrt(3)*a*
d^2) - 1/6*(-a*b^2)^(1/3)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3))
/(b^2*c - a*b*d) + 1/6*(-c*d^2)^(1/3)*ln(x^2 + x*(-c/d)^(1/3) + (
-c/d)^(2/3))/(b*c*d - a*d^2)
```

3.113 $\int \frac{x^2}{(a+bx^3)(c+dx^3)} dx$

Optimal. Leaf size=45

$$\frac{\log(a+bx^3)}{3(bc-ad)} - \frac{\log(c+dx^3)}{3(bc-ad)}$$

```
[Out] Log[a + b*x^3]/(3*(b*c - a*d)) - Log[c + d*x^3]/(3*(b*c - a*d))
```

Rubi [A] time = 0.097998, antiderivative size = 45, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{\log(a+bx^3)}{3(bc-ad)} - \frac{\log(c+dx^3)}{3(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] Log[a + b*x^3]/(3*(b*c - a*d)) - Log[c + d*x^3]/(3*(b*c - a*d))
```

Rubi in Sympy [A] time = 12.6155, size = 36, normalized size = 0.8

$$-\frac{\log(a+bx^3)}{3(ad-bc)} + \frac{\log(c+dx^3)}{3(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -log(a + b*x**3)/(3*(a*d - b*c)) + log(c + d*x**3)/(3*(a*d - b*c)
)
```

Mathematica [A] time = 0.0337505, size = 31, normalized size = 0.69

$$\frac{\log(a+bx^3) - \log(c+dx^3)}{3bc-3ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] (Log[a + b*x^3] - Log[c + d*x^3])/(3*b*c - 3*a*d)
```

Maple [A] time = 0.01, size = 42, normalized size = 0.9

$$-\frac{\ln(bx^3+a)}{3ad-3bc} + \frac{\ln(dx^3+c)}{3ad-3bc}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/3/(a*d-b*c)*ln(b*x^3+a)+1/3/(a*d-b*c)*ln(d*x^3+c)
```

Maxima [A] time = 1.46264, size = 55, normalized size = 1.22

$$\frac{\log\left(bx^3+a\right)}{3\,(bc-ad)}-\frac{\log\left(dx^3+c\right)}{3\,(bc-ad)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] 1/3*log(b*x^3 + a)/(b*c - a*d) - 1/3*log(d*x^3 + c)/(b*c - a*d)
```

Fricas [A] time = 0.232425, size = 42, normalized size = 0.93

$$\frac{\log\left(bx^3+a\right)-\log\left(dx^3+c\right)}{3\,(bc-ad)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/3*(log(b*x^3 + a) - log(d*x^3 + c))/(b*c - a*d)
```

Sympy [A] time = 4.31924, size = 138, normalized size = 3.07

$$\frac{\log\left(x^3+\frac{-\frac{a^2d^2}{ad-bc}+\frac{2abcd}{ad-bc}+ad-\frac{b^2c^2}{ad-bc}+bc}{2bd}\right)}{3\,(ad-bc)}-\frac{\log\left(x^3+\frac{\frac{a^2d^2}{ad-bc}-\frac{2abcd}{ad-bc}+ad+\frac{b^2c^2}{ad-bc}+bc}{2bd}\right)}{3\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] log(x**3 + (-a**2*d**2/(a*d - b*c) + 2*a*b*c*d/(a*d - b*c) + a*d
- b**2*c**2/(a*d - b*c) + b*c)/(2*b*d))/(3*(a*d - b*c)) - log(x**
3 + (a**2*d**2/(a*d - b*c) - 2*a*b*c*d/(a*d - b*c) + a*d + b**2*c
**2/(a*d - b*c) + b*c)/(2*b*d))/(3*(a*d - b*c))
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.114 $\int \frac{x}{(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=288

$$\frac{\sqrt[3]{b}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6\sqrt[3]{a}(bc-ad)}-\frac{\sqrt[3]{d}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6\sqrt[3]{c}(bc-ad)}-\frac{\sqrt[3]{b}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{a}(bc-ad)}+\frac{\sqrt[3]{d}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3\sqrt[3]{c}(bc-ad)}-\frac{\sqrt[3]{b}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}\sqrt[3]{a}(bc-ad)}+\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}\sqrt[3]{c}(bc-ad)}$$

```
[Out] -((b^(1/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sq
rt[3]*a^(1/3)*(b*c - a*d))) + (d^(1/3)*ArcTan[(c^(1/3) - 2*d^(1/3
)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(1/3)*(b*c - a*d)) - (b^(1/3)
*Log[a^(1/3) + b^(1/3)*x])/(3*a^(1/3)*(b*c - a*d)) + (d^(1/3)*Log
[c^(1/3) + d^(1/3)*x])/(3*c^(1/3)*(b*c - a*d)) + (b^(1/3)*Log[a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(1/3)*(b*c - a*d))
- (d^(1/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(
1/3)*(b*c - a*d))
```

Rubi [A] time = 0.367817, antiderivative size = 288, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.35

$$\frac{\sqrt[3]{b}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6\sqrt[3]{a}(bc-ad)}-\frac{\sqrt[3]{d}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6\sqrt[3]{c}(bc-ad)}-\frac{\sqrt[3]{b}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{a}(bc-ad)}+\frac{\sqrt[3]{d}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3\sqrt[3]{c}(bc-ad)}-\frac{\sqrt[3]{b}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}\sqrt[3]{a}(bc-ad)}+\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}\sqrt[3]{c}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -((b^(1/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sq
rt[3]*a^(1/3)*(b*c - a*d))) + (d^(1/3)*ArcTan[(c^(1/3) - 2*d^(1/3
)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(1/3)*(b*c - a*d)) - (b^(1/3)
*Log[a^(1/3) + b^(1/3)*x])/(3*a^(1/3)*(b*c - a*d)) + (d^(1/3)*Log
[c^(1/3) + d^(1/3)*x])/(3*c^(1/3)*(b*c - a*d)) + (b^(1/3)*Log[a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(1/3)*(b*c - a*d))
- (d^(1/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(
1/3)*(b*c - a*d))
```

Rubi in Sympy [A] time = 65.2044, size = 260, normalized size = 0.9

$$-\frac{\sqrt[3]{d}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3\sqrt[3]{c}\,(ad-bc)}+\frac{\sqrt[3]{d}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6\sqrt[3]{c}\,(ad-bc)}-\frac{\sqrt{3}\sqrt[3]{d}\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3\sqrt[3]{c}\,(ad-bc)}+\frac{\sqrt[3]{b}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3\sqrt[3]{a}\,(ad-bc)}-\frac{\sqrt[3]{b}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6\sqrt[3]{a}\,(ad-bc)}+\frac{\sqrt{3}\sqrt[3]{b}\,\mathrm{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3\sqrt[3]{a}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -d**(1/3)*log(c**(1/3) + d**(1/3)*x)/(3*c**(1/3)*(a*d - b*c)) + d
**(1/3)*log(c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*c*
*(1/3)*(a*d - b*c)) - sqrt(3)*d**(1/3)*atan(sqrt(3)*(c**(1/3)/3 -
 2*d**(1/3)*x/3)/c**(1/3))/(3*c**(1/3)*(a*d - b*c)) + b**(1/3)*lo
g(a**(1/3) + b**(1/3)*x)/(3*a**(1/3)*(a*d - b*c)) - b**(1/3)*log(
a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*a**(1/3)*(a*d
- b*c)) + sqrt(3)*b**(1/3)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*
x/3)/a**(1/3))/(3*a**(1/3)*(a*d - b*c))
```

Mathematica [A] time = 0.22842, size = 224, normalized size = 0.78

$$\frac{-\frac{\sqrt[3]{b}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{\sqrt[3]{a}}+\frac{2\sqrt[3]{b}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[3]{a}}+\frac{2\sqrt{3}\sqrt[3]{b}\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{\sqrt[3]{a}}+\frac{\sqrt[3]{d}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{\sqrt[3]{c}}-\frac{2\sqrt[3]{d}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt[3]{c}}-}{6ad-6bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((2*Sqrt[3]*b^(1/3)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/
a^(1/3) - (2*Sqrt[3]*d^(1/3)*ArcTan[(1 - (2*d^(1/3)*x)/c^(1/3))/S
qrt[3]])/c^(1/3) + (2*b^(1/3)*Log[a^(1/3) + b^(1/3)*x])/a^(1/3) -
 (2*d^(1/3)*Log[c^(1/3) + d^(1/3)*x])/c^(1/3) - (b^(1/3)*Log[a^(2
/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/a^(1/3) + (d^(1/3)*Log[c^
(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/c^(1/3))/(-6*b*c + 6*a*
d)
```

Maple [A] time = 0.009, size = 222, normalized size = 0.8

$$\frac{1}{3\,ad-3\,bc}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{1}{6\,ad-6\,bc}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{\sqrt{3}}{3\,ad-3\,bc}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{1}{3\,ad-3\,bc}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$
$$+\frac{1}{6\,ad-6\,bc}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}+\frac{\sqrt{3}}{3\,ad-3\,bc}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] 1/3/(a*d-b*c)/(a/b)^(1/3)*ln(x+(a/b)^(1/3))-1/6/(a*d-b*c)/(a/b)^(
1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-1/3/(a*d-b*c)*3^(1/2)/(a/b
)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))-1/3/(a*d-b*c)/(c/
d)^(1/3)*ln(x+(c/d)^(1/3))+1/6/(a*d-b*c)/(c/d)^(1/3)*ln(x^2-x*(c/
d)^(1/3)+(c/d)^(2/3))+1/3/(a*d-b*c)*3^(1/2)/(c/d)^(1/3)*arctan(1/
3*3^(1/2)*(2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.258621, size = 323, normalized size = 1.12

$$\frac{\sqrt{3}\left(\sqrt{3}\left(\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx^2 - ax\left(\frac{b}{a}\right)^{\frac{2}{3}} + a\left(\frac{b}{a}\right)^{\frac{1}{3}}\right) + \sqrt{3}\left(-\frac{d}{c}\right)^{\frac{1}{3}}\log\left(dx^2 - cx\left(-\frac{d}{c}\right)^{\frac{2}{3}} - c\left(-\frac{d}{c}\right)^{\frac{1}{3}}\right) - 2\sqrt{3}\left(\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx + a\left(\frac{b}{a}\right)\right.\right.}{18\,(bc - a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*(b/a)^(1/3)*log(b*x^2 - a*x*(b/a)^(2/3) + a
*(b/a)^(1/3)) + sqrt(3)*(-d/c)^(1/3)*log(d*x^2 - c*x*(-d/c)^(2/3)
 - c*(-d/c)^(1/3)) - 2*sqrt(3)*(b/a)^(1/3)*log(b*x + a*(b/a)^(2/3
)) - 2*sqrt(3)*(-d/c)^(1/3)*log(d*x + c*(-d/c)^(2/3)) - 6*(b/a)^(
1/3)*arctan(-1/3*(2*sqrt(3)*b*x - sqrt(3)*a*(b/a)^(2/3))/(a*(b/a)
^(2/3))) - 6*(-d/c)^(1/3)*arctan(-1/3*(2*sqrt(3)*d*x - sqrt(3)*c*
(-d/c)^(2/3))/(c*(-d/c)^(2/3))))/(b*c - a*d)
```

Sympy [A] time = 17.5527, size = 515, normalized size = 1.79

$$\operatorname{RootSum}\left(t^3\left(27a^4d^3 - 81a^3bcd^2 + 81a^2b^2c^2d - 27ab^3c^3\right) - b, \left(t \mapsto t\log\left(x + \frac{243t^5a^7cd^6 - 1458t^5a^6bc^2d^5 + 3645t^5a^5b^2c^3}{\ldots}\right.\right.\right.$$
$$+\operatorname{RootSum}\left(t^3\left(27a^3cd^3 - 81a^2bc^2d^2 + 81ab^2c^3d - 27b^3c^4\right) + d, \left(t \mapsto t\log\left(x + \frac{243t^5a^7cd^6 - 1458t^5a^6bc^2d^5 + 3645t^5a^5b^2c}{\ldots}\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] RootSum(_t**3*(27*a**4*d**3 - 81*a**3*b*c*d**2 + 81*a**2*b**2*c**
2*d - 27*a*b**3*c**3) - b, Lambda(_t, _t*log(x + (243*_t**5*a**7*
c*d**6 - 1458*_t**5*a**6*b*c**2*d**5 + 3645*_t**5*a**5*b**2*c**3*
d**4 - 4860*_t**5*a**4*b**3*c**4*d**3 + 3645*_t**5*a**3*b**4*c**5
*d**2 - 1458*_t**5*a**2*b**5*c**6*d + 243*_t**5*a*b**6*c**7 + 9*_
t**2*a**4*d**4 - 18*_t**2*a**3*b*c*d**3 + 18*_t**2*a**2*b**2*c**2
*d**2 - 18*_t**2*a*b**3*c**3*d + 9*_t**2*b**4*c**4)/(a*b*d**2 + b
**2*c*d)))) + RootSum(_t**3*(27*a**3*c*d**3 - 81*a**2*b*c**2*d**2
 + 81*a*b**2*c**3*d - 27*b**3*c**4) + d, Lambda(_t, _t*log(x + (2
43*_t**5*a**7*c*d**6 - 1458*_t**5*a**6*b*c**2*d**5 + 3645*_t**5*a
**5*b**2*c**3*d**4 - 4860*_t**5*a**4*b**3*c**4*d**3 + 3645*_t**5*
a**3*b**4*c**5*d**2 - 1458*_t**5*a**2*b**5*c**6*d + 243*_t**5*a*b
**6*c**7 + 9*_t**2*a**4*d**4 - 18*_t**2*a**3*b*c*d**3 + 18*_t**2*
a**2*b**2*c**2*d**2 - 18*_t**2*a*b**3*c**3*d + 9*_t**2*b**4*c**4)
/(a*b*d**2 + b**2*c*d))))
```

<u>**GIAC/XCAS**</u> **[A]** time = 0.228643, size = 392, normalized size = 1.36

$$-\frac{b\left(-\frac{a}{b}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\left(abc-a^{2}d\right)}+\frac{d\left(-\frac{c}{d}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\left(bc^{2}-acd\right)}-\frac{\left(-ab^{2}\right)^{\frac{2}{3}}\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}ab^{2}c-\sqrt{3}a^{2}bd}+\frac{\left(-cd^{2}\right)^{\frac{2}{3}}\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bc^{2}d-\sqrt{3}acd^{2}}+\frac{\left(-ab^{2}\right)^{\frac{2}{3}}\ln\left(x^{2}+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\left(ab^{2}c-a^{2}bd\right)}-\frac{\left(-cd^{2}\right)^{\frac{2}{3}}\ln\left(x^{2}+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\left(bc^{2}d-acd^{2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] -1/3*b*(-a/b)^(2/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b*c - a^2*d) + 1
/3*d*(-c/d)^(2/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^2 - a*c*d) - (-a
*b^2)^(2/3)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))
/(sqrt(3)*a*b^2*c - sqrt(3)*a^2*b*d) + (-c*d^2)^(2/3)*arctan(1/3*
sqrt(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*b*c^2*d - sqr
t(3)*a*c*d^2) + 1/6*(-a*b^2)^(2/3)*ln(x^2 + x*(-a/b)^(1/3) + (-a/
b)^(2/3))/(a*b^2*c - a^2*b*d) - 1/6*(-c*d^2)^(2/3)*ln(x^2 + x*(-c
/d)^(1/3) + (-c/d)^(2/3))/(b*c^2*d - a*c*d^2)
```

3.115 $\int \frac{1}{(a+bx^3)(c+dx^3)} \, dx$

Optimal. Leaf size=288

$$-\frac{b^{2/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{2/3}(bc-ad)}+\frac{b^{2/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{2/3}(bc-ad)}-\frac{b^{2/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{2/3}(bc-ad)}+\frac{d^{2/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{2/3}(bc-ad)}-\frac{d^{2/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{2/3}(bc-ad)}+\frac{d^{2/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{2/3}(bc-ad)}$$

```
[Out] -((b^(2/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sq
rt[3]*a^(2/3)*(b*c - a*d))) + (d^(2/3)*ArcTan[(c^(1/3) - 2*d^(1/3
)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(2/3)*(b*c - a*d)) + (b^(2/3)
*Log[a^(1/3) + b^(1/3)*x])/(3*a^(2/3)*(b*c - a*d)) - (d^(2/3)*Log
[c^(1/3) + d^(1/3)*x])/(3*c^(2/3)*(b*c - a*d)) - (b^(2/3)*Log[a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(2/3)*(b*c - a*d))
+ (d^(2/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(
2/3)*(b*c - a*d))
```

Rubi [A] time = 0.348858, antiderivative size = 288, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 7, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.368$

$$-\frac{b^{2/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{2/3}(bc-ad)}+\frac{b^{2/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{2/3}(bc-ad)}-\frac{b^{2/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{2/3}(bc-ad)}+\frac{d^{2/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{2/3}(bc-ad)}-\frac{d^{2/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{2/3}(bc-ad)}+\frac{d^{2/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{2/3}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -((b^(2/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sq
rt[3]*a^(2/3)*(b*c - a*d))) + (d^(2/3)*ArcTan[(c^(1/3) - 2*d^(1/3
)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(2/3)*(b*c - a*d)) + (b^(2/3)
*Log[a^(1/3) + b^(1/3)*x])/(3*a^(2/3)*(b*c - a*d)) - (d^(2/3)*Log
[c^(1/3) + d^(1/3)*x])/(3*c^(2/3)*(b*c - a*d)) - (b^(2/3)*Log[a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(2/3)*(b*c - a*d))
+ (d^(2/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(
2/3)*(b*c - a*d))
```

Rubi in Sympy [A] time = 66.5821, size = 260, normalized size = 0.9

$$\frac{d^{\frac{2}{3}}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{\frac{2}{3}}\left(ad-bc\right)}-\frac{d^{\frac{2}{3}}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6c^{\frac{2}{3}}\left(ad-bc\right)}-\frac{\sqrt{3}d^{\frac{2}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3c^{\frac{2}{3}}\left(ad-bc\right)}-\frac{b^{\frac{2}{3}}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{2}{3}}\left(ad-bc\right)}+\frac{b^{\frac{2}{3}}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{2}{3}}\left(ad-bc\right)}+\frac{\sqrt{3}b^{\frac{2}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{2}{3}}\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] d**(2/3)*log(c**(1/3) + d**(1/3)*x)/(3*c**(2/3)*(a*d - b*c)) - d*
*(2/3)*log(c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*c**
(2/3)*(a*d - b*c)) - sqrt(3)*d**(2/3)*atan(sqrt(3)*(c**(1/3)/3 -
2*d**(1/3)*x/3)/c**(1/3))/(3*c**(2/3)*(a*d - b*c)) - b**(2/3)*log
(a**(1/3) + b**(1/3)*x)/(3*a**(2/3)*(a*d - b*c)) + b**(2/3)*log(a
**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*a**(2/3)*(a*d -
 b*c)) + sqrt(3)*b**(2/3)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x
/3)/a**(1/3))/(3*a**(2/3)*(a*d - b*c))
```

Mathematica [A] time = 0.222932, size = 224, normalized size = 0.78

$$\frac{\frac{b^{2/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{2/3}}-\frac{2b^{2/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{2/3}}+\frac{2\sqrt{3}b^{2/3}\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{2/3}}-\frac{d^{2/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{c^{2/3}}+\frac{2d^{2/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{c^{2/3}}-}{6ad-6bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((2*Sqrt[3]*b^(2/3)*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/
a^(2/3) - (2*Sqrt[3]*d^(2/3)*ArcTan[(1 - (2*d^(1/3)*x)/c^(1/3))/S
qrt[3]])/c^(2/3) - (2*b^(2/3)*Log[a^(1/3) + b^(1/3)*x])/a^(2/3) +
 (2*d^(2/3)*Log[c^(1/3) + d^(1/3)*x])/c^(2/3) + (b^(2/3)*Log[a^(2
/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/a^(2/3) - (d^(2/3)*Log[c^
(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/c^(2/3))/(-6*b*c + 6*a*
d)
```

Maple [A] time = 0.002, size = 222, normalized size = 0.8

$$-\frac{1}{3\,ad-3\,bc}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{1}{6\,ad-6\,bc}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$-\frac{\sqrt{3}}{3\,ad-3\,bc}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}+\frac{1}{3\,ad-3\,bc}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$
$$-\frac{1}{6\,ad-6\,bc}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}+\frac{\sqrt{3}}{3\,ad-3\,bc}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/3/(a*d-b*c)/(a/b)^(2/3)*ln(x+(a/b)^(1/3))+1/6/(a*d-b*c)/(a/b)^
(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-1/3/(a*d-b*c)/(a/b)^(2/3)
*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+1/3/(a*d-b*c)/(c
/d)^(2/3)*ln(x+(c/d)^(1/3))-1/6/(a*d-b*c)/(c/d)^(2/3)*ln(x^2-x*(c
/d)^(1/3)+(c/d)^(2/3))+1/3/(a*d-b*c)/(c/d)^(2/3)*3^(1/2)*arctan(1
/3*3^(1/2)*(2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.302653, size = 377, normalized size = 1.31

$$\frac{\sqrt{3}\left(\sqrt{3}\left(-\frac{b^2}{a^2}\right)^{\frac{1}{3}}\log\left(b^2x^2+abx\left(-\frac{b^2}{a^2}\right)^{\frac{1}{3}}+a^2\left(-\frac{b^2}{a^2}\right)^{\frac{2}{3}}\right)+\sqrt{3}\left(\frac{d^2}{c^2}\right)^{\frac{1}{3}}\log\left(d^2x^2-cdx\left(\frac{d^2}{c^2}\right)^{\frac{1}{3}}+c^2\left(\frac{d^2}{c^2}\right)^{\frac{2}{3}}\right)-2\sqrt{3}\left(-\frac{b^2}{a^2}\right)^{\frac{1}{3}}\log\cdots}{18\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*(-b^2/a^2)^(1/3)*log(b^2*x^2 + a*b*x*(-b^2/
a^2)^(1/3) + a^2*(-b^2/a^2)^(2/3)) + sqrt(3)*(d^2/c^2)^(1/3)*log(
d^2*x^2 - c*d*x*(d^2/c^2)^(1/3) + c^2*(d^2/c^2)^(2/3)) - 2*sqrt(3
)*(-b^2/a^2)^(1/3)*log(b*x - a*(-b^2/a^2)^(1/3)) - 2*sqrt(3)*(d^2
/c^2)^(1/3)*log(d*x + c*(d^2/c^2)^(1/3)) + 6*(-b^2/a^2)^(1/3)*arc
tan(1/3*(2*sqrt(3)*b*x + sqrt(3)*a*(-b^2/a^2)^(1/3))/(a*(-b^2/a^2
)^(1/3))) + 6*(d^2/c^2)^(1/3)*arctan(-1/3*(2*sqrt(3)*d*x - sqrt(3
)*c*(d^2/c^2)^(1/3))/(c*(d^2/c^2)^(1/3)))))/(b*c - a*d)
```

Sympy [A] time = 105.04, size = 447, normalized size = 1.55

$$\mathrm{RootSum}\left(t^3\left(27a^5d^3-81a^4bcd^2+81a^3b^2c^2d-27a^2b^3c^3\right)+b^2,\left(t\mapsto t\log\left(x+\frac{81t^4a^7c^2d^5-243t^4a^6bc^3d^4+162t^4a^5b^2c^4\cdots}{\cdots}\right)\right)\right)$$
$$+\mathrm{RootSum}\left(t^3\left(27a^3c^2d^3-81a^2bc^3d^2+81ab^2c^4d-27b^3c^5\right)-d^2,\left(t\mapsto t\log\left(x+\frac{81t^4a^7c^2d^5-243t^4a^6bc^3d^4+162t^4a^5b^2c\cdots}{\cdots}\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] RootSum(_t**3*(27*a**5*d**3 - 81*a**4*b*c*d**2 + 81*a**3*b**2*c**
2*d - 27*a**2*b**3*c**3) + b**2, Lambda(_t, _t*log(x + (81*_t**4*
a**7*c**2*d**5 - 243*_t**4*a**6*b*c**3*d**4 + 162*_t**4*a**5*b**2
*c**4*d**3 + 162*_t**4*a**4*b**3*c**5*d**2 - 243*_t**4*a**3*b**4*
c**6*d + 81*_t**4*a**2*b**5*c**7 - 3*_t*a**4*d**4 + 3*_t*a**3*b*c
*d**3 + 3*_t*a*b**3*c**3*d - 3*_t*b**4*c**4)/(a**2*b*d**3 + b**3*
c**2*d)))) + RootSum(_t**3*(27*a**3*c**2*d**3 - 81*a**2*b*c**3*d*
*2 + 81*a*b**2*c**4*d - 27*b**3*c**5) - d**2, Lambda(_t, _t*log(x
 + (81*_t**4*a**7*c**2*d**5 - 243*_t**4*a**6*b*c**3*d**4 + 162*_t
**4*a**5*b**2*c**4*d**3 + 162*_t**4*a**4*b**3*c**5*d**2 - 243*_t*
*4*a**3*b**4*c**6*d + 81*_t**4*a**2*b**5*c**7 - 3*_t*a**4*d**4 +
3*_t*a**3*b*c*d**3 + 3*_t*a*b**3*c**3*d - 3*_t*b**4*c**4)/(a**2*b
*d**3 + b**3*c**2*d))))
```

GIAC/XCAS [A] time = 0.226518, size = 375, normalized size = 1.3

$$-\frac{b\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,(abc-a^2d)}+\frac{d\left(-\frac{c}{d}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\,(bc^2-acd)}+\frac{\left(-ab^2\right)^{\frac{1}{3}}\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}abc-\sqrt{3}a^2d}-\frac{\left(-cd^2\right)^{\frac{1}{3}}\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bc^2-\sqrt{3}acd}+\frac{\left(-ab^2\right)^{\frac{1}{3}}\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,(abc-a^2d)}-\frac{\left(-cd^2\right)^{\frac{1}{3}}\ln\left(x^2+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\,(bc^2-acd)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] -1/3*b*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a*b*c - a^2*d) + 1
/3*d*(-c/d)^(1/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^2 - a*c*d) + (-a
*b^2)^(1/3)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)^(1/3))
/(sqrt(3)*a*b*c - sqrt(3)*a^2*d) - (-c*d^2)^(1/3)*arctan(1/3*sqrt
(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*b*c^2 - sqrt(3)*a
*c*d) + 1/6*(-a*b^2)^(1/3)*ln(x^2 + x*(-a/b)^(1/3) + (-a/b)^(2/3)
)/(a*b*c - a^2*d) - 1/6*(-c*d^2)^(1/3)*ln(x^2 + x*(-c/d)^(1/3) +
(-c/d)^(2/3))/(b*c^2 - a*c*d)
```

3.116 $\int \frac{1}{x(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=62

$$-\frac{b\log\left(a+bx^3\right)}{3a(bc-ad)}+\frac{d\log\left(c+dx^3\right)}{3c(bc-ad)}+\frac{\log(x)}{ac}$$

```
[Out] Log[x]/(a*c) - (b*Log[a + b*x^3])/(3*a*(b*c - a*d)) + (d*Log[c +
d*x^3])/(3*c*(b*c - a*d))
```

Rubi [A] time = 0.171639, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{b\log\left(a+bx^3\right)}{3a(bc-ad)}+\frac{d\log\left(c+dx^3\right)}{3c(bc-ad)}+\frac{\log(x)}{ac}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] Log[x]/(a*c) - (b*Log[a + b*x^3])/(3*a*(b*c - a*d)) + (d*Log[c +
d*x^3])/(3*c*(b*c - a*d))
```

Rubi in Sympy [A] time = 23.2207, size = 49, normalized size = 0.79

$$-\frac{d\log\left(c+dx^3\right)}{3c\,(ad-bc)}+\frac{b\log\left(a+bx^3\right)}{3a\,(ad-bc)}+\frac{\log\left(x^3\right)}{3ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -d*log(c + d*x**3)/(3*c*(a*d - b*c)) + b*log(a + b*x**3)/(3*a*(a*
d - b*c)) + log(x**3)/(3*a*c)
```

Mathematica [A] time = 0.0555116, size = 54, normalized size = 0.87

$$\frac{-bc\log\left(a+bx^3\right)+ad\log\left(c+dx^3\right)-3ad\log(x)+3bc\log(x)}{3abc^2-3a^2cd}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] (3*b*c*Log[x] - 3*a*d*Log[x] - b*c*Log[a + b*x^3] + a*d*Log[c + d
*x^3])/(3*a*b*c^2 - 3*a^2*c*d)
```

Maple [A] time = 0.013, size = 59, normalized size = 1.

$$\frac{\ln(x)}{ac}+\frac{b\ln\left(bx^3+a\right)}{3\,a\,(ad-bc)}-\frac{d\ln\left(dx^3+c\right)}{3\,c\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] ln(x)/a/c+1/3*b/a/(a*d-b*c)*ln(b*x^3+a)-1/3*d/c/(a*d-b*c)*ln(d*x^
3+c)
```

Maxima [A] time = 1.38134, size = 82, normalized size = 1.32

$$-\frac{b\log\left(bx^3+a\right)}{3\left(abc-a^2d\right)}+\frac{d\log\left(dx^3+c\right)}{3\left(bc^2-acd\right)}+\frac{\log\left(x^3\right)}{3\,ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x),x, algorithm="maxima")
```

```
[Out] -1/3*b*log(b*x^3 + a)/(a*b*c - a^2*d) + 1/3*d*log(d*x^3 + c)/(b*c
^2 - a*c*d) + 1/3*log(x^3)/(a*c)
```

Fricas [A] time = 0.550342, size = 73, normalized size = 1.18

$$-\frac{bc\log\left(bx^3+a\right)-ad\log\left(dx^3+c\right)-3\left(bc-ad\right)\log\left(x\right)}{3\left(abc^2-a^2cd\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x),x, algorithm="fricas")
```

```
[Out] -1/3*(b*c*log(b*x^3 + a) - a*d*log(d*x^3 + c) - 3*(b*c - a*d)*log
(x))/(a*b*c^2 - a^2*c*d)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.117 $\int \frac{1}{x^2(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=299

$$-\frac{b^{4/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{4/3}(bc-ad)}+\frac{b^{4/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{4/3}(bc-ad)}+\frac{b^{4/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{4/3}(bc-ad)}+\frac{d^{4/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{4/3}(bc-ad)}-\frac{d^{4/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{4/3}(bc-ad)}-\frac{d^{4/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{4/3}(bc-ad)}-\frac{1}{acx}$$

```
[Out] -(1/(a*c*x)) + (b^(4/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a
^(1/3))])/(Sqrt[3]*a^(4/3)*(b*c - a*d)) - (d^(4/3)*ArcTan[(c^(1/3
) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(4/3)*(b*c - a*d)
) + (b^(4/3)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(4/3)*(b*c - a*d)) -
(d^(4/3)*Log[c^(1/3) + d^(1/3)*x])/(3*c^(4/3)*(b*c - a*d)) - (b^(
4/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(4/3)*(
b*c - a*d)) + (d^(4/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*
x^2])/(6*c^(4/3)*(b*c - a*d))
```

Rubi [A] time = 0.691927, antiderivative size = 299, normalized size of antiderivative = 1., number of steps used = 15, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$

$$-\frac{b^{4/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{4/3}(bc-ad)}+\frac{b^{4/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{4/3}(bc-ad)}+\frac{b^{4/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{4/3}(bc-ad)}+\frac{d^{4/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{4/3}(bc-ad)}-\frac{d^{4/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{4/3}(bc-ad)}-\frac{d^{4/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{4/3}(bc-ad)}-\frac{1}{acx}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -(1/(a*c*x)) + (b^(4/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a
^(1/3))])/(Sqrt[3]*a^(4/3)*(b*c - a*d)) - (d^(4/3)*ArcTan[(c^(1/3
) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(4/3)*(b*c - a*d)
) + (b^(4/3)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(4/3)*(b*c - a*d)) -
(d^(4/3)*Log[c^(1/3) + d^(1/3)*x])/(3*c^(4/3)*(b*c - a*d)) - (b^(
4/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(4/3)*(
b*c - a*d)) + (d^(4/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*
x^2])/(6*c^(4/3)*(b*c - a*d))
```

Rubi in Sympy [A] time = 115.728, size = 267, normalized size = 0.89

$$\frac{d^{\frac{4}{3}}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{\frac{4}{3}}\left(ad-bc\right)}-\frac{d^{\frac{4}{3}}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6c^{\frac{4}{3}}\left(ad-bc\right)}+\frac{\sqrt{3}d^{\frac{4}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3c^{\frac{4}{3}}\left(ad-bc\right)}-\frac{1}{acx}-\frac{b^{\frac{4}{3}}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{4}{3}}\left(ad-bc\right)}+\frac{b^{\frac{4}{3}}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{4}{3}}\left(ad-bc\right)}-\frac{\sqrt{3}b^{\frac{4}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{4}{3}}\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] d**(4/3)*log(c**(1/3) + d**(1/3)*x)/(3*c**(4/3)*(a*d - b*c)) - d*
*(4/3)*log(c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*c**
(4/3)*(a*d - b*c)) + sqrt(3)*d**(4/3)*atan(sqrt(3)*(c**(1/3)/3 -
2*d**(1/3)*x/3)/c**(1/3))/(3*c**(4/3)*(a*d - b*c)) - 1/(a*c*x) -
b**(4/3)*log(a**(1/3) + b**(1/3)*x)/(3*a**(4/3)*(a*d - b*c)) + b*
*(4/3)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*a**
(4/3)*(a*d - b*c)) - sqrt(3)*b**(4/3)*atan(sqrt(3)*(a**(1/3)/3 -
2*b**(1/3)*x/3)/a**(1/3))/(3*a**(4/3)*(a*d - b*c))
```

Mathematica [A] time = 0.309663, size = 244, normalized size = 0.82

$$\frac{\frac{b^{4/3}x\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{4/3}}-\frac{2b^{4/3}x\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{4/3}}-\frac{2\sqrt{3}b^{4/3}x\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{4/3}}+\frac{6b}{a}-\frac{d^{4/3}x\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{c^{4/3}}+\frac{2d^{4/3}x\log\left(\cdots\right.}{c^{4/\cdots}}}{6adx-6bcx}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((6*b)/a - (6*d)/c - (2*Sqrt[3]*b^(4/3)*x*ArcTan[(1 - (2*b^(1/3)*
x)/a^(1/3))/Sqrt[3]])/a^(4/3) + (2*Sqrt[3]*d^(4/3)*x*ArcTan[(1 -
(2*d^(1/3)*x)/c^(1/3))/Sqrt[3]])/c^(4/3) - (2*b^(4/3)*x*Log[a^(1/
3) + b^(1/3)*x])/a^(4/3) + (2*d^(4/3)*x*Log[c^(1/3) + d^(1/3)*x])
/c^(4/3) + (b^(4/3)*x*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x
^2])/a^(4/3) - (d^(4/3)*x*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/
3)*x^2])/c^(4/3))/(-6*b*c*x + 6*a*d*x)
```

Maple [A] time = 0.013, size = 257, normalized size = 0.9

$$-\frac{b}{3a(ad-bc)}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{b}{6a(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$+\frac{b\sqrt{3}}{3a(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{d}{3c(ad-bc)}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$
$$-\frac{d}{6c(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}-\frac{d\sqrt{3}}{3c(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}-\frac{1}{acx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/3*b/a/(a*d-b*c)/(a/b)^(1/3)*ln(x+(a/b)^(1/3))+1/6*b/a/(a*d-b*c
)/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+1/3*b/a/(a*d-b*c)
*3^(1/2)/(a/b)^(1/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+1/3*
d/c/(a*d-b*c)/(c/d)^(1/3)*ln(x+(c/d)^(1/3))-1/6*d/c/(a*d-b*c)/(c/
d)^(1/3)*ln(x^2-x*(c/d)^(1/3)+(c/d)^(2/3))-1/3*d/c/(a*d-b*c)*3^(1
/2)/(c/d)^(1/3)*arctan(1/3*3^(1/2)*(2/(c/d)^(1/3)*x-1))-1/a/c/x
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.252817, size = 377, normalized size = 1.26

$$\frac{\sqrt{3}\left(\sqrt{3}bcx\left(-\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx^2 - ax\left(-\frac{b}{a}\right)^{\frac{2}{3}} - a\left(-\frac{b}{a}\right)^{\frac{1}{3}}\right) + \sqrt{3}adx\left(\frac{d}{c}\right)^{\frac{1}{3}}\log\left(dx^2 - cx\left(\frac{d}{c}\right)^{\frac{2}{3}} + c\left(\frac{d}{c}\right)^{\frac{1}{3}}\right) - 2\sqrt{3}bcx\left(-\frac{b}{a}\right)^{\frac{1}{3}}\log\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^2),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*b*c*x*(-b/a)^(1/3)*log(b*x^2 - a*x*(-b/a)^(
2/3) - a*(-b/a)^(1/3)) + sqrt(3)*a*d*x*(d/c)^(1/3)*log(d*x^2 - c*
x*(d/c)^(2/3) + c*(d/c)^(1/3)) - 2*sqrt(3)*b*c*x*(-b/a)^(1/3)*log
(b*x + a*(-b/a)^(2/3)) - 2*sqrt(3)*a*d*x*(d/c)^(1/3)*log(d*x + c*
(d/c)^(2/3)) - 6*b*c*x*(-b/a)^(1/3)*arctan(-1/3*(2*sqrt(3)*b*x -
sqrt(3)*a*(-b/a)^(2/3))/(a*(-b/a)^(2/3))) - 6*a*d*x*(d/c)^(1/3)*a
rctan(-1/3*(2*sqrt(3)*d*x - sqrt(3)*c*(d/c)^(2/3))/(c*(d/c)^(2/3)
)) - 6*sqrt(3)*(b*c - a*d))/((a*b*c^2 - a^2*c*d)*x)
```

Sympy [A] time = 108.363, size = 661, normalized size = 2.21

$$\mathrm{RootSum}\left(t^3\left(27a^7d^3 - 81a^6bcd^2 + 81a^5b^2c^2d - 27a^4b^3c^3\right) + b^4, \left(t \mapsto t\log\left(x + \frac{-243t^5a^{12}c^4d^8 + 1215t^5a^{11}bc^5d^7 - 2430t^5}{}\right.\right.\right.$$

$$+\mathrm{RootSum}\left(t^3\left(27a^3c^4d^3 - 81a^2bc^5d^2 + 81ab^2c^6d - 27b^3c^7\right) - d^4, \left(t \mapsto t\log\left(x + \frac{-243t^5a^{12}c^4d^8 + 1215t^5a^{11}bc^5d^7 - 2430}{}\right.\right.\right.$$

$$-\frac{1}{acx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] RootSum(_t**3*(27*a**7*d**3 - 81*a**6*b*c*d**2 + 81*a**5*b**2*c**
2*d - 27*a**4*b**3*c**3) + b**4, Lambda(_t, _t*log(x + (-243*_t**
5*a**12*c**4*d**8 + 1215*_t**5*a**11*b*c**5*d**7 - 2430*_t**5*a**
10*b**2*c**6*d**6 + 2673*_t**5*a**9*b**3*c**7*d**5 - 2430*_t**5*a
**8*b**4*c**8*d**4 + 2673*_t**5*a**7*b**5*c**9*d**3 - 2430*_t**5*
a**6*b**6*c**10*d**2 + 1215*_t**5*a**5*b**7*c**11*d - 243*_t**5*a
**4*b**8*c**12 + 9*_t**2*a**9*d**9 - 18*_t**2*a**8*b*c*d**8 + 9*_
t**2*a**7*b**2*c**2*d**7 + 9*_t**2*a**2*b**7*c**7*d**2 - 18*_t**2
*a*b**8*c**8*d + 9*_t**2*b**9*c**9)/(a**4*b**3*d**7 + b**7*c**4*d
**3)))) + RootSum(_t**3*(27*a**3*c**4*d**3 - 81*a**2*b*c**5*d**2
+ 81*a*b**2*c**6*d - 27*b**3*c**7) - d**4, Lambda(_t, _t*log(x +
(-243*_t**5*a**12*c**4*d**8 + 1215*_t**5*a**11*b*c**5*d**7 - 2430
*_t**5*a**10*b**2*c**6*d**6 + 2673*_t**5*a**9*b**3*c**7*d**5 - 24
30*_t**5*a**8*b**4*c**8*d**4 + 2673*_t**5*a**7*b**5*c**9*d**3 - 2
430*_t**5*a**6*b**6*c**10*d**2 + 1215*_t**5*a**5*b**7*c**11*d - 2
43*_t**5*a**4*b**8*c**12 + 9*_t**2*a**9*d**9 - 18*_t**2*a**8*b*c*
d**8 + 9*_t**2*a**7*b**2*c**2*d**7 + 9*_t**2*a**2*b**7*c**7*d**2
- 18*_t**2*a*b**8*c**8*d + 9*_t**2*b**9*c**9)/(a**4*b**3*d**7 + b
**7*c**4*d**3)))) - 1/(a*c*x)
```

GIAC/XCAS [A] time = 0.228523, size = 412, normalized size = 1.38

$$\frac{b^2\left(-\frac{a}{b}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\left(a^2bc-a^3d\right)}-\frac{d^2\left(-\frac{c}{d}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\left(bc^3-ac^2d\right)}+\frac{\left(-ab^2\right)^{\frac{2}{3}}\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}a^2bc-\sqrt{3}a^3d}-\frac{\left(-cd^2\right)^{\frac{2}{3}}\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bc^3-\sqrt{3}ac^2d}-\frac{\left(-ab^2\right)^{\frac{2}{3}}\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\left(a^2bc-a^3d\right)}+\frac{\left(-cd^2\right)^{\frac{2}{3}}\ln\left(x^2+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\left(bc^3-ac^2d\right)}-\frac{1}{acx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^2),x, algorithm="giac")
```

```
[Out] 1/3*b^2*(-a/b)^(2/3)*ln(abs(x - (-a/b)^(1/3)))/(a^2*b*c - a^3*d)
- 1/3*d^2*(-c/d)^(2/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^3 - a*c^2*d
) + (-a*b^2)^(2/3)*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/b)
^(1/3))/(sqrt(3)*a^2*b*c - sqrt(3)*a^3*d) - (-c*d^2)^(2/3)*arctan
(1/3*sqrt(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*b*c^3 -
sqrt(3)*a*c^2*d) - 1/6*(-a*b^2)^(2/3)*ln(x^2 + x*(-a/b)^(1/3) + (
-a/b)^(2/3))/(a^2*b*c - a^3*d) + 1/6*(-c*d^2)^(2/3)*ln(x^2 + x*(-
c/d)^(1/3) + (-c/d)^(2/3))/(b*c^3 - a*c^2*d) - 1/(a*c*x)
```

3.118 $\int \frac{1}{x^3(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=301

$$\frac{b^{5/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{5/3}(bc-ad)}-\frac{b^{5/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{5/3}(bc-ad)}+\frac{b^{5/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{5/3}(bc-ad)}-\frac{d^{5/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{5/3}(bc-ad)}+\frac{d^{5/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{5/3}(bc-ad)}-\frac{d^{5/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{5/3}(bc-ad)}-\frac{1}{2acx^2}$$

```
[Out] -1/(2*a*c*x^2) + (b^(5/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]
*a^(1/3))])/(Sqrt[3]*a^(5/3)*(b*c - a*d)) - (d^(5/3)*ArcTan[(c^(1
/3) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(5/3)*(b*c - a*
d)) - (b^(5/3)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(5/3)*(b*c - a*d))
+ (d^(5/3)*Log[c^(1/3) + d^(1/3)*x])/(3*c^(5/3)*(b*c - a*d)) + (b
^(5/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(5/3)
*(b*c - a*d)) - (d^(5/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3
)*x^2])/(6*c^(5/3)*(b*c - a*d))
```

Rubi [A] time = 0.634966, antiderivative size = 301, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$\frac{b^{5/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{5/3}(bc-ad)}-\frac{b^{5/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{5/3}(bc-ad)}+\frac{b^{5/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{5/3}(bc-ad)}-\frac{d^{5/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{5/3}(bc-ad)}+\frac{d^{5/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{5/3}(bc-ad)}-\frac{d^{5/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{5/3}(bc-ad)}-\frac{1}{2acx^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -1/(2*a*c*x^2) + (b^(5/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]
*a^(1/3))])/(Sqrt[3]*a^(5/3)*(b*c - a*d)) - (d^(5/3)*ArcTan[(c^(1
/3) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(5/3)*(b*c - a*
d)) - (b^(5/3)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(5/3)*(b*c - a*d))
+ (d^(5/3)*Log[c^(1/3) + d^(1/3)*x])/(3*c^(5/3)*(b*c - a*d)) + (b
^(5/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/(6*a^(5/3)
*(b*c - a*d)) - (d^(5/3)*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3
)*x^2])/(6*c^(5/3)*(b*c - a*d))
```

Rubi in Sympy [A] time = 103.149, size = 270, normalized size = 0.9

$$-\frac{d^{\frac{5}{3}}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{\frac{5}{3}}\left(ad-bc\right)}+\frac{d^{\frac{5}{3}}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6c^{\frac{5}{3}}\left(ad-bc\right)}+\frac{\sqrt{3}d^{\frac{5}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3c^{\frac{5}{3}}\left(ad-bc\right)}-\frac{1}{2acx^2}+\frac{b^{\frac{5}{3}}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{5}{3}}\left(ad-bc\right)}-\frac{b^{\frac{5}{3}}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{5}{3}}\left(ad-bc\right)}-\frac{\sqrt{3}b^{\frac{5}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{5}{3}}\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -d**(5/3)*log(c**(1/3) + d**(1/3)*x)/(3*c**(5/3)*(a*d - b*c)) + d
**(5/3)*log(c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*c*
*(5/3)*(a*d - b*c)) + sqrt(3)*d**(5/3)*atan(sqrt(3)*(c**(1/3)/3 -
 2*d**(1/3)*x/3)/c**(1/3))/(3*c**(5/3)*(a*d - b*c)) - 1/(2*a*c*x*
*2) + b**(5/3)*log(a**(1/3) + b**(1/3)*x)/(3*a**(5/3)*(a*d - b*c)
) - b**(5/3)*log(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(6*a**(5/3)*(a*d - b*c)) - sqrt(3)*b**(5/3)*atan(sqrt(3)*(a**(1/3
)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*a**(5/3)*(a*d - b*c))
```

Mathematica [A] time = 0.374834, size = 259, normalized size = 0.86

$$\frac{\frac{2b^{5/3}x^2\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{5/3}}-\frac{b^{5/3}x^2\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{5/3}}-\frac{2\sqrt{3}b^{5/3}x^2\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{5/3}}+\frac{3b}{a}-\frac{2d^{5/3}x^2\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{c^{5/3}}+\frac{d^{5/3}x^2\log\left(c^{2/3}-\sqrt[3]{c}\cdots\right.}{c^{5/3}}}{6x^2(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((3*b)/a - (3*d)/c - (2*Sqrt[3]*b^(5/3)*x^2*ArcTan[(1 - (2*b^(1/3
)*x)/a^(1/3))/Sqrt[3]])/a^(5/3) + (2*Sqrt[3]*d^(5/3)*x^2*ArcTan[(
1 - (2*d^(1/3)*x)/c^(1/3))/Sqrt[3]])/c^(5/3) + (2*b^(5/3)*x^2*Log
[a^(1/3) + b^(1/3)*x])/a^(5/3) - (2*d^(5/3)*x^2*Log[c^(1/3) + d^(
1/3)*x])/c^(5/3) - (b^(5/3)*x^2*Log[a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2])/a^(5/3) + (d^(5/3)*x^2*Log[c^(2/3) - c^(1/3)*d^(1/
3)*x + d^(2/3)*x^2])/c^(5/3))/(6*(-(b*c) + a*d)*x^2)
```

Maple [A] time = 0.013, size = 257, normalized size = 0.9

$$\frac{b}{3\,a\,(ad-bc)}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{b}{6\,a\,(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{b\sqrt{3}}{3\,a\,(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{1}{2\,acx^2}-\frac{d}{3\,c\,(ad-bc)}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$
$$+\frac{d}{6\,c\,(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}-\frac{d\sqrt{3}}{3\,c\,(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] 1/3/a*b/(a*d-b*c)/(a/b)^(2/3)*ln(x+(a/b)^(1/3))-1/6/a*b/(a*d-b*c)
/(a/b)^(2/3)*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))+1/3/a*b/(a*d-b*c)/
(a/b)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))-1/2/a
/c/x^2-1/3/c*d/(a*d-b*c)/(c/d)^(2/3)*ln(x+(c/d)^(1/3))+1/6/c*d/(a
*d-b*c)/(c/d)^(2/3)*ln(x^2-x*(c/d)^(1/3)+(c/d)^(2/3))-1/3/c*d/(a*
d-b*c)/(c/d)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(c/d)^(1/3)*x-1)
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.12364, size = 447, normalized size = 1.49

$$\frac{\sqrt{3}\left(\sqrt{3}bcx^2\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}}\log\left(b^2x^2 - abx\left(\frac{b^2}{a^2}\right)^{\frac{1}{3}} + a^2\left(\frac{b^2}{a^2}\right)^{\frac{2}{3}}\right) + \sqrt{3}adx^2\left(-\frac{d^2}{c^2}\right)^{\frac{1}{3}}\log\left(d^2x^2 + cdx\left(-\frac{d^2}{c^2}\right)^{\frac{1}{3}} + c^2\left(-\frac{d^2}{c^2}\right)^{\frac{2}{3}}\right) - 2\sqrt{3}bc\ldots}{\ldots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^3),x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(sqrt(3)*b*c*x^2*(b^2/a^2)^(1/3)*log(b^2*x^2 - a*b*x
*(b^2/a^2)^(1/3) + a^2*(b^2/a^2)^(2/3)) + sqrt(3)*a*d*x^2*(-d^2/c
^2)^(1/3)*log(d^2*x^2 + c*d*x*(-d^2/c^2)^(1/3) + c^2*(-d^2/c^2)^(
2/3)) - 2*sqrt(3)*b*c*x^2*(b^2/a^2)^(1/3)*log(b*x + a*(b^2/a^2)^(
1/3)) - 2*sqrt(3)*a*d*x^2*(-d^2/c^2)^(1/3)*log(d*x - c*(-d^2/c^2)
^(1/3)) + 6*b*c*x^2*(b^2/a^2)^(1/3)*arctan(-1/3*(2*sqrt(3)*b*x -
sqrt(3)*a*(b^2/a^2)^(1/3))/(a*(b^2/a^2)^(1/3))) + 6*a*d*x^2*(-d^2
/c^2)^(1/3)*arctan(1/3*(2*sqrt(3)*d*x + sqrt(3)*c*(-d^2/c^2)^(1/3
))/(c*(-d^2/c^2)^(1/3))) - 3*sqrt(3)*(b*c - a*d))/((a*b*c^2 - a^2
*c*d)*x^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.225098, size = 417, normalized size = 1.39

$$\frac{b^2\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\left(a^2bc - a^3d\right)} - \frac{d^2\left(-\frac{c}{d}\right)^{\frac{1}{3}}\ln\left(\left|x - \left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\left(bc^3 - ac^2d\right)} - \frac{\left(-ab^2\right)^{\frac{1}{3}}b\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}a^2bc - \sqrt{3}a^3d} + \frac{\left(-cd^2\right)^{\frac{1}{3}}d\arctan\left(\frac{\sqrt{3}\left(2x + \left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bc^3 - \sqrt{3}ac^2d} - \frac{\left(-ab^2\right)^{\frac{1}{3}}b\ln\left(x^2 + x\left(-\frac{a}{b}\right)^{\frac{1}{3}} + \left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\left(a^2bc - a^3d\right)} + \frac{\left(-cd^2\right)^{\frac{1}{3}}d\ln\left(x^2 + x\left(-\frac{c}{d}\right)^{\frac{1}{3}} + \left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\left(bc^3 - ac^2d\right)} - \frac{1}{2\,acx^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^3),x, algorithm="giac")
```

```
[Out] 1/3*b^2*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a^2*b*c - a^3*d)
- 1/3*d^2*(-c/d)^(1/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^3 - a*c^2*d
) - (-a*b^2)^(1/3)*b*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a/
b)^(1/3))/(sqrt(3)*a^2*b*c - sqrt(3)*a^3*d) + (-c*d^2)^(1/3)*d*ar
```

```
ctan(1/3*sqrt(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*b*c^
3 - sqrt(3)*a*c^2*d) - 1/6*(-a*b^2)^(1/3)*b*ln(x^2 + x*(-a/b)^(1/
3) + (-a/b)^(2/3))/(a^2*b*c - a^3*d) + 1/6*(-c*d^2)^(1/3)*d*ln(x^
2 + x*(-c/d)^(1/3) + (-c/d)^(2/3))/(b*c^3 - a*c^2*d) - 1/2/(a*c*x
^2)
```

3.119 $\int \frac{1}{x^4(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=87

$$\frac{b^2\log\left(a+bx^3\right)}{3a^2(bc-ad)}-\frac{\log(x)(ad+bc)}{a^2c^2}-\frac{d^2\log\left(c+dx^3\right)}{3c^2(bc-ad)}-\frac{1}{3acx^3}$$

```
[Out] -1/(3*a*c*x^3) - ((b*c + a*d)*Log[x])/(a^2*c^2) + (b^2*Log[a + b*
x^3])/(3*a^2*(b*c - a*d)) - (d^2*Log[c + d*x^3])/(3*c^2*(b*c - a*
d))
```

Rubi [A] time = 0.244589, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{b^2\log\left(a+bx^3\right)}{3a^2(bc-ad)}-\frac{\log(x)(ad+bc)}{a^2c^2}-\frac{d^2\log\left(c+dx^3\right)}{3c^2(bc-ad)}-\frac{1}{3acx^3}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^4*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -1/(3*a*c*x^3) - ((b*c + a*d)*Log[x])/(a^2*c^2) + (b^2*Log[a + b*
x^3])/(3*a^2*(b*c - a*d)) - (d^2*Log[c + d*x^3])/(3*c^2*(b*c - a*
d))
```

Rubi in Sympy [A] time = 30.4183, size = 76, normalized size = 0.87

$$\frac{d^2\log\left(c+dx^3\right)}{3c^2\left(ad-bc\right)}-\frac{1}{3acx^3}-\frac{b^2\log\left(a+bx^3\right)}{3a^2\left(ad-bc\right)}-\frac{(ad+bc)\log\left(x^3\right)}{3a^2c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**4/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] d**2*log(c + d*x**3)/(3*c**2*(a*d - b*c)) - 1/(3*a*c*x**3) - b**2
*log(a + b*x**3)/(3*a**2*(a*d - b*c)) - (a*d + b*c)*log(x**3)/(3*
a**2*c**2)
```

Mathematica [A] time = 0.0797666, size = 88, normalized size = 1.01

$$-\frac{b^2\log\left(a+bx^3\right)}{3a^2(ad-bc)}+\frac{\log(x)(-ad-bc)}{a^2c^2}-\frac{d^2\log\left(c+dx^3\right)}{3c^2(bc-ad)}-\frac{1}{3acx^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^4*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -1/(3*a*c*x^3) + ((-(b*c) - a*d)*Log[x])/(a^2*c^2) - (b^2*Log[a +
 b*x^3])/(3*a^2*(-(b*c) + a*d)) - (d^2*Log[c + d*x^3])/(3*c^2*(b*
c - a*d))
```

Maple [A] time = 0.016, size = 87, normalized size = 1.

$$-\frac{1}{3\,acx^3}-\frac{\ln(x)\,d}{ac^2}-\frac{\ln(x)\,b}{a^2c}-\frac{b^2\ln\left(bx^3+a\right)}{3\,a^2\,(ad-bc)}+\frac{d^2\ln\left(dx^3+c\right)}{3\,c^2\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/3/a/c/x^3-1/a/c^2*ln(x)*d-1/a^2/c*ln(x)*b-1/3*b^2/a^2/(a*d-b*c
)*ln(b*x^3+a)+1/3*d^2/c^2/(a*d-b*c)*ln(d*x^3+c)
```

Maxima [A] time = 1.40407, size = 117, normalized size = 1.34

$$\frac{b^2 \log\left(bx^3 + a\right)}{3\left(a^2bc - a^3d\right)} - \frac{d^2 \log\left(dx^3 + c\right)}{3\left(bc^3 - ac^2d\right)} - \frac{(bc + ad)\log\left(x^3\right)}{3\,a^2c^2} - \frac{1}{3\,acx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^4),x, algorithm="maxima")
```

```
[Out] 1/3*b^2*log(b*x^3 + a)/(a^2*b*c - a^3*d) - 1/3*d^2*log(d*x^3 + c)
/(b*c^3 - a*c^2*d) - 1/3*(b*c + a*d)*log(x^3)/(a^2*c^2) - 1/3/(a*
c*x^3)
```

Fricas [A] time = 1.83515, size = 134, normalized size = 1.54

$$\frac{b^2c^2x^3 \log\left(bx^3 + a\right) - a^2d^2x^3 \log\left(dx^3 + c\right) - 3\left(b^2c^2 - a^2d^2\right)x^3 \log\left(x\right) - abc^2 + a^2cd}{3\left(a^2bc^3 - a^3c^2d\right)x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^4),x, algorithm="fricas")
```

```
[Out] 1/3*(b^2*c^2*x^3*log(b*x^3 + a) - a^2*d^2*x^3*log(d*x^3 + c) - 3*
(b^2*c^2 - a^2*d^2)*x^3*log(x) - a*b*c^2 + a^2*c*d)/((a^2*b*c^3 -
 a^3*c^2*d)*x^3)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^4),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.120 $\int \frac{1}{x^5(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=318

$$\frac{b^{7/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{7/3}(bc-ad)}-\frac{b^{7/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{7/3}(bc-ad)}-\frac{b^{7/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{7/3}(bc-ad)}+\frac{ad+bc}{a^2c^2x}-\frac{d^{7/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{7/3}(bc-ad)}+\frac{d^{7/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{7/3}(bc-ad)}+\frac{d^{7/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{7/3}(bc-ad)}-\frac{1}{4acx^4}$$

```
[Out] -1/(4*a*c*x^4) + (b*c + a*d)/(a^2*c^2*x) - (b^(7/3)*ArcTan[(a^(1/
3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(7/3)*(b*c - a*d
)) + (d^(7/3)*ArcTan[(c^(1/3) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/
(Sqrt[3]*c^(7/3)*(b*c - a*d)) - (b^(7/3)*Log[a^(1/3) + b^(1/3)*x]
)/(3*a^(7/3)*(b*c - a*d)) + (d^(7/3)*Log[c^(1/3) + d^(1/3)*x])/(3
*c^(7/3)*(b*c - a*d)) + (b^(7/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2])/(6*a^(7/3)*(b*c - a*d)) - (d^(7/3)*Log[c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(7/3)*(b*c - a*d))
```

Rubi [A] time = 1.0002, antiderivative size = 318, normalized size of antiderivative = 1., number of steps used = 16, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$\frac{b^{7/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{7/3}(bc-ad)}-\frac{b^{7/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{7/3}(bc-ad)}-\frac{b^{7/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{7/3}(bc-ad)}+\frac{ad+bc}{a^2c^2x}-\frac{d^{7/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{7/3}(bc-ad)}+\frac{d^{7/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{7/3}(bc-ad)}+\frac{d^{7/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{7/3}(bc-ad)}-\frac{1}{4acx^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -1/(4*a*c*x^4) + (b*c + a*d)/(a^2*c^2*x) - (b^(7/3)*ArcTan[(a^(1/
3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(7/3)*(b*c - a*d
)) + (d^(7/3)*ArcTan[(c^(1/3) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/
(Sqrt[3]*c^(7/3)*(b*c - a*d)) - (b^(7/3)*Log[a^(1/3) + b^(1/3)*x]
)/(3*a^(7/3)*(b*c - a*d)) + (d^(7/3)*Log[c^(1/3) + d^(1/3)*x])/(3
*c^(7/3)*(b*c - a*d)) + (b^(7/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2])/(6*a^(7/3)*(b*c - a*d)) - (d^(7/3)*Log[c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(7/3)*(b*c - a*d))
```

Rubi in Sympy [A] time = 178.47, size = 286, normalized size = 0.9

$$-\frac{d^{\frac{7}{3}}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{\frac{7}{3}}(ad-bc)}+\frac{d^{\frac{7}{3}}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6c^{\frac{7}{3}}(ad-bc)}-\frac{\sqrt{3}d^{\frac{7}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3c^{\frac{7}{3}}(ad-bc)}-\frac{1}{4acx^4}+\frac{ad+bc}{a^2c^2x}+\frac{b^{\frac{7}{3}}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{7}{3}}(ad-bc)}-\frac{b^{\frac{7}{3}}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{7}{3}}(ad-bc)}+\frac{\sqrt{3}b^{\frac{7}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{7}{3}}(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -d**(7/3)*log(c**(1/3) + d**(1/3)*x)/(3*c**(7/3)*(a*d - b*c)) + d
**(7/3)*log(c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*c*
*(7/3)*(a*d - b*c)) - sqrt(3)*d**(7/3)*atan(sqrt(3)*(c**(1/3)/3 -
 2*d**(1/3)*x/3)/c**(1/3))/(3*c**(7/3)*(a*d - b*c)) - 1/(4*a*c*x*
*4) + (a*d + b*c)/(a**2*c**2*x) + b**(7/3)*log(a**(1/3) + b**(1/3
)*x)/(3*a**(7/3)*(a*d - b*c)) - b**(7/3)*log(a**(2/3) - a**(1/3)*
b**(1/3)*x + b**(2/3)*x**2)/(6*a**(7/3)*(a*d - b*c)) + sqrt(3)*b*
*(7/3)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(3*a*
*(7/3)*(a*d - b*c))
```

Mathematica [A] time = 0.3825, size = 282, normalized size = 0.89

$$\frac{\frac{4b^{7/3}x^4\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{7/3}}+\frac{4\sqrt{3}b^{7/3}x^4\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{7/3}}-\frac{2b^{7/3}x^4\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{7/3}}-\frac{12b^2x^3}{a^2}+\frac{3b}{a}-\frac{4d^{7/3}x^4\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{c^{7/3}}-\frac{4\sqrt{3}d^{7/\cdots}}{\cdots}}{12x^4(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^5*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((3*b)/a - (3*d)/c - (12*b^2*x^3)/a^2 + (12*d^2*x^3)/c^2 + (4*Sqr
t[3]*b^(7/3)*x^4*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/a^(
7/3) - (4*Sqrt[3]*d^(7/3)*x^4*ArcTan[(1 - (2*d^(1/3)*x)/c^(1/3))/
Sqrt[3]])/c^(7/3) + (4*b^(7/3)*x^4*Log[a^(1/3) + b^(1/3)*x])/a^(7
/3) - (4*d^(7/3)*x^4*Log[c^(1/3) + d^(1/3)*x])/c^(7/3) - (2*b^(7/
3)*x^4*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/a^(7/3) +
(2*d^(7/3)*x^4*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/c^
(7/3))/(12*(-(b*c) + a*d)*x^4)
```

Maple [A] time = 0.016, size = 291, normalized size = 0.9

$$-\frac{1}{4\,ac{x}^{4}}+\frac{d}{a{c}^{2}x}+\frac{b}{{a}^{2}cx}+\frac{{b}^{2}}{3\,{a}^{2}\left(ad-bc\right)}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{{b}^{2}}{6\,{a}^{2}\left(ad-bc\right)}\ln\left({x}^{2}-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}-\frac{{b}^{2}\sqrt{3}}{3\,{a}^{2}\left(ad-bc\right)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}$$
$$-\frac{{d}^{2}}{3\,{c}^{2}\left(ad-bc\right)}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}+\frac{{d}^{2}}{6\,{c}^{2}\left(ad-bc\right)}\ln\left({x}^{2}-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$
$$+\frac{{d}^{2}\sqrt{3}}{3\,{c}^{2}\left(ad-bc\right)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/4/a/c/x^4+1/a/c^2/x*d+1/a^2/c/x*b+1/3*b^2/a^2/(a*d-b*c)/(a/b)^
(1/3)*ln(x+(a/b)^(1/3))-1/6*b^2/a^2/(a*d-b*c)/(a/b)^(1/3)*ln(x^2-
x*(a/b)^(1/3)+(a/b)^(2/3))-1/3*b^2/a^2/(a*d-b*c)*3^(1/2)/(a/b)^(1
/3)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))-1/3*d^2/c^2/(a*d-b*c)
/(c/d)^(1/3)*ln(x+(c/d)^(1/3))+1/6*d^2/c^2/(a*d-b*c)/(c/d)^(1/3)*
ln(x^2-x*(c/d)^(1/3)+(c/d)^(2/3))+1/3*d^2/c^2/(a*d-b*c)*3^(1/2)/(
c/d)^(1/3)*arctan(1/3*3^(1/2)*(2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^5),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.1535, size = 470, normalized size = 1.48

$$\frac{\sqrt{3}\left(2\sqrt{3}b^2c^2x^4\left(\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx^2-ax\left(\frac{b}{a}\right)^{\frac{2}{3}}+a\left(\frac{b}{a}\right)^{\frac{1}{3}}\right)+2\sqrt{3}a^2d^2x^4\left(-\frac{d}{c}\right)^{\frac{1}{3}}\log\left(dx^2-cx\left(-\frac{d}{c}\right)^{\frac{2}{3}}-c\left(-\frac{d}{c}\right)^{\frac{1}{3}}\right)-4\sqrt{3}b^2c^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^5),x, algorithm="fricas")
```

```
[Out] 1/36*sqrt(3)*(2*sqrt(3)*b^2*c^2*x^4*(b/a)^(1/3)*log(b*x^2 - a*x*(
b/a)^(2/3) + a*(b/a)^(1/3)) + 2*sqrt(3)*a^2*d^2*x^4*(-d/c)^(1/3)*
log(d*x^2 - c*x*(-d/c)^(2/3) - c*(-d/c)^(1/3)) - 4*sqrt(3)*b^2*c^
2*x^4*(b/a)^(1/3)*log(b*x + a*(b/a)^(2/3)) - 4*sqrt(3)*a^2*d^2*x^
4*(-d/c)^(1/3)*log(d*x + c*(-d/c)^(2/3)) - 12*b^2*c^2*x^4*(b/a)^(
1/3)*arctan(-1/3*(2*sqrt(3)*b*x - sqrt(3)*a*(b/a)^(2/3))/(a*(b/a)
^(2/3))) - 12*a^2*d^2*x^4*(-d/c)^(1/3)*arctan(-1/3*(2*sqrt(3)*d*x
 - sqrt(3)*c*(-d/c)^(2/3))/(c*(-d/c)^(2/3))) - 3*sqrt(3)*(a*b*c^2
 - a^2*c*d - 4*(b^2*c^2 - a^2*d^2)*x^3))/((a^2*b*c^3 - a^3*c^2*d)
*x^4)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.228953, size = 443, normalized size = 1.39

$$-\frac{b^3\left(-\frac{a}{b}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\left(a^3bc-a^4d\right)}+\frac{d^3\left(-\frac{c}{d}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\left(bc^4-ac^3d\right)}-\frac{\left(-ab^2\right)^{\frac{2}{3}}b\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}a^3bc-\sqrt{3}a^4d}$$
$$+\frac{\left(-cd^2\right)^{\frac{2}{3}}d\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bc^4-\sqrt{3}ac^3d}+\frac{\left(-ab^2\right)^{\frac{2}{3}}b\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\left(a^3bc-a^4d\right)}$$
$$-\frac{\left(-cd^2\right)^{\frac{2}{3}}d\ln\left(x^2+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\left(bc^4-ac^3d\right)}+\frac{4bcx^3+4adx^3-ac}{4a^2c^2x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^5),x, algorithm="giac")
```

```
[Out] -1/3*b^3*(-a/b)^(2/3)*ln(abs(x - (-a/b)^(1/3)))/(a^3*b*c - a^4*d)
 + 1/3*d^3*(-c/d)^(2/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^4 - a*c^3*
d) - (-a*b^2)^(2/3)*b*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-a
/b)^(1/3))/(sqrt(3)*a^3*b*c - sqrt(3)*a^4*d) + (-c*d^2)^(2/3)*d*a
rctan(1/3*sqrt(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*b*c
^4 - sqrt(3)*a*c^3*d) + 1/6*(-a*b^2)^(2/3)*b*ln(x^2 + x*(-a/b)^(1
/3) + (-a/b)^(2/3))/(a^3*b*c - a^4*d) - 1/6*(-c*d^2)^(2/3)*d*ln(x
^2 + x*(-c/d)^(1/3) + (-c/d)^(2/3))/(b*c^4 - a*c^3*d) + 1/4*(4*b*
c*x^3 + 4*a*d*x^3 - a*c)/(a^2*c^2*x^4)
```

3.121 $\int \frac{1}{x^6(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=321

$$-\frac{b^{8/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{8/3}(bc-ad)}+\frac{b^{8/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{8/3}(bc-ad)}-\frac{b^{8/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{8/3}(bc-ad)}+\frac{ad+bc}{2a^2c^2x^2}+\frac{d^{8/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{8/3}(bc-ad)}-\frac{d^{8/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{8/3}(bc-ad)}+\frac{d^{8/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{8/3}(bc-ad)}-\frac{1}{5acx^5}$$

```
[Out] -1/(5*a*c*x^5) + (b*c + a*d)/(2*a^2*c^2*x^2) - (b^(8/3)*ArcTan[(a
^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(8/3)*(b*c -
 a*d)) + (d^(8/3)*ArcTan[(c^(1/3) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3)
)])/(Sqrt[3]*c^(8/3)*(b*c - a*d)) + (b^(8/3)*Log[a^(1/3) + b^(1/3
)*x])/(3*a^(8/3)*(b*c - a*d)) - (d^(8/3)*Log[c^(1/3) + d^(1/3)*x]
)/(3*c^(8/3)*(b*c - a*d)) - (b^(8/3)*Log[a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2])/(6*a^(8/3)*(b*c - a*d)) + (d^(8/3)*Log[c^(2/3
) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(8/3)*(b*c - a*d))
```

Rubi [A] time = 1.10016, antiderivative size = 321, normalized size of antiderivative = 1., number of steps used = 15, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$-\frac{b^{8/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{8/3}(bc-ad)}+\frac{b^{8/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{8/3}(bc-ad)}-\frac{b^{8/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{8/3}(bc-ad)}+\frac{ad+bc}{2a^2c^2x^2}+\frac{d^{8/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{8/3}(bc-ad)}-\frac{d^{8/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{8/3}(bc-ad)}+\frac{d^{8/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{8/3}(bc-ad)}-\frac{1}{5acx^5}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^6*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -1/(5*a*c*x^5) + (b*c + a*d)/(2*a^2*c^2*x^2) - (b^(8/3)*ArcTan[(a
^(1/3) - 2*b^(1/3)*x)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(8/3)*(b*c -
 a*d)) + (d^(8/3)*ArcTan[(c^(1/3) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3)
)])/(Sqrt[3]*c^(8/3)*(b*c - a*d)) + (b^(8/3)*Log[a^(1/3) + b^(1/3
)*x])/(3*a^(8/3)*(b*c - a*d)) - (d^(8/3)*Log[c^(1/3) + d^(1/3)*x]
)/(3*c^(8/3)*(b*c - a*d)) - (b^(8/3)*Log[a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2])/(6*a^(8/3)*(b*c - a*d)) + (d^(8/3)*Log[c^(2/3
) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(8/3)*(b*c - a*d))
```

Rubi in Sympy [A] time = 157.701, size = 289, normalized size = 0.9

$$\frac{d^{\frac{8}{3}}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{\frac{8}{3}}(ad-bc)}-\frac{d^{\frac{8}{3}}\log\left(c^{\frac{2}{3}}-\sqrt[3]{c}\sqrt[3]{d}x+d^{\frac{2}{3}}x^2\right)}{6c^{\frac{8}{3}}(ad-bc)}-\frac{\sqrt{3}d^{\frac{8}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{c}}{3}-\frac{2\sqrt[3]{d}x}{3}\right)}{\sqrt[3]{c}}\right)}{3c^{\frac{8}{3}}(ad-bc)}-\frac{1}{5acx^5}+\frac{ad+bc}{2a^2c^2x^2}-\frac{b^{\frac{8}{3}}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{\frac{8}{3}}(ad-bc)}+\frac{b^{\frac{8}{3}}\log\left(a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2\right)}{6a^{\frac{8}{3}}(ad-bc)}+\frac{\sqrt{3}b^{\frac{8}{3}}\operatorname{atan}\left(\frac{\sqrt{3}\left(\frac{\sqrt[3]{a}}{3}-\frac{2\sqrt[3]{b}x}{3}\right)}{\sqrt[3]{a}}\right)}{3a^{\frac{8}{3}}(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**6/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] d**(8/3)*log(c**(1/3) + d**(1/3)*x)/(3*c**(8/3)*(a*d - b*c)) - d*
*(8/3)*log(c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(6*c**
(8/3)*(a*d - b*c)) - sqrt(3)*d**(8/3)*atan(sqrt(3)*(c**(1/3)/3 -
2*d**(1/3)*x/3)/c**(1/3))/(3*c**(8/3)*(a*d - b*c)) - 1/(5*a*c*x**
5) + (a*d + b*c)/(2*a**2*c**2*x**2) - b**(8/3)*log(a**(1/3) + b**
(1/3)*x)/(3*a**(8/3)*(a*d - b*c)) + b**(8/3)*log(a**(2/3) - a**(1
/3)*b**(1/3)*x + b**(2/3)*x**2)/(6*a**(8/3)*(a*d - b*c)) + sqrt(3
)*b**(8/3)*atan(sqrt(3)*(a**(1/3)/3 - 2*b**(1/3)*x/3)/a**(1/3))/(
3*a**(8/3)*(a*d - b*c))
```

Mathematica [A] time = 0.417279, size = 282, normalized size = 0.88

$$\frac{-\frac{10b^{8/3}x^5\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{8/3}}+\frac{10\sqrt{3}b^{8/3}x^5\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{8/3}}+\frac{5b^{8/3}x^5\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{8/3}}-\frac{15b^2x^3}{a^2}+\frac{6b}{a}+\frac{10d^{8/3}x^5\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{c^{8/3}}-\cdots}{30x^5(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^6*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((6*b)/a - (6*d)/c - (15*b^2*x^3)/a^2 + (15*d^2*x^3)/c^2 + (10*Sq
rt[3]*b^(8/3)*x^5*ArcTan[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/a^
(8/3) - (10*Sqrt[3]*d^(8/3)*x^5*ArcTan[(1 - (2*d^(1/3)*x)/c^(1/3)
)/Sqrt[3]])/c^(8/3) - (10*b^(8/3)*x^5*Log[a^(1/3) + b^(1/3)*x])/a
^(8/3) + (10*d^(8/3)*x^5*Log[c^(1/3) + d^(1/3)*x])/c^(8/3) + (5*b
^(8/3)*x^5*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/a^(8/3
) - (5*d^(8/3)*x^5*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2]
)/c^(8/3))/(30*(-(b*c) + a*d)*x^5)
```

Maple [A] time = 0.017, size = 293, normalized size = 0.9

$$-\frac{1}{5\,acx^5}+\frac{d}{2\,ac^2x^2}+\frac{b}{2\,a^2cx^2}-\frac{b^2}{3\,a^2\,(ad-bc)}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{b^2}{6\,a^2\,(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}-\frac{b^2\sqrt{3}}{3\,a^2\,(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\left(\frac{a}{b}\right)^{-\frac{2}{3}}$$
$$+\frac{d^2}{3\,c^2\,(ad-bc)}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}-\frac{d^2}{6\,c^2\,(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$
$$+\frac{d^2\sqrt{3}}{3\,c^2\,(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\left(\frac{c}{d}\right)^{-\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^6/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/5/a/c/x^5+1/2/a/c^2/x^2*d+1/2/a^2/c/x^2*b-1/3/a^2*b^2/(a*d-b*c
)/(a/b)^(2/3)*ln(x+(a/b)^(1/3))+1/6/a^2*b^2/(a*d-b*c)/(a/b)^(2/3)
*ln(x^2-x*(a/b)^(1/3)+(a/b)^(2/3))-1/3/a^2*b^2/(a*d-b*c)/(a/b)^(2
/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+1/3/c^2*d^2/(
a*d-b*c)/(c/d)^(2/3)*ln(x+(c/d)^(1/3))-1/6/c^2*d^2/(a*d-b*c)/(c/d
)^(2/3)*ln(x^2-x*(c/d)^(1/3)+(c/d)^(2/3))+1/3/c^2*d^2/(a*d-b*c)/(
c/d)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^6),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.35578, size = 525, normalized size = 1.64

$$\sqrt{3}\left(5\sqrt{3}b^2c^2x^5\left(-\frac{b^2}{a^2}\right)^{\frac{1}{3}}\log\left(b^2x^2+abx\left(-\frac{b^2}{a^2}\right)^{\frac{1}{3}}+a^2\left(-\frac{b^2}{a^2}\right)^{\frac{2}{3}}\right)+5\sqrt{3}a^2d^2x^5\left(\frac{d^2}{c^2}\right)^{\frac{1}{3}}\log\left(d^2x^2-cdx\left(\frac{d^2}{c^2}\right)^{\frac{1}{3}}+c^2\left(\frac{d^2}{c^2}\right)^{\frac{2}{3}}\right)-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^6),x, algorithm="fricas")
```

```
[Out] 1/90*sqrt(3)*(5*sqrt(3)*b^2*c^2*x^5*(-b^2/a^2)^(1/3)*log(b^2*x^2
+ a*b*x*(-b^2/a^2)^(1/3) + a^2*(-b^2/a^2)^(2/3)) + 5*sqrt(3)*a^2*
d^2*x^5*(d^2/c^2)^(1/3)*log(d^2*x^2 - c*d*x*(d^2/c^2)^(1/3) + c^2
*(d^2/c^2)^(2/3)) - 10*sqrt(3)*b^2*c^2*x^5*(-b^2/a^2)^(1/3)*log(b
*x - a*(-b^2/a^2)^(1/3)) - 10*sqrt(3)*a^2*d^2*x^5*(d^2/c^2)^(1/3)
*log(d*x + c*(d^2/c^2)^(1/3)) + 30*b^2*c^2*x^5*(-b^2/a^2)^(1/3)*a
rctan(1/3*(2*sqrt(3)*b*x + sqrt(3)*a*(-b^2/a^2)^(1/3))/(a*(-b^2/a
^2)^(1/3))) + 30*a^2*d^2*x^5*(d^2/c^2)^(1/3)*arctan(-1/3*(2*sqrt(
3)*d*x - sqrt(3)*c*(d^2/c^2)^(1/3))/(c*(d^2/c^2)^(1/3))) - 3*sqrt
(3)*(2*a*b*c^2 - 2*a^2*c*d - 5*(b^2*c^2 - a^2*d^2)*x^3))/((a^2*b*
c^3 - a^3*c^2*d)*x^5)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**6/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.227652, size = 454, normalized size = 1.41

$$-\frac{b^3\left(-\frac{a}{b}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\,(a^3bc-a^4d)}+\frac{d^3\left(-\frac{c}{d}\right)^{\frac{1}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\,(bc^4-ac^3d)}+\frac{\left(-ab^2\right)^{\frac{1}{3}}b^2\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}a^3bc-\sqrt{3}a^4d}$$
$$-\frac{\left(-cd^2\right)^{\frac{1}{3}}d^2\arctan\left(\frac{\sqrt{3}\left(2\,x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bc^4-\sqrt{3}ac^3d}+\frac{\left(-ab^2\right)^{\frac{1}{3}}b^2\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\,(a^3bc-a^4d)}$$
$$-\frac{\left(-cd^2\right)^{\frac{1}{3}}d^2\ln\left(x^2+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\,(bc^4-ac^3d)}+\frac{5\,bcx^3+5\,adx^3-2\,ac}{10\,a^2c^2x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^6),x, algorithm="giac")
```

```
[Out] -1/3*b^3*(-a/b)^(1/3)*ln(abs(x - (-a/b)^(1/3)))/(a^3*b*c - a^4*d)
 + 1/3*d^3*(-c/d)^(1/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^4 - a*c^3*
d) + (-a*b^2)^(1/3)*b^2*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(
-a/b)^(1/3))/(sqrt(3)*a^3*b*c - sqrt(3)*a^4*d) - (-c*d^2)^(1/3)*d
^2*arctan(1/3*sqrt(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)
*b*c^4 - sqrt(3)*a*c^3*d) + 1/6*(-a*b^2)^(1/3)*b^2*ln(x^2 + x*(-a
/b)^(1/3) + (-a/b)^(2/3))/(a^3*b*c - a^4*d) - 1/6*(-c*d^2)^(1/3)*
d^2*ln(x^2 + x*(-c/d)^(1/3) + (-c/d)^(2/3))/(b*c^4 - a*c^3*d) + 1
/10*(5*b*c*x^3 + 5*a*d*x^3 - 2*a*c)/(a^2*c^2*x^5)
```

3.122 $\int \frac{1}{x^7(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=119

$$-\frac{b^3\log\left(a+bx^3\right)}{3a^3(bc-ad)}+\frac{ad+bc}{3a^2c^2x^3}+\frac{\log(x)\left(a^2d^2+abcd+b^2c^2\right)}{a^3c^3}+\frac{d^3\log\left(c+dx^3\right)}{3c^3(bc-ad)}-\frac{1}{6acx^6}$$

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

Rubi [A] time = 0.321633, antiderivative size = 119, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{b^3\log\left(a+bx^3\right)}{3a^3(bc-ad)}+\frac{ad+bc}{3a^2c^2x^3}+\frac{\log(x)\left(a^2d^2+abcd+b^2c^2\right)}{a^3c^3}+\frac{d^3\log\left(c+dx^3\right)}{3c^3(bc-ad)}-\frac{1}{6acx^6}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(a + b*x^3)*(c + d*x^3)),x]
```

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

Rubi in Sympy [A] time = 37.4735, size = 109, normalized size = 0.92

$$-\frac{d^3\log\left(c+dx^3\right)}{3c^3\left(ad-bc\right)}-\frac{1}{6acx^6}+\frac{ad+bc}{3a^2c^2x^3}+\frac{b^3\log\left(a+bx^3\right)}{3a^3\left(ad-bc\right)}+\frac{\left(a^2d^2+abcd+b^2c^2\right)\log\left(x^3\right)}{3a^3c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] -d**3*log(c + d*x**3)/(3*c**3*(a*d - b*c)) - 1/(6*a*c*x**6) + (a*
d + b*c)/(3*a**2*c**2*x**3) + b**3*log(a + b*x**3)/(3*a**3*(a*d -
 b*c)) + (a**2*d**2 + a*b*c*d + b**2*c**2)*log(x**3)/(3*a**3*c**3
)
```

Mathematica [A] time = 0.100781, size = 119, normalized size = 1.

$$\frac{b^3\log\left(a+bx^3\right)}{3a^3(ad-bc)}+\frac{ad+bc}{3a^2c^2x^3}+\frac{\log(x)\left(a^2d^2+abcd+b^2c^2\right)}{a^3c^3}+\frac{d^3\log\left(c+dx^3\right)}{3c^3(bc-ad)}-\frac{1}{6acx^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^7*(a + b*x^3)*(c + d*x^3)),x]
```

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

Maple [A] time = 0.017, size = 124, normalized size = 1.

$$-\frac{1}{6\,ac{x}^{6}}+\frac{d}{3\,a{c}^{2}{x}^{3}}+\frac{b}{3\,{a}^{2}c{x}^{3}}+\frac{\ln\left(x\right){d}^{2}}{a{c}^{3}}+\frac{\ln\left(x\right)bd}{{a}^{2}{c}^{2}}+\frac{\ln\left(x\right){b}^{2}}{{a}^{3}c}+\frac{{b}^{3}\ln\left(b{x}^{3}+a\right)}{3\,{a}^{3}\left(ad-bc\right)}-\frac{{d}^{3}\ln\left(d{x}^{3}+c\right)}{3\,{c}^{3}\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^7/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/6/a/c/x^6+1/3/a/c^2/x^3*d+1/3/a^2/c/x^3*b+1/a/c^3*ln(x)*d^2+1/
a^2/c^2*ln(x)*b*d+1/a^3/c*ln(x)*b^2+1/3*b^3/a^3/(a*d-b*c)*ln(b*x^
3+a)-1/3*d^3/c^3/(a*d-b*c)*ln(d*x^3+c)
```

Maxima [A] time = 1.48408, size = 158, normalized size = 1.33

$$-\frac{b^3 \log\left(bx^3+a\right)}{3\left(a^3bc-a^4d\right)}+\frac{d^3 \log\left(dx^3+c\right)}{3\left(bc^4-ac^3d\right)}+\frac{\left(b^2c^2+abcd+a^2d^2\right)\log\left(x^3\right)}{3\,a^3c^3}+\frac{2\left(bc+ad\right)x^3-ac}{6\,a^2c^2x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^7),x, algorithm="maxima")
```

```
[Out] -1/3*b^3*log(b*x^3 + a)/(a^3*b*c - a^4*d) + 1/3*d^3*log(d*x^3 + c
)/(b*c^4 - a*c^3*d) + 1/3*(b^2*c^2 + a*b*c*d + a^2*d^2)*log(x^3)/
(a^3*c^3) + 1/6*(2*(b*c + a*d)*x^3 - a*c)/(a^2*c^2*x^6)
```

Fricas [A] time = 6.00004, size = 171, normalized size = 1.44

$$-\frac{2\,b^3c^3x^6 \log\left(bx^3+a\right)-2\,a^3d^3x^6 \log\left(dx^3+c\right)-6\left(b^3c^3-a^3d^3\right)x^6 \log\left(x\right)+a^2bc^3-a^3c^2d-2\left(ab^2c^3-a^3cd^2\right)x^3}{6\left(a^3bc^4-a^4c^3d\right)x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^7),x, algorithm="fricas")
```

```
[Out] -1/6*(2*b^3*c^3*x^6*log(b*x^3 + a) - 2*a^3*d^3*x^6*log(d*x^3 + c)
 - 6*(b^3*c^3 - a^3*d^3)*x^6*log(x) + a^2*b*c^3 - a^3*c^2*d - 2*(
a*b^2*c^3 - a^3*c*d^2)*x^3)/((a^3*b*c^4 - a^4*c^3*d)*x^6)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x**7/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^7),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.123 $\int \frac{1}{x^8(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=352

$$-\frac{b^{10/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{10/3}(bc-ad)}+\frac{b^{10/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{10/3}(bc-ad)}+\frac{b^{10/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{10/3}(bc-ad)}+\frac{ad+bc}{4a^2c^2x^4}-\frac{a^2d^2+abcd+b^2c^2}{a^3c^3x}+\frac{d^{10/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{10/3}(bc-ad)}-\frac{d^{10/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{10/3}(bc-ad)}-\frac{d^{10/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{10/3}(bc-ad)}-\frac{1}{7acx^7}$$

```
[Out] -1/(7*a*c*x^7) + (b*c + a*d)/(4*a^2*c^2*x^4) - (b^2*c^2 + a*b*c*d
 + a^2*d^2)/(a^3*c^3*x) + (b^(10/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x
)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(10/3)*(b*c - a*d)) - (d^(10/3)*
ArcTan[(c^(1/3) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(10
/3)*(b*c - a*d)) + (b^(10/3)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(10/3
)*(b*c - a*d)) - (d^(10/3)*Log[c^(1/3) + d^(1/3)*x])/(3*c^(10/3)*
(b*c - a*d)) - (b^(10/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2])/(6*a^(10/3)*(b*c - a*d)) + (d^(10/3)*Log[c^(2/3) - c^(1/3
)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(10/3)*(b*c - a*d))
```

Rubi [A] time = 1.3383, antiderivative size = 352, normalized size of antiderivative = 1., number of steps used = 17, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$-\frac{b^{10/3}\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{6a^{10/3}(bc-ad)}+\frac{b^{10/3}\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{3a^{10/3}(bc-ad)}+\frac{b^{10/3}\tan^{-1}\left(\frac{\sqrt[3]{a}-2\sqrt[3]{b}x}{\sqrt{3}\sqrt[3]{a}}\right)}{\sqrt{3}a^{10/3}(bc-ad)}+\frac{ad+bc}{4a^2c^2x^4}-\frac{a^2d^2+abcd+b^2c^2}{a^3c^3x}+\frac{d^{10/3}\log\left(c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2\right)}{6c^{10/3}(bc-ad)}-\frac{d^{10/3}\log\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{3c^{10/3}(bc-ad)}-\frac{d^{10/3}\tan^{-1}\left(\frac{\sqrt[3]{c}-2\sqrt[3]{d}x}{\sqrt{3}\sqrt[3]{c}}\right)}{\sqrt{3}c^{10/3}(bc-ad)}-\frac{1}{7acx^7}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^8*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] -1/(7*a*c*x^7) + (b*c + a*d)/(4*a^2*c^2*x^4) - (b^2*c^2 + a*b*c*d
 + a^2*d^2)/(a^3*c^3*x) + (b^(10/3)*ArcTan[(a^(1/3) - 2*b^(1/3)*x
)/(Sqrt[3]*a^(1/3))])/(Sqrt[3]*a^(10/3)*(b*c - a*d)) - (d^(10/3)*
ArcTan[(c^(1/3) - 2*d^(1/3)*x)/(Sqrt[3]*c^(1/3))])/(Sqrt[3]*c^(10
/3)*(b*c - a*d)) + (b^(10/3)*Log[a^(1/3) + b^(1/3)*x])/(3*a^(10/3
)*(b*c - a*d)) - (d^(10/3)*Log[c^(1/3) + d^(1/3)*x])/(3*c^(10/3)*
(b*c - a*d)) - (b^(10/3)*Log[a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2])/(6*a^(10/3)*(b*c - a*d)) + (d^(10/3)*Log[c^(2/3) - c^(1/3
)*d^(1/3)*x + d^(2/3)*x^2])/(6*c^(10/3)*(b*c - a*d))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**8/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.494183, size = 304, normalized size = 0.86

$$\frac{-\frac{28b^{10/3}x^7\log\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{10/3}}-\frac{28\sqrt{3}b^{10/3}x^7\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{b}x}{\sqrt[3]{a}}}{\sqrt{3}}\right)}{a^{10/3}}+\frac{14b^{10/3}x^7\log\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)}{a^{10/3}}+\frac{84b^3x^6}{a^3}-\frac{21b^2x^3}{a^2}+\frac{12b}{a}+\frac{28d^{10/3}x^7\log\left(\sqrt[3]{\cdots}\right.}{c^{10/3}}\cdots}{84x^7(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^8*(a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] ((12*b)/a - (12*d)/c - (21*b^2*x^3)/a^2 + (21*d^2*x^3)/c^2 + (84*
b^3*x^6)/a^3 - (84*d^3*x^6)/c^3 - (28*Sqrt[3]*b^(10/3)*x^7*ArcTan
[(1 - (2*b^(1/3)*x)/a^(1/3))/Sqrt[3]])/a^(10/3) + (28*Sqrt[3]*d^(
10/3)*x^7*ArcTan[(1 - (2*d^(1/3)*x)/c^(1/3))/Sqrt[3]])/c^(10/3) -
 (28*b^(10/3)*x^7*Log[a^(1/3) + b^(1/3)*x])/a^(10/3) + (28*d^(10/
3)*x^7*Log[c^(1/3) + d^(1/3)*x])/c^(10/3) + (14*b^(10/3)*x^7*Log[
a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2])/a^(10/3) - (14*d^(10/
3)*x^7*Log[c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2])/c^(10/3))/
(84*(-(b*c) + a*d)*x^7)
```

Maple [A] time = 0.018, size = 334, normalized size = 1.

$$-\frac{1}{7\,acx^7}+\frac{d}{4\,ax^4c^2}+\frac{b}{4\,x^4a^2c}-\frac{d^2}{ac^3x}-\frac{bd}{a^2c^2x}-\frac{b^2}{a^3cx}-\frac{b^3}{3\,a^3\,(ad-bc)}\ln\left(x+\sqrt[3]{\frac{a}{b}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{b^3}{6\,a^3\,(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{a}{b}}+\left(\frac{a}{b}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{b^3\sqrt{3}}{3\,a^3\,(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{a}{b}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{a}{b}}}+\frac{d^3}{3\,c^3\,(ad-bc)}\ln\left(x+\sqrt[3]{\frac{c}{d}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}-\frac{d^3}{6\,c^3\,(ad-bc)}\ln\left(x^2-x\sqrt[3]{\frac{c}{d}}+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}-\frac{d^3\sqrt{3}}{3\,c^3\,(ad-bc)}\arctan\left(\frac{\sqrt{3}}{3}\left(2\,x\frac{1}{\sqrt[3]{\frac{c}{d}}}-1\right)\right)\frac{1}{\sqrt[3]{\frac{c}{d}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^8/(b*x^3+a)/(d*x^3+c),x)
```

```
[Out] -1/7/a/c/x^7+1/4/x^4/a/c^2*d+1/4/x^4/a^2/c*b-1/a/c^3/x*d^2-1/a^2/
c^2/x*b*d-1/a^3/c/x*b^2-1/3*b^3/a^3/(a*d-b*c)/(a/b)^(1/3)*ln(x+(a
/b)^(1/3))+1/6*b^3/a^3/(a*d-b*c)/(a/b)^(1/3)*ln(x^2-x*(a/b)^(1/3)
+(a/b)^(2/3))+1/3*b^3/a^3/(a*d-b*c)*3^(1/2)/(a/b)^(1/3)*arctan(1/
3*3^(1/2)*(2/(a/b)^(1/3)*x-1))+1/3*d^3/c^3/(a*d-b*c)/(c/d)^(1/3)*
ln(x+(c/d)^(1/3))-1/6*d^3/c^3/(a*d-b*c)/(c/d)^(1/3)*ln(x^2-x*(c/d
)^(1/3)+(c/d)^(2/3))-1/3*d^3/c^3/(a*d-b*c)*3^(1/2)/(c/d)^(1/3)*ar
ctan(1/3*3^(1/2)*(2/(c/d)^(1/3)*x-1))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^8),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.41818, size = 508, normalized size = 1.44

$$\frac{\sqrt{3}\left(14\,\sqrt{3}b^3c^3x^7\left(-\frac{b}{a}\right)^{\frac{1}{3}}\log\left(bx^2-ax\left(-\frac{b}{a}\right)^{\frac{2}{3}}-a\left(-\frac{b}{a}\right)^{\frac{1}{3}}\right)+14\,\sqrt{3}a^3d^3x^7\left(\frac{d}{c}\right)^{\frac{1}{3}}\log\left(dx^2-cx\left(\frac{d}{c}\right)^{\frac{2}{3}}+c\left(\frac{d}{c}\right)^{\frac{1}{3}}\right)-28\,\sqrt{3}b^3c\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^8),x, algorithm="fricas")
```

```
[Out] 1/252*sqrt(3)*(14*sqrt(3)*b^3*c^3*x^7*(-b/a)^(1/3)*log(b*x^2 - a*
x*(-b/a)^(2/3) - a*(-b/a)^(1/3)) + 14*sqrt(3)*a^3*d^3*x^7*(d/c)^(
1/3)*log(d*x^2 - c*x*(d/c)^(2/3) + c*(d/c)^(1/3)) - 28*sqrt(3)*b^
3*c^3*x^7*(-b/a)^(1/3)*log(b*x + a*(-b/a)^(2/3)) - 28*sqrt(3)*a^3
*d^3*x^7*(d/c)^(1/3)*log(d*x + c*(d/c)^(2/3)) - 84*b^3*c^3*x^7*(-
b/a)^(1/3)*arctan(-1/3*(2*sqrt(3)*b*x - sqrt(3)*a*(-b/a)^(2/3))/(
a*(-b/a)^(2/3))) - 84*a^3*d^3*x^7*(d/c)^(1/3)*arctan(-1/3*(2*sqrt
(3)*d*x - sqrt(3)*c*(d/c)^(2/3))/(c*(d/c)^(2/3))) - 3*sqrt(3)*(28
*(b^3*c^3 - a^3*d^3)*x^6 + 4*a^2*b*c^3 - 4*a^3*c^2*d - 7*(a*b^2*c
^3 - a^3*c*d^2)*x^3))/((a^3*b*c^4 - a^4*c^3*d)*x^7)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**8/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.231721, size = 509, normalized size = 1.45

$$\frac{b^4\left(-\frac{a}{b}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right|\right)}{3\left(a^4bc-a^5d\right)}-\frac{d^4\left(-\frac{c}{d}\right)^{\frac{2}{3}}\ln\left(\left|x-\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right|\right)}{3\left(bc^5-ac^4d\right)}+\frac{\left(-ab^2\right)^{\frac{2}{3}}b^2\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{a}{b}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{a}{b}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}a^4bc-\sqrt{3}a^5d}-\frac{\left(-cd^2\right)^{\frac{2}{3}}d^2\arctan\left(\frac{\sqrt{3}\left(2x+\left(-\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3\left(-\frac{c}{d}\right)^{\frac{1}{3}}}\right)}{\sqrt{3}bc^5-\sqrt{3}ac^4d}-\frac{\left(-ab^2\right)^{\frac{2}{3}}b^2\ln\left(x^2+x\left(-\frac{a}{b}\right)^{\frac{1}{3}}+\left(-\frac{a}{b}\right)^{\frac{2}{3}}\right)}{6\left(a^4bc-a^5d\right)}+\frac{\left(-cd^2\right)^{\frac{2}{3}}d^2\ln\left(x^2+x\left(-\frac{c}{d}\right)^{\frac{1}{3}}+\left(-\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6\left(bc^5-ac^4d\right)}-\frac{28\,b^2c^2x^6+28\,abcdx^6+28\,a^2d^2x^6-7\,abc^2x^3-7\,a^2cdx^3+4\,a^2c^2}{28\,a^3c^3x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)*x^8),x, algorithm="giac")
```

```
[Out] 1/3*b^4*(-a/b)^(2/3)*ln(abs(x - (-a/b)^(1/3)))/(a^4*b*c - a^5*d)
- 1/3*d^4*(-c/d)^(2/3)*ln(abs(x - (-c/d)^(1/3)))/(b*c^5 - a*c^4*d
```

```
) + (-a*b^2)^(2/3)*b^2*arctan(1/3*sqrt(3)*(2*x + (-a/b)^(1/3))/(-
a/b)^(1/3))/(sqrt(3)*a^4*b*c - sqrt(3)*a^5*d) - (-c*d^2)^(2/3)*d^
2*arctan(1/3*sqrt(3)*(2*x + (-c/d)^(1/3))/(-c/d)^(1/3))/(sqrt(3)*
b*c^5 - sqrt(3)*a*c^4*d) - 1/6*(-a*b^2)^(2/3)*b^2*ln(x^2 + x*(-a/
b)^(1/3) + (-a/b)^(2/3))/(a^4*b*c - a^5*d) + 1/6*(-c*d^2)^(2/3)*d
^2*ln(x^2 + x*(-c/d)^(1/3) + (-c/d)^(2/3))/(b*c^5 - a*c^4*d) - 1/
28*(28*b^2*c^2*x^6 + 28*a*b*c*d*x^6 + 28*a^2*d^2*x^6 - 7*a*b*c^2*
x^3 - 7*a^2*c*d*x^3 + 4*a^2*c^2)/(a^3*c^3*x^7)
```

3.124 $\int x^m \left(a+bx^3\right)^5 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=148

$$\frac{a^5 A x^{m+1}}{m+1}+\frac{a^4 x^{m+4}(aB+5Ab)}{m+4}+\frac{5a^3 b x^{m+7}(aB+2Ab)}{m+7}+\frac{10a^2b^2x^{m+10}(aB+Ab)}{m+10}+\frac{b^4 x^{m+16}(5aB+Ab)}{m+16}+\frac{5ab^3x^{m+13}(2aB+Ab)}{m+13}+\frac{b^5 B x^{m+19}}{m+19}$$

```
[Out] (a^5*A*x^(1 + m))/(1 + m) + (a^4*(5*A*b + a*B)*x^(4 + m))/(4 + m)
 + (5*a^3*b*(2*A*b + a*B)*x^(7 + m))/(7 + m) + (10*a^2*b^2*(A*b +
 a*B)*x^(10 + m))/(10 + m) + (5*a*b^3*(A*b + 2*a*B)*x^(13 + m))/(
13 + m) + (b^4*(A*b + 5*a*B)*x^(16 + m))/(16 + m) + (b^5*B*x^(19
+ m))/(19 + m)
```

Rubi [A] time = 0.277599, antiderivative size = 148, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{a^5 A x^{m+1}}{m+1}+\frac{a^4 x^{m+4}(aB+5Ab)}{m+4}+\frac{5a^3 b x^{m+7}(aB+2Ab)}{m+7}+\frac{10a^2b^2x^{m+10}(aB+Ab)}{m+10}+\frac{b^4 x^{m+16}(5aB+Ab)}{m+16}+\frac{5ab^3x^{m+13}(2aB+Ab)}{m+13}+\frac{b^5 B x^{m+19}}{m+19}$$

Antiderivative was successfully verified.

```
[In]  Int[x^m*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] (a^5*A*x^(1 + m))/(1 + m) + (a^4*(5*A*b + a*B)*x^(4 + m))/(4 + m)
 + (5*a^3*b*(2*A*b + a*B)*x^(7 + m))/(7 + m) + (10*a^2*b^2*(A*b +
 a*B)*x^(10 + m))/(10 + m) + (5*a*b^3*(A*b + 2*a*B)*x^(13 + m))/(
13 + m) + (b^4*(A*b + 5*a*B)*x^(16 + m))/(16 + m) + (b^5*B*x^(19
+ m))/(19 + m)
```

Rubi in Sympy [A] time = 29.1288, size = 138, normalized size = 0.93

$$\frac{Aa^5x^{m+1}}{m+1}+\frac{Bb^5x^{m+19}}{m+19}+\frac{a^4x^{m+4}\left(5Ab+Ba\right)}{m+4}+\frac{5a^3bx^{m+7}\left(2Ab+Ba\right)}{m+7}+\frac{10a^2b^2x^{m+10}\left(Ab+Ba\right)}{m+10}+\frac{5ab^3x^{m+13}\left(Ab+2Ba\right)}{m+13}+\frac{b^4x^{m+16}\left(Ab+5Ba\right)}{m+16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**m*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] A*a**5*x**(m + 1)/(m + 1) + B*b**5*x**(m + 19)/(m + 19) + a**4*x*
*(m + 4)*(5*A*b + B*a)/(m + 4) + 5*a**3*b*x**(m + 7)*(2*A*b + B*a
)/(m + 7) + 10*a**2*b**2*x**(m + 10)*(A*b + B*a)/(m + 10) + 5*a*b
**3*x**(m + 13)*(A*b + 2*B*a)/(m + 13) + b**4*x**(m + 16)*(A*b +
5*B*a)/(m + 16)
```

Mathematica [A] time = 0.219728, size = 136, normalized size = 0.92

$$x^m\left(\frac{a^5Ax}{m+1}+\frac{a^4x^4(aB+5Ab)}{m+4}+\frac{5a^3bx^7(aB+2Ab)}{m+7}+\frac{10a^2b^2x^{10}(aB+Ab)}{m+10}+\frac{b^4x^{16}(5aB+Ab)}{m+16}+\frac{5ab^3x^{13}(2aB+Ab)}{m+13}+\frac{b^5Bx^{19}}{m+19}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^m*(a + b*x^3)^5*(A + B*x^3),x]
```

```
[Out] x^m*((a^5*A*x)/(1 + m) + (a^4*(5*A*b + a*B)*x^4)/(4 + m) + (5*a^3
*b*(2*A*b + a*B)*x^7)/(7 + m) + (10*a^2*b^2*(A*b + a*B)*x^10)/(10
 + m) + (5*a*b^3*(A*b + 2*a*B)*x^13)/(13 + m) + (b^4*(A*b + 5*a*B
)*x^16)/(16 + m) + (b^5*B*x^19)/(19 + m))
```

Maple [B] time = 0.014, size = 1078, normalized size = 7.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^m*(b*x^3+a)^5*(B*x^3+A),x)
```

```
[Out] x^(1+m)*(B*b^5*m^6*x^18+51*B*b^5*m^5*x^18+1005*B*b^5*m^4*x^18+A*b
^5*m^6*x^15+5*B*a*b^4*m^6*x^15+9605*B*b^5*m^3*x^18+54*A*b^5*m^5*x
^15+270*B*a*b^4*m^5*x^15+45474*B*b^5*m^2*x^18+1110*A*b^5*m^4*x^15
+5550*B*a*b^4*m^4*x^15+95064*B*b^5*m*x^18+5*A*a*b^4*m^6*x^12+1094
0*A*b^5*m^3*x^15+10*B*a^2*b^3*m^6*x^12+54700*B*a*b^4*m^3*x^15+582
40*B*b^5*x^18+285*A*a*b^4*m^5*x^12+52929*A*b^5*m^2*x^15+570*B*a^2
*b^3*m^5*x^12+264645*B*a*b^4*m^2*x^15+6165*A*a*b^4*m^4*x^12+11220
6*A*b^5*m*x^15+12330*B*a^2*b^3*m^4*x^12+561030*B*a*b^4*m*x^15+10*
A*a^2*b^3*m^6*x^9+63355*A*a*b^4*m^3*x^12+69160*A*b^5*x^15+10*B*a^
3*b^2*m^6*x^9+126710*B*a^2*b^3*m^3*x^12+345800*B*a*b^4*x^15+600*A
*a^2*b^3*m^5*x^9+316230*A*a*b^4*m^2*x^12+600*B*a^3*b^2*m^5*x^9+63
2460*B*a^2*b^3*m^2*x^12+13740*A*a^2*b^3*m^4*x^9+684360*A*a*b^4*m*
x^12+13740*B*a^3*b^2*m^4*x^9+1368720*B*a^2*b^3*m*x^12+10*A*a^3*b^
2*m^6*x^6+149600*A*a^2*b^3*m^3*x^9+425600*A*a*b^4*x^12+5*B*a^4*b*
m^6*x^6+149600*B*a^3*b^2*m^3*x^9+851200*B*a^2*b^3*x^12+630*A*a^3*
b^2*m^5*x^6+783690*A*a^2*b^3*m^2*x^9+315*B*a^4*b*m^5*x^6+783690*B
*a^3*b^2*m^2*x^9+15330*A*a^3*b^2*m^4*x^6+1753800*A*a^2*b^3*m*x^9+
7665*B*a^4*b*m^4*x^6+1753800*B*a^3*b^2*m*x^9+5*A*a^4*b*m^6*x^3+17
9690*A*a^3*b^2*m^3*x^6+1106560*A*a^2*b^3*x^9+B*a^5*m^6*x^3+89845*
B*a^4*b*m^3*x^6+1106560*B*a^3*b^2*x^9+330*A*a^4*b*m^5*x^3+1021860
*A*a^3*b^2*m^2*x^6+66*B*a^5*m^5*x^3+510930*B*a^4*b*m^2*x^6+8550*A
*a^4*b*m^4*x^3+2437680*A*a^3*b^2*m*x^6+1710*B*a^5*m^4*x^3+1218840
*B*a^4*b*m*x^6+A*a^5*m^6+109300*A*a^4*b*m^3*x^3+1580800*A*a^3*b^2
*x^6+21860*B*a^5*m^3*x^3+790400*B*a^4*b*x^6+69*A*a^5*m^5+702645*A
*a^4*b*m^2*x^3+140529*B*a^5*m^2*x^3+1905*A*a^5*m^4+1984770*A*a^4*
b*m*x^3+396954*B*a^5*m*x^3+26795*A*a^5*m^3+1383200*A*a^4*b*x^3+27
6640*B*a^5*x^3+201174*A*a^5*m^2+757896*A*a^5*m+1106560*A*a^5)/(1+
m)/(4+m)/(7+m)/(10+m)/(13+m)/(16+m)/(19+m)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^m,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.24997, size = 1149, normalized size = 7.76

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^m,x, algorithm="fricas")
```

```
[Out] ((B*b^5*m^6 + 51*B*b^5*m^5 + 1005*B*b^5*m^4 + 9605*B*b^5*m^3 + 45
474*B*b^5*m^2 + 95064*B*b^5*m + 58240*B*b^5)*x^19 + ((5*B*a*b^4 +
 A*b^5)*m^6 + 345800*B*a*b^4 + 69160*A*b^5 + 54*(5*B*a*b^4 + A*b^
5)*m^5 + 1110*(5*B*a*b^4 + A*b^5)*m^4 + 10940*(5*B*a*b^4 + A*b^5)
*m^3 + 52929*(5*B*a*b^4 + A*b^5)*m^2 + 112206*(5*B*a*b^4 + A*b^5)
*m)*x^16 + 5*((2*B*a^2*b^3 + A*a*b^4)*m^6 + 170240*B*a^2*b^3 + 85
120*A*a*b^4 + 57*(2*B*a^2*b^3 + A*a*b^4)*m^5 + 1233*(2*B*a^2*b^3
+ A*a*b^4)*m^4 + 12671*(2*B*a^2*b^3 + A*a*b^4)*m^3 + 63246*(2*B*a
^2*b^3 + A*a*b^4)*m^2 + 136872*(2*B*a^2*b^3 + A*a*b^4)*m)*x^13 +
10*((B*a^3*b^2 + A*a^2*b^3)*m^6 + 110656*B*a^3*b^2 + 110656*A*a^2
*b^3 + 60*(B*a^3*b^2 + A*a^2*b^3)*m^5 + 1374*(B*a^3*b^2 + A*a^2*b
^3)*m^4 + 14960*(B*a^3*b^2 + A*a^2*b^3)*m^3 + 78369*(B*a^3*b^2 +
A*a^2*b^3)*m^2 + 175380*(B*a^3*b^2 + A*a^2*b^3)*m)*x^10 + 5*((B*a
^4*b + 2*A*a^3*b^2)*m^6 + 158080*B*a^4*b + 316160*A*a^3*b^2 + 63*
(B*a^4*b + 2*A*a^3*b^2)*m^5 + 1533*(B*a^4*b + 2*A*a^3*b^2)*m^4 +
17969*(B*a^4*b + 2*A*a^3*b^2)*m^3 + 102186*(B*a^4*b + 2*A*a^3*b^2
)*m^2 + 243768*(B*a^4*b + 2*A*a^3*b^2)*m)*x^7 + ((B*a^5 + 5*A*a^4
*b)*m^6 + 276640*B*a^5 + 1383200*A*a^4*b + 66*(B*a^5 + 5*A*a^4*b)
*m^5 + 1710*(B*a^5 + 5*A*a^4*b)*m^4 + 21860*(B*a^5 + 5*A*a^4*b)*m
^3 + 140529*(B*a^5 + 5*A*a^4*b)*m^2 + 396954*(B*a^5 + 5*A*a^4*b)*
m)*x^4 + (A*a^5*m^6 + 69*A*a^5*m^5 + 1905*A*a^5*m^4 + 26795*A*a^5
*m^3 + 201174*A*a^5*m^2 + 757896*A*a^5*m + 1106560*A*a^5)*x)*x^m/
(m^7 + 70*m^6 + 1974*m^5 + 28700*m^4 + 227969*m^3 + 959070*m^2 +
1864456*m + 1106560)
```

Sympy [A] time = 75.3193, size = 5418, normalized size = 36.61

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**m*(b*x**3+a)**5*(B*x**3+A),x)
```

```
[Out] Piecewise((-A*a**5/(18*x**18) - A*a**4*b/(3*x**15) - 5*A*a**3*b**
2/(6*x**12) - 10*A*a**2*b**3/(9*x**9) - 5*A*a*b**4/(6*x**6) - A*b
**5/(3*x**3) - B*a**5/(15*x**15) - 5*B*a**4*b/(12*x**12) - 10*B*a
**3*b**2/(9*x**9) - 5*B*a**2*b**3/(3*x**6) - 5*B*a*b**4/(3*x**3)
+ B*b**5*log(x), Eq(m, -19)), (-A*a**5/(15*x**15) - 5*A*a**4*b/(1
2*x**12) - 10*A*a**3*b**2/(9*x**9) - 5*A*a**2*b**3/(3*x**6) - 5*A
*a*b**4/(3*x**3) + A*b**5*log(x) - B*a**5/(12*x**12) - 5*B*a**4*b
/(9*x**9) - 5*B*a**3*b**2/(3*x**6) - 10*B*a**2*b**3/(3*x**3) + 5*
B*a*b**4*log(x) + B*b**5*x**3/3, Eq(m, -16)), (-A*a**5/(12*x**12)
 - 5*A*a**4*b/(9*x**9) - 5*A*a**3*b**2/(3*x**6) - 10*A*a**2*b**3/
(3*x**3) + 5*A*a*b**4*log(x) + A*b**5*x**3/3 - B*a**5/(9*x**9) -
5*B*a**4*b/(6*x**6) - 10*B*a**3*b**2/(3*x**3) + 10*B*a**2*b**3*lo
g(x) + 5*B*a*b**4*x**3/3 + B*b**5*x**6/6, Eq(m, -13)), (-A*a**5/(
9*x**9) - 5*A*a**4*b/(6*x**6) - 10*A*a**3*b**2/(3*x**3) + 10*A*a*
*2*b**3*log(x) + 5*A*a*b**4*x**3/3 + A*b**5*x**6/6 - B*a**5/(6*x*
*6) - 5*B*a**4*b/(3*x**3) + 10*B*a**3*b**2*log(x) + 10*B*a**2*b**
3*x**3/3 + 5*B*a*b**4*x**6/6 + B*b**5*x**9/9, Eq(m, -10)), (-A*a*
*5/(6*x**6) - 5*A*a**4*b/(3*x**3) + 10*A*a**3*b**2*log(x) + 10*A*
a**2*b**3*x**3/3 + 5*A*a*b**4*x**6/6 + A*b**5*x**9/9 - B*a**5/(3*
x**3) + 5*B*a**4*b*log(x) + 10*B*a**3*b**2*x**3/3 + 5*B*a**2*b**3
*x**6/3 + 5*B*a*b**4*x**9/9 + B*b**5*x**12/12, Eq(m, -7)), (-A*a*
*5/(3*x**3) + 5*A*a**4*b*log(x) + 10*A*a**3*b**2*x**3/3 + 5*A*a**
2*b**3*x**6/3 + 5*A*a*b**4*x**9/9 + A*b**5*x**12/12 + B*a**5*log(
x) + 5*B*a**4*b*x**3/3 + 5*B*a**3*b**2*x**6/3 + 10*B*a**2*b**3*x*
*9/9 + 5*B*a*b**4*x**12/12 + B*b**5*x**15/15, Eq(m, -4)), (A*a**5
*log(x) + 5*A*a**4*b*x**3/3 + 5*A*a**3*b**2*x**6/3 + 10*A*a**2*b*
*3*x**9/9 + 5*A*a*b**4*x**12/12 + A*b**5*x**15/15 + B*a**5*x**3/3
 + 5*B*a**4*b*x**6/6 + 10*B*a**3*b**2*x**9/9 + 5*B*a**2*b**3*x**1
2/6 + B*a*b**4*x**15/3 + B*b**5*x**18/18, Eq(m, -1)), (A*a**5*m**
6*x*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 +
 959070*m**2 + 1864456*m + 1106560) + 69*A*a**5*m**5*x*x**m/(m**7
 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 +
 1864456*m + 1106560) + 1905*A*a**5*m**4*x*x**m/(m**7 + 70*m**6 +
 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m +
 1106560) + 26795*A*a**5*m**3*x*x**m/(m**7 + 70*m**6 + 1974*m**5
+ 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) +
 201174*A*a**5*m**2*x*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m*
```

```
*4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 757896*A*
a**5*m*x*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m
**3 + 959070*m**2 + 1864456*m + 1106560) + 1106560*A*a**5*x*x**m/
(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m
**2 + 1864456*m + 1106560) + 5*A*a**4*b*m**6*x**4*x**m/(m**7 + 70
*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864
456*m + 1106560) + 330*A*a**4*b*m**5*x**4*x**m/(m**7 + 70*m**6 +
1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m +
1106560) + 8550*A*a**4*b*m**4*x**4*x**m/(m**7 + 70*m**6 + 1974*m*
*5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560
) + 109300*A*a**4*b*m**3*x**4*x**m/(m**7 + 70*m**6 + 1974*m**5 +
28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 7
02645*A*a**4*b*m**2*x**4*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700
*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 198477
0*A*a**4*b*m*x**4*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 +
 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 1383200*A*a**
4*b*x**4*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m
**3 + 959070*m**2 + 1864456*m + 1106560) + 10*A*a**3*b**2*m**6*x*
*7*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 +
959070*m**2 + 1864456*m + 1106560) + 630*A*a**3*b**2*m**5*x**7*x*
*m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 95907
0*m**2 + 1864456*m + 1106560) + 15330*A*a**3*b**2*m**4*x**7*x**m/
(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m
**2 + 1864456*m + 1106560) + 179690*A*a**3*b**2*m**3*x**7*x**m/(m
**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**
2 + 1864456*m + 1106560) + 1021860*A*a**3*b**2*m**2*x**7*x**m/(m*
*7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2
 + 1864456*m + 1106560) + 2437680*A*a**3*b**2*m*x**7*x**m/(m**7 +
 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1
864456*m + 1106560) + 1580800*A*a**3*b**2*x**7*x**m/(m**7 + 70*m*
*6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456
*m + 1106560) + 10*A*a**2*b**3*m**6*x**10*x**m/(m**7 + 70*m**6 +
1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m +
1106560) + 600*A*a**2*b**3*m**5*x**10*x**m/(m**7 + 70*m**6 + 1974
*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106
560) + 13740*A*a**2*b**3*m**4*x**10*x**m/(m**7 + 70*m**6 + 1974*m
**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 110656
0) + 149600*A*a**2*b**3*m**3*x**10*x**m/(m**7 + 70*m**6 + 1974*m*
*5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560
) + 783690*A*a**2*b**3*m**2*x**10*x**m/(m**7 + 70*m**6 + 1974*m**
5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560)
 + 1753800*A*a**2*b**3*m*x**10*x**m/(m**7 + 70*m**6 + 1974*m**5 +
 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) +
1106560*A*a**2*b**3*x**10*x**m/(m**7 + 70*m**6 + 1974*m**5 + 2870
0*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 5*A*a
*b**4*m**6*x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 +
227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 285*A*a*b**4*m
**5*x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*
m**3 + 959070*m**2 + 1864456*m + 1106560) + 6165*A*a*b**4*m**4*x*
*13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 +
 959070*m**2 + 1864456*m + 1106560) + 63355*A*a*b**4*m**3*x**13*x
**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 9590
70*m**2 + 1864456*m + 1106560) + 316230*A*a*b**4*m**2*x**13*x**m/
(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m
**2 + 1864456*m + 1106560) + 684360*A*a*b**4*m*x**13*x**m/(m**7 +
 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1
864456*m + 1106560) + 425600*A*a*b**4*x**13*x**m/(m**7 + 70*m**6
+ 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m
+ 1106560) + A*b**5*m**6*x**16*x**m/(m**7 + 70*m**6 + 1974*m**5 +
 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) +
54*A*b**5*m**5*x**16*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**
4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 1110*A*b**
5*m**4*x**16*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 2279
69*m**3 + 959070*m**2 + 1864456*m + 1106560) + 10940*A*b**5*m**3*
x**16*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3
 + 959070*m**2 + 1864456*m + 1106560) + 52929*A*b**5*m**2*x**16*x
**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 9590
70*m**2 + 1864456*m + 1106560) + 112206*A*b**5*m*x**16*x**m/(m**7
 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 +
 1864456*m + 1106560) + 69160*A*b**5*x**16*x**m/(m**7 + 70*m**6 +
 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m +
 1106560) + B*a**5*m**6*x**4*x**m/(m**7 + 70*m**6 + 1974*m**5 + 2
8700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 66
*B*a**5*m**5*x**4*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 +
```

```
 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 1710*B*a**5*m
**4*x**4*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m
**3 + 959070*m**2 + 1864456*m + 1106560) + 21860*B*a**5*m**3*x**4
*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 95
9070*m**2 + 1864456*m + 1106560) + 140529*B*a**5*m**2*x**4*x**m/(
m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m*
*2 + 1864456*m + 1106560) + 396954*B*a**5*m*x**4*x**m/(m**7 + 70*
m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 18644
56*m + 1106560) + 276640*B*a**5*x**4*x**m/(m**7 + 70*m**6 + 1974*
m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 11065
60) + 5*B*a**4*b*m**6*x**7*x**m/(m**7 + 70*m**6 + 1974*m**5 + 287
00*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 315*
B*a**4*b*m**5*x**7*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4
+ 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 7665*B*a**4*
b*m**4*x**7*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 22796
9*m**3 + 959070*m**2 + 1864456*m + 1106560) + 89845*B*a**4*b*m**3
*x**7*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3
 + 959070*m**2 + 1864456*m + 1106560) + 510930*B*a**4*b*m**2*x**7
*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 95
9070*m**2 + 1864456*m + 1106560) + 1218840*B*a**4*b*m*x**7*x**m/(
m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m*
*2 + 1864456*m + 1106560) + 790400*B*a**4*b*x**7*x**m/(m**7 + 70*
m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 18644
56*m + 1106560) + 10*B*a**3*b**2*m**6*x**10*x**m/(m**7 + 70*m**6
+ 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m
+ 1106560) + 600*B*a**3*b**2*m**5*x**10*x**m/(m**7 + 70*m**6 + 19
74*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 11
06560) + 13740*B*a**3*b**2*m**4*x**10*x**m/(m**7 + 70*m**6 + 1974
*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106
560) + 149600*B*a**3*b**2*m**3*x**10*x**m/(m**7 + 70*m**6 + 1974*
m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 11065
60) + 783690*B*a**3*b**2*m**2*x**10*x**m/(m**7 + 70*m**6 + 1974*m
**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 110656
0) + 1753800*B*a**3*b**2*m*x**10*x**m/(m**7 + 70*m**6 + 1974*m**5
 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560)
+ 1106560*B*a**3*b**2*x**10*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28
700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 10*
B*a**2*b**3*m**6*x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m
**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 570*B*a*
*2*b**3*m**5*x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4
+ 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 12330*B*a**2
*b**3*m**4*x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 +
227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 126710*B*a**2*
b**3*m**3*x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 2
27969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 632460*B*a**2*b
**3*m**2*x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 22
7969*m**3 + 959070*m**2 + 1864456*m + 1106560) + 1368720*B*a**2*b
**3*m*x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 22796
9*m**3 + 959070*m**2 + 1864456*m + 1106560) + 851200*B*a**2*b**3*
x**13*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3
 + 959070*m**2 + 1864456*m + 1106560) + 5*B*a*b**4*m**6*x**16*x**
m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070
*m**2 + 1864456*m + 1106560) + 270*B*a*b**4*m**5*x**16*x**m/(m**7
 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 +
 1864456*m + 1106560) + 5550*B*a*b**4*m**4*x**16*x**m/(m**7 + 70*
m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 18644
56*m + 1106560) + 54700*B*a*b**4*m**3*x**16*x**m/(m**7 + 70*m**6
+ 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m
+ 1106560) + 264645*B*a*b**4*m**2*x**16*x**m/(m**7 + 70*m**6 + 19
74*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 11
06560) + 561030*B*a*b**4*m*x**16*x**m/(m**7 + 70*m**6 + 1974*m**5
 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560)
+ 345800*B*a*b**4*x**16*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*
m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560) + B*b**5*
m**6*x**19*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969
*m**3 + 959070*m**2 + 1864456*m + 1106560) + 51*B*b**5*m**5*x**19
*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 95
9070*m**2 + 1864456*m + 1106560) + 1005*B*b**5*m**4*x**19*x**m/(m
**7 + 70*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**
2 + 1864456*m + 1106560) + 9605*B*b**5*m**3*x**19*x**m/(m**7 + 70
*m**6 + 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864
456*m + 1106560) + 45474*B*b**5*m**2*x**19*x**m/(m**7 + 70*m**6 +
 1974*m**5 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m +
 1106560) + 95064*B*b**5*m*x**19*x**m/(m**7 + 70*m**6 + 1974*m**5
```

```
 + 28700*m**4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560)
+ 58240*B*b**5*x**19*x**m/(m**7 + 70*m**6 + 1974*m**5 + 28700*m**
4 + 227969*m**3 + 959070*m**2 + 1864456*m + 1106560), True))
```

GIAC/XCAS [A] time = 0.240377, size = 1, normalized size = 0.01

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^5*x^m,x, algorithm="giac")
```

```
[Out] Done
```

3.125 $\int x^m \left(a+bx^3\right)^2 \left(A+Bx^3\right)\, dx$

Optimal. Leaf size=71

$$\frac{a^2Ax^{m+1}}{m+1}+\frac{ax^{m+4}(aB+2Ab)}{m+4}+\frac{bx^{m+7}(2aB+Ab)}{m+7}+\frac{b^2Bx^{m+10}}{m+10}$$

```
[Out] (a^2*A*x^(1 + m))/(1 + m) + (a*(2*A*b + a*B)*x^(4 + m))/(4 + m) +
 (b*(A*b + 2*a*B)*x^(7 + m))/(7 + m) + (b^2*B*x^(10 + m))/(10 + m
)
```

Rubi [A] time = 0.124598, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{a^2Ax^{m+1}}{m+1}+\frac{ax^{m+4}(aB+2Ab)}{m+4}+\frac{bx^{m+7}(2aB+Ab)}{m+7}+\frac{b^2Bx^{m+10}}{m+10}$$

Antiderivative was successfully verified.

```
[In]  Int[x^m*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (a^2*A*x^(1 + m))/(1 + m) + (a*(2*A*b + a*B)*x^(4 + m))/(4 + m) +
 (b*(A*b + 2*a*B)*x^(7 + m))/(7 + m) + (b^2*B*x^(10 + m))/(10 + m
)
```

Rubi in Sympy [A] time = 14.2511, size = 63, normalized size = 0.89

$$\frac{Aa^2x^{m+1}}{m+1}+\frac{Bb^2x^{m+10}}{m+10}+\frac{ax^{m+4}\left(2Ab+Ba\right)}{m+4}+\frac{bx^{m+7}\left(Ab+2Ba\right)}{m+7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**m*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] A*a**2*x**(m + 1)/(m + 1) + B*b**2*x**(m + 10)/(m + 10) + a*x**(m
 + 4)*(2*A*b + B*a)/(m + 4) + b*x**(m + 7)*(A*b + 2*B*a)/(m + 7)
```

Mathematica [A] time = 0.0870738, size = 65, normalized size = 0.92

$$x^m\left(\frac{a^2Ax}{m+1}+\frac{bx^7(2aB+Ab)}{m+7}+\frac{ax^4(aB+2Ab)}{m+4}+\frac{b^2Bx^{10}}{m+10}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^m*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] x^m*((a^2*A*x)/(1 + m) + (a*(2*A*b + a*B)*x^4)/(4 + m) + (b*(A*b
+ 2*a*B)*x^7)/(7 + m) + (b^2*B*x^10)/(10 + m))
```

Maple [B] time = 0.009, size = 262, normalized size = 3.7

$$\frac{x^{1+m}\left(Bb^2m^3x^9+12\,Bb^2m^2x^9+39\,Bb^2mx^9+Ab^2m^3x^6+2\,Babm^3x^6+28\,Bx^9b^2+15\,Ab^2m^2x^6+30\,Babm^2x^6+54\,Ab^2mx^6\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^m*(b*x^3+a)^2*(B*x^3+A),x)
```

```
[Out] x^(1+m)*(B*b^2*m^3*x^9+12*B*b^2*m^2*x^9+39*B*b^2*m*x^9+A*b^2*m^3*
x^6+2*B*a*b*m^3*x^6+28*B*b^2*x^9+15*A*b^2*m^2*x^6+30*B*a*b*m^2*x^
6+54*A*b^2*m*x^6+108*B*a*b*m*x^6+2*A*a*b*m^3*x^3+40*A*b^2*x^6+B*a
^2*m^3*x^3+80*B*a*b*x^6+36*A*a*b*m^2*x^3+18*B*a^2*m^2*x^3+174*A*a
*b*m*x^3+87*B*a^2*m*x^3+A*a^2*m^3+140*A*a*b*x^3+70*B*a^2*x^3+21*A
*a^2*m^2+138*A*a^2*m+280*A*a^2)/(10+m)/(7+m)/(4+m)/(1+m)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^m,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.242579, size = 290, normalized size = 4.08

$$\frac{\left(\left(Bb^2m^3 + 12\,Bb^2m^2 + 39\,Bb^2m + 28\,Bb^2\right)x^{10} + \left(\left(2\,Bab + Ab^2\right)m^3 + 80\,Bab + 40\,Ab^2 + 15\,\left(2\,Bab + Ab^2\right)m^2 + 54\,\left(2\,Bab + A\right.\right.}{m^4 +}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^m,x, algorithm="fricas")
```

```
[Out] ((B*b^2*m^3 + 12*B*b^2*m^2 + 39*B*b^2*m + 28*B*b^2)*x^10 + ((2*B*
a*b + A*b^2)*m^3 + 80*B*a*b + 40*A*b^2 + 15*(2*B*a*b + A*b^2)*m^2
 + 54*(2*B*a*b + A*b^2)*m)*x^7 + ((B*a^2 + 2*A*a*b)*m^3 + 70*B*a^
2 + 140*A*a*b + 18*(B*a^2 + 2*A*a*b)*m^2 + 87*(B*a^2 + 2*A*a*b)*m
)*x^4 + (A*a^2*m^3 + 21*A*a^2*m^2 + 138*A*a^2*m + 280*A*a^2)*x)*x
^m/(m^4 + 22*m^3 + 159*m^2 + 418*m + 280)
```

Sympy [A] time = 10.5193, size = 1057, normalized size = 14.89

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**m*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] Piecewise((-A*a**2/(9*x**9) - A*a*b/(3*x**6) - A*b**2/(3*x**3) -
B*a**2/(6*x**6) - 2*B*a*b/(3*x**3) + B*b**2*log(x), Eq(m, -10)),
(-A*a**2/(6*x**6) - 2*A*a*b/(3*x**3) + A*b**2*log(x) - B*a**2/(3*
x**3) + 2*B*a*b*log(x) + B*b**2*x**3/3, Eq(m, -7)), (-A*a**2/(3*x
**3) + 2*A*a*b*log(x) + A*b**2*x**3/3 + B*a**2*log(x) + 2*B*a*b*x
**3/3 + B*b**2*x**6/6, Eq(m, -4)), (A*a**2*log(x) + 2*A*a*b*x**3/
3 + A*b**2*x**6/6 + B*a**2*x**3/3 + B*a*b*x**6/3 + B*b**2*x**9/9,
 Eq(m, -1)), (A*a**2*m**3*x*x**m/(m**4 + 22*m**3 + 159*m**2 + 418
*m + 280) + 21*A*a**2*m**2*x*x**m/(m**4 + 22*m**3 + 159*m**2 + 41
8*m + 280) + 138*A*a**2*m*x*x**m/(m**4 + 22*m**3 + 159*m**2 + 418
*m + 280) + 280*A*a**2*x*x**m/(m**4 + 22*m**3 + 159*m**2 + 418*m
+ 280) + 2*A*a*b*m**3*x**4*x**m/(m**4 + 22*m**3 + 159*m**2 + 418*
m + 280) + 36*A*a*b*m**2*x**4*x**m/(m**4 + 22*m**3 + 159*m**2 + 4
18*m + 280) + 174*A*a*b*m*x**4*x**m/(m**4 + 22*m**3 + 159*m**2 +
418*m + 280) + 140*A*a*b*x**4*x**m/(m**4 + 22*m**3 + 159*m**2 + 4
18*m + 280) + A*b**2*m**3*x**7*x**m/(m**4 + 22*m**3 + 159*m**2 +
418*m + 280) + 15*A*b**2*m**2*x**7*x**m/(m**4 + 22*m**3 + 159*m**
```

```
2 + 418*m + 280) + 54*A*b**2*m*x**7*x**m/(m**4 + 22*m**3 + 159*m*
*2 + 418*m + 280) + 40*A*b**2*x**7*x**m/(m**4 + 22*m**3 + 159*m**
2 + 418*m + 280) + B*a**2*m**3*x**4*x**m/(m**4 + 22*m**3 + 159*m*
*2 + 418*m + 280) + 18*B*a**2*m**2*x**4*x**m/(m**4 + 22*m**3 + 15
9*m**2 + 418*m + 280) + 87*B*a**2*m*x**4*x**m/(m**4 + 22*m**3 + 1
59*m**2 + 418*m + 280) + 70*B*a**2*x**4*x**m/(m**4 + 22*m**3 + 15
9*m**2 + 418*m + 280) + 2*B*a*b*m**3*x**7*x**m/(m**4 + 22*m**3 +
159*m**2 + 418*m + 280) + 30*B*a*b*m**2*x**7*x**m/(m**4 + 22*m**3
 + 159*m**2 + 418*m + 280) + 108*B*a*b*m*x**7*x**m/(m**4 + 22*m**
3 + 159*m**2 + 418*m + 280) + 80*B*a*b*x**7*x**m/(m**4 + 22*m**3
+ 159*m**2 + 418*m + 280) + B*b**2*m**3*x**10*x**m/(m**4 + 22*m**
3 + 159*m**2 + 418*m + 280) + 12*B*b**2*m**2*x**10*x**m/(m**4 + 2
2*m**3 + 159*m**2 + 418*m + 280) + 39*B*b**2*m*x**10*x**m/(m**4 +
 22*m**3 + 159*m**2 + 418*m + 280) + 28*B*b**2*x**10*x**m/(m**4 +
 22*m**3 + 159*m**2 + 418*m + 280), True))
```

GIAC/XCAS [A] time = 0.221644, size = 513, normalized size = 7.23

$$\frac{Bb^2m^3x^{10}e^{(m\ln(x))} + 12\,Bb^2m^2x^{10}e^{(m\ln(x))} + 39\,Bb^2mx^{10}e^{(m\ln(x))} + 2\,Babm^3x^7e^{(m\ln(x))} + Ab^2m^3x^7e^{(m\ln(x))} + 28\,Bb^2x^{10}e^{(m\ln(x))}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^m,x, algorithm="giac")
```

```
[Out] (B*b^2*m^3*x^10*e^(m*ln(x)) + 12*B*b^2*m^2*x^10*e^(m*ln(x)) + 39*
B*b^2*m*x^10*e^(m*ln(x)) + 2*B*a*b*m^3*x^7*e^(m*ln(x)) + A*b^2*m^
3*x^7*e^(m*ln(x)) + 28*B*b^2*x^10*e^(m*ln(x)) + 30*B*a*b*m^2*x^7*
e^(m*ln(x)) + 15*A*b^2*m^2*x^7*e^(m*ln(x)) + 108*B*a*b*m*x^7*e^(m
*ln(x)) + 54*A*b^2*m*x^7*e^(m*ln(x)) + B*a^2*m^3*x^4*e^(m*ln(x))
+ 2*A*a*b*m^3*x^4*e^(m*ln(x)) + 80*B*a*b*x^7*e^(m*ln(x)) + 40*A*b
^2*x^7*e^(m*ln(x)) + 18*B*a^2*m^2*x^4*e^(m*ln(x)) + 36*A*a*b*m^2*
x^4*e^(m*ln(x)) + 87*B*a^2*m*x^4*e^(m*ln(x)) + 174*A*a*b*m*x^4*e^
(m*ln(x)) + A*a^2*m^3*x*e^(m*ln(x)) + 70*B*a^2*x^4*e^(m*ln(x)) +
140*A*a*b*x^4*e^(m*ln(x)) + 21*A*a^2*m^2*x*e^(m*ln(x)) + 138*A*a^
2*m*x*e^(m*ln(x)) + 280*A*a^2*x*e^(m*ln(x)))/(m^4 + 22*m^3 + 159*
m^2 + 418*m + 280)
```

3.126 $\int x^m (a+bx^3) (A+Bx^3) \, dx$

Optimal. Leaf size=45

$$\frac{x^{m+4}(aB+Ab)}{m+4}+\frac{aAx^{m+1}}{m+1}+\frac{bBx^{m+7}}{m+7}$$

```
[Out] (a*A*x^(1 + m))/(1 + m) + ((A*b + a*B)*x^(4 + m))/(4 + m) + (b*B*
x^(7 + m))/(7 + m)
```

Rubi [A] time = 0.0703345, antiderivative size = 45, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056

$$\frac{x^{m+4}(aB+Ab)}{m+4}+\frac{aAx^{m+1}}{m+1}+\frac{bBx^{m+7}}{m+7}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (a*A*x^(1 + m))/(1 + m) + ((A*b + a*B)*x^(4 + m))/(4 + m) + (b*B*
x^(7 + m))/(7 + m)
```

Rubi in Sympy [A] time = 8.51197, size = 37, normalized size = 0.82

$$\frac{Aax^{m+1}}{m+1}+\frac{Bbx^{m+7}}{m+7}+\frac{x^{m+4}(Ab+Ba)}{m+4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**m*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] A*a*x**(m + 1)/(m + 1) + B*b*x**(m + 7)/(m + 7) + x**(m + 4)*(A*b
 + B*a)/(m + 4)
```

Mathematica [A] time = 0.0478, size = 41, normalized size = 0.91

$$x^m\left(\frac{x^4(aB+Ab)}{m+4}+\frac{aAx}{m+1}+\frac{bBx^7}{m+7}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] x^m*((a*A*x)/(1 + m) + ((A*b + a*B)*x^4)/(4 + m) + (b*B*x^7)/(7 +
 m))
```

Maple [B] time = 0.006, size = 110, normalized size = 2.4

$$\frac{x^{1+m}\left(Bbm^2x^6+5\,Bbmx^6+4\,bBx^6+Abm^2x^3+Bam^2x^3+8\,Abmx^3+8\,Bamx^3+7\,Ax^3b+7\,Bx^3a+Aam^2+11\,Aam+28\,A\right.}{(7+m)(4+m)(1+m)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*(b*x^3+a)*(B*x^3+A),x)
```

```
[Out] x^(1+m)*(B*b*m^2*x^6+5*B*b*m*x^6+4*B*b*x^6+A*b*m^2*x^3+B*a*m^2*x^
3+8*A*b*m*x^3+8*B*a*m*x^3+7*A*b*x^3+7*B*a*x^3+A*a*m^2+11*A*a*m+28
*A*a)/(7+m)/(4+m)/(1+m)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^m,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.246423, size = 124, normalized size = 2.76

$$\frac{\left(\left(Bbm^2+5\,Bbm+4\,Bb\right)x^7+\left((Ba+Ab)m^2+7\,Ba+7\,Ab+8\,(Ba+Ab)m\right)x^4+\left(Aam^2+11\,Aam+28\,Aa\right)x\right)x^m}{m^3+12\,m^2+39\,m+28}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^m,x, algorithm="fricas")
```

```
[Out] ((B*b*m^2 + 5*B*b*m + 4*B*b)*x^7 + ((B*a + A*b)*m^2 + 7*B*a + 7*A
*b + 8*(B*a + A*b)*m)*x^4 + (A*a*m^2 + 11*A*a*m + 28*A*a)*x)*x^m/
(m^3 + 12*m^2 + 39*m + 28)
```

Sympy [A] time = 4.45935, size = 410, normalized size = 9.11

$$\begin{cases} -\frac{Aa}{6x^6}-\frac{Ab}{3x^3}-\frac{Ba}{3x^3}+Bb\log(x) \\ -\frac{Aa}{3x^3}+Ab\log(x)+Ba\log(x)+\frac{Bbx^3}{3} \\ Aa\log(x)+\frac{Abx^3}{3}+\frac{Bax^3}{3}+\frac{Bbx^6}{6} \\ \frac{Aam^2xx^m}{m^3+12m^2+39m+28}+\frac{11Aamxx^m}{m^3+12m^2+39m+28}+\frac{28Aaxx^m}{m^3+12m^2+39m+28}+\frac{Abm^2x^4x^m}{m^3+12m^2+39m+28}+\frac{8Abmx^4x^m}{m^3+12m^2+39m+28}+\frac{7Abx^4x^m}{m^3+12m^2+39m+28}+\frac{Bam^2x^4x^m}{m^3+12m^2+39m+2} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**m*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] Piecewise((-A*a/(6*x**6) - A*b/(3*x**3) - B*a/(3*x**3) + B*b*log(
x), Eq(m, -7)), (-A*a/(3*x**3) + A*b*log(x) + B*a*log(x) + B*b*x*
*3/3, Eq(m, -4)), (A*a*log(x) + A*b*x**3/3 + B*a*x**3/3 + B*b*x**
6/6, Eq(m, -1)), (A*a*m**2*x*x**m/(m**3 + 12*m**2 + 39*m + 28) +
11*A*a*m*x*x**m/(m**3 + 12*m**2 + 39*m + 28) + 28*A*a*x*x**m/(m**
3 + 12*m**2 + 39*m + 28) + A*b*m**2*x**4*x**m/(m**3 + 12*m**2 + 3
9*m + 28) + 8*A*b*m*x**4*x**m/(m**3 + 12*m**2 + 39*m + 28) + 7*A*
b*x**4*x**m/(m**3 + 12*m**2 + 39*m + 28) + B*a*m**2*x**4*x**m/(m*
*3 + 12*m**2 + 39*m + 28) + 8*B*a*m*x**4*x**m/(m**3 + 12*m**2 + 3
9*m + 28) + 7*B*a*x**4*x**m/(m**3 + 12*m**2 + 39*m + 28) + B*b*m*
*2*x**7*x**m/(m**3 + 12*m**2 + 39*m + 28) + 5*B*b*m*x**7*x**m/(m*
*3 + 12*m**2 + 39*m + 28) + 4*B*b*x**7*x**m/(m**3 + 12*m**2 + 39*
m + 28), True))
```

GIAC/XCAS [A] time = 0.216468, size = 225, normalized size = 5.

$$\frac{Bbm^2x^7e^{(m\ln(x))}+5\,Bbmx^7e^{(m\ln(x))}+4\,Bbx^7e^{(m\ln(x))}+Bam^2x^4e^{(m\ln(x))}+Abm^2x^4e^{(m\ln(x))}+8\,Bamx^4e^{(m\ln(x))}+8\,Abmx^4e^{(ml}}{m^3+12\,m^2+39\,m+28}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^m,x, algorithm="giac")
```

```
[Out] (B*b*m^2*x^7*e^(m*ln(x)) + 5*B*b*m*x^7*e^(m*ln(x)) + 4*B*b*x^7*e^
(m*ln(x)) + B*a*m^2*x^4*e^(m*ln(x)) + A*b*m^2*x^4*e^(m*ln(x)) + 8
*B*a*m*x^4*e^(m*ln(x)) + 8*A*b*m*x^4*e^(m*ln(x)) + 7*B*a*x^4*e^(m
*ln(x)) + 7*A*b*x^4*e^(m*ln(x)) + A*a*m^2*x*e^(m*ln(x)) + 11*A*a*
m*x*e^(m*ln(x)) + 28*A*a*x*e^(m*ln(x)))/(m^3 + 12*m^2 + 39*m + 28
)
```

3.127 $\int \frac{x^m (A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=66

$$\frac{x^{m+1}(Ab-aB)\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{ab(m+1)}+\frac{Bx^{m+1}}{b(m+1)}$$

```
[Out] (B*x^(1 + m))/(b*(1 + m)) + ((A*b - a*B)*x^(1 + m)*Hypergeometric
2F1[1, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(a*b*(1 + m))
```

Rubi [A] time = 0.108708, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{x^{m+1}(Ab-aB)\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{ab(m+1)}+\frac{Bx^{m+1}}{b(m+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^m*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (B*x^(1 + m))/(b*(1 + m)) + ((A*b - a*B)*x^(1 + m)*Hypergeometric
2F1[1, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(a*b*(1 + m))
```

Rubi in Sympy [A] time = 10.4017, size = 49, normalized size = 0.74

$$\frac{Bx^{m+1}}{b\,(m+1)}+\frac{x^{m+1}\,(Ab-Ba)\,{}_2F_1\left(\begin{matrix}1,\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{ab\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**m*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] B*x**(m + 1)/(b*(m + 1)) + x**(m + 1)*(A*b - B*a)*hyper((1, m/3 +
 1/3), (m/3 + 4/3,), -b*x**3/a)/(a*b*(m + 1))
```

Mathematica [A] time = 0.0907811, size = 55, normalized size = 0.83

$$\frac{x^{m+1}\left((Ab-aB)\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)+aB\right)}{ab(m+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^m*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (x^(1 + m)*(a*B + (A*b - a*B)*Hypergeometric2F1[1, (1 + m)/3, (4
+ m)/3, -((b*x^3)/a)]))/(a*b*(1 + m))
```

Maple [F] time = 0.053, size = 0, normalized size = 0.

$$\int \frac{x^m\left(Bx^3+A\right)}{bx^3+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^m*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] int(x^m*(B*x^3+A)/(b*x^3+a),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^m}{bx^3 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^m/(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bx^3 + A)x^m}{bx^3 + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*x^m/(b*x^3 + a), x)
```

Sympy [A] time = 93.2513, size = 190, normalized size = 2.88

$$\frac{Amxx^m\left(\frac{bx^3e^{i\pi}}{a}, 1, \frac{m}{3} + \frac{1}{3}\right)\left(\frac{m}{3} + \frac{1}{3}\right)}{9a\left(\frac{m}{3} + \frac{4}{3}\right)} + \frac{Axx^m\left(\frac{bx^3e^{i\pi}}{a}, 1, \frac{m}{3} + \frac{1}{3}\right)\left(\frac{m}{3} + \frac{1}{3}\right)}{9a\left(\frac{m}{3} + \frac{4}{3}\right)} + \frac{Bmx^4x^m\left(\frac{bx^3e^{i\pi}}{a}, 1, \frac{m}{3} + \frac{4}{3}\right)\left(\frac{m}{3} + \frac{4}{3}\right)}{9a\left(\frac{m}{3} + \frac{7}{3}\right)} + \frac{4Bx^4x^m\left(\frac{bx^3e^{i\pi}}{a}, 1, \frac{m}{3} + \frac{4}{3}\right)\left(\frac{m}{3} + \frac{4}{3}\right)}{9a\left(\frac{m}{3} + \frac{7}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**m*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] A*m*x*x**m*lerchphi(b*x**3*exp_polar(I*pi)/a, 1, m/3 + 1/3)*gamma
(m/3 + 1/3)/(9*a*gamma(m/3 + 4/3)) + A*x*x**m*lerchphi(b*x**3*exp
_polar(I*pi)/a, 1, m/3 + 1/3)*gamma(m/3 + 1/3)/(9*a*gamma(m/3 + 4
/3)) + B*m*x**4*x**m*lerchphi(b*x**3*exp_polar(I*pi)/a, 1, m/3 +
4/3)*gamma(m/3 + 4/3)/(9*a*gamma(m/3 + 7/3)) + 4*B*x**4*x**m*lerc
hphi(b*x**3*exp_polar(I*pi)/a, 1, m/3 + 4/3)*gamma(m/3 + 4/3)/(9*
a*gamma(m/3 + 7/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^m}{bx^3 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a),x, algorithm="giac")

[Out] integrate((B*x^3 + A)*x^m/(b*x^3 + a), x)
```

3.128 $\int \frac{x^m(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=93

$$\frac{x^{m+1}(aB(m+1)+Ab(2-m))\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{3a^2b(m+1)}+\frac{x^{m+1}(Ab-aB)}{3ab\,(a+bx^3)}$$

```
[Out] ((A*b - a*B)*x^(1 + m))/(3*a*b*(a + b*x^3)) + ((A*b*(2 - m) + a*B
*(1 + m))*x^(1 + m)*Hypergeometric2F1[1, (1 + m)/3, (4 + m)/3, -(
(b*x^3)/a)])/(3*a^2*b*(1 + m))
```

Rubi [A] time = 0.135231, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{x^{m+1}(aB(m+1)+Ab(2-m))\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{3a^2b(m+1)}+\frac{x^{m+1}(Ab-aB)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^m*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((A*b - a*B)*x^(1 + m))/(3*a*b*(a + b*x^3)) + ((A*b*(2 - m) + a*B
*(1 + m))*x^(1 + m)*Hypergeometric2F1[1, (1 + m)/3, (4 + m)/3, -(
(b*x^3)/a)])/(3*a^2*b*(1 + m))
```

Rubi in Sympy [A] time = 12.4381, size = 71, normalized size = 0.76

$$\frac{x^{m+1}\,(Ab-Ba)}{3ab\,(a+bx^3)}+\frac{x^{m+1}\,(Ab\,(-m+2)+Ba\,(m+1))\,{}_2F_1\left(\begin{matrix}1,\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{3a^2b\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**m*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] x**(m + 1)*(A*b - B*a)/(3*a*b*(a + b*x**3)) + x**(m + 1)*(A*b*(-m
 + 2) + B*a*(m + 1))*hyper((1, m/3 + 1/3), (m/3 + 4/3,), -b*x**3/
a)/(3*a**2*b*(m + 1))
```

Mathematica [A] time = 0.0891434, size = 80, normalized size = 0.86

$$\frac{x^{m+1}\left((Ab-aB)\,{}_2F_1\left(2,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)+aB\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)\right)}{a^2b(m+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^m*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (x^(1 + m)*(a*B*Hypergeometric2F1[1, (1 + m)/3, (4 + m)/3, -((b*x
^3)/a)] + (A*b - a*B)*Hypergeometric2F1[2, (1 + m)/3, (4 + m)/3,
-((b*x^3)/a)]))/(a^2*b*(1 + m))
```

Maple [F] time = 0.065, size = 0, normalized size = 0.

$$\int \frac{x^{m} \left(B x^{3}+A\right)}{\left(b x^{3}+a\right)^{2}}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^m*(B*x^3+A)/(b*x^3+a)^2,x)

[Out] int(x^m*(B*x^3+A)/(b*x^3+a)^2,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(B x^{3}+A\right) x^{m}}{\left(b x^{3}+a\right)^{2}}\,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a)^2,x, algorithm="maxima")

[Out] integrate((B*x^3 + A)*x^m/(b*x^3 + a)^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(B x^{3}+A\right) x^{m}}{b^{2} x^{6}+2\,a b x^{3}+a^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a)^2,x, algorithm="fricas")

[Out] integral((B*x^3 + A)*x^m/(b^2*x^6 + 2*a*b*x^3 + a^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**m*(B*x**3+A)/(b*x**3+a)**2,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(B x^{3}+A\right) x^{m}}{\left(b x^{3}+a\right)^{2}}\,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a)^2,x, algorithm="giac")

[Out] integrate((B*x^3 + A)*x^m/(b*x^3 + a)^2, x)
```

3.129 $\int \frac{x^m\left(A+Bx^3\right)}{\left(a+bx^3\right)^3}\,dx$

Optimal. Leaf size=93

$$\frac{x^{m+1}(aB(m+1)+Ab(5-m))\,{}_2F_1\left(2,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{6a^3b(m+1)}+\frac{x^{m+1}(Ab-aB)}{6ab\left(a+bx^3\right)^2}$$

```
[Out] ((A*b - a*B)*x^(1 + m))/(6*a*b*(a + b*x^3)^2) + ((A*b*(5 - m) + a
*B*(1 + m))*x^(1 + m)*Hypergeometric2F1[2, (1 + m)/3, (4 + m)/3,
-((b*x^3)/a)])/(6*a^3*b*(1 + m))
```

Rubi [A] time = 0.139544, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{x^{m+1}(aB(m+1)+Ab(5-m))\,{}_2F_1\left(2,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{6a^3b(m+1)}+\frac{x^{m+1}(Ab-aB)}{6ab\left(a+bx^3\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^m*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - a*B)*x^(1 + m))/(6*a*b*(a + b*x^3)^2) + ((A*b*(5 - m) + a
*B*(1 + m))*x^(1 + m)*Hypergeometric2F1[2, (1 + m)/3, (4 + m)/3,
-((b*x^3)/a)])/(6*a^3*b*(1 + m))
```

Rubi in Sympy [A] time = 11.9777, size = 73, normalized size = 0.78

$$\frac{x^{m+1}\left(Ab-Ba\right)}{6ab\left(a+bx^3\right)^2}+\frac{x^{m+1}\left(Ab\left(-m+5\right)+Ba\left(m+1\right)\right){}_2F_1\left(\begin{matrix}2,\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|{-\frac{bx^3}{a}}\right)}{6a^3b\left(m+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**m*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] x**(m + 1)*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) + x**(m + 1)*(A*b*
(-m + 5) + B*a*(m + 1))*hyper((2, m/3 + 1/3), (m/3 + 4/3,), -b*x*
*3/a)/(6*a**3*b*(m + 1))
```

Mathematica [A] time = 0.0894682, size = 80, normalized size = 0.86

$$\frac{x^{m+1}\left((Ab-aB)\,{}_2F_1\left(3,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)+aB\,{}_2F_1\left(2,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)\right)}{a^3b(m+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^m*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] (x^(1 + m)*(a*B*Hypergeometric2F1[2, (1 + m)/3, (4 + m)/3, -((b*x
^3)/a)] + (A*b - a*B)*Hypergeometric2F1[3, (1 + m)/3, (4 + m)/3,
-((b*x^3)/a)]))/(a^3*b*(1 + m))
```

Maple [F] time = 0.053, size = 0, normalized size = 0.

$$\int \frac{x^{m} \left(B x^{3}+A \right)}{\left(b x^{3}+a \right)^{3}}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^m*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] int(x^m*(B*x^3+A)/(b*x^3+a)^3,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(B x^{3}+A\right)x^{m}}{\left(b x^{3}+a\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^m/(b*x^3 + a)^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\left(B x^{3}+A\right)x^{m}}{b^{3} x^{9}+3\,a b^{2} x^{6}+3\,a^{2} b x^{3}+a^{3}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*x^m/(b^3*x^9 + 3*a*b^2*x^6 + 3*a^2*b*x^3 + a
^3), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**m*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(B x^{3}+A\right)x^{m}}{\left(b x^{3}+a\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^m/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^m/(b*x^3 + a)^3, x)
```

3.130 $\int \frac{(ex)^m}{(a+bx^3)(c+dx^3)}\,dx$

Optimal. Leaf size=112

$$\frac{b(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{ae(m+1)(bc-ad)}-\frac{d(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{dx^3}{c}\right)}{ce(m+1)(bc-ad)}$$

```
[Out] (b*(e*x)^(1 + m)*Hypergeometric2F1[1, (1 + m)/3, (4 + m)/3, -((b*
x^3)/a)])/(a*(b*c - a*d)*e*(1 + m)) - (d*(e*x)^(1 + m)*Hypergeome
tric2F1[1, (1 + m)/3, (4 + m)/3, -((d*x^3)/c)])/(c*(b*c - a*d)*e*
(1 + m))
```

Rubi [A] time = 0.185098, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{b(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{ae(m+1)(bc-ad)}-\frac{d(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{dx^3}{c}\right)}{ce(m+1)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] (b*(e*x)^(1 + m)*Hypergeometric2F1[1, (1 + m)/3, (4 + m)/3, -((b*
x^3)/a)])/(a*(b*c - a*d)*e*(1 + m)) - (d*(e*x)^(1 + m)*Hypergeome
tric2F1[1, (1 + m)/3, (4 + m)/3, -((d*x^3)/c)])/(c*(b*c - a*d)*e*
(1 + m))
```

Rubi in Sympy [A] time = 20.177, size = 83, normalized size = 0.74

$$\frac{d\,(ex)^{m+1}\,{}_2F_1\left(\begin{matrix}1,\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{dx^3}{c}\right)}{ce\,(m+1)\,(ad-bc)}-\frac{b\,(ex)^{m+1}\,{}_2F_1\left(\begin{matrix}1,\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{ae\,(m+1)\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(b*x**3+a)/(d*x**3+c),x)
```

```
[Out] d*(e*x)**(m + 1)*hyper((1, m/3 + 1/3), (m/3 + 4/3,), -d*x**3/c)/(
c*e*(m + 1)*(a*d - b*c)) - b*(e*x)**(m + 1)*hyper((1, m/3 + 1/3),
 (m/3 + 4/3,), -b*x**3/a)/(a*e*(m + 1)*(a*d - b*c))
```

Mathematica [A] time = 0.0983938, size = 86, normalized size = 0.77

$$\frac{x(ex)^m\left(ad\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{dx^3}{c}\right)-bc\,{}_2F_1\left(1,\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)\right)}{ac(m+1)(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^m/((a + b*x^3)*(c + d*x^3)),x]
```

```
[Out] (x*(e*x)^m*(-(b*c*Hypergeometric2F1[1, (1 + m)/3, (4 + m)/3, -((b
*x^3)/a)]) + a*d*Hypergeometric2F1[1, (1 + m)/3, (4 + m)/3, -((d*
x^3)/c)]))/(a*c*(-(b*c) + a*d)*(1 + m))
```

Maple [F] time = 0.086, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^3+a)(dx^3+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(b*x^3+a)/(d*x^3+c),x)

[Out] int((e*x)^m/(b*x^3+a)/(d*x^3+c),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^3+a)(dx^3+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="maxima")

[Out] integrate((e*x)^m/((b*x^3 + a)*(d*x^3 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{bdx^6+(bc+ad)x^3+ac},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="fricas")

[Out] integral((e*x)^m/(b*d*x^6 + (b*c + a*d)*x^3 + a*c), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(b*x**3+a)/(d*x**3+c),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^3+a)(dx^3+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^3 + a)*(d*x^3 + c)),x, algorithm="giac")

[Out] integrate((e*x)^m/((b*x^3 + a)*(d*x^3 + c)), x)
```

3.131 $\int x^{7/2}\left(a+bx^3\right)\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=39

$$\frac{2}{15}x^{15/2}(aB+Ab)+\frac{2}{9}aAx^{9/2}+\frac{2}{21}bBx^{21/2}$$

```
[Out] (2*a*A*x^(9/2))/9 + (2*(A*b + a*B)*x^(15/2))/15 + (2*b*B*x^(21/2)
)/21
```

Rubi [A] time = 0.057978, antiderivative size = 39, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{2}{15}x^{15/2}(aB+Ab)+\frac{2}{9}aAx^{9/2}+\frac{2}{21}bBx^{21/2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(7/2)*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (2*a*A*x^(9/2))/9 + (2*(A*b + a*B)*x^(15/2))/15 + (2*b*B*x^(21/2)
)/21
```

Rubi in Sympy [A] time = 6.08142, size = 41, normalized size = 1.05

$$\frac{2Aax^{\frac{9}{2}}}{9}+\frac{2Bbx^{\frac{21}{2}}}{21}+x^{\frac{15}{2}}\left(\frac{2Ab}{15}+\frac{2Ba}{15}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(7/2)*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] 2*A*a*x**(9/2)/9 + 2*B*b*x**(21/2)/21 + x**(15/2)*(2*A*b/15 + 2*B
*a/15)
```

Mathematica [A] time = 0.0207275, size = 33, normalized size = 0.85

$$\frac{2}{315}x^{9/2}\left(21x^3(aB+Ab)+35aA+15bBx^6\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(7/2)*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (2*x^(9/2)*(35*a*A + 21*(A*b + a*B)*x^3 + 15*b*B*x^6))/315
```

Maple [A] time = 0.006, size = 32, normalized size = 0.8

$$\frac{30\,bBx^6+42\,Ax^3b+42\,Bx^3a+70\,Aa}{315}x^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(7/2)*(b*x^3+a)*(B*x^3+A),x)
```

```
[Out] 2/315*x^(9/2)*(15*B*b*x^6+21*A*b*x^3+21*B*a*x^3+35*A*a)
```

Maxima [A] time = 1.36516, size = 36, normalized size = 0.92

$$\frac{2}{21}\,Bbx^{\frac{21}{2}} + \frac{2}{15}\,(Ba + Ab)x^{\frac{15}{2}} + \frac{2}{9}\,Aax^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(7/2),x, algorithm="maxima")
```

```
[Out] 2/21*B*b*x^(21/2) + 2/15*(B*a + A*b)*x^(15/2) + 2/9*A*a*x^(9/2)
```

Fricas [A] time = 0.222331, size = 43, normalized size = 1.1

$$\frac{2}{315}\,\left(15\,Bbx^{10} + 21\,(Ba + Ab)x^{7} + 35\,Aax^{4}\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(7/2),x, algorithm="fricas")
```

```
[Out] 2/315*(15*B*b*x^10 + 21*(B*a + A*b)*x^7 + 35*A*a*x^4)*sqrt(x)
```

Sympy [A] time = 70.5765, size = 46, normalized size = 1.18

$$\frac{2Aax^{\frac{9}{2}}}{9} + \frac{2Abx^{\frac{15}{2}}}{15} + \frac{2Bax^{\frac{15}{2}}}{15} + \frac{2Bbx^{\frac{21}{2}}}{21}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(7/2)*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] 2*A*a*x**(9/2)/9 + 2*A*b*x**(15/2)/15 + 2*B*a*x**(15/2)/15 + 2*B*
b*x**(21/2)/21
```

GIAC/XCAS [A] time = 0.210716, size = 39, normalized size = 1.

$$\frac{2}{21}\,Bbx^{\frac{21}{2}} + \frac{2}{15}\,Bax^{\frac{15}{2}} + \frac{2}{15}\,Abx^{\frac{15}{2}} + \frac{2}{9}\,Aax^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(7/2),x, algorithm="giac")
```

```
[Out] 2/21*B*b*x^(21/2) + 2/15*B*a*x^(15/2) + 2/15*A*b*x^(15/2) + 2/9*A
*a*x^(9/2)
```

3.132 $\int x^{5/2} \left(a+bx^3\right) \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=39

$$\frac{2}{13}x^{13/2}(aB+Ab)+\frac{2}{7}aAx^{7/2}+\frac{2}{19}bBx^{19/2}$$

```
[Out] (2*a*A*x^(7/2))/7 + (2*(A*b + a*B)*x^(13/2))/13 + (2*b*B*x^(19/2)
)/19
```

Rubi [A] time = 0.0576091, antiderivative size = 39, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{2}{13}x^{13/2}(aB+Ab)+\frac{2}{7}aAx^{7/2}+\frac{2}{19}bBx^{19/2}$$

Antiderivative was successfully verified.

```
[In] Int[x^(5/2)*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (2*a*A*x^(7/2))/7 + (2*(A*b + a*B)*x^(13/2))/13 + (2*b*B*x^(19/2)
)/19
```

Rubi in Sympy [A] time = 6.0477, size = 41, normalized size = 1.05

$$\frac{2Aax^{\frac{7}{2}}}{7}+\frac{2Bbx^{\frac{19}{2}}}{19}+x^{\frac{13}{2}}\left(\frac{2Ab}{13}+\frac{2Ba}{13}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(5/2)*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] 2*A*a*x**(7/2)/7 + 2*B*b*x**(19/2)/19 + x**(13/2)*(2*A*b/13 + 2*B
*a/13)
```

Mathematica [A] time = 0.0200636, size = 33, normalized size = 0.85

$$\frac{2x^{7/2}\left(133x^3(aB+Ab)+247aA+91bBx^6\right)}{1729}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(5/2)*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (2*x^(7/2)*(247*a*A + 133*(A*b + a*B)*x^3 + 91*b*B*x^6))/1729
```

Maple [A] time = 0.005, size = 32, normalized size = 0.8

$$\frac{182\,bBx^6+266\,Ax^3b+266\,Bx^3a+494\,Aa}{1729}x^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^(5/2)*(b*x^3+a)*(B*x^3+A),x)
```

```
[Out] 2/1729*x^(7/2)*(91*B*b*x^6+133*A*b*x^3+133*B*a*x^3+247*A*a)
```

Maxima [A] time = 1.41554, size = 36, normalized size = 0.92

$$\frac{2}{19}Bbx^{\frac{19}{2}} + \frac{2}{13}(Ba + Ab)x^{\frac{13}{2}} + \frac{2}{7}Aax^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(5/2),x, algorithm="maxima")
```

```
[Out] 2/19*B*b*x^(19/2) + 2/13*(B*a + A*b)*x^(13/2) + 2/7*A*a*x^(7/2)
```

Fricas [A] time = 0.229348, size = 43, normalized size = 1.1

$$\frac{2}{1729}\left(91\,Bbx^9 + 133\,(Ba + Ab)x^6 + 247\,Aax^3\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(5/2),x, algorithm="fricas")
```

```
[Out] 2/1729*(91*B*b*x^9 + 133*(B*a + A*b)*x^6 + 247*A*a*x^3)*sqrt(x)
```

Sympy [A] time = 38.1018, size = 46, normalized size = 1.18

$$\frac{2Aax^{\frac{7}{2}}}{7} + \frac{2Abx^{\frac{13}{2}}}{13} + \frac{2Bax^{\frac{13}{2}}}{13} + \frac{2Bbx^{\frac{19}{2}}}{19}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] 2*A*a*x**(7/2)/7 + 2*A*b*x**(13/2)/13 + 2*B*a*x**(13/2)/13 + 2*B*
b*x**(19/2)/19
```

GIAC/XCAS [A] time = 0.213856, size = 39, normalized size = 1.

$$\frac{2}{19}Bbx^{\frac{19}{2}} + \frac{2}{13}Bax^{\frac{13}{2}} + \frac{2}{13}Abx^{\frac{13}{2}} + \frac{2}{7}Aax^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(5/2),x, algorithm="giac")
```

```
[Out] 2/19*B*b*x^(19/2) + 2/13*B*a*x^(13/2) + 2/13*A*b*x^(13/2) + 2/7*A
*a*x^(7/2)
```

3.133 $\int x^{3/2} \left(a+bx^3\right) \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=39

$$\frac{2}{11}x^{11/2}(aB+Ab)+\frac{2}{5}aAx^{5/2}+\frac{2}{17}bBx^{17/2}$$

```
[Out] (2*a*A*x^(5/2))/5 + (2*(A*b + a*B)*x^(11/2))/11 + (2*b*B*x^(17/2)
)/17
```

Rubi [A] time = 0.0570354, antiderivative size = 39, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{2}{11}x^{11/2}(aB+Ab)+\frac{2}{5}aAx^{5/2}+\frac{2}{17}bBx^{17/2}$$

Antiderivative was successfully verified.

```
[In] Int[x^(3/2)*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (2*a*A*x^(5/2))/5 + (2*(A*b + a*B)*x^(11/2))/11 + (2*b*B*x^(17/2)
)/17
```

Rubi in Sympy [A] time = 6.07963, size = 41, normalized size = 1.05

$$\frac{2Aax^{\frac{5}{2}}}{5}+\frac{2Bbx^{\frac{17}{2}}}{17}+x^{\frac{11}{2}}\left(\frac{2Ab}{11}+\frac{2Ba}{11}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(3/2)*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] 2*A*a*x**(5/2)/5 + 2*B*b*x**(17/2)/17 + x**(11/2)*(2*A*b/11 + 2*B
*a/11)
```

Mathematica [A] time = 0.0192323, size = 33, normalized size = 0.85

$$\frac{2}{935}x^{5/2}\left(85x^3(aB+Ab)+187aA+55bBx^6\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(3/2)*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (2*x^(5/2)*(187*a*A + 85*(A*b + a*B)*x^3 + 55*b*B*x^6))/935
```

Maple [A] time = 0.004, size = 32, normalized size = 0.8

$$\frac{110\,bB{x}^{6}+170\,A{x}^{3}b+170\,B{x}^{3}a+374\,Aa}{935}{x}^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^(3/2)*(b*x^3+a)*(B*x^3+A),x)
```

```
[Out] 2/935*x^(5/2)*(55*B*b*x^6+85*A*b*x^3+85*B*a*x^3+187*A*a)
```

Maxima [A] time = 1.36883, size = 36, normalized size = 0.92

$$\frac{2}{17}\,Bbx^{\frac{17}{2}} + \frac{2}{11}\,(Ba + Ab)x^{\frac{11}{2}} + \frac{2}{5}\,Aax^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(3/2),x, algorithm="maxima")
```

```
[Out] 2/17*B*b*x^(17/2) + 2/11*(B*a + A*b)*x^(11/2) + 2/5*A*a*x^(5/2)
```

Fricas [A] time = 0.234927, size = 43, normalized size = 1.1

$$\frac{2}{935}\left(55\,Bbx^{8} + 85\,(Ba + Ab)x^{5} + 187\,Aax^{2}\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(3/2),x, algorithm="fricas")
```

```
[Out] 2/935*(55*B*b*x^8 + 85*(B*a + A*b)*x^5 + 187*A*a*x^2)*sqrt(x)
```

Sympy [A] time = 19.4076, size = 46, normalized size = 1.18

$$\frac{2Aax^{\frac{5}{2}}}{5} + \frac{2Abx^{\frac{11}{2}}}{11} + \frac{2Bax^{\frac{11}{2}}}{11} + \frac{2Bbx^{\frac{17}{2}}}{17}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)*(b*x**3+a)*(B*x**3+A),x)
```

```
[Out] 2*A*a*x**(5/2)/5 + 2*A*b*x**(11/2)/11 + 2*B*a*x**(11/2)/11 + 2*B*
b*x**(17/2)/17
```

GIAC/XCAS [A] time = 0.210095, size = 39, normalized size = 1.

$$\frac{2}{17}\,Bbx^{\frac{17}{2}} + \frac{2}{11}\,Bax^{\frac{11}{2}} + \frac{2}{11}\,Abx^{\frac{11}{2}} + \frac{2}{5}\,Aax^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*x^(3/2),x, algorithm="giac")
```

```
[Out] 2/17*B*b*x^(17/2) + 2/11*B*a*x^(11/2) + 2/11*A*b*x^(11/2) + 2/5*A
*a*x^(5/2)
```

3.134 $\int \sqrt{x}\left(a+bx^3\right)\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=39

$$\frac{2}{9}x^{9/2}(aB+Ab)+\frac{2}{3}aAx^{3/2}+\frac{2}{15}bBx^{15/2}$$

```
[Out] (2*a*A*x^(3/2))/3 + (2*(A*b + a*B)*x^(9/2))/9 + (2*b*B*x^(15/2))/
15
```

Rubi [A] time = 0.0560962, antiderivative size = 39, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{2}{9}x^{9/2}(aB+Ab)+\frac{2}{3}aAx^{3/2}+\frac{2}{15}bBx^{15/2}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x]*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (2*a*A*x^(3/2))/3 + (2*(A*b + a*B)*x^(9/2))/9 + (2*b*B*x^(15/2))/
15
```

Rubi in Sympy [A] time = 6.27942, size = 41, normalized size = 1.05

$$\frac{2Aax^{\frac{3}{2}}}{3}+\frac{2Bbx^{\frac{15}{2}}}{15}+x^{\frac{9}{2}}\left(\frac{2Ab}{9}+\frac{2Ba}{9}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A)*x**(1/2),x)
```

```
[Out] 2*A*a*x**(3/2)/3 + 2*B*b*x**(15/2)/15 + x**(9/2)*(2*A*b/9 + 2*B*a
/9)
```

Mathematica [A] time = 0.0191043, size = 33, normalized size = 0.85

$$\frac{2}{45}x^{3/2}\left(5x^3(aB+Ab)+15aA+3bBx^6\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x]*(a + b*x^3)*(A + B*x^3),x]
```

```
[Out] (2*x^(3/2)*(15*a*A + 5*(A*b + a*B)*x^3 + 3*b*B*x^6))/45
```

Maple [A] time = 0.006, size = 32, normalized size = 0.8

$$\frac{6\,bBx^6+10\,Ax^3b+10\,Bx^3a+30\,Aa}{45}x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A)*x^(1/2),x)
```

```
[Out] 2/45*x^(3/2)*(3*B*b*x^6+5*A*b*x^3+5*B*a*x^3+15*A*a)
```

Maxima [A] time = 1.36541, size = 36, normalized size = 0.92

$$\frac{2}{15}\,Bbx^{\frac{15}{2}} + \frac{2}{9}\,(Ba + Ab)x^{\frac{9}{2}} + \frac{2}{3}\,Aax^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*sqrt(x),x, algorithm="maxima")
```

```
[Out] 2/15*B*b*x^(15/2) + 2/9*(B*a + A*b)*x^(9/2) + 2/3*A*a*x^(3/2)
```

Fricas [A] time = 0.229242, size = 41, normalized size = 1.05

$$\frac{2}{45}\left(3\,Bbx^7 + 5\,(Ba + Ab)x^4 + 15\,Aax\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*sqrt(x),x, algorithm="fricas")
```

```
[Out] 2/45*(3*B*b*x^7 + 5*(B*a + A*b)*x^4 + 15*A*a*x)*sqrt(x)
```

Sympy [A] time = 4.9497, size = 37, normalized size = 0.95

$$\frac{2Aax^{\frac{3}{2}}}{3} + \frac{2Bbx^{\frac{15}{2}}}{15} + \frac{2x^{\frac{9}{2}}\,(Ab + Ba)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)*x**(1/2),x)
```

```
[Out] 2*A*a*x**(3/2)/3 + 2*B*b*x**(15/2)/15 + 2*x**(9/2)*(A*b + B*a)/9
```

GIAC/XCAS [A] time = 0.213066, size = 39, normalized size = 1.

$$\frac{2}{15}\,Bbx^{\frac{15}{2}} + \frac{2}{9}\,Bax^{\frac{9}{2}} + \frac{2}{9}\,Abx^{\frac{9}{2}} + \frac{2}{3}\,Aax^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)*sqrt(x),x, algorithm="giac")
```

```
[Out] 2/15*B*b*x^(15/2) + 2/9*B*a*x^(9/2) + 2/9*A*b*x^(9/2) + 2/3*A*a*x
^(3/2)
```

3.135 $\int \frac{(a+bx^3)(A+Bx^3)}{\sqrt{x}}\,dx$

Optimal. Leaf size=37

$$\frac{2}{7}x^{7/2}(aB+Ab)+2aA\sqrt{x}+\frac{2}{13}bBx^{13/2}$$

```
[Out] 2*a*A*Sqrt[x] + (2*(A*b + a*B)*x^(7/2))/7 + (2*b*B*x^(13/2))/13
```

Rubi [A] time = 0.0555078, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{2}{7}x^{7/2}(aB+Ab)+2aA\sqrt{x}+\frac{2}{13}bBx^{13/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)*(A + B*x^3))/Sqrt[x],x]

[Out] 2*a*A*Sqrt[x] + (2*(A*b + a*B)*x^(7/2))/7 + (2*b*B*x^(13/2))/13
```

Rubi in Sympy [A] time = 6.08623, size = 39, normalized size = 1.05

$$2Aa\sqrt{x}+\frac{2Bbx^{\frac{13}{2}}}{13}+x^{\frac{7}{2}}\left(\frac{2Ab}{7}+\frac{2Ba}{7}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A)/x**(1/2),x)

[Out] 2*A*a*sqrt(x) + 2*B*b*x**(13/2)/13 + x**(7/2)*(2*A*b/7 + 2*B*a/7)
```

Mathematica [A] time = 0.0227102, size = 33, normalized size = 0.89

$$\frac{2}{91}\sqrt{x}\left(13x^3(aB+Ab)+91aA+7bBx^6\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)*(A + B*x^3))/Sqrt[x],x]

[Out] (2*Sqrt[x]*(91*a*A + 13*(A*b + a*B)*x^3 + 7*b*B*x^6))/91
```

Maple [A] time = 0.005, size = 32, normalized size = 0.9

$$\frac{14\,bBx^6+26\,Ax^3b+26\,Bx^3a+182\,Aa}{91}\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A)/x^(1/2),x)

[Out] 2/91*x^(1/2)*(7*B*b*x^6+13*A*b*x^3+13*B*a*x^3+91*A*a)
```

Maxima [A] time = 1.42902, size = 36, normalized size = 0.97

$$\frac{2}{13}\,Bbx^{\frac{13}{2}} + \frac{2}{7}\,(Ba + Ab)x^{\frac{7}{2}} + 2\,Aa\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/sqrt(x),x, algorithm="maxima")
```

```
[Out] 2/13*B*b*x^(13/2) + 2/7*(B*a + A*b)*x^(7/2) + 2*A*a*sqrt(x)
```

Fricas [A] time = 0.222752, size = 39, normalized size = 1.05

$$\frac{2}{91}\,\left(7\,Bbx^6 + 13\,(Ba + Ab)x^3 + 91\,Aa\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/sqrt(x),x, algorithm="fricas")
```

```
[Out] 2/91*(7*B*b*x^6 + 13*(B*a + A*b)*x^3 + 91*A*a)*sqrt(x)
```

Sympy [A] time = 6.46046, size = 44, normalized size = 1.19

$$2Aa\sqrt{x} + \frac{2Abx^{\frac{7}{2}}}{7} + \frac{2Bax^{\frac{7}{2}}}{7} + \frac{2Bbx^{\frac{13}{2}}}{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**(1/2),x)
```

```
[Out] 2*A*a*sqrt(x) + 2*A*b*x**(7/2)/7 + 2*B*a*x**(7/2)/7 + 2*B*b*x**(1
3/2)/13
```

GIAC/XCAS [A] time = 0.214899, size = 39, normalized size = 1.05

$$\frac{2}{13}\,Bbx^{\frac{13}{2}} + \frac{2}{7}\,Bax^{\frac{7}{2}} + \frac{2}{7}\,Abx^{\frac{7}{2}} + 2\,Aa\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/sqrt(x),x, algorithm="giac")
```

```
[Out] 2/13*B*b*x^(13/2) + 2/7*B*a*x^(7/2) + 2/7*A*b*x^(7/2) + 2*A*a*sqr
t(x)
```

3.136 $\int \frac{(a+bx^3)(A+Bx^3)}{x^{3/2}}\,dx$

Optimal. Leaf size=37

$$\frac{2}{5}x^{5/2}(aB+Ab)-\frac{2aA}{\sqrt{x}}+\frac{2}{11}bBx^{11/2}$$

```
[Out] (-2*a*A)/Sqrt[x] + (2*(A*b + a*B)*x^(5/2))/5 + (2*b*B*x^(11/2))/1
1
```

Rubi [A] time = 0.0558825, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$\frac{2}{5}x^{5/2}(aB+Ab)-\frac{2aA}{\sqrt{x}}+\frac{2}{11}bBx^{11/2}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)*(A + B*x^3))/x^(3/2),x]
```

```
[Out] (-2*a*A)/Sqrt[x] + (2*(A*b + a*B)*x^(5/2))/5 + (2*b*B*x^(11/2))/1
1
```

Rubi in Sympy [A] time = 6.10194, size = 39, normalized size = 1.05

$$-\frac{2Aa}{\sqrt{x}}+\frac{2Bbx^{\frac{11}{2}}}{11}+x^{\frac{5}{2}}\left(\frac{2Ab}{5}+\frac{2Ba}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)*(B*x**3+A)/x**(3/2),x)
```

```
[Out] -2*A*a/sqrt(x) + 2*B*b*x**(11/2)/11 + x**(5/2)*(2*A*b/5 + 2*B*a/5
)
```

Mathematica [A] time = 0.020357, size = 33, normalized size = 0.89

$$\frac{2\left(11x^3(aB+Ab)-55aA+5bBx^6\right)}{55\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)*(A + B*x^3))/x^(3/2),x]
```

```
[Out] (2*(-55*a*A + 11*(A*b + a*B)*x^3 + 5*b*B*x^6))/(55*Sqrt[x])
```

Maple [A] time = 0.005, size = 32, normalized size = 0.9

$$-\frac{-10\,bBx^6-22\,Ax^3b-22\,Bx^3a+110\,Aa}{55}\frac{1}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^3+a)*(B*x^3+A)/x^(3/2),x)
```

```
[Out] -2/55*(-5*B*b*x^6-11*A*b*x^3-11*B*a*x^3+55*A*a)/x^(1/2)
```

Maxima [A] time = 1.4073, size = 36, normalized size = 0.97

$$\frac{2}{11} Bbx^{\frac{11}{2}} + \frac{2}{5} (Ba + Ab)x^{\frac{5}{2}} - \frac{2 Aa}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(3/2),x, algorithm="maxima")
```

```
[Out] 2/11*B*b*x^(11/2) + 2/5*(B*a + A*b)*x^(5/2) - 2*A*a/sqrt(x)
```

Fricas [A] time = 0.226676, size = 39, normalized size = 1.05

$$\frac{2 \left(5 Bbx^6 + 11 (Ba + Ab)x^3 - 55 Aa\right)}{55 \sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(3/2),x, algorithm="fricas")
```

```
[Out] 2/55*(5*B*b*x^6 + 11*(B*a + A*b)*x^3 - 55*A*a)/sqrt(x)
```

Sympy [A] time = 8.25465, size = 44, normalized size = 1.19

$$-\frac{2Aa}{\sqrt{x}} + \frac{2Abx^{\frac{5}{2}}}{5} + \frac{2Bax^{\frac{5}{2}}}{5} + \frac{2Bbx^{\frac{11}{2}}}{11}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**(3/2),x)
```

```
[Out] -2*A*a/sqrt(x) + 2*A*b*x**(5/2)/5 + 2*B*a*x**(5/2)/5 + 2*B*b*x**(
11/2)/11
```

GIAC/XCAS [A] time = 0.213983, size = 39, normalized size = 1.05

$$\frac{2}{11} Bbx^{\frac{11}{2}} + \frac{2}{5} Bax^{\frac{5}{2}} + \frac{2}{5} Abx^{\frac{5}{2}} - \frac{2 Aa}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(3/2),x, algorithm="giac")
```

```
[Out] 2/11*B*b*x^(11/2) + 2/5*B*a*x^(5/2) + 2/5*A*b*x^(5/2) - 2*A*a/sqr
t(x)
```

3.137 $\int \frac{(a+bx^3)(A+Bx^3)}{x^{5/2}}\,dx$

Optimal. Leaf size=39

$$\frac{2}{3}x^{3/2}(aB+Ab)-\frac{2aA}{3x^{3/2}}+\frac{2}{9}bBx^{9/2}$$

```
[Out] (-2*a*A)/(3*x^(3/2)) + (2*(A*b + a*B)*x^(3/2))/3 + (2*b*B*x^(9/2)
)/9
```

Rubi [A] time = 0.0574405, antiderivative size = 39, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{2}{3}x^{3/2}(aB+Ab)-\frac{2aA}{3x^{3/2}}+\frac{2}{9}bBx^{9/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)*(A + B*x^3))/x^(5/2),x]
```

```
[Out] (-2*a*A)/(3*x^(3/2)) + (2*(A*b + a*B)*x^(3/2))/3 + (2*b*B*x^(9/2)
)/9
```

Rubi in Sympy [A] time = 6.0919, size = 41, normalized size = 1.05

$$-\frac{2Aa}{3x^{\frac{3}{2}}}+\frac{2Bbx^{\frac{9}{2}}}{9}+x^{\frac{3}{2}}\left(\frac{2Ab}{3}+\frac{2Ba}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)*(B*x**3+A)/x**(5/2),x)
```

```
[Out] -2*A*a/(3*x**(3/2)) + 2*B*b*x**(9/2)/9 + x**(3/2)*(2*A*b/3 + 2*B*
a/3)
```

Mathematica [A] time = 0.0202908, size = 34, normalized size = 0.87

$$\frac{2\left(-3aA+3aBx^3+3Abx^3+bBx^6\right)}{9x^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)*(A + B*x^3))/x^(5/2),x]
```

```
[Out] (2*(-3*a*A + 3*A*b*x^3 + 3*a*B*x^3 + b*B*x^6))/(9*x^(3/2))
```

Maple [A] time = 0.006, size = 32, normalized size = 0.8

$$-\frac{-2\,bBx^6-6\,Ax^3b-6\,Bx^3a+6\,Aa}{9}x^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)*(B*x^3+A)/x^(5/2),x)
```

```
[Out] -2/9*(-B*b*x^6-3*A*b*x^3-3*B*a*x^3+3*A*a)/x^(3/2)
```

Maxima [A] time = 1.58397, size = 36, normalized size = 0.92

$$\frac{2}{9}\,Bbx^{\frac{9}{2}}+\frac{2}{3}\,(Ba+Ab)x^{\frac{3}{2}}-\frac{2\,Aa}{3\,x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(5/2),x, algorithm="maxima")

[Out] 2/9*B*b*x^(9/2) + 2/3*(B*a + A*b)*x^(3/2) - 2/3*A*a/x^(3/2)
```

Fricas [A] time = 0.227699, size = 38, normalized size = 0.97

$$\frac{2\left(Bbx^{6}+3\,(Ba+Ab)x^{3}-3\,Aa\right)}{9\,x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(5/2),x, algorithm="fricas")

[Out] 2/9*(B*b*x^6 + 3*(B*a + A*b)*x^3 - 3*A*a)/x^(3/2)
```

Sympy [A] time = 9.95857, size = 46, normalized size = 1.18

$$-\frac{2Aa}{3x^{\frac{3}{2}}}+\frac{2Abx^{\frac{3}{2}}}{3}+\frac{2Bax^{\frac{3}{2}}}{3}+\frac{2Bbx^{\frac{9}{2}}}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**(5/2),x)

[Out] -2*A*a/(3*x**(3/2)) + 2*A*b*x**(3/2)/3 + 2*B*a*x**(3/2)/3 + 2*B*b
*x**(9/2)/9
```

GIAC/XCAS [A] time = 0.212472, size = 39, normalized size = 1.

$$\frac{2}{9}\,Bbx^{\frac{9}{2}}+\frac{2}{3}\,Bax^{\frac{3}{2}}+\frac{2}{3}\,Abx^{\frac{3}{2}}-\frac{2\,Aa}{3\,x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(5/2),x, algorithm="giac")

[Out] 2/9*B*b*x^(9/2) + 2/3*B*a*x^(3/2) + 2/3*A*b*x^(3/2) - 2/3*A*a/x^(
3/2)
```

3.138 $\int \frac{(a+bx^3)(A+Bx^3)}{x^{7/2}}\,dx$

Optimal. Leaf size=37

$$2\sqrt{x}(aB+Ab)-\frac{2aA}{5x^{5/2}}+\frac{2}{7}bBx^{7/2}$$

```
[Out] (-2*a*A)/(5*x^(5/2)) + 2*(A*b + a*B)*Sqrt[x] + (2*b*B*x^(7/2))/7
```

Rubi [A] time = 0.0584551, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$2\sqrt{x}(aB+Ab)-\frac{2aA}{5x^{5/2}}+\frac{2}{7}bBx^{7/2}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)*(A + B*x^3))/x^(7/2),x]

[Out] (-2*a*A)/(5*x^(5/2)) + 2*(A*b + a*B)*Sqrt[x] + (2*b*B*x^(7/2))/7
```

Rubi in Sympy [A] time = 6.12636, size = 37, normalized size = 1.

$$-\frac{2Aa}{5x^{\frac{5}{2}}}+\frac{2Bbx^{\frac{7}{2}}}{7}+\sqrt{x}\,(2Ab+2Ba)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)*(B*x**3+A)/x**(7/2),x)

[Out] -2*A*a/(5*x**(5/2)) + 2*B*b*x**(7/2)/7 + sqrt(x)*(2*A*b + 2*B*a)
```

Mathematica [A] time = 0.0202911, size = 33, normalized size = 0.89

$$\frac{2\left(35x^3(aB+Ab)-7aA+5bBx^6\right)}{35x^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)*(A + B*x^3))/x^(7/2),x]

[Out] (2*(-7*a*A + 35*(A*b + a*B)*x^3 + 5*b*B*x^6))/(35*x^(5/2))
```

Maple [A] time = 0.004, size = 32, normalized size = 0.9

$$-\frac{-10\,bBx^6-70\,Ax^3b-70\,Bx^3a+14\,Aa}{35}x^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^3+a)*(B*x^3+A)/x^(7/2),x)

[Out] -2/35*(-5*B*b*x^6-35*A*b*x^3-35*B*a*x^3+7*A*a)/x^(5/2)
```

Maxima [A] time = 1.8591, size = 36, normalized size = 0.97

$$\frac{2}{7}\,Bbx^{\frac{7}{2}} + 2\,(Ba + Ab)\sqrt{x} - \frac{2\,Aa}{5\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(7/2),x, algorithm="maxima")

[Out] 2/7*B*b*x^(7/2) + 2*(B*a + A*b)*sqrt(x) - 2/5*A*a/x^(5/2)
```

Fricas [A] time = 0.228116, size = 39, normalized size = 1.05

$$\frac{2\left(5\,Bbx^{6} + 35\,(Ba + Ab)x^{3} - 7\,Aa\right)}{35\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(7/2),x, algorithm="fricas")

[Out] 2/35*(5*B*b*x^6 + 35*(B*a + A*b)*x^3 - 7*A*a)/x^(5/2)
```

Sympy [A] time = 14.7258, size = 42, normalized size = 1.14

$$-\frac{2Aa}{5x^{\frac{5}{2}}} + 2Ab\sqrt{x} + 2Ba\sqrt{x} + \frac{2Bbx^{\frac{7}{2}}}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)*(B*x**3+A)/x**(7/2),x)

[Out] -2*A*a/(5*x**(5/2)) + 2*A*b*sqrt(x) + 2*B*a*sqrt(x) + 2*B*b*x**(7
/2)/7
```

GIAC/XCAS [A] time = 0.212451, size = 39, normalized size = 1.05

$$\frac{2}{7}\,Bbx^{\frac{7}{2}} + 2\,Ba\sqrt{x} + 2\,Ab\sqrt{x} - \frac{2\,Aa}{5\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)/x^(7/2),x, algorithm="giac")

[Out] 2/7*B*b*x^(7/2) + 2*B*a*sqrt(x) + 2*A*b*sqrt(x) - 2/5*A*a/x^(5/2)
```

3.139 $\int x^{7/2} \left(a+bx^3\right)^2 \left(A+Bx^3\right)\,dx$

Optimal. Leaf size=63

$$\frac{2}{9}a^2Ax^{9/2}+\frac{2}{21}bx^{21/2}(2aB+Ab)+\frac{2}{15}ax^{15/2}(aB+2Ab)+\frac{2}{27}b^2Bx^{27/2}$$

```
[Out] (2*a^2*A*x^(9/2))/9 + (2*a*(2*A*b + a*B)*x^(15/2))/15 + (2*b*(A*b
 + 2*a*B)*x^(21/2))/21 + (2*b^2*B*x^(27/2))/27
```

Rubi [A] time = 0.104011, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$

$$\frac{2}{9}a^2Ax^{9/2}+\frac{2}{21}bx^{21/2}(2aB+Ab)+\frac{2}{15}ax^{15/2}(aB+2Ab)+\frac{2}{27}b^2Bx^{27/2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(7/2)*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (2*a^2*A*x^(9/2))/9 + (2*a*(2*A*b + a*B)*x^(15/2))/15 + (2*b*(A*b
 + 2*a*B)*x^(21/2))/21 + (2*b^2*B*x^(27/2))/27
```

Rubi in Sympy [A] time = 10.7559, size = 63, normalized size = 1.

$$\frac{2Aa^2x^{\frac{9}{2}}}{9}+\frac{2Bb^2x^{\frac{27}{2}}}{27}+\frac{2ax^{\frac{15}{2}}(2Ab+Ba)}{15}+\frac{2bx^{\frac{21}{2}}(Ab+2Ba)}{21}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(7/2)*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] 2*A*a**2*x**(9/2)/9 + 2*B*b**2*x**(27/2)/27 + 2*a*x**(15/2)*(2*A*
b + B*a)/15 + 2*b*x**(21/2)*(A*b + 2*B*a)/21
```

Mathematica [A] time = 0.0367779, size = 53, normalized size = 0.84

$$\frac{2}{945}x^{9/2}\left(105a^2A+45bx^6(2aB+Ab)+63ax^3(aB+2Ab)+35b^2Bx^9\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(7/2)*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (2*x^(9/2)*(105*a^2*A + 63*a*(2*A*b + a*B)*x^3 + 45*b*(A*b + 2*a*
B)*x^6 + 35*b^2*B*x^9))/945
```

Maple [A] time = 0.007, size = 56, normalized size = 0.9

$$\frac{70\,Bx^9b^2+90\,Ab^2x^6+180\,Bx^6ab+252\,aAbx^3+126\,Bx^3a^2+210\,Aa^2}{945}x^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(7/2)*(b*x^3+a)^2*(B*x^3+A),x)
```

```
[Out] 2/945*x^(9/2)*(35*B*b^2*x^9+45*A*b^2*x^6+90*B*a*b*x^6+126*A*a*b*x
^3+63*B*a^2*x^3+105*A*a^2)
```

Maxima [A] time = 1.61315, size = 69, normalized size = 1.1

$$\frac{2}{27}\,Bb^2x^{\frac{27}{2}}+\frac{2}{21}\left(2\,Bab+Ab^2\right)x^{\frac{21}{2}}+\frac{2}{15}\left(Ba^2+2\,Aab\right)x^{\frac{15}{2}}+\frac{2}{9}\,Aa^2x^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(7/2),x, algorithm="maxima")
```

```
[Out] 2/27*B*b^2*x^(27/2) + 2/21*(2*B*a*b + A*b^2)*x^(21/2) + 2/15*(B*a
^2 + 2*A*a*b)*x^(15/2) + 2/9*A*a^2*x^(9/2)
```

Fricas [A] time = 0.234867, size = 76, normalized size = 1.21

$$\frac{2}{945}\left(35\,Bb^2x^{13}+45\left(2\,Bab+Ab^2\right)x^{10}+63\left(Ba^2+2\,Aab\right)x^7+105\,Aa^2x^4\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(7/2),x, algorithm="fricas")
```

```
[Out] 2/945*(35*B*b^2*x^13 + 45*(2*B*a*b + A*b^2)*x^10 + 63*(B*a^2 + 2*
A*a*b)*x^7 + 105*A*a^2*x^4)*sqrt(x)
```

Sympy [A] time = 167.797, size = 80, normalized size = 1.27

$$\frac{2Aa^2x^{\frac{9}{2}}}{9}+\frac{4Aabx^{\frac{15}{2}}}{15}+\frac{2Ab^2x^{\frac{21}{2}}}{21}+\frac{2Ba^2x^{\frac{15}{2}}}{15}+\frac{4Babx^{\frac{21}{2}}}{21}+\frac{2Bb^2x^{\frac{27}{2}}}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(7/2)*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] 2*A*a**2*x**(9/2)/9 + 4*A*a*b*x**(15/2)/15 + 2*A*b**2*x**(21/2)/2
1 + 2*B*a**2*x**(15/2)/15 + 4*B*a*b*x**(21/2)/21 + 2*B*b**2*x**(2
7/2)/27
```

GIAC/XCAS [A] time = 0.215062, size = 72, normalized size = 1.14

$$\frac{2}{27}\,Bb^2x^{\frac{27}{2}}+\frac{4}{21}\,Babx^{\frac{21}{2}}+\frac{2}{21}\,Ab^2x^{\frac{21}{2}}+\frac{2}{15}\,Ba^2x^{\frac{15}{2}}+\frac{4}{15}\,Aabx^{\frac{15}{2}}+\frac{2}{9}\,Aa^2x^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(7/2),x, algorithm="giac")
```

```
[Out] 2/27*B*b^2*x^(27/2) + 4/21*B*a*b*x^(21/2) + 2/21*A*b^2*x^(21/2) +
 2/15*B*a^2*x^(15/2) + 4/15*A*a*b*x^(15/2) + 2/9*A*a^2*x^(9/2)
```

3.140 $\int x^{5/2} \left(a+bx^3\right)^2 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=63

$$\frac{2}{7}a^2Ax^{7/2}+\frac{2}{19}bx^{19/2}(2aB+Ab)+\frac{2}{13}ax^{13/2}(aB+2Ab)+\frac{2}{25}b^2Bx^{25/2}$$

```
[Out] (2*a^2*A*x^(7/2))/7 + (2*a*(2*A*b + a*B)*x^(13/2))/13 + (2*b*(A*b
 + 2*a*B)*x^(19/2))/19 + (2*b^2*B*x^(25/2))/25
```

Rubi [A] time = 0.0994184, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$

$$\frac{2}{7}a^2Ax^{7/2}+\frac{2}{19}bx^{19/2}(2aB+Ab)+\frac{2}{13}ax^{13/2}(aB+2Ab)+\frac{2}{25}b^2Bx^{25/2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(5/2)*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (2*a^2*A*x^(7/2))/7 + (2*a*(2*A*b + a*B)*x^(13/2))/13 + (2*b*(A*b
 + 2*a*B)*x^(19/2))/19 + (2*b^2*B*x^(25/2))/25
```

Rubi in Sympy [A] time = 10.734, size = 63, normalized size = 1.

$$\frac{2Aa^2x^{\frac{7}{2}}}{7}+\frac{2Bb^2x^{\frac{25}{2}}}{25}+\frac{2ax^{\frac{13}{2}}\left(2Ab+Ba\right)}{13}+\frac{2bx^{\frac{19}{2}}\left(Ab+2Ba\right)}{19}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] 2*A*a**2*x**(7/2)/7 + 2*B*b**2*x**(25/2)/25 + 2*a*x**(13/2)*(2*A*
b + B*a)/13 + 2*b*x**(19/2)*(A*b + 2*B*a)/19
```

Mathematica [A] time = 0.0396245, size = 63, normalized size = 1.

$$\frac{2}{7}a^2Ax^{7/2}+\frac{2}{19}bx^{19/2}(2aB+Ab)+\frac{2}{13}ax^{13/2}(aB+2Ab)+\frac{2}{25}b^2Bx^{25/2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(5/2)*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (2*a^2*A*x^(7/2))/7 + (2*a*(2*A*b + a*B)*x^(13/2))/13 + (2*b*(A*b
 + 2*a*B)*x^(19/2))/19 + (2*b^2*B*x^(25/2))/25
```

Maple [A] time = 0.009, size = 56, normalized size = 0.9

$$\frac{3458\,Bx^9b^2+4550\,Ab^2x^6+9100\,Bx^6ab+13300\,aAbx^3+6650\,Bx^3a^2+12350\,Aa^2}{43225}x^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)*(b*x^3+a)^2*(B*x^3+A),x)
```

```
[Out] 2/43225*x^(7/2)*(1729*B*b^2*x^9+2275*A*b^2*x^6+4550*B*a*b*x^6+665
0*A*a*b*x^3+3325*B*a^2*x^3+6175*A*a^2)
```

Maxima [A] time = 1.85873, size = 69, normalized size = 1.1

$$\frac{2}{25}\,Bb^2x^{\frac{25}{2}} + \frac{2}{19}\left(2\,Bab + Ab^2\right)x^{\frac{19}{2}} + \frac{2}{13}\left(Ba^2 + 2\,Aab\right)x^{\frac{13}{2}} + \frac{2}{7}\,Aa^2x^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(5/2),x, algorithm="maxima")
```

```
[Out] 2/25*B*b^2*x^(25/2) + 2/19*(2*B*a*b + A*b^2)*x^(19/2) + 2/13*(B*a
^2 + 2*A*a*b)*x^(13/2) + 2/7*A*a^2*x^(7/2)
```

Fricas [A] time = 0.234111, size = 76, normalized size = 1.21

$$\frac{2}{43225}\left(1729\,Bb^2x^{12} + 2275\left(2\,Bab + Ab^2\right)x^9 + 3325\left(Ba^2 + 2\,Aab\right)x^6 + 6175\,Aa^2x^3\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(5/2),x, algorithm="fricas")
```

```
[Out] 2/43225*(1729*B*b^2*x^12 + 2275*(2*B*a*b + A*b^2)*x^9 + 3325*(B*a
^2 + 2*A*a*b)*x^6 + 6175*A*a^2*x^3)*sqrt(x)
```

Sympy [A] time = 95.4141, size = 80, normalized size = 1.27

$$\frac{2Aa^2x^{\frac{7}{2}}}{7} + \frac{4Aabx^{\frac{13}{2}}}{13} + \frac{2Ab^2x^{\frac{19}{2}}}{19} + \frac{2Ba^2x^{\frac{13}{2}}}{13} + \frac{4Babx^{\frac{19}{2}}}{19} + \frac{2Bb^2x^{\frac{25}{2}}}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] 2*A*a**2*x**(7/2)/7 + 4*A*a*b*x**(13/2)/13 + 2*A*b**2*x**(19/2)/1
9 + 2*B*a**2*x**(13/2)/13 + 4*B*a*b*x**(19/2)/19 + 2*B*b**2*x**(2
5/2)/25
```

GIAC/XCAS [A] time = 0.21284, size = 72, normalized size = 1.14

$$\frac{2}{25}\,Bb^2x^{\frac{25}{2}} + \frac{4}{19}\,Babx^{\frac{19}{2}} + \frac{2}{19}\,Ab^2x^{\frac{19}{2}} + \frac{2}{13}\,Ba^2x^{\frac{13}{2}} + \frac{4}{13}\,Aabx^{\frac{13}{2}} + \frac{2}{7}\,Aa^2x^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(5/2),x, algorithm="giac")
```

```
[Out] 2/25*B*b^2*x^(25/2) + 4/19*B*a*b*x^(19/2) + 2/19*A*b^2*x^(19/2) +
 2/13*B*a^2*x^(13/2) + 4/13*A*a*b*x^(13/2) + 2/7*A*a^2*x^(7/2)
```

3.141 $\int x^{3/2} \left(a+bx^3\right)^2 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=63

$$\frac{2}{5}a^2Ax^{5/2}+\frac{2}{17}bx^{17/2}(2aB+Ab)+\frac{2}{11}ax^{11/2}(aB+2Ab)+\frac{2}{23}b^2Bx^{23/2}$$

```
[Out] (2*a^2*A*x^(5/2))/5 + (2*a*(2*A*b + a*B)*x^(11/2))/11 + (2*b*(A*b
 + 2*a*B)*x^(17/2))/17 + (2*b^2*B*x^(23/2))/23
```

Rubi [A] time = 0.0985128, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$\frac{2}{5}a^2Ax^{5/2}+\frac{2}{17}bx^{17/2}(2aB+Ab)+\frac{2}{11}ax^{11/2}(aB+2Ab)+\frac{2}{23}b^2Bx^{23/2}$$

Antiderivative was successfully verified.

```
[In] Int[x^(3/2)*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (2*a^2*A*x^(5/2))/5 + (2*a*(2*A*b + a*B)*x^(11/2))/11 + (2*b*(A*b
 + 2*a*B)*x^(17/2))/17 + (2*b^2*B*x^(23/2))/23
```

Rubi in Sympy [A] time = 10.7863, size = 63, normalized size = 1.

$$\frac{2Aa^2x^{\frac{5}{2}}}{5}+\frac{2Bb^2x^{\frac{23}{2}}}{23}+\frac{2ax^{\frac{11}{2}}\left(2Ab+Ba\right)}{11}+\frac{2bx^{\frac{17}{2}}\left(Ab+2Ba\right)}{17}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(3/2)*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] 2*A*a**2*x**(5/2)/5 + 2*B*b**2*x**(23/2)/23 + 2*a*x**(11/2)*(2*A*
b + B*a)/11 + 2*b*x**(17/2)*(A*b + 2*B*a)/17
```

Mathematica [A] time = 0.0389861, size = 53, normalized size = 0.84

$$\frac{2x^{5/2}\left(4301a^2A+1265bx^6(2aB+Ab)+1955ax^3(aB+2Ab)+935b^2Bx^9\right)}{21505}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(3/2)*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (2*x^(5/2)*(4301*a^2*A + 1955*a*(2*A*b + a*B)*x^3 + 1265*b*(A*b +
 2*a*B)*x^6 + 935*b^2*B*x^9))/21505
```

Maple [A] time = 0.008, size = 56, normalized size = 0.9

$$\frac{1870\,Bx^9b^2+2530\,Ab^2x^6+5060\,Bx^6ab+7820\,aAbx^3+3910\,Bx^3a^2+8602\,Aa^2}{21505}x^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)*(b*x^3+a)^2*(B*x^3+A),x)
```

```
[Out] 2/21505*x^(5/2)*(935*B*b^2*x^9+1265*A*b^2*x^6+2530*B*a*b*x^6+3910
*A*a*b*x^3+1955*B*a^2*x^3+4301*A*a^2)
```

Maxima [A] time = 1.39846, size = 69, normalized size = 1.1

$$\frac{2}{23}\,Bb^2x^{\frac{23}{2}} + \frac{2}{17}\left(2\,Bab + Ab^2\right)x^{\frac{17}{2}} + \frac{2}{11}\left(Ba^2 + 2\,Aab\right)x^{\frac{11}{2}} + \frac{2}{5}\,Aa^2x^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(3/2),x, algorithm="maxima")
```

```
[Out] 2/23*B*b^2*x^(23/2) + 2/17*(2*B*a*b + A*b^2)*x^(17/2) + 2/11*(B*a
^2 + 2*A*a*b)*x^(11/2) + 2/5*A*a^2*x^(5/2)
```

Fricas [A] time = 0.233983, size = 76, normalized size = 1.21

$$\frac{2}{21505}\left(935\,Bb^2x^{11} + 1265\left(2\,Bab + Ab^2\right)x^8 + 1955\left(Ba^2 + 2\,Aab\right)x^5 + 4301\,Aa^2x^2\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(3/2),x, algorithm="fricas")
```

```
[Out] 2/21505*(935*B*b^2*x^11 + 1265*(2*B*a*b + A*b^2)*x^8 + 1955*(B*a^
2 + 2*A*a*b)*x^5 + 4301*A*a^2*x^2)*sqrt(x)
```

Sympy [A] time = 53.2448, size = 80, normalized size = 1.27

$$\frac{2Aa^2x^{\frac{5}{2}}}{5} + \frac{4Aabx^{\frac{11}{2}}}{11} + \frac{2Ab^2x^{\frac{17}{2}}}{17} + \frac{2Ba^2x^{\frac{11}{2}}}{11} + \frac{4Babx^{\frac{17}{2}}}{17} + \frac{2Bb^2x^{\frac{23}{2}}}{23}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)*(b*x**3+a)**2*(B*x**3+A),x)
```

```
[Out] 2*A*a**2*x**(5/2)/5 + 4*A*a*b*x**(11/2)/11 + 2*A*b**2*x**(17/2)/1
7 + 2*B*a**2*x**(11/2)/11 + 4*B*a*b*x**(17/2)/17 + 2*B*b**2*x**(2
3/2)/23
```

GIAC/XCAS [A] time = 0.213044, size = 72, normalized size = 1.14

$$\frac{2}{23}\,Bb^2x^{\frac{23}{2}} + \frac{4}{17}\,Babx^{\frac{17}{2}} + \frac{2}{17}\,Ab^2x^{\frac{17}{2}} + \frac{2}{11}\,Ba^2x^{\frac{11}{2}} + \frac{4}{11}\,Aabx^{\frac{11}{2}} + \frac{2}{5}\,Aa^2x^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*x^(3/2),x, algorithm="giac")
```

```
[Out] 2/23*B*b^2*x^(23/2) + 4/17*B*a*b*x^(17/2) + 2/17*A*b^2*x^(17/2) +
 2/11*B*a^2*x^(11/2) + 4/11*A*a*b*x^(11/2) + 2/5*A*a^2*x^(5/2)
```

3.142 $\int \sqrt{x}\left(a+bx^3\right)^2\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=63

$$\frac{2}{3}a^2Ax^{3/2}+\frac{2}{15}bx^{15/2}(2aB+Ab)+\frac{2}{9}ax^{9/2}(aB+2Ab)+\frac{2}{21}b^2Bx^{21/2}$$

```
[Out] (2*a^2*A*x^(3/2))/3 + (2*a*(2*A*b + a*B)*x^(9/2))/9 + (2*b*(A*b +
 2*a*B)*x^(15/2))/15 + (2*b^2*B*x^(21/2))/21
```

Rubi [A] time = 0.0962474, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$\frac{2}{3}a^2Ax^{3/2}+\frac{2}{15}bx^{15/2}(2aB+Ab)+\frac{2}{9}ax^{9/2}(aB+2Ab)+\frac{2}{21}b^2Bx^{21/2}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[x]*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (2*a^2*A*x^(3/2))/3 + (2*a*(2*A*b + a*B)*x^(9/2))/9 + (2*b*(A*b +
 2*a*B)*x^(15/2))/15 + (2*b^2*B*x^(21/2))/21
```

Rubi in Sympy [A] time = 11.0932, size = 63, normalized size = 1.

$$\frac{2Aa^2x^{\frac{3}{2}}}{3}+\frac{2Bb^2x^{\frac{21}{2}}}{21}+\frac{2ax^{\frac{9}{2}}\left(2Ab+Ba\right)}{9}+\frac{2bx^{\frac{15}{2}}\left(Ab+2Ba\right)}{15}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**2*(B*x**3+A)*x**(1/2),x)
```

```
[Out] 2*A*a**2*x**(3/2)/3 + 2*B*b**2*x**(21/2)/21 + 2*a*x**(9/2)*(2*A*b
 + B*a)/9 + 2*b*x**(15/2)*(A*b + 2*B*a)/15
```

Mathematica [A] time = 0.0360365, size = 53, normalized size = 0.84

$$\frac{2}{315}x^{3/2}\left(105a^2A+21bx^6(2aB+Ab)+35ax^3(aB+2Ab)+15b^2Bx^9\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[x]*(a + b*x^3)^2*(A + B*x^3),x]
```

```
[Out] (2*x^(3/2)*(105*a^2*A + 35*a*(2*A*b + a*B)*x^3 + 21*b*(A*b + 2*a*
B)*x^6 + 15*b^2*B*x^9))/315
```

Maple [A] time = 0.01, size = 56, normalized size = 0.9

$$\frac{30\,Bx^9b^2+42\,Ab^2x^6+84\,Bx^6ab+140\,aAbx^3+70\,Bx^3a^2+210\,Aa^2}{315}x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^3+a)^2*(B*x^3+A)*x^(1/2),x)
```

```
[Out] 2/315*x^(3/2)*(15*B*b^2*x^9+21*A*b^2*x^6+42*B*a*b*x^6+70*A*a*b*x^
3+35*B*a^2*x^3+105*A*a^2)
```

Maxima [A] time = 1.50146, size = 69, normalized size = 1.1

$$\frac{2}{21}\,Bb^2x^{\frac{21}{2}} + \frac{2}{15}\left(2\,Bab + Ab^2\right)x^{\frac{15}{2}} + \frac{2}{9}\left(Ba^2 + 2\,Aab\right)x^{\frac{9}{2}} + \frac{2}{3}\,Aa^2x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*sqrt(x),x, algorithm="maxima")
```

```
[Out] 2/21*B*b^2*x^(21/2) + 2/15*(2*B*a*b + A*b^2)*x^(15/2) + 2/9*(B*a^
2 + 2*A*a*b)*x^(9/2) + 2/3*A*a^2*x^(3/2)
```

Fricas [A] time = 0.229277, size = 73, normalized size = 1.16

$$\frac{2}{315}\left(15\,Bb^2x^{10} + 21\left(2\,Bab + Ab^2\right)x^7 + 35\left(Ba^2 + 2\,Aab\right)x^4 + 105\,Aa^2x\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*sqrt(x),x, algorithm="fricas")
```

```
[Out] 2/315*(15*B*b^2*x^10 + 21*(2*B*a*b + A*b^2)*x^7 + 35*(B*a^2 + 2*A
*a*b)*x^4 + 105*A*a^2*x)*sqrt(x)
```

Sympy [A] time = 14.1647, size = 66, normalized size = 1.05

$$\frac{2Aa^2x^{\frac{3}{2}}}{3} + \frac{2Bb^2x^{\frac{21}{2}}}{21} + \frac{2x^{\frac{15}{2}}\left(Ab^2 + 2Bab\right)}{15} + \frac{2x^{\frac{9}{2}}\left(2Aab + Ba^2\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)*x**(1/2),x)
```

```
[Out] 2*A*a**2*x**(3/2)/3 + 2*B*b**2*x**(21/2)/21 + 2*x**(15/2)*(A*b**2
 + 2*B*a*b)/15 + 2*x**(9/2)*(2*A*a*b + B*a**2)/9
```

GIAC/XCAS [A] time = 0.211709, size = 72, normalized size = 1.14

$$\frac{2}{21}\,Bb^2x^{\frac{21}{2}} + \frac{4}{15}\,Babx^{\frac{15}{2}} + \frac{2}{15}\,Ab^2x^{\frac{15}{2}} + \frac{2}{9}\,Ba^2x^{\frac{9}{2}} + \frac{4}{9}\,Aabx^{\frac{9}{2}} + \frac{2}{3}\,Aa^2x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2*sqrt(x),x, algorithm="giac")
```

```
[Out] 2/21*B*b^2*x^(21/2) + 4/15*B*a*b*x^(15/2) + 2/15*A*b^2*x^(15/2) +
 2/9*B*a^2*x^(9/2) + 4/9*A*a*b*x^(9/2) + 2/3*A*a^2*x^(3/2)
```

3.143 $\int \frac{(a+bx^3)^2(A+Bx^3)}{\sqrt{x}}\,dx$

Optimal. Leaf size=61

$$2a^2A\sqrt{x}+\frac{2}{13}bx^{13/2}(2aB+Ab)+\frac{2}{7}ax^{7/2}(aB+2Ab)+\frac{2}{19}b^2Bx^{19/2}$$

```
[Out] 2*a^2*A*Sqrt[x] + (2*a*(2*A*b + a*B)*x^(7/2))/7 + (2*b*(A*b + 2*a
*B)*x^(13/2))/13 + (2*b^2*B*x^(19/2))/19
```

Rubi [A] time = 0.0976163, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$2a^2A\sqrt{x}+\frac{2}{13}bx^{13/2}(2aB+Ab)+\frac{2}{7}ax^{7/2}(aB+2Ab)+\frac{2}{19}b^2Bx^{19/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^2*(A + B*x^3))/Sqrt[x],x]
```

```
[Out] 2*a^2*A*Sqrt[x] + (2*a*(2*A*b + a*B)*x^(7/2))/7 + (2*b*(A*b + 2*a
*B)*x^(13/2))/13 + (2*b^2*B*x^(19/2))/19
```

Rubi in Sympy [A] time = 10.7851, size = 61, normalized size = 1.

$$2Aa^2\sqrt{x}+\frac{2Bb^2x^{\frac{19}{2}}}{19}+\frac{2ax^{\frac{7}{2}}(2Ab+Ba)}{7}+\frac{2bx^{\frac{13}{2}}(Ab+2Ba)}{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**(1/2),x)
```

```
[Out] 2*A*a**2*sqrt(x) + 2*B*b**2*x**(19/2)/19 + 2*a*x**(7/2)*(2*A*b +
B*a)/7 + 2*b*x**(13/2)*(A*b + 2*B*a)/13
```

Mathematica [A] time = 0.0362192, size = 53, normalized size = 0.87

$$\frac{2\sqrt{x}\left(1729a^2A+133bx^6(2aB+Ab)+247ax^3(aB+2Ab)+91b^2Bx^9\right)}{1729}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^2*(A + B*x^3))/Sqrt[x],x]
```

```
[Out] (2*Sqrt[x]*(1729*a^2*A + 247*a*(2*A*b + a*B)*x^3 + 133*b*(A*b + 2
*a*B)*x^6 + 91*b^2*B*x^9))/1729
```

Maple [A] time = 0.007, size = 56, normalized size = 0.9

$$\frac{182\,Bx^9b^2+266\,Ab^2x^6+532\,Bx^6ab+988\,aAbx^3+494\,Bx^3a^2+3458\,Aa^2}{1729}\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^(1/2),x)
```

```
[Out] 2/1729*x^(1/2)*(91*B*b^2*x^9+133*A*b^2*x^6+266*B*a*b*x^6+494*A*a*
b*x^3+247*B*a^2*x^3+1729*A*a^2)
```

Maxima [A] time = 1.42428, size = 69, normalized size = 1.13

$$\frac{2}{19} Bb^2 x^{\frac{19}{2}} + \frac{2}{13} \left(2 Bab + Ab^2\right) x^{\frac{13}{2}} + \frac{2}{7} \left(Ba^2 + 2 Aab\right) x^{\frac{7}{2}} + 2 Aa^2 \sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/sqrt(x),x, algorithm="maxima")
```

```
[Out] 2/19*B*b^2*x^(19/2) + 2/13*(2*B*a*b + A*b^2)*x^(13/2) + 2/7*(B*a^
2 + 2*A*a*b)*x^(7/2) + 2*A*a^2*sqrt(x)
```

Fricas [A] time = 0.231278, size = 72, normalized size = 1.18

$$\frac{2}{1729} \left(91 Bb^2 x^9 + 133 \left(2 Bab + Ab^2\right) x^6 + 247 \left(Ba^2 + 2 Aab\right) x^3 + 1729 Aa^2\right) \sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/sqrt(x),x, algorithm="fricas")
```

```
[Out] 2/1729*(91*B*b^2*x^9 + 133*(2*B*a*b + A*b^2)*x^6 + 247*(B*a^2 + 2
*A*a*b)*x^3 + 1729*A*a^2)*sqrt(x)
```

Sympy [A] time = 24.1036, size = 78, normalized size = 1.28

$$2Aa^2\sqrt{x} + \frac{4Aabx^{\frac{7}{2}}}{7} + \frac{2Ab^2x^{\frac{13}{2}}}{13} + \frac{2Ba^2x^{\frac{7}{2}}}{7} + \frac{4Babx^{\frac{13}{2}}}{13} + \frac{2Bb^2x^{\frac{19}{2}}}{19}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**(1/2),x)
```

```
[Out] 2*A*a**2*sqrt(x) + 4*A*a*b*x**(7/2)/7 + 2*A*b**2*x**(13/2)/13 + 2
*B*a**2*x**(7/2)/7 + 4*B*a*b*x**(13/2)/13 + 2*B*b**2*x**(19/2)/19
```

GIAC/XCAS [A] time = 0.21072, size = 72, normalized size = 1.18

$$\frac{2}{19} Bb^2 x^{\frac{19}{2}} + \frac{4}{13} Babx^{\frac{13}{2}} + \frac{2}{13} Ab^2 x^{\frac{13}{2}} + \frac{2}{7} Ba^2 x^{\frac{7}{2}} + \frac{4}{7} Aabx^{\frac{7}{2}} + 2 Aa^2 \sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/sqrt(x),x, algorithm="giac")
```

```
[Out] 2/19*B*b^2*x^(19/2) + 4/13*B*a*b*x^(13/2) + 2/13*A*b^2*x^(13/2) +
 2/7*B*a^2*x^(7/2) + 4/7*A*a*b*x^(7/2) + 2*A*a^2*sqrt(x)
```

3.144 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^{3/2}}\,dx$

Optimal. Leaf size=61

$$-\frac{2a^2A}{\sqrt{x}}+\frac{2}{11}bx^{11/2}(2aB+Ab)+\frac{2}{5}ax^{5/2}(aB+2Ab)+\frac{2}{17}b^2Bx^{17/2}$$

```
[Out] (-2*a^2*A)/Sqrt[x] + (2*a*(2*A*b + a*B)*x^(5/2))/5 + (2*b*(A*b +
2*a*B)*x^(11/2))/11 + (2*b^2*B*x^(17/2))/17
```

Rubi [A] time = 0.0994594, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$-\frac{2a^2A}{\sqrt{x}}+\frac{2}{11}bx^{11/2}(2aB+Ab)+\frac{2}{5}ax^{5/2}(aB+2Ab)+\frac{2}{17}b^2Bx^{17/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^2*(A + B*x^3))/x^(3/2),x]
```

```
[Out] (-2*a^2*A)/Sqrt[x] + (2*a*(2*A*b + a*B)*x^(5/2))/5 + (2*b*(A*b +
2*a*B)*x^(11/2))/11 + (2*b^2*B*x^(17/2))/17
```

Rubi in Sympy [A] time = 10.7906, size = 61, normalized size = 1.

$$-\frac{2Aa^2}{\sqrt{x}}+\frac{2Bb^2x^{\frac{17}{2}}}{17}+\frac{2ax^{\frac{5}{2}}(2Ab+Ba)}{5}+\frac{2bx^{\frac{11}{2}}(Ab+2Ba)}{11}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**(3/2),x)
```

```
[Out] -2*A*a**2/sqrt(x) + 2*B*b**2*x**(17/2)/17 + 2*a*x**(5/2)*(2*A*b +
 B*a)/5 + 2*b*x**(11/2)*(A*b + 2*B*a)/11
```

Mathematica [A] time = 0.0360448, size = 53, normalized size = 0.87

$$\frac{2\left(-935a^2A+85bx^6(2aB+Ab)+187ax^3(aB+2Ab)+55b^2Bx^9\right)}{935\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^2*(A + B*x^3))/x^(3/2),x]
```

```
[Out] (2*(-935*a^2*A + 187*a*(2*A*b + a*B)*x^3 + 85*b*(A*b + 2*a*B)*x^6
 + 55*b^2*B*x^9))/(935*Sqrt[x])
```

Maple [A] time = 0.009, size = 56, normalized size = 0.9

$$-\frac{-110\,Bx^9b^2-170\,Ab^2x^6-340\,Bx^6ab-748\,aAbx^3-374\,Bx^3a^2+1870\,Aa^2}{935}\frac{1}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^(3/2),x)
```

```
[Out] -2/935*(-55*B*b^2*x^9-85*A*b^2*x^6-170*B*a*b*x^6-374*A*a*b*x^3-18
7*B*a^2*x^3+935*A*a^2)/x^(1/2)
```

Maxima [A] time = 1.48656, size = 69, normalized size = 1.13

$$\frac{2}{17}\,Bb^2x^{\frac{17}{2}} + \frac{2}{11}\left(2\,Bab + Ab^2\right)x^{\frac{11}{2}} + \frac{2}{5}\left(Ba^2 + 2\,Aab\right)x^{\frac{5}{2}} - \frac{2\,Aa^2}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(3/2),x, algorithm="maxima")
```

```
[Out] 2/17*B*b^2*x^(17/2) + 2/11*(2*B*a*b + A*b^2)*x^(11/2) + 2/5*(B*a^
2 + 2*A*a*b)*x^(5/2) - 2*A*a^2/sqrt(x)
```

Fricas [A] time = 0.225667, size = 72, normalized size = 1.18

$$\frac{2\left(55\,Bb^2x^9 + 85\left(2\,Bab + Ab^2\right)x^6 + 187\left(Ba^2 + 2\,Aab\right)x^3 - 935\,Aa^2\right)}{935\,\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(3/2),x, algorithm="fricas")
```

```
[Out] 2/935*(55*B*b^2*x^9 + 85*(2*B*a*b + A*b^2)*x^6 + 187*(B*a^2 + 2*A
*a*b)*x^3 - 935*A*a^2)/sqrt(x)
```

Sympy [A] time = 28.5672, size = 78, normalized size = 1.28

$$-\frac{2Aa^2}{\sqrt{x}} + \frac{4Aabx^{\frac{5}{2}}}{5} + \frac{2Ab^2x^{\frac{11}{2}}}{11} + \frac{2Ba^2x^{\frac{5}{2}}}{5} + \frac{4Babx^{\frac{11}{2}}}{11} + \frac{2Bb^2x^{\frac{17}{2}}}{17}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**(3/2),x)
```

```
[Out] -2*A*a**2/sqrt(x) + 4*A*a*b*x**(5/2)/5 + 2*A*b**2*x**(11/2)/11 +
2*B*a**2*x**(5/2)/5 + 4*B*a*b*x**(11/2)/11 + 2*B*b**2*x**(17/2)/1
7
```

GIAC/XCAS [A] time = 0.211593, size = 72, normalized size = 1.18

$$\frac{2}{17}\,Bb^2x^{\frac{17}{2}} + \frac{4}{11}\,Babx^{\frac{11}{2}} + \frac{2}{11}\,Ab^2x^{\frac{11}{2}} + \frac{2}{5}\,Ba^2x^{\frac{5}{2}} + \frac{4}{5}\,Aabx^{\frac{5}{2}} - \frac{2\,Aa^2}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(3/2),x, algorithm="giac")
```

```
[Out] 2/17*B*b^2*x^(17/2) + 4/11*B*a*b*x^(11/2) + 2/11*A*b^2*x^(11/2) +
 2/5*B*a^2*x^(5/2) + 4/5*A*a*b*x^(5/2) - 2*A*a^2/sqrt(x)
```

3.145 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^{5/2}}\,dx$

Optimal. Leaf size=63

$$-\frac{2a^2A}{3x^{3/2}}+\frac{2}{9}bx^{9/2}(2aB+Ab)+\frac{2}{3}ax^{3/2}(aB+2Ab)+\frac{2}{15}b^2Bx^{15/2}$$

```
[Out] (-2*a^2*A)/(3*x^(3/2)) + (2*a*(2*A*b + a*B)*x^(3/2))/3 + (2*b*(A*
b + 2*a*B)*x^(9/2))/9 + (2*b^2*B*x^(15/2))/15
```

Rubi [A] time = 0.0994123, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$-\frac{2a^2A}{3x^{3/2}}+\frac{2}{9}bx^{9/2}(2aB+Ab)+\frac{2}{3}ax^{3/2}(aB+2Ab)+\frac{2}{15}b^2Bx^{15/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^2*(A + B*x^3))/x^(5/2),x]
```

```
[Out] (-2*a^2*A)/(3*x^(3/2)) + (2*a*(2*A*b + a*B)*x^(3/2))/3 + (2*b*(A*
b + 2*a*B)*x^(9/2))/9 + (2*b^2*B*x^(15/2))/15
```

Rubi in Sympy [A] time = 10.7985, size = 63, normalized size = 1.

$$-\frac{2Aa^2}{3x^{\frac{3}{2}}}+\frac{2Bb^2x^{\frac{15}{2}}}{15}+\frac{2ax^{\frac{3}{2}}(2Ab+Ba)}{3}+\frac{2bx^{\frac{9}{2}}(Ab+2Ba)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**(5/2),x)
```

```
[Out] -2*A*a**2/(3*x**(3/2)) + 2*B*b**2*x**(15/2)/15 + 2*a*x**(3/2)*(2*
A*b + B*a)/3 + 2*b*x**(9/2)*(A*b + 2*B*a)/9
```

Mathematica [A] time = 0.0307331, size = 57, normalized size = 0.9

$$\frac{-30a^2\left(A-Bx^3\right)+20abx^3\left(3A+Bx^3\right)+2b^2x^6\left(5A+3Bx^3\right)}{45x^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^2*(A + B*x^3))/x^(5/2),x]
```

```
[Out] (-30*a^2*(A - B*x^3) + 20*a*b*x^3*(3*A + B*x^3) + 2*b^2*x^6*(5*A
+ 3*B*x^3))/(45*x^(3/2))
```

Maple [A] time = 0.008, size = 56, normalized size = 0.9

$$-\frac{-6\,Bx^9b^2-10\,Ab^2x^6-20\,Bx^6ab-60\,aAbx^3-30\,Bx^3a^2+30\,Aa^2}{45}x^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^(5/2),x)
```

```
[Out] -2/45*(-3*B*b^2*x^9-5*A*b^2*x^6-10*B*a*b*x^6-30*A*a*b*x^3-15*B*a^
2*x^3+15*A*a^2)/x^(3/2)
```

Maxima [A] time = 1.4551, size = 69, normalized size = 1.1

$$\frac{2}{15} Bb^2 x^{\frac{15}{2}} + \frac{2}{9} \left(2 Bab + Ab^2\right) x^{\frac{9}{2}} + \frac{2}{3} \left(Ba^2 + 2 Aab\right) x^{\frac{3}{2}} - \frac{2 Aa^2}{3 x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(5/2),x, algorithm="maxima")
```

```
[Out] 2/15*B*b^2*x^(15/2) + 2/9*(2*B*a*b + A*b^2)*x^(9/2) + 2/3*(B*a^2
+ 2*A*a*b)*x^(3/2) - 2/3*A*a^2/x^(3/2)
```

Fricas [A] time = 0.229495, size = 72, normalized size = 1.14

$$\frac{2 \left(3 Bb^2 x^9 + 5 \left(2 Bab + Ab^2\right) x^6 + 15 \left(Ba^2 + 2 Aab\right) x^3 - 15 Aa^2\right)}{45 x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(5/2),x, algorithm="fricas")
```

```
[Out] 2/45*(3*B*b^2*x^9 + 5*(2*B*a*b + A*b^2)*x^6 + 15*(B*a^2 + 2*A*a*b
)*x^3 - 15*A*a^2)/x^(3/2)
```

Sympy [A] time = 33.5563, size = 80, normalized size = 1.27

$$-\frac{2Aa^2}{3x^{\frac{3}{2}}} + \frac{4Aabx^{\frac{3}{2}}}{3} + \frac{2Ab^2x^{\frac{9}{2}}}{9} + \frac{2Ba^2x^{\frac{3}{2}}}{3} + \frac{4Babx^{\frac{9}{2}}}{9} + \frac{2Bb^2x^{\frac{15}{2}}}{15}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**(5/2),x)
```

```
[Out] -2*A*a**2/(3*x**(3/2)) + 4*A*a*b*x**(3/2)/3 + 2*A*b**2*x**(9/2)/9
 + 2*B*a**2*x**(3/2)/3 + 4*B*a*b*x**(9/2)/9 + 2*B*b**2*x**(15/2)/
15
```

GIAC/XCAS [A] time = 0.212635, size = 72, normalized size = 1.14

$$\frac{2}{15} Bb^2 x^{\frac{15}{2}} + \frac{4}{9} Babx^{\frac{9}{2}} + \frac{2}{9} Ab^2 x^{\frac{9}{2}} + \frac{2}{3} Ba^2 x^{\frac{3}{2}} + \frac{4}{3} Aabx^{\frac{3}{2}} - \frac{2 Aa^2}{3 x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(5/2),x, algorithm="giac")
```

```
[Out] 2/15*B*b^2*x^(15/2) + 4/9*B*a*b*x^(9/2) + 2/9*A*b^2*x^(9/2) + 2/3
*B*a^2*x^(3/2) + 4/3*A*a*b*x^(3/2) - 2/3*A*a^2/x^(3/2)
```

3.146 $\int \frac{(a+bx^3)^2(A+Bx^3)}{x^{7/2}}\,dx$

Optimal. Leaf size=61

$$-\frac{2a^2A}{5x^{5/2}}+\frac{2}{7}bx^{7/2}(2aB+Ab)+2a\sqrt{x}(aB+2Ab)+\frac{2}{13}b^2Bx^{13/2}$$

```
[Out] (-2*a^2*A)/(5*x^(5/2)) + 2*a*(2*A*b + a*B)*Sqrt[x] + (2*b*(A*b + 2*a*B)*x^(7/2))/7 + (2*b^2*B*x^(13/2))/13
```

Rubi [A] time = 0.0983477, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$-\frac{2a^2A}{5x^{5/2}}+\frac{2}{7}bx^{7/2}(2aB+Ab)+2a\sqrt{x}(aB+2Ab)+\frac{2}{13}b^2Bx^{13/2}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^2*(A + B*x^3))/x^(7/2),x]
```

```
[Out] (-2*a^2*A)/(5*x^(5/2)) + 2*a*(2*A*b + a*B)*Sqrt[x] + (2*b*(A*b + 2*a*B)*x^(7/2))/7 + (2*b^2*B*x^(13/2))/13
```

Rubi in Sympy [A] time = 10.894, size = 61, normalized size = 1.

$$-\frac{2Aa^2}{5x^{\frac{5}{2}}}+\frac{2Bb^2x^{\frac{13}{2}}}{13}+2a\sqrt{x}\,(2Ab+Ba)+\frac{2bx^{\frac{7}{2}}\,(Ab+2Ba)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a)**2*(B*x**3+A)/x**(7/2),x)
```

```
[Out] -2*A*a**2/(5*x**(5/2)) + 2*B*b**2*x**(13/2)/13 + 2*a*sqrt(x)*(2*A*b + B*a) + 2*b*x**(7/2)*(A*b + 2*B*a)/7
```

Mathematica [A] time = 0.0374611, size = 53, normalized size = 0.87

$$\frac{2\left(-91a^2A+65bx^6(2aB+Ab)+455ax^3(aB+2Ab)+35b^2Bx^9\right)}{455x^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^3)^2*(A + B*x^3))/x^(7/2),x]
```

```
[Out] (2*(-91*a^2*A + 455*a*(2*A*b + a*B)*x^3 + 65*b*(A*b + 2*a*B)*x^6 + 35*b^2*B*x^9))/(455*x^(5/2))
```

Maple [A] time = 0.009, size = 56, normalized size = 0.9

$$-\frac{-70\,Bx^9b^2-130\,Ab^2x^6-260\,Bx^6ab-1820\,aAbx^3-910\,Bx^3a^2+182\,Aa^2}{455}x^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^2*(B*x^3+A)/x^(7/2),x)
```

```
[Out] -2/455*(-35*B*b^2*x^9-65*A*b^2*x^6-130*B*a*b*x^6-910*A*a*b*x^3-45
5*B*a^2*x^3+91*A*a^2)/x^(5/2)
```

Maxima [A] time = 1.42658, size = 69, normalized size = 1.13

$$\frac{2}{13}\,Bb^2x^{\frac{13}{2}} + \frac{2}{7}\left(2\,Bab + Ab^2\right)x^{\frac{7}{2}} + 2\left(Ba^2 + 2\,Aab\right)\sqrt{x} - \frac{2\,Aa^2}{5\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(7/2),x, algorithm="maxima")
```

```
[Out] 2/13*B*b^2*x^(13/2) + 2/7*(2*B*a*b + A*b^2)*x^(7/2) + 2*(B*a^2 +
2*A*a*b)*sqrt(x) - 2/5*A*a^2/x^(5/2)
```

Fricas [A] time = 0.234177, size = 72, normalized size = 1.18

$$\frac{2\left(35\,Bb^2x^9 + 65\left(2\,Bab + Ab^2\right)x^6 + 455\left(Ba^2 + 2\,Aab\right)x^3 - 91\,Aa^2\right)}{455\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(7/2),x, algorithm="fricas")
```

```
[Out] 2/455*(35*B*b^2*x^9 + 65*(2*B*a*b + A*b^2)*x^6 + 455*(B*a^2 + 2*A
*a*b)*x^3 - 91*A*a^2)/x^(5/2)
```

Sympy [A] time = 42.0911, size = 76, normalized size = 1.25

$$-\frac{2Aa^2}{5x^{\frac{5}{2}}} + 4Aab\sqrt{x} + \frac{2Ab^2x^{\frac{7}{2}}}{7} + 2Ba^2\sqrt{x} + \frac{4Babx^{\frac{7}{2}}}{7} + \frac{2Bb^2x^{\frac{13}{2}}}{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**2*(B*x**3+A)/x**(7/2),x)
```

```
[Out] -2*A*a**2/(5*x**(5/2)) + 4*A*a*b*sqrt(x) + 2*A*b**2*x**(7/2)/7 +
2*B*a**2*sqrt(x) + 4*B*a*b*x**(7/2)/7 + 2*B*b**2*x**(13/2)/13
```

GIAC/XCAS [A] time = 0.210256, size = 72, normalized size = 1.18

$$\frac{2}{13}\,Bb^2x^{\frac{13}{2}} + \frac{4}{7}\,Babx^{\frac{7}{2}} + \frac{2}{7}\,Ab^2x^{\frac{7}{2}} + 2\,Ba^2\sqrt{x} + 4\,Aab\sqrt{x} - \frac{2\,Aa^2}{5\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^2/x^(7/2),x, algorithm="giac")
```

```
[Out] 2/13*B*b^2*x^(13/2) + 4/7*B*a*b*x^(7/2) + 2/7*A*b^2*x^(7/2) + 2*B
*a^2*sqrt(x) + 4*A*a*b*sqrt(x) - 2/5*A*a^2/x^(5/2)
```

3.147 $\int x^{7/2} \left(a+bx^3\right)^3 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=85

$$\frac{2}{9}a^3Ax^{9/2}+\frac{2}{15}a^2x^{15/2}(aB+3Ab)+\frac{2}{27}b^2x^{27/2}(3aB+Ab)+\frac{2}{7}abx^{21/2}(aB+Ab)+\frac{2}{33}b^3Bx^{33/2}$$

```
[Out] (2*a^3*A*x^(9/2))/9 + (2*a^2*(3*A*b + a*B)*x^(15/2))/15 + (2*a*b*
(A*b + a*B)*x^(21/2))/7 + (2*b^2*(A*b + 3*a*B)*x^(27/2))/27 + (2*
b^3*B*x^(33/2))/33
```

Rubi [A] time = 0.134523, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$

$$\frac{2}{9}a^3Ax^{9/2}+\frac{2}{15}a^2x^{15/2}(aB+3Ab)+\frac{2}{27}b^2x^{27/2}(3aB+Ab)+\frac{2}{7}abx^{21/2}(aB+Ab)+\frac{2}{33}b^3Bx^{33/2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(7/2)*(a + b*x^3)^3*(A + B*x^3),x]
```

```
[Out] (2*a^3*A*x^(9/2))/9 + (2*a^2*(3*A*b + a*B)*x^(15/2))/15 + (2*a*b*
(A*b + a*B)*x^(21/2))/7 + (2*b^2*(A*b + 3*a*B)*x^(27/2))/27 + (2*
b^3*B*x^(33/2))/33
```

Rubi in Sympy [A] time = 14.1484, size = 85, normalized size = 1.

$$\frac{2Aa^3x^{\frac{9}{2}}}{9}+\frac{2Bb^3x^{\frac{33}{2}}}{33}+\frac{2a^2x^{\frac{15}{2}}\left(3Ab+Ba\right)}{15}+\frac{2abx^{\frac{21}{2}}\left(Ab+Ba\right)}{7}+\frac{2b^2x^{\frac{27}{2}}\left(Ab+3Ba\right)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(7/2)*(b*x**3+a)**3*(B*x**3+A),x)
```

```
[Out] 2*A*a**3*x**(9/2)/9 + 2*B*b**3*x**(33/2)/33 + 2*a**2*x**(15/2)*(3
*A*b + B*a)/15 + 2*a*b*x**(21/2)*(A*b + B*a)/7 + 2*b**2*x**(27/2)
*(A*b + 3*B*a)/27
```

Mathematica [A] time = 0.0486192, size = 71, normalized size = 0.84

$$\frac{2x^{9/2}\left(1155a^3A+693a^2x^3(aB+3Ab)+385b^2x^9(3aB+Ab)+1485abx^6(aB+Ab)+315b^3Bx^{12}\right)}{10395}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(7/2)*(a + b*x^3)^3*(A + B*x^3),x]
```

```
[Out] (2*x^(9/2)*(1155*a^3*A + 693*a^2*(3*A*b + a*B)*x^3 + 1485*a*b*(A*
b + a*B)*x^6 + 385*b^2*(A*b + 3*a*B)*x^9 + 315*b^3*B*x^12))/10395
```

Maple [A] time = 0.009, size = 80, normalized size = 0.9

$$\frac{630\,Bb^3x^{12}+770\,x^9Ab^3+2310\,x^9ab^2B+2970\,x^6ab^2A+2970\,x^6Ba^2b+4158\,x^3Aa^2b+1386\,x^3Ba^3+2310\,Aa^3}{10395}x^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(7/2)*(b*x^3+a)^3*(B*x^3+A),x)
```

```
[Out] 2/10395*x^(9/2)*(315*B*b^3*x^12+385*A*b^3*x^9+1155*B*a*b^2*x^9+14
85*A*a*b^2*x^6+1485*B*a^2*b*x^6+2079*A*a^2*b*x^3+693*B*a^3*x^3+11
55*A*a^3)
```

Maxima [A] time = 1.43726, size = 99, normalized size = 1.16

$$\frac{2}{33}Bb^3x^{\frac{33}{2}} + \frac{2}{27}\left(3Bab^2 + Ab^3\right)x^{\frac{27}{2}} + \frac{2}{7}\left(Ba^2b + Aab^2\right)x^{\frac{21}{2}} + \frac{2}{9}Aa^3x^{\frac{9}{2}} + \frac{2}{15}\left(Ba^3 + 3Aa^2b\right)x^{\frac{15}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(7/2),x, algorithm="maxima")
```

```
[Out] 2/33*B*b^3*x^(33/2) + 2/27*(3*B*a*b^2 + A*b^3)*x^(27/2) + 2/7*(B*
a^2*b + A*a*b^2)*x^(21/2) + 2/9*A*a^3*x^(9/2) + 2/15*(B*a^3 + 3*A
*a^2*b)*x^(15/2)
```

Fricas [A] time = 0.235215, size = 105, normalized size = 1.24

$$\frac{2}{10395}\left(315Bb^3x^{16} + 385\left(3Bab^2 + Ab^3\right)x^{13} + 1485\left(Ba^2b + Aab^2\right)x^{10} + 1155Aa^3x^4 + 693\left(Ba^3 + 3Aa^2b\right)x^7\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(7/2),x, algorithm="fricas")
```

```
[Out] 2/10395*(315*B*b^3*x^16 + 385*(3*B*a*b^2 + A*b^3)*x^13 + 1485*(B*
a^2*b + A*a*b^2)*x^10 + 1155*A*a^3*x^4 + 693*(B*a^3 + 3*A*a^2*b)*
x^7)*sqrt(x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(7/2)*(b*x**3+a)**3*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21362, size = 104, normalized size = 1.22

$$\frac{2}{33}Bb^3x^{\frac{33}{2}} + \frac{2}{9}Bab^2x^{\frac{27}{2}} + \frac{2}{27}Ab^3x^{\frac{27}{2}} + \frac{2}{7}Ba^2bx^{\frac{21}{2}} + \frac{2}{7}Aab^2x^{\frac{21}{2}} + \frac{2}{15}Ba^3x^{\frac{15}{2}} + \frac{2}{5}Aa^2bx^{\frac{15}{2}} + \frac{2}{9}Aa^3x^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(7/2),x, algorithm="giac")
```

```
[Out] 2/33*B*b^3*x^(33/2) + 2/9*B*a*b^2*x^(27/2) + 2/27*A*b^3*x^(27/2)
+ 2/7*B*a^2*b*x^(21/2) + 2/7*A*a*b^2*x^(21/2) + 2/15*B*a^3*x^(15/
2) + 2/5*A*a^2*b*x^(15/2) + 2/9*A*a^3*x^(9/2)
```

3.148 $\int x^{5/2} \left(a+bx^3\right)^3 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=85

$$\frac{2}{7}a^3Ax^{7/2}+\frac{2}{13}a^2x^{13/2}(aB+3Ab)+\frac{2}{25}b^2x^{25/2}(3aB+Ab)+\frac{6}{19}abx^{19/2}(aB+Ab)+\frac{2}{31}b^3Bx^{31/2}$$

```
[Out] (2*a^3*A*x^(7/2))/7 + (2*a^2*(3*A*b + a*B)*x^(13/2))/13 + (6*a*b*
(A*b + a*B)*x^(19/2))/19 + (2*b^2*(A*b + 3*a*B)*x^(25/2))/25 + (2
*b^3*B*x^(31/2))/31
```

Rubi [A] time = 0.128127, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$

$$\frac{2}{7}a^3Ax^{7/2}+\frac{2}{13}a^2x^{13/2}(aB+3Ab)+\frac{2}{25}b^2x^{25/2}(3aB+Ab)+\frac{6}{19}abx^{19/2}(aB+Ab)+\frac{2}{31}b^3Bx^{31/2}$$

Antiderivative was successfully verified.

```
[In] Int[x^(5/2)*(a + b*x^3)^3*(A + B*x^3),x]
```

```
[Out] (2*a^3*A*x^(7/2))/7 + (2*a^2*(3*A*b + a*B)*x^(13/2))/13 + (6*a*b*
(A*b + a*B)*x^(19/2))/19 + (2*b^2*(A*b + 3*a*B)*x^(25/2))/25 + (2
*b^3*B*x^(31/2))/31
```

Rubi in Sympy [A] time = 14.1236, size = 85, normalized size = 1.

$$\frac{2Aa^3x^{\frac{7}{2}}}{7}+\frac{2Bb^3x^{\frac{31}{2}}}{31}+\frac{2a^2x^{\frac{13}{2}}\left(3Ab+Ba\right)}{13}+\frac{6abx^{\frac{19}{2}}\left(Ab+Ba\right)}{19}+\frac{2b^2x^{\frac{25}{2}}\left(Ab+3Ba\right)}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(5/2)*(b*x**3+a)**3*(B*x**3+A),x)
```

```
[Out] 2*A*a**3*x**(7/2)/7 + 2*B*b**3*x**(31/2)/31 + 2*a**2*x**(13/2)*(3
*A*b + B*a)/13 + 6*a*b*x**(19/2)*(A*b + B*a)/19 + 2*b**2*x**(25/2
)*(A*b + 3*B*a)/25
```

Mathematica [A] time = 0.0461847, size = 85, normalized size = 1.

$$\frac{2}{7}a^3Ax^{7/2}+\frac{2}{13}a^2x^{13/2}(aB+3Ab)+\frac{2}{25}b^2x^{25/2}(3aB+Ab)+\frac{6}{19}abx^{19/2}(aB+Ab)+\frac{2}{31}b^3Bx^{31/2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(5/2)*(a + b*x^3)^3*(A + B*x^3),x]
```

```
[Out] (2*a^3*A*x^(7/2))/7 + (2*a^2*(3*A*b + a*B)*x^(13/2))/13 + (6*a*b*
(A*b + a*B)*x^(19/2))/19 + (2*b^2*(A*b + 3*a*B)*x^(25/2))/25 + (2
*b^3*B*x^(31/2))/31
```

Maple [A] time = 0.009, size = 80, normalized size = 0.9

$$\frac{86450\,Bb^3x^{12}+107198\,x^9Ab^3+321594\,x^9ab^2B+423150\,x^6ab^2A+423150\,x^6Ba^2b+618450\,x^3Aa^2b+206150\,x^3Ba^3+3828}{1339975}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)*(b*x^3+a)^3*(B*x^3+A),x)
```

```
[Out] 2/1339975*x^(7/2)*(43225*B*b^3*x^12+53599*A*b^3*x^9+160797*B*a*b^
2*x^9+211575*A*a*b^2*x^6+211575*B*a^2*b*x^6+309225*A*a^2*b*x^3+10
3075*B*a^3*x^3+191425*A*a^3)
```

Maxima [A] time = 1.40659, size = 99, normalized size = 1.16

$$\frac{2}{31}\,Bb^3x^{\frac{31}{2}} + \frac{2}{25}\left(3\,Bab^2 + Ab^3\right)x^{\frac{25}{2}} + \frac{6}{19}\left(Ba^2b + Aab^2\right)x^{\frac{19}{2}} + \frac{2}{7}\,Aa^3x^{\frac{7}{2}} + \frac{2}{13}\left(Ba^3 + 3\,Aa^2b\right)x^{\frac{13}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(5/2),x, algorithm="maxima")
```

```
[Out] 2/31*B*b^3*x^(31/2) + 2/25*(3*B*a*b^2 + A*b^3)*x^(25/2) + 6/19*(B
*a^2*b + A*a*b^2)*x^(19/2) + 2/7*A*a^3*x^(7/2) + 2/13*(B*a^3 + 3*
A*a^2*b)*x^(13/2)
```

Fricas [A] time = 0.225451, size = 105, normalized size = 1.24

$$\frac{2}{1339975}\left(43225\,Bb^3x^{15} + 53599\left(3\,Bab^2 + Ab^3\right)x^{12} + 211575\left(Ba^2b + Aab^2\right)x^9 + 191425\,Aa^3x^3 + 103075\left(Ba^3 + 3\,Aa^2b\right)x^6\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(5/2),x, algorithm="fricas")
```

```
[Out] 2/1339975*(43225*B*b^3*x^15 + 53599*(3*B*a*b^2 + A*b^3)*x^12 + 21
1575*(B*a^2*b + A*a*b^2)*x^9 + 191425*A*a^3*x^3 + 103075*(B*a^3 +
 3*A*a^2*b)*x^6)*sqrt(x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)*(b*x**3+a)**3*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21307, size = 104, normalized size = 1.22

$$\frac{2}{31}\,Bb^3x^{\frac{31}{2}} + \frac{6}{25}\,Bab^2x^{\frac{25}{2}} + \frac{2}{25}\,Ab^3x^{\frac{25}{2}} + \frac{6}{19}\,Ba^2bx^{\frac{19}{2}} + \frac{6}{19}\,Aab^2x^{\frac{19}{2}} + \frac{2}{13}\,Ba^3x^{\frac{13}{2}} + \frac{6}{13}\,Aa^2bx^{\frac{13}{2}} + \frac{2}{7}\,Aa^3x^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(5/2),x, algorithm="giac")
```

```
[Out] 2/31*B*b^3*x^(31/2) + 6/25*B*a*b^2*x^(25/2) + 2/25*A*b^3*x^(25/2)
 + 6/19*B*a^2*b*x^(19/2) + 6/19*A*a*b^2*x^(19/2) + 2/13*B*a^3*x^(
13/2) + 6/13*A*a^2*b*x^(13/2) + 2/7*A*a^3*x^(7/2)
```

3.149 $\int x^{3/2}\left(a+bx^3\right)^3\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=85

$$\frac{2}{5}a^3Ax^{5/2}+\frac{2}{11}a^2x^{11/2}(aB+3Ab)+\frac{2}{23}b^2x^{23/2}(3aB+Ab)+\frac{6}{17}abx^{17/2}(aB+Ab)+\frac{2}{29}b^3Bx^{29/2}$$

```
[Out] (2*a^3*A*x^(5/2))/5 + (2*a^2*(3*A*b + a*B)*x^(11/2))/11 + (6*a*b*
(A*b + a*B)*x^(17/2))/17 + (2*b^2*(A*b + 3*a*B)*x^(23/2))/23 + (2
*b^3*B*x^(29/2))/29
```

Rubi [A] time = 0.12639, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$\frac{2}{5}a^3Ax^{5/2}+\frac{2}{11}a^2x^{11/2}(aB+3Ab)+\frac{2}{23}b^2x^{23/2}(3aB+Ab)+\frac{6}{17}abx^{17/2}(aB+Ab)+\frac{2}{29}b^3Bx^{29/2}$$

Antiderivative was successfully verified.

```
[In] Int[x^(3/2)*(a + b*x^3)^3*(A + B*x^3),x]
```

```
[Out] (2*a^3*A*x^(5/2))/5 + (2*a^2*(3*A*b + a*B)*x^(11/2))/11 + (6*a*b*
(A*b + a*B)*x^(17/2))/17 + (2*b^2*(A*b + 3*a*B)*x^(23/2))/23 + (2
*b^3*B*x^(29/2))/29
```

Rubi in Sympy [A] time = 14.0824, size = 85, normalized size = 1.

$$\frac{2Aa^3x^{\frac{5}{2}}}{5}+\frac{2Bb^3x^{\frac{29}{2}}}{29}+\frac{2a^2x^{\frac{11}{2}}\left(3Ab+Ba\right)}{11}+\frac{6abx^{\frac{17}{2}}\left(Ab+Ba\right)}{17}+\frac{2b^2x^{\frac{23}{2}}\left(Ab+3Ba\right)}{23}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(3/2)*(b*x**3+a)**3*(B*x**3+A),x)
```

```
[Out] 2*A*a**3*x**(5/2)/5 + 2*B*b**3*x**(29/2)/29 + 2*a**2*x**(11/2)*(3
*A*b + B*a)/11 + 6*a*b*x**(17/2)*(A*b + B*a)/17 + 2*b**2*x**(23/2
)*(A*b + 3*B*a)/23
```

Mathematica [A] time = 0.0469156, size = 85, normalized size = 1.

$$\frac{2}{5}a^3Ax^{5/2}+\frac{2}{11}a^2x^{11/2}(aB+3Ab)+\frac{2}{23}b^2x^{23/2}(3aB+Ab)+\frac{6}{17}abx^{17/2}(aB+Ab)+\frac{2}{29}b^3Bx^{29/2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(3/2)*(a + b*x^3)^3*(A + B*x^3),x]
```

```
[Out] (2*a^3*A*x^(5/2))/5 + (2*a^2*(3*A*b + a*B)*x^(11/2))/11 + (6*a*b*
(A*b + a*B)*x^(17/2))/17 + (2*b^2*(A*b + 3*a*B)*x^(23/2))/23 + (2
*b^3*B*x^(29/2))/29
```

Maple [A] time = 0.009, size = 80, normalized size = 0.9

$$\frac{43010\,Bb^3x^{12}+54230\,x^9Ab^3+162690\,x^9ab^2B+220110\,x^6ab^2A+220110\,x^6Ba^2b+340170\,x^3Aa^2b+113390\,x^3Ba^3+24945}{623645}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)*(b*x^3+a)^3*(B*x^3+A),x)
```

```
[Out] 2/623645*x^(5/2)*(21505*B*b^3*x^12+27115*A*b^3*x^9+81345*B*a*b^2*
x^9+110055*A*a*b^2*x^6+110055*B*a^2*b*x^6+170085*A*a^2*b*x^3+5669
5*B*a^3*x^3+124729*A*a^3)
```

Maxima [A] time = 1.43999, size = 99, normalized size = 1.16

$$\frac{2}{29}\,Bb^3x^{\frac{29}{2}} + \frac{2}{23}\left(3\,Bab^2 + Ab^3\right)x^{\frac{23}{2}} + \frac{6}{17}\left(Ba^2b + Aab^2\right)x^{\frac{17}{2}} + \frac{2}{5}\,Aa^3x^{\frac{5}{2}} + \frac{2}{11}\left(Ba^3 + 3\,Aa^2b\right)x^{\frac{11}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(3/2),x, algorithm="maxima")
```

```
[Out] 2/29*B*b^3*x^(29/2) + 2/23*(3*B*a*b^2 + A*b^3)*x^(23/2) + 6/17*(B
*a^2*b + A*a*b^2)*x^(17/2) + 2/5*A*a^3*x^(5/2) + 2/11*(B*a^3 + 3*
A*a^2*b)*x^(11/2)
```

Fricas [A] time = 0.228435, size = 105, normalized size = 1.24

$$\frac{2}{623645}\left(21505\,Bb^3x^{14} + 27115\left(3\,Bab^2 + Ab^3\right)x^{11} + 110055\left(Ba^2b + Aab^2\right)x^8 + 124729\,Aa^3x^2 + 56695\left(Ba^3 + 3\,Aa^2b\right)x^5\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(3/2),x, algorithm="fricas")
```

```
[Out] 2/623645*(21505*B*b^3*x^14 + 27115*(3*B*a*b^2 + A*b^3)*x^11 + 110
055*(B*a^2*b + A*a*b^2)*x^8 + 124729*A*a^3*x^2 + 56695*(B*a^3 + 3
*A*a^2*b)*x^5)*sqrt(x)
```

Sympy [A] time = 124.276, size = 114, normalized size = 1.34

$$\frac{2Aa^3x^{\frac{5}{2}}}{5} + \frac{6Aa^2bx^{\frac{11}{2}}}{11} + \frac{6Aab^2x^{\frac{17}{2}}}{17} + \frac{2Ab^3x^{\frac{23}{2}}}{23} + \frac{2Ba^3x^{\frac{11}{2}}}{11} + \frac{6Ba^2bx^{\frac{17}{2}}}{17} + \frac{6Bab^2x^{\frac{23}{2}}}{23} + \frac{2Bb^3x^{\frac{29}{2}}}{29}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)*(b*x**3+a)**3*(B*x**3+A),x)
```

```
[Out] 2*A*a**3*x**(5/2)/5 + 6*A*a**2*b*x**(11/2)/11 + 6*A*a*b**2*x**(17
/2)/17 + 2*A*b**3*x**(23/2)/23 + 2*B*a**3*x**(11/2)/11 + 6*B*a**2
*b*x**(17/2)/17 + 6*B*a*b**2*x**(23/2)/23 + 2*B*b**3*x**(29/2)/29
```

GIAC/XCAS [A] time = 0.211814, size = 104, normalized size = 1.22

$$\frac{2}{29}\,Bb^3x^{\frac{29}{2}} + \frac{6}{23}\,Bab^2x^{\frac{23}{2}} + \frac{2}{23}\,Ab^3x^{\frac{23}{2}} + \frac{6}{17}\,Ba^2bx^{\frac{17}{2}} + \frac{6}{17}\,Aab^2x^{\frac{17}{2}} + \frac{2}{11}\,Ba^3x^{\frac{11}{2}} + \frac{6}{11}\,Aa^2bx^{\frac{11}{2}} + \frac{2}{5}\,Aa^3x^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*x^(3/2),x, algorithm="giac")
```

```
[Out] 2/29*B*b^3*x^(29/2) + 6/23*B*a*b^2*x^(23/2) + 2/23*A*b^3*x^(23/2)
 + 6/17*B*a^2*b*x^(17/2) + 6/17*A*a*b^2*x^(17/2) + 2/11*B*a^3*x^(
11/2) + 6/11*A*a^2*b*x^(11/2) + 2/5*A*a^3*x^(5/2)
```

3.150 $\int \sqrt{x} \left(a+bx^3\right)^3 \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=85

$$\frac{2}{3}a^3Ax^{3/2}+\frac{2}{9}a^2x^{9/2}(aB+3Ab)+\frac{2}{21}b^2x^{21/2}(3aB+Ab)+\frac{2}{5}abx^{15/2}(aB+Ab)+\frac{2}{27}b^3Bx^{27/2}$$

```
[Out] (2*a^3*A*x^(3/2))/3 + (2*a^2*(3*A*b + a*B)*x^(9/2))/9 + (2*a*b*(A
*b + a*B)*x^(15/2))/5 + (2*b^2*(A*b + 3*a*B)*x^(21/2))/21 + (2*b^
3*B*x^(27/2))/27
```

Rubi [A] time = 0.125593, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$\frac{2}{3}a^3Ax^{3/2}+\frac{2}{9}a^2x^{9/2}(aB+3Ab)+\frac{2}{21}b^2x^{21/2}(3aB+Ab)+\frac{2}{5}abx^{15/2}(aB+Ab)+\frac{2}{27}b^3Bx^{27/2}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x]*(a + b*x^3)^3*(A + B*x^3),x]
```

```
[Out] (2*a^3*A*x^(3/2))/3 + (2*a^2*(3*A*b + a*B)*x^(9/2))/9 + (2*a*b*(A
*b + a*B)*x^(15/2))/5 + (2*b^2*(A*b + 3*a*B)*x^(21/2))/21 + (2*b^
3*B*x^(27/2))/27
```

Rubi in Sympy [A] time = 14.5231, size = 85, normalized size = 1.

$$\frac{2Aa^3x^{\frac{3}{2}}}{3}+\frac{2Bb^3x^{\frac{27}{2}}}{27}+\frac{2a^2x^{\frac{9}{2}}(3Ab+Ba)}{9}+\frac{2abx^{\frac{15}{2}}(Ab+Ba)}{5}+\frac{2b^2x^{\frac{21}{2}}(Ab+3Ba)}{21}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**3*(B*x**3+A)*x**(1/2),x)
```

```
[Out] 2*A*a**3*x**(3/2)/3 + 2*B*b**3*x**(27/2)/27 + 2*a**2*x**(9/2)*(3*
A*b + B*a)/9 + 2*a*b*x**(15/2)*(A*b + B*a)/5 + 2*b**2*x**(21/2)*(
A*b + 3*B*a)/21
```

Mathematica [A] time = 0.0470081, size = 71, normalized size = 0.84

$$\frac{2}{945}x^{3/2}\left(315a^3A+105a^2x^3(aB+3Ab)+45b^2x^9(3aB+Ab)+189abx^6(aB+Ab)+35b^3Bx^{12}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x]*(a + b*x^3)^3*(A + B*x^3),x]
```

```
[Out] (2*x^(3/2)*(315*a^3*A + 105*a^2*(3*A*b + a*B)*x^3 + 189*a*b*(A*b
+ a*B)*x^6 + 45*b^2*(A*b + 3*a*B)*x^9 + 35*b^3*B*x^12))/945
```

Maple [A] time = 0.009, size = 80, normalized size = 0.9

$$\frac{70\,b^3Bx^{12}+90\,x^9b^3A+270\,x^9ab^2B+378\,x^6ab^2A+378\,x^6a^2bB+630\,x^3Aa^2b+210\,x^3Ba^3+630\,Aa^3}{945}x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^3*(B*x^3+A)*x^(1/2),x)
```

```
[Out] 2/945*x^(3/2)*(35*B*b^3*x^12+45*A*b^3*x^9+135*B*a*b^2*x^9+189*A*a
*b^2*x^6+189*B*a^2*b*x^6+315*A*a^2*b*x^3+105*B*a^3*x^3+315*A*a^3)
```

Maxima [A] time = 1.35154, size = 99, normalized size = 1.16

$$\frac{2}{27}\,Bb^3x^{\frac{27}{2}} + \frac{2}{21}\left(3\,Bab^2 + Ab^3\right)x^{\frac{21}{2}} + \frac{2}{5}\left(Ba^2b + Aab^2\right)x^{\frac{15}{2}} + \frac{2}{3}\,Aa^3x^{\frac{3}{2}} + \frac{2}{9}\left(Ba^3 + 3\,Aa^2b\right)x^{\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*sqrt(x),x, algorithm="maxima")
```

```
[Out] 2/27*B*b^3*x^(27/2) + 2/21*(3*B*a*b^2 + A*b^3)*x^(21/2) + 2/5*(B*
a^2*b + A*a*b^2)*x^(15/2) + 2/3*A*a^3*x^(3/2) + 2/9*(B*a^3 + 3*A*
a^2*b)*x^(9/2)
```

Fricas [A] time = 0.221995, size = 103, normalized size = 1.21

$$\frac{2}{945}\left(35\,Bb^3x^{13} + 45\left(3\,Bab^2 + Ab^3\right)x^{10} + 189\left(Ba^2b + Aab^2\right)x^7 + 315\,Aa^3x + 105\left(Ba^3 + 3\,Aa^2b\right)x^4\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*sqrt(x),x, algorithm="fricas")
```

```
[Out] 2/945*(35*B*b^3*x^13 + 45*(3*B*a*b^2 + A*b^3)*x^10 + 189*(B*a^2*b
 + A*a*b^2)*x^7 + 315*A*a^3*x + 105*(B*a^3 + 3*A*a^2*b)*x^4)*sqrt
(x)
```

Sympy [A] time = 29.6487, size = 95, normalized size = 1.12

$$\frac{2Aa^3x^{\frac{3}{2}}}{3} + \frac{2Bb^3x^{\frac{27}{2}}}{27} + \frac{2x^{\frac{21}{2}}\left(Ab^3 + 3Bab^2\right)}{21} + \frac{2x^{\frac{15}{2}}\left(3Aab^2 + 3Ba^2b\right)}{15} + \frac{2x^{\frac{9}{2}}\left(3Aa^2b + Ba^3\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**3*(B*x**3+A)*x**(1/2),x)
```

```
[Out] 2*A*a**3*x**(3/2)/3 + 2*B*b**3*x**(27/2)/27 + 2*x**(21/2)*(A*b**3
 + 3*B*a*b**2)/21 + 2*x**(15/2)*(3*A*a*b**2 + 3*B*a**2*b)/15 + 2*
x**(9/2)*(3*A*a**2*b + B*a**3)/9
```

GIAC/XCAS [A] time = 0.211864, size = 104, normalized size = 1.22

$$\frac{2}{27}\,Bb^3x^{\frac{27}{2}} + \frac{2}{7}\,Bab^2x^{\frac{21}{2}} + \frac{2}{21}\,Ab^3x^{\frac{21}{2}} + \frac{2}{5}\,Ba^2bx^{\frac{15}{2}} + \frac{2}{5}\,Aab^2x^{\frac{15}{2}} + \frac{2}{9}\,Ba^3x^{\frac{9}{2}} + \frac{2}{3}\,Aa^2bx^{\frac{9}{2}} + \frac{2}{3}\,Aa^3x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3*sqrt(x),x, algorithm="giac")
```

```
[Out] 2/27*B*b^3*x^(27/2) + 2/7*B*a*b^2*x^(21/2) + 2/21*A*b^3*x^(21/2)
+ 2/5*B*a^2*b*x^(15/2) + 2/5*A*a*b^2*x^(15/2) + 2/9*B*a^3*x^(9/2)
 + 2/3*A*a^2*b*x^(9/2) + 2/3*A*a^3*x^(3/2)
```

3.151 $\int \frac{(a+bx^3)^3(A+Bx^3)}{\sqrt{x}}\,dx$

Optimal. Leaf size=83

$$2a^3A\sqrt{x}+\frac{2}{7}a^2x^{7/2}(aB+3Ab)+\frac{2}{19}b^2x^{19/2}(3aB+Ab)+\frac{6}{13}abx^{13/2}(aB+Ab)+\frac{2}{25}b^3Bx^{25/2}$$

```
[Out] 2*a^3*A*Sqrt[x] + (2*a^2*(3*A*b + a*B)*x^(7/2))/7 + (6*a*b*(A*b +
 a*B)*x^(13/2))/13 + (2*b^2*(A*b + 3*a*B)*x^(19/2))/19 + (2*b^3*B
*x^(25/2))/25
```

Rubi [A] time = 0.126233, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$2a^3A\sqrt{x}+\frac{2}{7}a^2x^{7/2}(aB+3Ab)+\frac{2}{19}b^2x^{19/2}(3aB+Ab)+\frac{6}{13}abx^{13/2}(aB+Ab)+\frac{2}{25}b^3Bx^{25/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^3*(A + B*x^3))/Sqrt[x],x]
```

```
[Out] 2*a^3*A*Sqrt[x] + (2*a^2*(3*A*b + a*B)*x^(7/2))/7 + (6*a*b*(A*b +
 a*B)*x^(13/2))/13 + (2*b^2*(A*b + 3*a*B)*x^(19/2))/19 + (2*b^3*B
*x^(25/2))/25
```

Rubi in Sympy [A] time = 14.263, size = 83, normalized size = 1.

$$2Aa^3\sqrt{x}+\frac{2Bb^3x^{\frac{25}{2}}}{25}+\frac{2a^2x^{\frac{7}{2}}(3Ab+Ba)}{7}+\frac{6abx^{\frac{13}{2}}(Ab+Ba)}{13}+\frac{2b^2x^{\frac{19}{2}}(Ab+3Ba)}{19}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**3*(B*x**3+A)/x**(1/2),x)
```

```
[Out] 2*A*a**3*sqrt(x) + 2*B*b**3*x**(25/2)/25 + 2*a**2*x**(7/2)*(3*A*b
 + B*a)/7 + 6*a*b*x**(13/2)*(A*b + B*a)/13 + 2*b**2*x**(19/2)*(A*
b + 3*B*a)/19
```

Mathematica [A] time = 0.0461451, size = 83, normalized size = 1.

$$2a^3A\sqrt{x}+\frac{2}{7}a^2x^{7/2}(aB+3Ab)+\frac{2}{19}b^2x^{19/2}(3aB+Ab)+\frac{6}{13}abx^{13/2}(aB+Ab)+\frac{2}{25}b^3Bx^{25/2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^3*(A + B*x^3))/Sqrt[x],x]
```

```
[Out] 2*a^3*A*Sqrt[x] + (2*a^2*(3*A*b + a*B)*x^(7/2))/7 + (6*a*b*(A*b +
 a*B)*x^(13/2))/13 + (2*b^2*(A*b + 3*a*B)*x^(19/2))/19 + (2*b^3*B
*x^(25/2))/25
```

Maple [A] time = 0.009, size = 80, normalized size = 1.

$$\frac{3458\,b^3Bx^{12}+4550\,x^9b^3A+13650\,x^9ab^2B+19950\,x^6ab^2A+19950\,x^6a^2bB+37050\,x^3Aa^2b+12350\,x^3Ba^3+86450\,Aa^3}{43225}\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^3*(B*x^3+A)/x^(1/2),x)
```

```
[Out] 2/43225*x^(1/2)*(1729*B*b^3*x^12+2275*A*b^3*x^9+6825*B*a*b^2*x^9+
9975*A*a*b^2*x^6+9975*B*a^2*b*x^6+18525*A*a^2*b*x^3+6175*B*a^3*x^
3+43225*A*a^3)
```

Maxima [A] time = 1.36457, size = 99, normalized size = 1.19

$$\frac{2}{25}Bb^3x^{\frac{25}{2}} + \frac{2}{19}\left(3\,Bab^2 + Ab^3\right)x^{\frac{19}{2}} + \frac{6}{13}\left(Ba^2b + Aab^2\right)x^{\frac{13}{2}} + 2\,Aa^3\sqrt{x} + \frac{2}{7}\left(Ba^3 + 3\,Aa^2b\right)x^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/sqrt(x),x, algorithm="maxima")
```

```
[Out] 2/25*B*b^3*x^(25/2) + 2/19*(3*B*a*b^2 + A*b^3)*x^(19/2) + 6/13*(B
*a^2*b + A*a*b^2)*x^(13/2) + 2*A*a^3*sqrt(x) + 2/7*(B*a^3 + 3*A*a
^2*b)*x^(7/2)
```

Fricas [A] time = 0.233846, size = 101, normalized size = 1.22

$$\frac{2}{43225}\left(1729\,Bb^3x^{12} + 2275\left(3\,Bab^2 + Ab^3\right)x^9 + 9975\left(Ba^2b + Aab^2\right)x^6 + 43225\,Aa^3 + 6175\left(Ba^3 + 3\,Aa^2b\right)x^3\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/sqrt(x),x, algorithm="fricas")
```

```
[Out] 2/43225*(1729*B*b^3*x^12 + 2275*(3*B*a*b^2 + A*b^3)*x^9 + 9975*(B
*a^2*b + A*a*b^2)*x^6 + 43225*A*a^3 + 6175*(B*a^3 + 3*A*a^2*b)*x^
3)*sqrt(x)
```

Sympy [A] time = 62.5103, size = 112, normalized size = 1.35

$$2Aa^3\sqrt{x} + \frac{6Aa^2bx^{\frac{7}{2}}}{7} + \frac{6Aab^2x^{\frac{13}{2}}}{13} + \frac{2Ab^3x^{\frac{19}{2}}}{19} + \frac{2Ba^3x^{\frac{7}{2}}}{7} + \frac{6Ba^2bx^{\frac{13}{2}}}{13} + \frac{6Bab^2x^{\frac{19}{2}}}{19} + \frac{2Bb^3x^{\frac{25}{2}}}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**3*(B*x**3+A)/x**(1/2),x)
```

```
[Out] 2*A*a**3*sqrt(x) + 6*A*a**2*b*x**(7/2)/7 + 6*A*a*b**2*x**(13/2)/1
3 + 2*A*b**3*x**(19/2)/19 + 2*B*a**3*x**(7/2)/7 + 6*B*a**2*b*x**(
13/2)/13 + 6*B*a*b**2*x**(19/2)/19 + 2*B*b**3*x**(25/2)/25
```

GIAC/XCAS [A] time = 0.211434, size = 104, normalized size = 1.25

$$\frac{2}{25}Bb^3x^{\frac{25}{2}} + \frac{6}{19}Bab^2x^{\frac{19}{2}} + \frac{2}{19}Ab^3x^{\frac{19}{2}} + \frac{6}{13}Ba^2bx^{\frac{13}{2}} + \frac{6}{13}Aab^2x^{\frac{13}{2}} + \frac{2}{7}Ba^3x^{\frac{7}{2}} + \frac{6}{7}Aa^2bx^{\frac{7}{2}} + 2\,Aa^3\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/sqrt(x),x, algorithm="giac")
```

```
[Out] 2/25*B*b^3*x^(25/2) + 6/19*B*a*b^2*x^(19/2) + 2/19*A*b^3*x^(19/2)
 + 6/13*B*a^2*b*x^(13/2) + 6/13*A*a*b^2*x^(13/2) + 2/7*B*a^3*x^(7
/2) + 6/7*A*a^2*b*x^(7/2) + 2*A*a^3*sqrt(x)
```

3.152 $\int \frac{(a+bx^3)^3(A+Bx^3)}{x^{3/2}}\,dx$

Optimal. Leaf size=83

$$-\frac{2a^3A}{\sqrt{x}}+\frac{2}{5}a^2x^{5/2}(aB+3Ab)+\frac{2}{17}b^2x^{17/2}(3aB+Ab)+\frac{6}{11}abx^{11/2}(aB+Ab)+\frac{2}{23}b^3Bx^{23/2}$$

```
[Out] (-2*a^3*A)/Sqrt[x] + (2*a^2*(3*A*b + a*B)*x^(5/2))/5 + (6*a*b*(A*
b + a*B)*x^(11/2))/11 + (2*b^2*(A*b + 3*a*B)*x^(17/2))/17 + (2*b^
3*B*x^(23/2))/23
```

Rubi [A] time = 0.126183, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$-\frac{2a^3A}{\sqrt{x}}+\frac{2}{5}a^2x^{5/2}(aB+3Ab)+\frac{2}{17}b^2x^{17/2}(3aB+Ab)+\frac{6}{11}abx^{11/2}(aB+Ab)+\frac{2}{23}b^3Bx^{23/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^3*(A + B*x^3))/x^(3/2),x]
```

```
[Out] (-2*a^3*A)/Sqrt[x] + (2*a^2*(3*A*b + a*B)*x^(5/2))/5 + (6*a*b*(A*
b + a*B)*x^(11/2))/11 + (2*b^2*(A*b + 3*a*B)*x^(17/2))/17 + (2*b^
3*B*x^(23/2))/23
```

Rubi in Sympy [A] time = 14.1562, size = 83, normalized size = 1.

$$-\frac{2Aa^3}{\sqrt{x}}+\frac{2Bb^3x^{\frac{23}{2}}}{23}+\frac{2a^2x^{\frac{5}{2}}\,(3Ab+Ba)}{5}+\frac{6abx^{\frac{11}{2}}\,(Ab+Ba)}{11}+\frac{2b^2x^{\frac{17}{2}}\,(Ab+3Ba)}{17}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**3*(B*x**3+A)/x**(3/2),x)
```

```
[Out] -2*A*a**3/sqrt(x) + 2*B*b**3*x**(23/2)/23 + 2*a**2*x**(5/2)*(3*A*
b + B*a)/5 + 6*a*b*x**(11/2)*(A*b + B*a)/11 + 2*b**2*x**(17/2)*(A
*b + 3*B*a)/17
```

Mathematica [A] time = 0.0675491, size = 83, normalized size = 1.

$$-\frac{2a^3A}{\sqrt{x}}+\frac{2}{5}a^2x^{5/2}(aB+3Ab)+\frac{2}{17}b^2x^{17/2}(3aB+Ab)+\frac{6}{11}abx^{11/2}(aB+Ab)+\frac{2}{23}b^3Bx^{23/2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^3*(A + B*x^3))/x^(3/2),x]
```

```
[Out] (-2*a^3*A)/Sqrt[x] + (2*a^2*(3*A*b + a*B)*x^(5/2))/5 + (6*a*b*(A*
b + a*B)*x^(11/2))/11 + (2*b^2*(A*b + 3*a*B)*x^(17/2))/17 + (2*b^
3*B*x^(23/2))/23
```

Maple [A] time = 0.009, size = 80, normalized size = 1.

$$-\frac{-1870\,b^3Bx^{12}-2530\,x^9b^3A-7590\,x^9ab^2B-11730\,x^6ab^2A-11730\,x^6a^2bB-25806\,x^3Aa^2b-8602\,x^3Ba^3+43010\,Aa^3}{21505}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^3*(B*x^3+A)/x^(3/2),x)
```

```
[Out] -2/21505*(-935*B*b^3*x^12-1265*A*b^3*x^9-3795*B*a*b^2*x^9-5865*A*
a*b^2*x^6-5865*B*a^2*b*x^6-12903*A*a^2*b*x^3-4301*B*a^3*x^3+21505
*A*a^3)/x^(1/2)
```

Maxima [A] time = 1.36665, size = 99, normalized size = 1.19

$$\frac{2}{23}\,Bb^3x^{\frac{23}{2}} + \frac{2}{17}\left(3\,Bab^2 + Ab^3\right)x^{\frac{17}{2}} + \frac{6}{11}\left(Ba^2b + Aab^2\right)x^{\frac{11}{2}} - \frac{2\,Aa^3}{\sqrt{x}} + \frac{2}{5}\left(Ba^3 + 3\,Aa^2b\right)x^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(3/2),x, algorithm="maxima")
```

```
[Out] 2/23*B*b^3*x^(23/2) + 2/17*(3*B*a*b^2 + A*b^3)*x^(17/2) + 6/11*(B
*a^2*b + A*a*b^2)*x^(11/2) - 2*A*a^3/sqrt(x) + 2/5*(B*a^3 + 3*A*a
^2*b)*x^(5/2)
```

Fricas [A] time = 0.23055, size = 101, normalized size = 1.22

$$\frac{2\left(935\,Bb^3x^{12} + 1265\left(3\,Bab^2 + Ab^3\right)x^9 + 5865\left(Ba^2b + Aab^2\right)x^6 - 21505\,Aa^3 + 4301\left(Ba^3 + 3\,Aa^2b\right)x^3\right)}{21505\,\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(3/2),x, algorithm="fricas")
```

```
[Out] 2/21505*(935*B*b^3*x^12 + 1265*(3*B*a*b^2 + A*b^3)*x^9 + 5865*(B*
a^2*b + A*a*b^2)*x^6 - 21505*A*a^3 + 4301*(B*a^3 + 3*A*a^2*b)*x^3
)/sqrt(x)
```

Sympy [A] time = 71.2225, size = 112, normalized size = 1.35

$$-\frac{2Aa^3}{\sqrt{x}} + \frac{6Aa^2bx^{\frac{5}{2}}}{5} + \frac{6Aab^2x^{\frac{11}{2}}}{11} + \frac{2Ab^3x^{\frac{17}{2}}}{17} + \frac{2Ba^3x^{\frac{5}{2}}}{5} + \frac{6Ba^2bx^{\frac{11}{2}}}{11} + \frac{6Bab^2x^{\frac{17}{2}}}{17} + \frac{2Bb^3x^{\frac{23}{2}}}{23}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**3*(B*x**3+A)/x**(3/2),x)
```

```
[Out] -2*A*a**3/sqrt(x) + 6*A*a**2*b*x**(5/2)/5 + 6*A*a*b**2*x**(11/2)/
11 + 2*A*b**3*x**(17/2)/17 + 2*B*a**3*x**(5/2)/5 + 6*B*a**2*b*x**
(11/2)/11 + 6*B*a*b**2*x**(17/2)/17 + 2*B*b**3*x**(23/2)/23
```

GIAC/XCAS [A] time = 0.210629, size = 104, normalized size = 1.25

$$\frac{2}{23}\,Bb^3x^{\frac{23}{2}} + \frac{6}{17}\,Bab^2x^{\frac{17}{2}} + \frac{2}{17}\,Ab^3x^{\frac{17}{2}} + \frac{6}{11}\,Ba^2bx^{\frac{11}{2}} + \frac{6}{11}\,Aab^2x^{\frac{11}{2}} + \frac{2}{5}\,Ba^3x^{\frac{5}{2}} + \frac{6}{5}\,Aa^2bx^{\frac{5}{2}} - \frac{2\,Aa^3}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(3/2),x, algorithm="giac")
```

```
[Out] 2/23*B*b^3*x^(23/2) + 6/17*B*a*b^2*x^(17/2) + 2/17*A*b^3*x^(17/2)
 + 6/11*B*a^2*b*x^(11/2) + 6/11*A*a*b^2*x^(11/2) + 2/5*B*a^3*x^(5
/2) + 6/5*A*a^2*b*x^(5/2) - 2*A*a^3/sqrt(x)
```

3.153 $\int \frac{(a+bx^3)^3(A+Bx^3)}{x^{5/2}}\,dx$

Optimal. Leaf size=85

$$-\frac{2a^3A}{3x^{3/2}}+\frac{2}{3}a^2x^{3/2}(aB+3Ab)+\frac{2}{15}b^2x^{15/2}(3aB+Ab)+\frac{2}{3}abx^{9/2}(aB+Ab)+\frac{2}{21}b^3Bx^{21/2}$$

```
[Out] (-2*a^3*A)/(3*x^(3/2)) + (2*a^2*(3*A*b + a*B)*x^(3/2))/3 + (2*a*b
*(A*b + a*B)*x^(9/2))/3 + (2*b^2*(A*b + 3*a*B)*x^(15/2))/15 + (2*
b^3*B*x^(21/2))/21
```

Rubi [A] time = 0.129811, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$-\frac{2a^3A}{3x^{3/2}}+\frac{2}{3}a^2x^{3/2}(aB+3Ab)+\frac{2}{15}b^2x^{15/2}(3aB+Ab)+\frac{2}{3}abx^{9/2}(aB+Ab)+\frac{2}{21}b^3Bx^{21/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^3*(A + B*x^3))/x^(5/2),x]
```

```
[Out] (-2*a^3*A)/(3*x^(3/2)) + (2*a^2*(3*A*b + a*B)*x^(3/2))/3 + (2*a*b
*(A*b + a*B)*x^(9/2))/3 + (2*b^2*(A*b + 3*a*B)*x^(15/2))/15 + (2*
b^3*B*x^(21/2))/21
```

Rubi in Sympy [A] time = 14.3153, size = 83, normalized size = 0.98

$$-\frac{2Aa^3}{3x^{\frac{3}{2}}}+\frac{2Bb^3x^{\frac{21}{2}}}{21}+2a^2x^{\frac{3}{2}}\left(Ab+\frac{Ba}{3}\right)+\frac{2abx^{\frac{9}{2}}\left(Ab+Ba\right)}{3}+\frac{2b^2x^{\frac{15}{2}}\left(Ab+3Ba\right)}{15}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**3*(B*x**3+A)/x**(5/2),x)
```

```
[Out] -2*A*a**3/(3*x**(3/2)) + 2*B*b**3*x**(21/2)/21 + 2*a**2*x**(3/2)*
(A*b + B*a/3) + 2*a*b*x**(9/2)*(A*b + B*a)/3 + 2*b**2*x**(15/2)*(
A*b + 3*B*a)/15
```

Mathematica [A] time = 0.0411578, size = 77, normalized size = 0.91

$$\frac{2\left(-35a^3\left(A-Bx^3\right)+35a^2bx^3\left(3A+Bx^3\right)+7ab^2x^6\left(5A+3Bx^3\right)+b^3x^9\left(7A+5Bx^3\right)\right)}{105x^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^3*(A + B*x^3))/x^(5/2),x]
```

```
[Out] (2*(-35*a^3*(A - B*x^3) + 35*a^2*b*x^3*(3*A + B*x^3) + 7*a*b^2*x^
6*(5*A + 3*B*x^3) + b^3*x^9*(7*A + 5*B*x^3)))/(105*x^(3/2))
```

Maple [A] time = 0.01, size = 80, normalized size = 0.9

$$-\frac{-10\,b^3Bx^{12}-14\,x^9b^3A-42\,x^9ab^2B-70\,x^6ab^2A-70\,x^6a^2bB-210\,x^3Aa^2b-70\,x^3Ba^3+70\,Aa^3}{105}x^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^3*(B*x^3+A)/x^(5/2),x)
```

```
[Out] -2/105*(-5*B*b^3*x^12-7*A*b^3*x^9-21*B*a*b^2*x^9-35*A*a*b^2*x^6-3
5*B*a^2*b*x^6-105*A*a^2*b*x^3-35*B*a^3*x^3+35*A*a^3)/x^(3/2)
```

Maxima [A] time = 1.35764, size = 99, normalized size = 1.16

$$\frac{2}{21}\,Bb^3x^{\frac{21}{2}}+\frac{2}{15}\left(3\,Bab^2+Ab^3\right)x^{\frac{15}{2}}+\frac{2}{3}\left(Ba^2b+Aab^2\right)x^{\frac{9}{2}}-\frac{2\,Aa^3}{3\,x^{\frac{3}{2}}}+\frac{2}{3}\left(Ba^3+3\,Aa^2b\right)x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(5/2),x, algorithm="maxima")
```

```
[Out] 2/21*B*b^3*x^(21/2) + 2/15*(3*B*a*b^2 + A*b^3)*x^(15/2) + 2/3*(B*
a^2*b + A*a*b^2)*x^(9/2) - 2/3*A*a^3/x^(3/2) + 2/3*(B*a^3 + 3*A*a
^2*b)*x^(3/2)
```

Fricas [A] time = 0.238611, size = 101, normalized size = 1.19

$$\frac{2\left(5\,Bb^3x^{12}+7\left(3\,Bab^2+Ab^3\right)x^9+35\left(Ba^2b+Aab^2\right)x^6-35\,Aa^3+35\left(Ba^3+3\,Aa^2b\right)x^3\right)}{105\,x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(5/2),x, algorithm="fricas")
```

```
[Out] 2/105*(5*B*b^3*x^12 + 7*(3*B*a*b^2 + A*b^3)*x^9 + 35*(B*a^2*b + A
*a*b^2)*x^6 - 35*A*a^3 + 35*(B*a^3 + 3*A*a^2*b)*x^3)/x^(3/2)
```

Sympy [A] time = 80.9534, size = 112, normalized size = 1.32

$$-\frac{2Aa^3}{3x^{\frac{3}{2}}}+2Aa^2bx^{\frac{3}{2}}+\frac{2Aab^2x^{\frac{9}{2}}}{3}+\frac{2Ab^3x^{\frac{15}{2}}}{15}+\frac{2Ba^3x^{\frac{3}{2}}}{3}+\frac{2Ba^2bx^{\frac{9}{2}}}{3}+\frac{2Bab^2x^{\frac{15}{2}}}{5}+\frac{2Bb^3x^{\frac{21}{2}}}{21}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**3*(B*x**3+A)/x**(5/2),x)
```

```
[Out] -2*A*a**3/(3*x**(3/2)) + 2*A*a**2*b*x**(3/2) + 2*A*a*b**2*x**(9/2
)/3 + 2*A*b**3*x**(15/2)/15 + 2*B*a**3*x**(3/2)/3 + 2*B*a**2*b*x*
*(9/2)/3 + 2*B*a*b**2*x**(15/2)/5 + 2*B*b**3*x**(21/2)/21
```

GIAC/XCAS [A] time = 0.212935, size = 104, normalized size = 1.22

$$\frac{2}{21}\,Bb^3x^{\frac{21}{2}}+\frac{2}{5}\,Bab^2x^{\frac{15}{2}}+\frac{2}{15}\,Ab^3x^{\frac{15}{2}}+\frac{2}{3}\,Ba^2bx^{\frac{9}{2}}+\frac{2}{3}\,Aab^2x^{\frac{9}{2}}+\frac{2}{3}\,Ba^3x^{\frac{3}{2}}+2\,Aa^2bx^{\frac{3}{2}}-\frac{2\,Aa^3}{3\,x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(5/2),x, algorithm="giac")
```

```
[Out] 2/21*B*b^3*x^(21/2) + 2/5*B*a*b^2*x^(15/2) + 2/15*A*b^3*x^(15/2)
+ 2/3*B*a^2*b*x^(9/2) + 2/3*A*a*b^2*x^(9/2) + 2/3*B*a^3*x^(3/2) +
 2*A*a^2*b*x^(3/2) - 2/3*A*a^3/x^(3/2)
```

3.154 $\int \frac{(a+bx^3)^3(A+Bx^3)}{x^{7/2}}\,dx$

Optimal. Leaf size=83

$$-\frac{2a^3A}{5x^{5/2}}+2a^2\sqrt{x}(aB+3Ab)+\frac{2}{13}b^2x^{13/2}(3aB+Ab)+\frac{6}{7}abx^{7/2}(aB+Ab)+\frac{2}{19}b^3Bx^{19/2}$$

```
[Out] (-2*a^3*A)/(5*x^(5/2)) + 2*a^2*(3*A*b + a*B)*Sqrt[x] + (6*a*b*(A*
b + a*B)*x^(7/2))/7 + (2*b^2*(A*b + 3*a*B)*x^(13/2))/13 + (2*b^3*
B*x^(19/2))/19
```

Rubi [A] time = 0.125322, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$

$$-\frac{2a^3A}{5x^{5/2}}+2a^2\sqrt{x}(aB+3Ab)+\frac{2}{13}b^2x^{13/2}(3aB+Ab)+\frac{6}{7}abx^{7/2}(aB+Ab)+\frac{2}{19}b^3Bx^{19/2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^3*(A + B*x^3))/x^(7/2),x]
```

```
[Out] (-2*a^3*A)/(5*x^(5/2)) + 2*a^2*(3*A*b + a*B)*Sqrt[x] + (6*a*b*(A*
b + a*B)*x^(7/2))/7 + (2*b^2*(A*b + 3*a*B)*x^(13/2))/13 + (2*b^3*
B*x^(19/2))/19
```

Rubi in Sympy [A] time = 14.2805, size = 83, normalized size = 1.

$$-\frac{2Aa^3}{5x^{\frac{5}{2}}}+\frac{2Bb^3x^{\frac{19}{2}}}{19}+2a^2\sqrt{x}\,(3Ab+Ba)+\frac{6abx^{\frac{7}{2}}\,(Ab+Ba)}{7}+\frac{2b^2x^{\frac{13}{2}}\,(Ab+3Ba)}{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**3*(B*x**3+A)/x**(7/2),x)
```

```
[Out] -2*A*a**3/(5*x**(5/2)) + 2*B*b**3*x**(19/2)/19 + 2*a**2*sqrt(x)*(
3*A*b + B*a) + 6*a*b*x**(7/2)*(A*b + B*a)/7 + 2*b**2*x**(13/2)*(A
*b + 3*B*a)/13
```

Mathematica [A] time = 0.0622453, size = 83, normalized size = 1.

$$-\frac{2a^3A}{5x^{5/2}}+2a^2\sqrt{x}(aB+3Ab)+\frac{2}{13}b^2x^{13/2}(3aB+Ab)+\frac{6}{7}abx^{7/2}(aB+Ab)+\frac{2}{19}b^3Bx^{19/2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^3*(A + B*x^3))/x^(7/2),x]
```

```
[Out] (-2*a^3*A)/(5*x^(5/2)) + 2*a^2*(3*A*b + a*B)*Sqrt[x] + (6*a*b*(A*
b + a*B)*x^(7/2))/7 + (2*b^2*(A*b + 3*a*B)*x^(13/2))/13 + (2*b^3*
B*x^(19/2))/19
```

Maple [A] time = 0.008, size = 80, normalized size = 1.

$$-\frac{-910\,b^3Bx^{12}-1330\,x^9b^3A-3990\,x^9ab^2B-7410\,x^6ab^2A-7410\,x^6a^2bB-51870\,Aa^2bx^3-17290\,Ba^3x^3+3458\,Aa^3}{8645}x^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^3*(B*x^3+A)/x^(7/2),x)
```

```
[Out] -2/8645*(-455*B*b^3*x^12-665*A*b^3*x^9-1995*B*a*b^2*x^9-3705*A*a*
b^2*x^6-3705*B*a^2*b*x^6-25935*A*a^2*b*x^3-8645*B*a^3*x^3+1729*A*
a^3)/x^(5/2)
```

Maxima [A] time = 1.35171, size = 99, normalized size = 1.19

$$\frac{2}{19}\,Bb^3x^{\frac{19}{2}} + \frac{2}{13}\left(3\,Bab^2 + Ab^3\right)x^{\frac{13}{2}} + \frac{6}{7}\left(Ba^2b + Aab^2\right)x^{\frac{7}{2}} - \frac{2\,Aa^3}{5\,x^{\frac{5}{2}}} + 2\left(Ba^3 + 3\,Aa^2b\right)\sqrt{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(7/2),x, algorithm="maxima")
```

```
[Out] 2/19*B*b^3*x^(19/2) + 2/13*(3*B*a*b^2 + A*b^3)*x^(13/2) + 6/7*(B*
a^2*b + A*a*b^2)*x^(7/2) - 2/5*A*a^3/x^(5/2) + 2*(B*a^3 + 3*A*a^2
*b)*sqrt(x)
```

Fricas [A] time = 0.230926, size = 101, normalized size = 1.22

$$\frac{2\left(455\,Bb^3x^{12} + 665\left(3\,Bab^2 + Ab^3\right)x^9 + 3705\left(Ba^2b + Aab^2\right)x^6 - 1729\,Aa^3 + 8645\left(Ba^3 + 3\,Aa^2b\right)x^3\right)}{8645\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(7/2),x, algorithm="fricas")
```

```
[Out] 2/8645*(455*B*b^3*x^12 + 665*(3*B*a*b^2 + A*b^3)*x^9 + 3705*(B*a^
2*b + A*a*b^2)*x^6 - 1729*A*a^3 + 8645*(B*a^3 + 3*A*a^2*b)*x^3)/x
^(5/2)
```

Sympy [A] time = 104.28, size = 110, normalized size = 1.33

$$-\frac{2Aa^3}{5x^{\frac{5}{2}}} + 6Aa^2b\sqrt{x} + \frac{6Aab^2x^{\frac{7}{2}}}{7} + \frac{2Ab^3x^{\frac{13}{2}}}{13} + 2Ba^3\sqrt{x} + \frac{6Ba^2bx^{\frac{7}{2}}}{7} + \frac{6Bab^2x^{\frac{13}{2}}}{13} + \frac{2Bb^3x^{\frac{19}{2}}}{19}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**3*(B*x**3+A)/x**(7/2),x)
```

```
[Out] -2*A*a**3/(5*x**(5/2)) + 6*A*a**2*b*sqrt(x) + 6*A*a*b**2*x**(7/2)
/7 + 2*A*b**3*x**(13/2)/13 + 2*B*a**3*sqrt(x) + 6*B*a**2*b*x**(7/
2)/7 + 6*B*a*b**2*x**(13/2)/13 + 2*B*b**3*x**(19/2)/19
```

GIAC/XCAS [A] time = 0.214537, size = 104, normalized size = 1.25

$$\frac{2}{19}\,Bb^3x^{\frac{19}{2}} + \frac{6}{13}\,Bab^2x^{\frac{13}{2}} + \frac{2}{13}\,Ab^3x^{\frac{13}{2}} + \frac{6}{7}\,Ba^2bx^{\frac{7}{2}} + \frac{6}{7}\,Aab^2x^{\frac{7}{2}} + 2\,Ba^3\sqrt{x} + 6\,Aa^2b\sqrt{x} - \frac{2\,Aa^3}{5\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^3/x^(7/2),x, algorithm="giac")
```

```
[Out] 2/19*B*b^3*x^(19/2) + 6/13*B*a*b^2*x^(13/2) + 2/13*A*b^3*x^(13/2)
 + 6/7*B*a^2*b*x^(7/2) + 6/7*A*a*b^2*x^(7/2) + 2*B*a^3*sqrt(x) +
6*A*a^2*b*sqrt(x) - 2/5*A*a^3/x^(5/2)
```

3.155 $\int \frac{x^{7/2}(A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=73

$$-\frac{2\sqrt{a}(Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3b^{5/2}}+\frac{2x^{3/2}(Ab-aB)}{3b^2}+\frac{2Bx^{9/2}}{9b}$$

```
[Out] (2*(A*b - a*B)*x^(3/2))/(3*b^2) + (2*B*x^(9/2))/(9*b) - (2*Sqrt[a
]*(A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a]])/(3*b^(5/2))
```

Rubi [A] time = 0.148463, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{2\sqrt{a}(Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3b^{5/2}}+\frac{2x^{3/2}(Ab-aB)}{3b^2}+\frac{2Bx^{9/2}}{9b}$$

Antiderivative was successfully verified.

```
[In] Int[(x^(7/2)*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (2*(A*b - a*B)*x^(3/2))/(3*b^2) + (2*B*x^(9/2))/(9*b) - (2*Sqrt[a
]*(A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a]])/(3*b^(5/2))
```

Rubi in Sympy [A] time = 16.8753, size = 66, normalized size = 0.9

$$\frac{2Bx^{\frac{9}{2}}}{9b}-\frac{2\sqrt{a}\,(Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3b^{\frac{5}{2}}}+\frac{2x^{\frac{3}{2}}\,(Ab-Ba)}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(7/2)*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] 2*B*x**(9/2)/(9*b) - 2*sqrt(a)*(A*b - B*a)*atan(sqrt(b)*x**(3/2)/
sqrt(a))/(3*b**(5/2)) + 2*x**(3/2)*(A*b - B*a)/(3*b**2)
```

Mathematica [B] time = 0.175819, size = 180, normalized size = 2.47

$$\frac{2\sqrt{a}(aB-Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}-\sqrt{3}\sqrt[6]{a}}{\sqrt[6]{a}}\right)}{3b^{5/2}}+\frac{2\sqrt{a}(aB-Ab)\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{a}+2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3b^{5/2}}-\frac{2\sqrt{a}(aB-Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3b^{5/2}}+\frac{2x^{3/2}(Ab-aB)}{3b^2}+\frac{2Bx^{9/2}}{9b}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^(7/2)*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (2*(A*b - a*B)*x^(3/2))/(3*b^2) + (2*B*x^(9/2))/(9*b) + (2*Sqrt[a
]*(-(A*b) + a*B)*ArcTan[(-(Sqrt[3]*a^(1/6)) + 2*b^(1/6)*Sqrt[x])/
a^(1/6)])/(3*b^(5/2)) + (2*Sqrt[a]*(-(A*b) + a*B)*ArcTan[(Sqrt[3]
*a^(1/6) + 2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*b^(5/2)) - (2*Sqrt[a]*
(-(A*b) + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*b^(5/2))
```

Maple [A] time = 0.013, size = 78, normalized size = 1.1

$$\frac{2B}{9b}x^{\frac{9}{2}}+\frac{2A}{3b}x^{\frac{3}{2}}-\frac{2Ba}{3b^2}x^{\frac{3}{2}}-\frac{2Aa}{3b}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}+\frac{2a^2B}{3b^2}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(7/2)*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 2/9*B*x^(9/2)/b+2/3/b*A*x^(3/2)-2/3/b^2*B*x^(3/2)*a-2/3*a/b/(a*b)
^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*A+2/3*a^2/b^2/(a*b)^(1/2)*ar
ctan(x^(3/2)*b/(a*b)^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.244268, size = 1, normalized size = 0.01

$$\left[-\frac{3\,(Ba-Ab)\sqrt{-\frac{a}{b}}\log\left(\frac{bx^3-2\,bx^{\frac{3}{2}}\sqrt{-\frac{a}{b}}-a}{bx^3+a}\right)-2\left(Bbx^4-3\,(Ba-Ab)x\right)\sqrt{x}}{9\,b^2},\ \frac{2\left(3\,(Ba-Ab)\sqrt{\frac{a}{b}}\arctan\left(\frac{x^{\frac{3}{2}}}{\sqrt{\frac{a}{b}}}\right)+\left(Bbx^4-3\,(Ba\right.\right.}{9\,b^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [-1/9*(3*(B*a - A*b)*sqrt(-a/b)*log((b*x^3 - 2*b*x^(3/2)*sqrt(-a/
b) - a)/(b*x^3 + a)) - 2*(B*b*x^4 - 3*(B*a - A*b)*x)*sqrt(x))/b^2
, 2/9*(3*(B*a - A*b)*sqrt(a/b)*arctan(x^(3/2)/sqrt(a/b)) + (B*b*x
^4 - 3*(B*a - A*b)*x)*sqrt(x))/b^2]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(7/2)*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21628, size = 86, normalized size = 1.18

$$\frac{2\left(Ba^2-Aab\right)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{3\sqrt{ab}b^2}+\frac{2\left(Bb^2x^{\frac{9}{2}}-3\,Babx^{\frac{3}{2}}+3\,Ab^2x^{\frac{3}{2}}\right)}{9\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 2/3*(B*a^2 - A*a*b)*arctan(b*x^(3/2)/sqrt(a*b))/(sqrt(a*b)*b^2) +
 2/9*(B*b^2*x^(9/2) - 3*B*a*b*x^(3/2) + 3*A*b^2*x^(3/2))/b^3
```

3.156 $\int \frac{x^{5/2}(A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=288

$$\frac{\sqrt[6]{a}(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}b^{13/6}}-\frac{\sqrt[6]{a}(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}b^{13/6}}+\frac{\sqrt[6]{a}(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3b^{13/6}}-\frac{\sqrt[6]{a}(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3b^{13/6}}-\frac{2\sqrt[6]{a}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3b^{13/6}}+\frac{2\sqrt{x}(Ab-aB)}{b^2}+\frac{2Bx^{7/2}}{7b}$$

```
[Out] (2*(A*b - a*B)*Sqrt[x])/b^2 + (2*B*x^(7/2))/(7*b) + (a^(1/6)*(A*b
 - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*b^(13/6
)) - (a^(1/6)*(A*b - a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^
(1/6)])/(3*b^(13/6)) - (2*a^(1/6)*(A*b - a*B)*ArcTan[(b^(1/6)*Sqr
t[x])/a^(1/6)])/(3*b^(13/6)) + (a^(1/6)*(A*b - a*B)*Log[a^(1/3) -
 Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*b^(13/6
)) - (a^(1/6)*(A*b - a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*S
qrt[x] + b^(1/3)*x])/(2*Sqrt[3]*b^(13/6))
```

Rubi [A] time = 1.14572, antiderivative size = 288, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.409$

$$\frac{\sqrt[6]{a}(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}b^{13/6}}-\frac{\sqrt[6]{a}(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}b^{13/6}}+\frac{\sqrt[6]{a}(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3b^{13/6}}-\frac{\sqrt[6]{a}(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3b^{13/6}}-\frac{2\sqrt[6]{a}(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3b^{13/6}}+\frac{2\sqrt{x}(Ab-aB)}{b^2}+\frac{2Bx^{7/2}}{7b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(5/2)*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (2*(A*b - a*B)*Sqrt[x])/b^2 + (2*B*x^(7/2))/(7*b) + (a^(1/6)*(A*b
 - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*b^(13/6
)) - (a^(1/6)*(A*b - a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^
(1/6)])/(3*b^(13/6)) - (2*a^(1/6)*(A*b - a*B)*ArcTan[(b^(1/6)*Sqr
t[x])/a^(1/6)])/(3*b^(13/6)) + (a^(1/6)*(A*b - a*B)*Log[a^(1/3) -
 Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*b^(13/6
)) - (a^(1/6)*(A*b - a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*S
qrt[x] + b^(1/3)*x])/(2*Sqrt[3]*b^(13/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.375995, size = 264, normalized size = 0.92

$$\frac{84\sqrt[6]{b}\sqrt{x}(Ab-aB)-7\sqrt{3}\sqrt[6]{a}(aB-Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)+7\sqrt{3}\sqrt[6]{a}(aB-Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)\cdots}{42\cdots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(5/2)*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (84*b^(1/6)*(A*b - a*B)*Sqrt[x] + 12*b^(7/6)*B*x^(7/2) - 14*a^(1/
6)*(-(A*b) + a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)] +
 14*a^(1/6)*(-(A*b) + a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a
^(1/6)] + 28*a^(1/6)*(-(A*b) + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1
/6)] - 7*Sqrt[3]*a^(1/6)*(-(A*b) + a*B)*Log[a^(1/3) - Sqrt[3]*a^(
1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x] + 7*Sqrt[3]*a^(1/6)*(-(A*b) + a
*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(
42*b^(13/6))
```

Maple [A] time = 0.087, size = 371, normalized size = 1.3

$$\frac{2B}{7b}x^{\frac{7}{2}}+2\frac{A\sqrt{x}}{b}-2\frac{B\sqrt{x}a}{b^2}-\frac{2A}{3b}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{2Ba}{3b^2}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$+\frac{\sqrt{3}A}{6b}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{a\sqrt{3}B}{6b^2}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{A}{3b}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{Ba}{3b^2}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$-\frac{\sqrt{3}A}{6b}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{a\sqrt{3}B}{6b^2}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{A}{3b}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)+\frac{Ba}{3b^2}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 2/7*B*x^(7/2)/b+2/b*A*x^(1/2)-2/b^2*B*x^(1/2)*a-2/3/b*(a/b)^(1/6)
*arctan(x^(1/2)/(a/b)^(1/6))*A+2/3*a/b^2*(a/b)^(1/6)*arctan(x^(1/
2)/(a/b)^(1/6))*B+1/6/b*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1
/6)*x^(1/2)+(a/b)^(1/3))*A-1/6*a/b^2*3^(1/2)*(a/b)^(1/6)*ln(x-3^(
1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B-1/3/b*(a/b)^(1/6)*arctan(
-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*A+1/3*a/b^2*(a/b)^(1/6)*arctan(-3
^(1/2)+2*x^(1/2)/(a/b)^(1/6))*B-1/6/b*3^(1/2)*(a/b)^(1/6)*ln(x+3^
(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A+1/6*a/b^2*3^(1/2)*(a/b)^
(1/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B-1/3/b*(a/b)
^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*A+1/3*a/b^2*(a/b)^(1
/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.288456, size = 2828, normalized size = 9.82

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/42*(28*sqrt(3)*b^2*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*
b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 +
 A^6*a*b^6)/b^13)^(1/6)*arctan(-sqrt(3)*b^2*(-(B^6*a^7 - 6*A*B^5*
a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*
b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/6)/(b^2*(-(B^6*a^7 -
6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*
B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/6) + 2*(B*a -
 A*b)*sqrt(x) - 2*sqrt(b^4*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^
4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2
*b^5 + A^6*a*b^6)/b^13)^(1/3) + (B^2*a^2 - 2*A*B*a*b + A^2*b^2)*x
 + (B*a*b^2 - A*b^3)*sqrt(x)*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*
B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a
^2*b^5 + A^6*a*b^6)/b^13)^(1/6)))) + 28*sqrt(3)*b^2*(-(B^6*a^7 -
6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*
B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/6)*arctan(sqr
t(3)*b^2*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3
*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/
b^13)^(1/6)/(b^2*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2
- 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6
*a*b^6)/b^13)^(1/6) - 2*(B*a - A*b)*sqrt(x) + 2*sqrt(b^4*(-(B^6*a
^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15
*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/3) + (B^
2*a^2 - 2*A*B*a*b + A^2*b^2)*x - (B*a*b^2 - A*b^3)*sqrt(x)*(-(B^6
*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 +
15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/6))))
+ 7*b^2*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*
B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b
^13)^(1/6)*log(4*b^4*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*
b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 +
 A^6*a*b^6)/b^13)^(1/3) + 4*(B^2*a^2 - 2*A*B*a*b + A^2*b^2)*x + 4
*(B*a*b^2 - A*b^3)*sqrt(x)*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^
4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2
*b^5 + A^6*a*b^6)/b^13)^(1/6)) - 7*b^2*(-(B^6*a^7 - 6*A*B^5*a^6*b
 + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 -
 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/6)*log(4*b^4*(-(B^6*a^7 -
6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*
B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/3) + 4*(B^2*a
^2 - 2*A*B*a*b + A^2*b^2)*x - 4*(B*a*b^2 - A*b^3)*sqrt(x)*(-(B^6*
a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 1
5*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/6)) - 1
4*b^2*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^
3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^1
3)^(1/6)*log(b^2*(-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2
- 20*A^3*B^3*a^4*b^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6
*a*b^6)/b^13)^(1/6) - (B*a - A*b)*sqrt(x)) + 14*b^2*(-(B^6*a^7 -
6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b^3 + 15*A^4*
B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/6)*log(-b^2*(
-(B^6*a^7 - 6*A*B^5*a^6*b + 15*A^2*B^4*a^5*b^2 - 20*A^3*B^3*a^4*b
^3 + 15*A^4*B^2*a^3*b^4 - 6*A^5*B*a^2*b^5 + A^6*a*b^6)/b^13)^(1/6
) - (B*a - A*b)*sqrt(x)) + 12*(B*b*x^3 - 7*B*a + 7*A*b)*sqrt(x))/
b^2
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.226836, size = 390, normalized size = 1.35

$$\frac{\sqrt{3}\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{6\,b^{3}}-\frac{\sqrt{3}\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{6\,b^{3}}+\frac{\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,b^{3}}+\frac{\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,b^{3}}+\frac{2\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,b^{3}}+\frac{2\left(Bb^{6}x^{\frac{7}{2}}-7\,Bab^{5}\sqrt{x}+7\,Ab^{6}\sqrt{x}\right)}{7\,b^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(3)*((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*ln(sqrt(3)*sq
rt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/b^3 - 1/6*sqrt(3)*((a*b^5)^(
1/6)*B*a - (a*b^5)^(1/6)*A*b)*ln(-sqrt(3)*sqrt(x)*(a/b)^(1/6) + x
 + (a/b)^(1/3))/b^3 + 1/3*((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)
*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))/(a/b)^(1/6))/b^3 + 1/3*
((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*arctan(-(sqrt(3)*(a/b)^(1
/6) - 2*sqrt(x))/(a/b)^(1/6))/b^3 + 2/3*((a*b^5)^(1/6)*B*a - (a*b
^5)^(1/6)*A*b)*arctan(sqrt(x)/(a/b)^(1/6))/b^3 + 2/7*(B*b^6*x^(7/
2) - 7*B*a*b^5*sqrt(x) + 7*A*b^6*sqrt(x))/b^7
```

3.157 $\int \frac{x^{3/2}(A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=270

$$\frac{(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}\sqrt[6]{a}b^{11/6}}-\frac{(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}\sqrt[6]{a}b^{11/6}}-\frac{(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3\sqrt[6]{a}b^{11/6}}+\frac{(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3\sqrt[6]{a}b^{11/6}}+\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3\sqrt[6]{a}b^{11/6}}+\frac{2Bx^{5/2}}{5b}$$

```
[Out] (2*B*x^(5/2))/(5*b) - ((A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sq
rt[x])/a^(1/6)])/(3*a^(1/6)*b^(11/6)) + ((A*b - a*B)*ArcTan[Sqrt[
3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(1/6)*b^(11/6)) + (2*(A*b
 - a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(1/6)*b^(11/6)) +
 ((A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(
1/3)*x])/(2*Sqrt[3]*a^(1/6)*b^(11/6)) - ((A*b - a*B)*Log[a^(1/3)
+ Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*a^(1/6
)*b^(11/6))
```

Rubi [A] time = 1.46519, antiderivative size = 270, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$\frac{(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}\sqrt[6]{a}b^{11/6}}-\frac{(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}\sqrt[6]{a}b^{11/6}}-\frac{(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3\sqrt[6]{a}b^{11/6}}+\frac{(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3\sqrt[6]{a}b^{11/6}}+\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3\sqrt[6]{a}b^{11/6}}+\frac{2Bx^{5/2}}{5b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(3/2)*(A + B*x^3))/(a + b*x^3),x]
```


```
[Out] (2*B*x^(5/2))/(5*b) - ((A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sq
rt[x])/a^(1/6)])/(3*a^(1/6)*b^(11/6)) + ((A*b - a*B)*ArcTan[Sqrt[
3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(1/6)*b^(11/6)) + (2*(A*b
 - a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(1/6)*b^(11/6)) +
 ((A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(
1/3)*x])/(2*Sqrt[3]*a^(1/6)*b^(11/6)) - ((A*b - a*B)*Log[a^(1/3)
+ Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*a^(1/6
)*b^(11/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)*(B*x**3+A)/(b*x**3+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.282216, size = 229, normalized size = 0.85

$$\frac{5\sqrt{3}(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)-5\sqrt{3}(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)-10(Ab-aB)\tan^{-1}\left(\sqrt{3}-\right.}{30\sqrt[6]{a}b^{11/6}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[(x^(3/2)*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (12*a^(1/6)*b^(5/6)*B*x^(5/2) - 10*(A*b - a*B)*ArcTan[Sqrt[3] - (
2*b^(1/6)*Sqrt[x])/a^(1/6)] + 10*(A*b - a*B)*ArcTan[Sqrt[3] + (2*
b^(1/6)*Sqrt[x])/a^(1/6)] + 20*(A*b - a*B)*ArcTan[(b^(1/6)*Sqrt[x
])/a^(1/6)] + 5*Sqrt[3]*(A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)
*b^(1/6)*Sqrt[x] + b^(1/3)*x] - 5*Sqrt[3]*(A*b - a*B)*Log[a^(1/3)
 + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(30*a^(1/6)*b^(1
1/6))
```

Maple [A] time = 0.066, size = 350, normalized size = 1.3

$$\frac{2B}{5b}x^{\frac{5}{2}}+\frac{2A}{3b}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}-\frac{2Ba}{3b^2}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$+\frac{\sqrt{3}A}{6a}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{\sqrt{3}B}{6b}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{A}{3b}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}-\frac{Ba}{3b^2}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$-\frac{\sqrt{3}A}{6a}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{\sqrt{3}B}{6b}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{A}{3b}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}-\frac{Ba}{3b^2}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(3/2)*(B*x^3+A)/(b*x^3+a),x)
```

```
[Out] 2/5*B*x^(5/2)/b+2/3/b/(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*A-2
/3/b^2/(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*B*a+1/6/a*(a/b)^(5
/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A-1/6/b
*(a/b)^(5/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3)
)*B+1/3/b/(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*A-1/
3/b^2/(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*B*a-1/6/
a*3^(1/2)*(a/b)^(5/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3
))*A+1/6/b*3^(1/2)*(a/b)^(5/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(
a/b)^(1/3))*B+1/3/b/(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1
/2))*A-1/3/b^2/(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*
B*a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.285556, size = 4471, normalized size = 16.56

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 1/30*(12*B*x^(5/2) + 20*sqrt(3)*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15
*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^
5*B*a*b^5 + A^6*b^6)/(a*b^11))^(1/6)*arctan(-sqrt(3)*a*b^9*(-(B^6
*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 +
15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(5/6)/(a*
b^9*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*
a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))
^(5/6) + 2*(B^5*a^5 - 5*A*B^4*a^4*b + 10*A^2*B^3*a^3*b^2 - 10*A^3
*B^2*a^2*b^3 + 5*A^4*B*a*b^4 - A^5*b^5)*sqrt(x) - 2*sqrt((B^5*a^6
*b^9 - 5*A*B^4*a^5*b^10 + 10*A^2*B^3*a^4*b^11 - 10*A^3*B^2*a^3*b^
12 + 5*A^4*B*a^2*b^13 - A^5*a*b^14)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*
a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*
b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(5/6) + (B^10*a^10 - 10*
A*B^9*a^9*b + 45*A^2*B^8*a^8*b^2 - 120*A^3*B^7*a^7*b^3 + 210*A^4*
B^6*a^6*b^4 - 252*A^5*B^5*a^5*b^5 + 210*A^6*B^4*a^4*b^6 - 120*A^7
*B^3*a^3*b^7 + 45*A^8*B^2*a^2*b^8 - 10*A^9*B*a*b^9 + A^10*b^10)*x
 - (B^6*a^7*b^7 - 6*A*B^5*a^6*b^8 + 15*A^2*B^4*a^5*b^9 - 20*A^3*B
^3*a^4*b^10 + 15*A^4*B^2*a^3*b^11 - 6*A^5*B*a^2*b^12 + A^6*a*b^13
)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^
3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(
2/3)))) + 20*sqrt(3)*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^
4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 +
 A^6*b^6)/(a*b^11))^(1/6)*arctan(sqrt(3)*a*b^9*(-(B^6*a^6 - 6*A*B
^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a
^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(5/6)/(a*b^9*(-(B^6*a
^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15
*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(5/6) - 2*(
B^5*a^5 - 5*A*B^4*a^4*b + 10*A^2*B^3*a^3*b^2 - 10*A^3*B^2*a^2*b^3
 + 5*A^4*B*a*b^4 - A^5*b^5)*sqrt(x) + sqrt(-4*(B^5*a^6*b^9 - 5*A*
B^4*a^5*b^10 + 10*A^2*B^3*a^4*b^11 - 10*A^3*B^2*a^3*b^12 + 5*A^4*
B*a^2*b^13 - A^5*a*b^14)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*
A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5
*B*a*b^5 + A^6*b^6)/(a*b^11))^(5/6) + 4*(B^10*a^10 - 10*A*B^9*a^9
*b + 45*A^2*B^8*a^8*b^2 - 120*A^3*B^7*a^7*b^3 + 210*A^4*B^6*a^6*b
^4 - 252*A^5*B^5*a^5*b^5 + 210*A^6*B^4*a^4*b^6 - 120*A^7*B^3*a^3*
b^7 + 45*A^8*B^2*a^2*b^8 - 10*A^9*B*a*b^9 + A^10*b^10)*x - 4*(B^6
*a^7*b^7 - 6*A*B^5*a^6*b^8 + 15*A^2*B^4*a^5*b^9 - 20*A^3*B^3*a^4*
b^10 + 15*A^4*B^2*a^3*b^11 - 6*A^5*B*a^2*b^12 + A^6*a*b^13)*(-(B^
6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 +
 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(2/3))))
 + 10*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*
B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^
11))^(1/6)*log(a*b^9*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*
b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A
^6*b^6)/(a*b^11))^(5/6) - (B^5*a^5 - 5*A*B^4*a^4*b + 10*A^2*B^3*a
^3*b^2 - 10*A^3*B^2*a^2*b^3 + 5*A^4*B*a*b^4 - A^5*b^5)*sqrt(x)) -
 10*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^
3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11
))^(1/6)*log(-a*b^9*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b
^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^
6*b^6)/(a*b^11))^(5/6) - (B^5*a^5 - 5*A*B^4*a^4*b + 10*A^2*B^3*a^
3*b^2 - 10*A^3*B^2*a^2*b^3 + 5*A^4*B*a*b^4 - A^5*b^5)*sqrt(x)) -
5*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*
a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))
^(1/6)*log(4*(B^5*a^6*b^9 - 5*A*B^4*a^5*b^10 + 10*A^2*B^3*a^4*b^1
1 - 10*A^3*B^2*a^3*b^12 + 5*A^4*B*a^2*b^13 - A^5*a*b^14)*sqrt(x)*
(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*
```

```
b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(5/
6) + 4*(B^10*a^10 - 10*A*B^9*a^9*b + 45*A^2*B^8*a^8*b^2 - 120*A^3
*B^7*a^7*b^3 + 210*A^4*B^6*a^6*b^4 - 252*A^5*B^5*a^5*b^5 + 210*A^
6*B^4*a^4*b^6 - 120*A^7*B^3*a^3*b^7 + 45*A^8*B^2*a^2*b^8 - 10*A^9
*B*a*b^9 + A^10*b^10)*x - 4*(B^6*a^7*b^7 - 6*A*B^5*a^6*b^8 + 15*A
^2*B^4*a^5*b^9 - 20*A^3*B^3*a^4*b^10 + 15*A^4*B^2*a^3*b^11 - 6*A^
5*B*a^2*b^12 + A^6*a*b^13)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^
4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b
^5 + A^6*b^6)/(a*b^11))^(2/3)) + 5*b*(-(B^6*a^6 - 6*A*B^5*a^5*b +
 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6
*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(1/6)*log(-4*(B^5*a^6*b^9 - 5*A
*B^4*a^5*b^10 + 10*A^2*B^3*a^4*b^11 - 10*A^3*B^2*a^3*b^12 + 5*A^4
*B*a^2*b^13 - A^5*a*b^14)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15
*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^
5*B*a*b^5 + A^6*b^6)/(a*b^11))^(5/6) + 4*(B^10*a^10 - 10*A*B^9*a^
9*b + 45*A^2*B^8*a^8*b^2 - 120*A^3*B^7*a^7*b^3 + 210*A^4*B^6*a^6*
b^4 - 252*A^5*B^5*a^5*b^5 + 210*A^6*B^4*a^4*b^6 - 120*A^7*B^3*a^3
*b^7 + 45*A^8*B^2*a^2*b^8 - 10*A^9*B*a*b^9 + A^10*b^10)*x - 4*(B^
6*a^7*b^7 - 6*A*B^5*a^6*b^8 + 15*A^2*B^4*a^5*b^9 - 20*A^3*B^3*a^4
*b^10 + 15*A^4*B^2*a^3*b^11 - 6*A^5*B*a^2*b^12 + A^6*a*b^13)*(-(B
^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3
+ 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a*b^11))^(2/3)))
/b
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)*(B*x**3+A)/(b*x**3+a),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.602817, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a),x, algorithm="giac")

[Out] Done
```

3.158 $\int \frac{\sqrt{x}(A+Bx^3)}{a+bx^3}\,dx$

Optimal. Leaf size=53

$$\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3\sqrt{a}b^{3/2}}+\frac{2Bx^{3/2}}{3b}$$

```
[Out] (2*B*x^(3/2))/(3*b) + (2*(A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqr
t[a]])/(3*Sqrt[a]*b^(3/2))
```

Rubi [A] time = 0.108199, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3\sqrt{a}b^{3/2}}+\frac{2Bx^{3/2}}{3b}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[x]*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (2*B*x^(3/2))/(3*b) + (2*(A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqr
t[a]])/(3*Sqrt[a]*b^(3/2))
```

Rubi in Sympy [A] time = 13.5483, size = 48, normalized size = 0.91

$$\frac{2Bx^{\frac{3}{2}}}{3b}+\frac{2\left(Ab-Ba\right)\operatorname{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3\sqrt{a}b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*x**(1/2)/(b*x**3+a),x)
```

```
[Out] 2*B*x**(3/2)/(3*b) + 2*(A*b - B*a)*atan(sqrt(b)*x**(3/2)/sqrt(a))
/(3*sqrt(a)*b**(3/2))
```

Mathematica [B] time = 0.114264, size = 139, normalized size = 2.62

$$\frac{2\left((aB-Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)+(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)-Ab\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)+\sqrt{a}\sqrt{b}Bx^{3/2}+aB\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)\right)}{3\sqrt{a}b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[x]*(A + B*x^3))/(a + b*x^3),x]
```

```
[Out] (2*(Sqrt[a]*Sqrt[b]*B*x^(3/2) + (-(A*b) + a*B)*ArcTan[Sqrt[3] - (
2*b^(1/6)*Sqrt[x])/a^(1/6)] + (A*b - a*B)*ArcTan[Sqrt[3] + (2*b^(
1/6)*Sqrt[x])/a^(1/6)] - A*b*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)] +
a*B*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)]))/(3*Sqrt[a]*b^(3/2))
```

Maple [A] time = 0.01, size = 53, normalized size = 1.

$$\frac{2\,B}{3\,b}x^{\frac{3}{2}}+\frac{2\,A}{3}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}-\frac{2\,Ba}{3\,b}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*x^(1/2)/(b*x^3+a),x)
```

```
[Out] 2/3*B*x^(3/2)/b+2/3/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*A-2
/3/b/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*B*a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.245341, size = 1, normalized size = 0.02

$$\left[\frac{2\sqrt{-ab}Bx^{\frac{3}{2}} - (Ba - Ab)\log\left(\frac{2\,abx^{\frac{3}{2}} + (bx^3 - a)\sqrt{-ab}}{bx^3 + a}\right)}{3\sqrt{-ab}b}, \frac{2\left(\sqrt{ab}Bx^{\frac{3}{2}} - (Ba - Ab)\arctan\left(\frac{\sqrt{ab}x^{\frac{3}{2}}}{a}\right)\right)}{3\sqrt{ab}b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [1/3*(2*sqrt(-a*b)*B*x^(3/2) - (B*a - A*b)*log((2*a*b*x^(3/2) + (
b*x^3 - a)*sqrt(-a*b))/(b*x^3 + a)))/(sqrt(-a*b)*b), 2/3*(sqrt(a*
b)*B*x^(3/2) - (B*a - A*b)*arctan(sqrt(a*b)*x^(3/2)/a))/(sqrt(a*b
)*b)]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*x**(1/2)/(b*x**3+a),x)
```

```
[Out] Exception raised: TypeError
```

GIAC/XCAS [A] time = 0.21394, size = 53, normalized size = 1.

$$\frac{2\,Bx^{\frac{3}{2}}}{3\,b} - \frac{2\,(Ba - Ab)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{3\sqrt{ab}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 2/3*B*x^(3/2)/b - 2/3*(B*a - A*b)*arctan(b*x^(3/2)/sqrt(a*b))/(sq
rt(a*b)*b)
```

3.159 $\int \frac{A+Bx^3}{\sqrt{x}(a+bx^3)}\,dx$

Optimal. Leaf size=268

$$-\frac{(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{5/6}b^{7/6}}+\frac{(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{5/6}b^{7/6}}-\frac{(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{5/6}b^{7/6}}+\frac{(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3a^{5/6}b^{7/6}}+\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{5/6}b^{7/6}}+\frac{2B\sqrt{x}}{b}$$

```
[Out] (2*B*Sqrt[x])/b - ((A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x
])/a^(1/6)])/(3*a^(5/6)*b^(7/6)) + ((A*b - a*B)*ArcTan[Sqrt[3] +
(2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(5/6)*b^(7/6)) + (2*(A*b - a*B
)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(5/6)*b^(7/6)) - ((A*b
- a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x]
)/(2*Sqrt[3]*a^(5/6)*b^(7/6)) + ((A*b - a*B)*Log[a^(1/3) + Sqrt[3
]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*a^(5/6)*b^(7/6
))
```

Rubi [A] time = 1.02544, antiderivative size = 268, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$

$$-\frac{(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{5/6}b^{7/6}}+\frac{(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{5/6}b^{7/6}}-\frac{(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{5/6}b^{7/6}}+\frac{(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3a^{5/6}b^{7/6}}+\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{5/6}b^{7/6}}+\frac{2B\sqrt{x}}{b}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(Sqrt[x]*(a + b*x^3)),x]
```

```
[Out] (2*B*Sqrt[x])/b - ((A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x
])/a^(1/6)])/(3*a^(5/6)*b^(7/6)) + ((A*b - a*B)*ArcTan[Sqrt[3] +
(2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(5/6)*b^(7/6)) + (2*(A*b - a*B
)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(5/6)*b^(7/6)) - ((A*b
- a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x]
)/(2*Sqrt[3]*a^(5/6)*b^(7/6)) + ((A*b - a*B)*Log[a^(1/3) + Sqrt[3
]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*a^(5/6)*b^(7/6
))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)/x**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.248682, size = 228, normalized size = 0.85

$$\frac{12a^{5/6}\sqrt[6]{b}B\sqrt{x}-\sqrt{3}(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)+\sqrt{3}(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)-2(Ab-aB)}{6a^{5/6}b^{7/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(Sqrt[x]*(a + b*x^3)),x]
```

```
[Out] (12*a^(5/6)*b^(1/6)*B*Sqrt[x] - 2*(A*b - a*B)*ArcTan[Sqrt[3] - (2
*b^(1/6)*Sqrt[x])/a^(1/6)] + 2*(A*b - a*B)*ArcTan[Sqrt[3] + (2*b^
(1/6)*Sqrt[x])/a^(1/6)] + 4*(A*b - a*B)*ArcTan[(b^(1/6)*Sqrt[x])/
a^(1/6)] - Sqrt[3]*(A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1
/6)*Sqrt[x] + b^(1/3)*x] + Sqrt[3]*(A*b - a*B)*Log[a^(1/3) + Sqrt
[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(6*a^(5/6)*b^(7/6))
```

Maple [A] time = 0.048, size = 347, normalized size = 1.3

$$2\,\frac{B\sqrt{x}}{b}+\frac{2\,A}{3\,a}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)-\frac{2\,B}{3\,b}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$-\frac{\sqrt{3}A}{6\,a}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{\sqrt{3}B}{6\,b}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{A}{3\,a}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)-\frac{B}{3\,b}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$+\frac{\sqrt{3}A}{6\,a}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{\sqrt{3}B}{6\,b}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{A}{3\,a}\sqrt[6]{\frac{a}{b}}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)-\frac{B}{3\,b}\sqrt[6]{\frac{a}{b}}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)/x^(1/2),x)
```

```
[Out] 2*B*x^(1/2)/b+2/3/a*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*A-2/3
/b*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*B-1/6/a*3^(1/2)*(a/b)^
(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A+1/6/b*3^(1/
2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B+1/
3/a*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*A-1/3/b*(a
/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*B+1/6/a*3^(1/2)*
(a/b)^(1/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A-1/6/b
*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3)
)*B+1/3/a*(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*A-1/3
/b*(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.2741, size = 2805, normalized size = 10.47

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*sqrt(x)),x, algorithm="fricas")
```

```
[Out] -1/6*(4*sqrt(3)*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2
 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*
b^6)/(a^5*b^7))^(1/6)*arctan(-sqrt(3)*a*b*(-(B^6*a^6 - 6*A*B^5*a^
5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^
4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/6)/(a*b*(-(B^6*a^6 - 6
*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B
^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/6) + 2*(B*a -
 A*b)*sqrt(x) - 2*sqrt(a^2*b^2*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^
2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B
*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/3) + (B^2*a^2 - 2*A*B*a*b + A^2*b
^2)*x + (B*a^2*b - A*a*b^2)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b +
15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*
A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/6)))) + 4*sqrt(3)*b*(-(B^6*a
^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15
*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/6)*arct
an(sqrt(3)*a*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 -
20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6
)/(a^5*b^7))^(1/6)/(a*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a
^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5
+ A^6*b^6)/(a^5*b^7))^(1/6) - 2*(B*a - A*b)*sqrt(x) + 2*sqrt(a^2*
b^2*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*
a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7)
)^(1/3) + (B^2*a^2 - 2*A*B*a*b + A^2*b^2)*x - (B*a^2*b - A*a*b^2)
*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3
*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5
*b^7))^(1/6)))) + b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b
^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^
6*b^6)/(a^5*b^7))^(1/6)*log(4*a^2*b^2*(-(B^6*a^6 - 6*A*B^5*a^5*b
+ 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 -
6*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/3) + 4*(B^2*a^2 - 2*A*B*a*
b + A^2*b^2)*x + 4*(B*a^2*b - A*a*b^2)*sqrt(x)*(-(B^6*a^6 - 6*A*B
^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a
^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/6)) - b*(-(B^6*a^
6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*
A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/6)*log(4
*a^2*b^2*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3
*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5
*b^7))^(1/3) + 4*(B^2*a^2 - 2*A*B*a*b + A^2*b^2)*x - 4*(B*a^2*b -
 A*a*b^2)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2
 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*
b^6)/(a^5*b^7))^(1/6)) - 2*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*
B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a
*b^5 + A^6*b^6)/(a^5*b^7))^(1/6)*log(a*b*(-(B^6*a^6 - 6*A*B^5*a^5
*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4
 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^7))^(1/6) - (B*a - A*b)*sqrt(x
)) + 2*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3
*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^5
*b^7))^(1/6)*log(-a*b*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4
*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 +
A^6*b^6)/(a^5*b^7))^(1/6) - (B*a - A*b)*sqrt(x)) - 12*B*sqrt(x))/
b
```

Sympy [A] time = 100.154, size = 864, normalized size = 3.22

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a)/x**(1/2),x)
```

```
[Out] Piecewise((zoo*(-2*A/(5*x**(5/2)) + 2*B*sqrt(x)), Eq(a, 0) & Eq(b
, 0)), ((2*A*sqrt(x) + 2*B*x**(7/2)/7)/a, Eq(b, 0)), ((-2*A/(5*x*
*(5/2)) + 2*B*sqrt(x))/b, Eq(a, 0)), (-(-1)**(1/6)*A*log(-(-1)**(
1/6)*a**(1/6)*(1/b)**(1/6) + sqrt(x))/(3*a**(5/6)*b**15*(1/b)**(8
9/6)) + (-1)**(1/6)*A*log((-1)**(1/6)*a**(1/6)*(1/b)**(1/6) + sqr
t(x))/(3*a**(5/6)*b**15*(1/b)**(89/6)) - (-1)**(1/6)*A*log(-4*(-1
)**(1/6)*a**(1/6)*sqrt(x)*(1/b)**(1/6) + 4*(-1)**(1/3)*a**(1/3)*(
1/b)**(1/3) + 4*x)/(6*a**(5/6)*b**15*(1/b)**(89/6)) + (-1)**(1/6)
*A*log(4*(-1)**(1/6)*a**(1/6)*sqrt(x)*(1/b)**(1/6) + 4*(-1)**(1/3
)*a**(1/3)*(1/b)**(1/3) + 4*x)/(6*a**(5/6)*b**15*(1/b)**(89/6)) +
 (-1)**(1/6)*sqrt(3)*A*atan(sqrt(3)/3 - 2*(-1)**(5/6)*sqrt(3)*sqr
t(x)/(3*a**(1/6)*(1/b)**(1/6)))/(3*a**(5/6)*b**15*(1/b)**(89/6))
- (-1)**(1/6)*sqrt(3)*A*atan(sqrt(3)/3 + 2*(-1)**(5/6)*sqrt(3)*sq
rt(x)/(3*a**(1/6)*(1/b)**(1/6)))/(3*a**(5/6)*b**15*(1/b)**(89/6))
 + (-1)**(1/6)*B*a**(1/6)*log(-(-1)**(1/6)*a**(1/6)*(1/b)**(1/6)
+ sqrt(x))/(3*b**16*(1/b)**(89/6)) - (-1)**(1/6)*B*a**(1/6)*log((
-1)**(1/6)*a**(1/6)*(1/b)**(1/6) + sqrt(x))/(3*b**16*(1/b)**(89/6
)) + (-1)**(1/6)*B*a**(1/6)*log(-4*(-1)**(1/6)*a**(1/6)*sqrt(x)*(
1/b)**(1/6) + 4*(-1)**(1/3)*a**(1/3)*(1/b)**(1/3) + 4*x)/(6*b**16
*(1/b)**(89/6)) - (-1)**(1/6)*B*a**(1/6)*log(4*(-1)**(1/6)*a**(1/
6)*sqrt(x)*(1/b)**(1/6) + 4*(-1)**(1/3)*a**(1/3)*(1/b)**(1/3) + 4
*x)/(6*b**16*(1/b)**(89/6)) - (-1)**(1/6)*sqrt(3)*B*a**(1/6)*atan
(sqrt(3)/3 - 2*(-1)**(5/6)*sqrt(3)*sqrt(x)/(3*a**(1/6)*(1/b)**(1/
6)))/(3*b**16*(1/b)**(89/6)) + (-1)**(1/6)*sqrt(3)*B*a**(1/6)*ata
n(sqrt(3)/3 + 2*(-1)**(5/6)*sqrt(3)*sqrt(x)/(3*a**(1/6)*(1/b)**(1
/6)))/(3*b**16*(1/b)**(89/6)) + 2*B*sqrt(x)/b, True))
```

GIAC/XCAS [A] time = 0.225896, size = 378, normalized size = 1.41

$$\frac{2\,B\sqrt{x}}{b}-\frac{\sqrt{3}\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{6\,ab^{2}}+\frac{\sqrt{3}\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{6\,ab^{2}}-\frac{\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,ab^{2}}-\frac{\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,ab^{2}}-\frac{2\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,ab^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*sqrt(x)),x, algorithm="giac")
```

```
[Out] 2*B*sqrt(x)/b - 1/6*sqrt(3)*((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*
b)*ln(sqrt(3)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a*b^2) + 1/
6*sqrt(3)*((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*ln(-sqrt(3)*sqr
t(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a*b^2) - 1/3*((a*b^5)^(1/6)*
B*a - (a*b^5)^(1/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))
/(a/b)^(1/6))/(a*b^2) - 1/3*((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*
b)*arctan(-(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6))/(a*b^2)
 - 2/3*((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*arctan(sqrt(x)/(a/
b)^(1/6))/(a*b^2)
```

3.160 $\int \frac{A+Bx^3}{x^{3/2}(a+bx^3)}\,dx$

Optimal. Leaf size=268

$$-\frac{(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{7/6}b^{5/6}}+\frac{(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{7/6}b^{5/6}}+\frac{(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{7/6}b^{5/6}}-\frac{(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3a^{7/6}b^{5/6}}-\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{7/6}b^{5/6}}-\frac{2A}{a\sqrt{x}}$$

```
[Out] (-2*A)/(a*Sqrt[x]) + ((A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqr
t[x])/a^(1/6)])/(3*a^(7/6)*b^(5/6)) - ((A*b - a*B)*ArcTan[Sqrt[3]
 + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(7/6)*b^(5/6)) - (2*(A*b -
a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(7/6)*b^(5/6)) - ((A
*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)
*x])/(2*Sqrt[3]*a^(7/6)*b^(5/6)) + ((A*b - a*B)*Log[a^(1/3) + Sqr
t[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*a^(7/6)*b^(
5/6))
```

Rubi [A] time = 1.4122, antiderivative size = 268, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$

$$-\frac{(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{7/6}b^{5/6}}+\frac{(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{7/6}b^{5/6}}+\frac{(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{7/6}b^{5/6}}-\frac{(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3a^{7/6}b^{5/6}}-\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{7/6}b^{5/6}}-\frac{2A}{a\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(3/2)*(a + b*x^3)),x]
```

```
[Out] (-2*A)/(a*Sqrt[x]) + ((A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqr
t[x])/a^(1/6)])/(3*a^(7/6)*b^(5/6)) - ((A*b - a*B)*ArcTan[Sqrt[3]
 + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(7/6)*b^(5/6)) - (2*(A*b -
a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(7/6)*b^(5/6)) - ((A
*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)
*x])/(2*Sqrt[3]*a^(7/6)*b^(5/6)) + ((A*b - a*B)*Log[a^(1/3) + Sqr
t[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*a^(7/6)*b^(
5/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(3/2)/(b*x**3+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.377679, size = 242, normalized size = 0.9

$$\frac{\frac{\sqrt{3}(aB-Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{5/6}}+\frac{\sqrt{3}(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{5/6}}+\frac{2(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{b^{5/6}}-\frac{2(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right.}{b^{5/6}}}{6a^{7/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(3/2)*(a + b*x^3)),x]
```

```
[Out] ((-12*a^(1/6)*A)/Sqrt[x] + (2*(A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(
1/6)*Sqrt[x])/a^(1/6)])/b^(5/6) - (2*(A*b - a*B)*ArcTan[Sqrt[3] +
 (2*b^(1/6)*Sqrt[x])/a^(1/6)])/b^(5/6) + (4*(-(A*b) + a*B)*ArcTan
[(b^(1/6)*Sqrt[x])/a^(1/6)])/b^(5/6) + (Sqrt[3]*(-(A*b) + a*B)*Lo
g[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/b^(5/6)
 + (Sqrt[3]*(A*b - a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqr
t[x] + b^(1/3)*x])/b^(5/6))/(6*a^(7/6))
```

Maple [A] time = 0.052, size = 349, normalized size = 1.3

$$-\frac{2A}{3a}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{2B}{3b}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$-\frac{\sqrt{3}Ab}{6a^2}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{\sqrt{3}B}{6a}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{A}{3a}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{B}{3b}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$+\frac{\sqrt{3}Ab}{6a^2}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{\sqrt{3}B}{6a}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{A}{3a}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{B}{3b}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}-2\frac{A}{a\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(3/2)/(b*x^3+a),x)
```

```
[Out] -2/3/a/(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*A+2/3/b/(a/b)^(1/6
)*arctan(x^(1/2)/(a/b)^(1/6))*B-1/6/a^2*(a/b)^(5/6)*3^(1/2)*ln(x-
3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A*b+1/6/a*(a/b)^(5/6)*3^
(1/2)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B-1/3/a/(a/b)
^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*A+1/3/b/(a/b)^(1/6)
*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*B+1/6/a^2*3^(1/2)*(a/b)^(
5/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A*b-1/6/a*3^(1
/2)*(a/b)^(5/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B-1
/3/a/(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*A+1/3/b/(a
/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B-2*A/a/x^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.292625, size = 4532, normalized size = 16.91

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(3/2)),x, algorithm="fricas")
```

```
[Out] -1/6*(4*sqrt(3)*a*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4
*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^
5 + A^6*b^6)/(a^7*b^5))^(1/6)*arctan(-sqrt(3)*a^6*b^4*(-(B^6*a^6
- 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^
4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(5/6)/(a^6*b^
4*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^
3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^
(5/6) + 2*(B^5*a^5 - 5*A*B^4*a^4*b + 10*A^2*B^3*a^3*b^2 - 10*A^3*
B^2*a^2*b^3 + 5*A^4*B*a*b^4 - A^5*b^5)*sqrt(x) - 2*sqrt((B^5*a^11
*b^4 - 5*A*B^4*a^10*b^5 + 10*A^2*B^3*a^9*b^6 - 10*A^3*B^2*a^8*b^7
 + 5*A^4*B*a^7*b^8 - A^5*a^6*b^9)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^
5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^
4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(5/6) + (B^10*a^10 - 10*A
*B^9*a^9*b + 45*A^2*B^8*a^8*b^2 - 120*A^3*B^7*a^7*b^3 + 210*A^4*B
^6*a^6*b^4 - 252*A^5*B^5*a^5*b^5 + 210*A^6*B^4*a^4*b^6 - 120*A^7*
B^3*a^3*b^7 + 45*A^8*B^2*a^2*b^8 - 10*A^9*B*a*b^9 + A^10*b^10)*x
- (B^6*a^11*b^3 - 6*A*B^5*a^10*b^4 + 15*A^2*B^4*a^9*b^5 - 20*A^3*
B^3*a^8*b^6 + 15*A^4*B^2*a^7*b^7 - 6*A^5*B*a^6*b^8 + A^6*a^5*b^9)
*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3
*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(
2/3)))) + 4*sqrt(3)*a*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2
*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*
a*b^5 + A^6*b^6)/(a^7*b^5))^(1/6)*arctan(sqrt(3)*a^6*b^4*(-(B^6*a
^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15
*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(5/6)/(a^6
*b^4*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3
*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5
))^(5/6) - 2*(B^5*a^5 - 5*A*B^4*a^4*b + 10*A^2*B^3*a^3*b^2 - 10*A
^3*B^2*a^2*b^3 + 5*A^4*B*a*b^4 - A^5*b^5)*sqrt(x) + sqrt(-4*(B^5*
a^11*b^4 - 5*A*B^4*a^10*b^5 + 10*A^2*B^3*a^9*b^6 - 10*A^3*B^2*a^8
*b^7 + 5*A^4*B*a^7*b^8 - A^5*a^6*b^9)*sqrt(x)*(-(B^6*a^6 - 6*A*B^
5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^
2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(5/6) + 4*(B^10*a^10
- 10*A*B^9*a^9*b + 45*A^2*B^8*a^8*b^2 - 120*A^3*B^7*a^7*b^3 + 210
*A^4*B^6*a^6*b^4 - 252*A^5*B^5*a^5*b^5 + 210*A^6*B^4*a^4*b^6 - 12
0*A^7*B^3*a^3*b^7 + 45*A^8*B^2*a^2*b^8 - 10*A^9*B*a*b^9 + A^10*b^
10)*x - 4*(B^6*a^11*b^3 - 6*A*B^5*a^10*b^4 + 15*A^2*B^4*a^9*b^5 -
 20*A^3*B^3*a^8*b^6 + 15*A^4*B^2*a^7*b^7 - 6*A^5*B*a^6*b^8 + A^6*
a^5*b^9)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3
*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7
*b^5))^(2/3)))) + 2*a*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2
*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*
a*b^5 + A^6*b^6)/(a^7*b^5))^(1/6)*log(a^6*b^4*(-(B^6*a^6 - 6*A*B^
5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^
2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(5/6) - (B^5*a^5 - 5*
A*B^4*a^4*b + 10*A^2*B^3*a^3*b^2 - 10*A^3*B^2*a^2*b^3 + 5*A^4*B*a
*b^4 - A^5*b^5)*sqrt(x)) - 2*a*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b
 + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 -
 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(1/6)*log(-a^6*b^4*(-(B^6*a^
6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*
A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(5/6) - (B^
5*a^5 - 5*A*B^4*a^4*b + 10*A^2*B^3*a^3*b^2 - 10*A^3*B^2*a^2*b^3 +
 5*A^4*B*a*b^4 - A^5*b^5)*sqrt(x)) - a*sqrt(x)*(-(B^6*a^6 - 6*A*B
^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a
^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(1/6)*log(4*(B^5*a^1
1*b^4 - 5*A*B^4*a^10*b^5 + 10*A^2*B^3*a^9*b^6 - 10*A^3*B^2*a^8*b^
7 + 5*A^4*B*a^7*b^8 - A^5*a^6*b^9)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a
```

```
^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b
^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(5/6) + 4*(B^10*a^10 - 1
0*A*B^9*a^9*b + 45*A^2*B^8*a^8*b^2 - 120*A^3*B^7*a^7*b^3 + 210*A^
4*B^6*a^6*b^4 - 252*A^5*B^5*a^5*b^5 + 210*A^6*B^4*a^4*b^6 - 120*A
^7*B^3*a^3*b^7 + 45*A^8*B^2*a^2*b^8 - 10*A^9*B*a*b^9 + A^10*b^10)
*x - 4*(B^6*a^11*b^3 - 6*A*B^5*a^10*b^4 + 15*A^2*B^4*a^9*b^5 - 20
*A^3*B^3*a^8*b^6 + 15*A^4*B^2*a^7*b^7 - 6*A^5*B*a^6*b^8 + A^6*a^5
*b^9)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^
3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^
5))^(2/3)) + a*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^
4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 +
 A^6*b^6)/(a^7*b^5))^(1/6)*log(-4*(B^5*a^11*b^4 - 5*A*B^4*a^10*b^
5 + 10*A^2*B^3*a^9*b^6 - 10*A^3*B^2*a^8*b^7 + 5*A^4*B*a^7*b^8 - A
^5*a^6*b^9)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b
^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^
6*b^6)/(a^7*b^5))^(5/6) + 4*(B^10*a^10 - 10*A*B^9*a^9*b + 45*A^2*
B^8*a^8*b^2 - 120*A^3*B^7*a^7*b^3 + 210*A^4*B^6*a^6*b^4 - 252*A^5
*B^5*a^5*b^5 + 210*A^6*B^4*a^4*b^6 - 120*A^7*B^3*a^3*b^7 + 45*A^8
*B^2*a^2*b^8 - 10*A^9*B*a*b^9 + A^10*b^10)*x - 4*(B^6*a^11*b^3 -
6*A*B^5*a^10*b^4 + 15*A^2*B^4*a^9*b^5 - 20*A^3*B^3*a^8*b^6 + 15*A
^4*B^2*a^7*b^7 - 6*A^5*B*a^6*b^8 + A^6*a^5*b^9)*(-(B^6*a^6 - 6*A*
B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*
a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^5))^(2/3)) + 12*A)/(a*s
qrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(3/2)/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.631124, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(3/2)),x, algorithm="giac")
```

```
[Out] Done
```

3.161 $\int \frac{A+Bx^3}{x^{5/2}(a+bx^3)}\,dx$

Optimal. Leaf size=53

$$-\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3a^{3/2}\sqrt{b}}-\frac{2A}{3ax^{3/2}}$$

```
[Out] (-2*A)/(3*a*x^(3/2)) - (2*(A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sq
rt[a]])/(3*a^(3/2)*Sqrt[b])
```

Rubi [A] time = 0.113014, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3a^{3/2}\sqrt{b}}-\frac{2A}{3ax^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(5/2)*(a + b*x^3)),x]
```

```
[Out] (-2*A)/(3*a*x^(3/2)) - (2*(A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sq
rt[a]])/(3*a^(3/2)*Sqrt[b])
```

Rubi in Sympy [A] time = 13.6981, size = 49, normalized size = 0.92

$$-\frac{2A}{3ax^{\frac{3}{2}}}-\frac{2\left(Ab-Ba\right)\operatorname{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3a^{\frac{3}{2}}\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(5/2)/(b*x**3+a),x)
```

```
[Out] -2*A/(3*a*x**(3/2)) - 2*(A*b - B*a)*atan(sqrt(b)*x**(3/2)/sqrt(a)
)/(3*a**(3/2)*sqrt(b))
```

Mathematica [B] time = 0.178389, size = 160, normalized size = 3.02

$$\frac{2(aB-Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}-\sqrt{3}\sqrt[6]{a}}{\sqrt[6]{a}}\right)}{3a^{3/2}\sqrt{b}}+\frac{2(aB-Ab)\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{a}+2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{3/2}\sqrt{b}}-\frac{2(aB-Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{3/2}\sqrt{b}}-\frac{2A}{3ax^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(5/2)*(a + b*x^3)),x]
```

```
[Out] (-2*A)/(3*a*x^(3/2)) + (2*(-(A*b) + a*B)*ArcTan[(-(Sqrt[3]*a^(1/6
)) + 2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(3/2)*Sqrt[b]) + (2*(-(A*b
) + a*B)*ArcTan[(Sqrt[3]*a^(1/6) + 2*b^(1/6)*Sqrt[x])/a^(1/6)])/(
3*a^(3/2)*Sqrt[b]) - (2*(-(A*b) + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a
^(1/6)])/(3*a^(3/2)*Sqrt[b])
```

Maple [A] time = 0.013, size = 53, normalized size = 1.

$$-\frac{2Ab}{3a}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}+\frac{2B}{3}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}-\frac{2A}{3a}x^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(5/2)/(b*x^3+a),x)
```

```
[Out] -2/3/a/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*A*b+2/3/(a*b)^(1
/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*B-2/3*A/a/x^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(5/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.245175, size = 1, normalized size = 0.02

$$\left[-\frac{(Ba-Ab)x^{\frac{3}{2}}\log\left(-\frac{2abx^{\frac{3}{2}}-(bx^3-a)\sqrt{-ab}}{bx^3+a}\right)+2\sqrt{-ab}A}{3\sqrt{-ab}ax^{\frac{3}{2}}},\ \frac{2\left((Ba-Ab)x^{\frac{3}{2}}\arctan\left(\frac{\sqrt{ab}x^{\frac{3}{2}}}{a}\right)-\sqrt{ab}A\right)}{3\sqrt{ab}ax^{\frac{3}{2}}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(5/2)),x, algorithm="fricas")
```

```
[Out] [-1/3*((B*a - A*b)*x^(3/2)*log(-(2*a*b*x^(3/2) - (b*x^3 - a)*sqrt
(-a*b))/(b*x^3 + a)) + 2*sqrt(-a*b)*A)/(sqrt(-a*b)*a*x^(3/2)), 2/
3*((B*a - A*b)*x^(3/2)*arctan(sqrt(a*b)*x^(3/2)/a) - sqrt(a*b)*A)
/(sqrt(a*b)*a*x^(3/2))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(5/2)/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.212065, size = 53, normalized size = 1.

$$\frac{2(Ba-Ab)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{3\sqrt{ab}a}-\frac{2A}{3ax^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(5/2)),x, algorithm="giac")
```

```
[Out] 2/3*(B*a - A*b)*arctan(b*x^(3/2)/sqrt(a*b))/(sqrt(a*b)*a) - 2/3*A
/(a*x^(3/2))
```

3.162 $\int \frac{A+Bx^3}{x^{7/2}(a+bx^3)}\,dx$

Optimal. Leaf size=270

$$\frac{(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{11/6}\sqrt[6]{b}}-\frac{(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{11/6}\sqrt[6]{b}}+\frac{(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{11/6}\sqrt[6]{b}}-\frac{(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3a^{11/6}\sqrt[6]{b}}-\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{11/6}\sqrt[6]{b}}-\frac{2A}{5ax^{5/2}}$$

```
[Out] (-2*A)/(5*a*x^(5/2)) + ((A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*S
qrt[x])/a^(1/6)])/(3*a^(11/6)*b^(1/6)) - ((A*b - a*B)*ArcTan[Sqrt
[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(11/6)*b^(1/6)) - (2*(A*
b - a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(11/6)*b^(1/6))
+ ((A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^
(1/3)*x])/(2*Sqrt[3]*a^(11/6)*b^(1/6)) - ((A*b - a*B)*Log[a^(1/3)
 + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*a^(11
/6)*b^(1/6))
```

Rubi [A] time = 1.02712, antiderivative size = 270, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$

$$\frac{(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{11/6}\sqrt[6]{b}}-\frac{(Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{2\sqrt{3}a^{11/6}\sqrt[6]{b}}+\frac{(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{11/6}\sqrt[6]{b}}-\frac{(Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{3a^{11/6}\sqrt[6]{b}}-\frac{2(Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{11/6}\sqrt[6]{b}}-\frac{2A}{5ax^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(7/2)*(a + b*x^3)),x]
```

```
[Out] (-2*A)/(5*a*x^(5/2)) + ((A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*S
qrt[x])/a^(1/6)])/(3*a^(11/6)*b^(1/6)) - ((A*b - a*B)*ArcTan[Sqrt
[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(11/6)*b^(1/6)) - (2*(A*
b - a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(11/6)*b^(1/6))
+ ((A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^
(1/3)*x])/(2*Sqrt[3]*a^(11/6)*b^(1/6)) - ((A*b - a*B)*Log[a^(1/3)
 + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(2*Sqrt[3]*a^(11
/6)*b^(1/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(7/2)/(b*x**3+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.416037, size = 244, normalized size = 0.9

$$\frac{-\frac{12a^{5/6}A}{x^{5/2}}+\frac{5\sqrt{3}(Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[6]{b}}+\frac{5\sqrt{3}(aB-Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[6]{b}}+\frac{10(Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{\sqrt[6]{b}}-\frac{10(Ab}{}}{30a^{11/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(7/2)*(a + b*x^3)),x]
```

```
[Out] ((-12*a^(5/6)*A)/x^(5/2) + (10*(A*b - a*B)*ArcTan[Sqrt[3] - (2*b^
(1/6)*Sqrt[x])/a^(1/6)])/b^(1/6) - (10*(A*b - a*B)*ArcTan[Sqrt[3]
 + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/b^(1/6) + (20*(-(A*b) + a*B)*Arc
Tan[(b^(1/6)*Sqrt[x])/a^(1/6)])/b^(1/6) + (5*Sqrt[3]*(A*b - a*B)*
Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/b^(1/
6) + (5*Sqrt[3]*(-(A*b) + a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1
/6)*Sqrt[x] + b^(1/3)*x])/b^(1/6))/(30*a^(11/6))
```

Maple [A] time = 0.053, size = 352, normalized size = 1.3

$$-\frac{2Ab}{3a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{2B}{3a}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$+\frac{\sqrt{3}Ab}{6a^2}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{\sqrt{3}B}{6a}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{Ab}{3a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{B}{3a}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$-\frac{\sqrt{3}Ab}{6a^2}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{\sqrt{3}B}{6a}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{Ab}{3a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)+\frac{B}{3a}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)-\frac{2A}{5a}x^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(7/2)/(b*x^3+a),x)
```

```
[Out] -2/3/a^2*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*A*b+2/3/a*(a/b)^
(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*B+1/6/a^2*3^(1/2)*(a/b)^(1/6)*l
n(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A*b-1/6/a*3^(1/2)*(a
/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B-1/3/a^2
*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*A*b+1/3/a*(a/
b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))*B-1/6/a^2*3^(1/2)
*(a/b)^(1/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A*b+1/
6/a*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1
/3))*B-1/3/a^2*(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*
A*b+1/3/a*(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B-2/5
*A/a/x^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(7/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.280204, size = 2817, normalized size = 10.43

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(7/2)),x, algorithm="fricas")
```

```
[Out] 1/30*(20*sqrt(3)*a*x^(5/2)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^
4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b
^5 + A^6*b^6)/(a^11*b))^(1/6)*arctan(-sqrt(3)*a^2*(-(B^6*a^6 - 6*
A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^
2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6)/(a^2*(-(B^6*
a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 1
5*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6) + 2*
(B*a - A*b)*sqrt(x) - 2*sqrt(a^4*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*
A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5
*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/3) + (B^2*a^2 - 2*A*B*a*b + A^2*
b^2)*x + (B*a^3 - A*a^2*b)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 1
5*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A
^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6)))) + 20*sqrt(3)*a*x^(5/2)*(
-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b
^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6
)*arctan(sqrt(3)*a^2*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*
b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A
^6*b^6)/(a^11*b))^(1/6)/(a^2*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*
B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a
*b^5 + A^6*b^6)/(a^11*b))^(1/6) - 2*(B*a - A*b)*sqrt(x) + 2*sqrt(
a^4*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*
a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b))
^(1/3) + (B^2*a^2 - 2*A*B*a*b + A^2*b^2)*x - (B*a^3 - A*a^2*b)*sq
rt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^
3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b
))^(1/6)))) + 5*a*x^(5/2)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4
*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^
5 + A^6*b^6)/(a^11*b))^(1/6)*log(4*a^4*(-(B^6*a^6 - 6*A*B^5*a^5*b
 + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 -
 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/3) + 4*(B^2*a^2 - 2*A*B*a*
b + A^2*b^2)*x + 4*(B*a^3 - A*a^2*b)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5
*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2
*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6)) - 5*a*x^(5/2)*(-
(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^
3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6)
*log(4*a^4*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A
^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a
^11*b))^(1/3) + 4*(B^2*a^2 - 2*A*B*a*b + A^2*b^2)*x - 4*(B*a^3 -
A*a^2*b)*sqrt(x)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^4*b^2
- 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 + A^6*b
^6)/(a^11*b))^(1/6)) - 10*a*x^(5/2)*(-(B^6*a^6 - 6*A*B^5*a^5*b +
15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*
A^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6)*log(a^2*(-(B^6*a^6 - 6*A*B
^5*a^5*b + 15*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a
^2*b^4 - 6*A^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6) - (B*a - A*b)*s
qrt(x)) + 10*a*x^(5/2)*(-(B^6*a^6 - 6*A*B^5*a^5*b + 15*A^2*B^4*a^
4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A^5*B*a*b^5 +
 A^6*b^6)/(a^11*b))^(1/6)*log(-a^2*(-(B^6*a^6 - 6*A*B^5*a^5*b + 1
5*A^2*B^4*a^4*b^2 - 20*A^3*B^3*a^3*b^3 + 15*A^4*B^2*a^2*b^4 - 6*A
^5*B*a*b^5 + A^6*b^6)/(a^11*b))^(1/6) - (B*a - A*b)*sqrt(x)) - 12
*A)/(a*x^(5/2))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(7/2)/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.225734, size = 378, normalized size = 1.4

$$\frac{\sqrt{3}\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{6\,a^{2}b}-\frac{\sqrt{3}\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{6\,a^{2}b}+\frac{\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,a^{2}b}+\frac{\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,a^{2}b}+\frac{2\left(\left(ab^{5}\right)^{\frac{1}{6}}Ba-\left(ab^{5}\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{3\,a^{2}b}-\frac{2\,A}{5\,ax^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)*x^(7/2)),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(3)*((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*ln(sqrt(3)*sq
rt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^2*b) - 1/6*sqrt(3)*((a*b^
5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*ln(-sqrt(3)*sqrt(x)*(a/b)^(1/6)
 + x + (a/b)^(1/3))/(a^2*b) + 1/3*((a*b^5)^(1/6)*B*a - (a*b^5)^(1
/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))/(a/b)^(1/6))/(a
^2*b) + 1/3*((a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*arctan(-(sqrt
(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6))/(a^2*b) + 2/3*((a*b^5)^
(1/6)*B*a - (a*b^5)^(1/6)*A*b)*arctan(sqrt(x)/(a/b)^(1/6))/(a^2*b
) - 2/5*A/(a*x^(5/2))
```

3.163 $\int \frac{x^{7/2}(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=95

$$\frac{(Ab-3aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3\sqrt{a}b^{5/2}}-\frac{x^{3/2}(Ab-3aB)}{3ab^2}+\frac{x^{9/2}(Ab-aB)}{3ab\,(a+bx^3)}$$

```
[Out] -((A*b - 3*a*B)*x^(3/2))/(3*a*b^2) + ((A*b - a*B)*x^(9/2))/(3*a*b
*(a + b*x^3)) + ((A*b - 3*a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a]])
/(3*Sqrt[a]*b^(5/2))
```

Rubi [A] time = 0.169996, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{(Ab-3aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3\sqrt{a}b^{5/2}}-\frac{x^{3/2}(Ab-3aB)}{3ab^2}+\frac{x^{9/2}(Ab-aB)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(7/2)*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] -((A*b - 3*a*B)*x^(3/2))/(3*a*b^2) + ((A*b - a*B)*x^(9/2))/(3*a*b
*(a + b*x^3)) + ((A*b - 3*a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a]])
/(3*Sqrt[a]*b^(5/2))
```

Rubi in Sympy [A] time = 18.9803, size = 80, normalized size = 0.84

$$\frac{x^{\frac{9}{2}}(Ab-Ba)}{3ab\,(a+bx^3)}-\frac{x^{\frac{3}{2}}(Ab-3Ba)}{3ab^2}+\frac{(Ab-3Ba)\,\mathrm{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3\sqrt{a}b^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(7/2)*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] x**(9/2)*(A*b - B*a)/(3*a*b*(a + b*x**3)) - x**(3/2)*(A*b - 3*B*a
)/(3*a*b**2) + (A*b - 3*B*a)*atan(sqrt(b)*x**(3/2)/sqrt(a))/(3*sq
rt(a)*b**(5/2))
```

Mathematica [A] time = 0.255638, size = 160, normalized size = 1.68

$$\frac{\frac{\sqrt{b}x^{3/2}(aB-Ab)}{a+bx^3}+\frac{(3aB-Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{\sqrt{a}}+\frac{(Ab-3aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{\sqrt{a}}+\frac{(3aB-Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{\sqrt{a}}+2\sqrt{b}Bx^{3/2}}{3b^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(7/2)*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (2*Sqrt[b]*B*x^(3/2) + (Sqrt[b]*(-(A*b) + a*B)*x^(3/2))/(a + b*x^
3) + ((-(A*b) + 3*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/
6)])/Sqrt[a] + ((A*b - 3*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x]
)/a^(1/6)])/Sqrt[a] + ((-(A*b) + 3*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/
```

```
a^(1/6)])/Sqrt[a])/(3*b^(5/2))
```

Maple [A] time = 0.024, size = 93, normalized size = 1.

$$\frac{2B}{3b^2}x^{\frac{3}{2}} - \frac{A}{3b(bx^3+a)}x^{\frac{3}{2}} + \frac{Ba}{3b^2(bx^3+a)}x^{\frac{3}{2}} + \frac{A}{3b}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}} - \frac{Ba}{b^2}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(7/2)*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 2/3*B*x^(3/2)/b^2-1/3/b*x^(3/2)/(b*x^3+a)*A+1/3/b^2*x^(3/2)/(b*x^
3+a)*B*a+1/3/b/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*A-1/b^2/
(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*B*a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.242472, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2Bbx^4+(3Ba-Ab)x\right)\sqrt{-ab}\sqrt{x} - \left(\left(3Bab-Ab^2\right)x^3+3Ba^2-Aab\right)\log\left(\frac{2abx^{\frac{3}{2}}+(bx^3-a)\sqrt{-ab}}{bx^3+a}\right)}{6(b^3x^3+ab^2)\sqrt{-ab}}, \frac{(2Bbx^4+(3Ba-Ab)x}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] [1/6*(2*(2*B*b*x^4 + (3*B*a - A*b)*x)*sqrt(-a*b)*sqrt(x) - ((3*B*
a*b - A*b^2)*x^3 + 3*B*a^2 - A*a*b)*log((2*a*b*x^(3/2) + (b*x^3 -
 a)*sqrt(-a*b))/(b*x^3 + a)))/((b^3*x^3 + a*b^2)*sqrt(-a*b)), 1/3
*((2*B*b*x^4 + (3*B*a - A*b)*x)*sqrt(a*b)*sqrt(x) - ((3*B*a*b - A
*b^2)*x^3 + 3*B*a^2 - A*a*b)*arctan(sqrt(a*b)*x^(3/2)/a))/((b^3*x
^3 + a*b^2)*sqrt(a*b))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**(7/2)*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216011, size = 92, normalized size = 0.97

$$\frac{2\,Bx^{\frac{3}{2}}}{3\,b^2} - \frac{(3\,Ba - Ab)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{3\,\sqrt{ab}b^2} + \frac{Bax^{\frac{3}{2}} - Abx^{\frac{3}{2}}}{3\,(bx^3 + a)b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 2/3*B*x^(3/2)/b^2 - 1/3*(3*B*a - A*b)*arctan(b*x^(3/2)/sqrt(a*b))
/(sqrt(a*b)*b^2) + 1/3*(B*a*x^(3/2) - A*b*x^(3/2))/((b*x^3 + a)*b
^2)
```

3.164 $\int \frac{x^{5/2}(A+Bx^3)}{(a+bx^3)^2} dx$

Optimal. Leaf size=312

$$-\frac{(Ab-7aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{5/6}b^{13/6}}+\frac{(Ab-7aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{5/6}b^{13/6}}-\frac{(Ab-7aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{5/6}b^{13/6}}+\frac{(Ab-7aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{5/6}b^{13/6}}+\frac{(Ab-7aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{5/6}b^{13/6}}-\frac{\sqrt{x}(Ab-7aB)}{3ab^2}+\frac{x^{7/2}(Ab-aB)}{3ab\,(a+bx^3)}$$

```
[Out] -((A*b - 7*a*B)*Sqrt[x])/(3*a*b^2) + ((A*b - a*B)*x^(7/2))/(3*a*b
*(a + b*x^3)) - ((A*b - 7*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x
])/a^(1/6)])/(18*a^(5/6)*b^(13/6)) + ((A*b - 7*a*B)*ArcTan[Sqrt[3
] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(5/6)*b^(13/6)) + ((A*b -
 7*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(9*a^(5/6)*b^(13/6)) -
 ((A*b - 7*a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b
^(1/3)*x])/(12*Sqrt[3]*a^(5/6)*b^(13/6)) + ((A*b - 7*a*B)*Log[a^(
1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*
a^(5/6)*b^(13/6))
```

Rubi [A] time = 1.17273, antiderivative size = 312, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$-\frac{(Ab-7aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{5/6}b^{13/6}}+\frac{(Ab-7aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{5/6}b^{13/6}}-\frac{(Ab-7aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{5/6}b^{13/6}}+\frac{(Ab-7aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{5/6}b^{13/6}}+\frac{(Ab-7aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{5/6}b^{13/6}}-\frac{\sqrt{x}(Ab-7aB)}{3ab^2}+\frac{x^{7/2}(Ab-aB)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(5/2)*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] -((A*b - 7*a*B)*Sqrt[x])/(3*a*b^2) + ((A*b - a*B)*x^(7/2))/(3*a*b
*(a + b*x^3)) - ((A*b - 7*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x
])/a^(1/6)])/(18*a^(5/6)*b^(13/6)) + ((A*b - 7*a*B)*ArcTan[Sqrt[3
] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(5/6)*b^(13/6)) + ((A*b -
 7*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(9*a^(5/6)*b^(13/6)) -
 ((A*b - 7*a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b
^(1/3)*x])/(12*Sqrt[3]*a^(5/6)*b^(13/6)) + ((A*b - 7*a*B)*Log[a^(
1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*
a^(5/6)*b^(13/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.540781, size = 273, normalized size = 0.88

$$\frac{\frac{\sqrt{3}(7aB-Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{5/6}}+\frac{\sqrt{3}(Ab-7aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{5/6}}+\frac{2(7aB-Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{a^{5/6}}+\frac{2(Ab-7aB)\tan^{-1}\left(2\right.}{a^{5/6}}}{36b^{13/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(5/2)*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] (72*b^(1/6)*B*Sqrt[x] - (12*b^(1/6)*(A*b - a*B)*Sqrt[x])/(a + b*x
^3) + (2*(-(A*b) + 7*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^
(1/6)])/a^(5/6) + (2*(A*b - 7*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sq
rt[x])/a^(1/6)])/a^(5/6) + (4*(A*b - 7*a*B)*ArcTan[(b^(1/6)*Sqrt[
x])/a^(1/6)])/a^(5/6) + (Sqrt[3]*(-(A*b) + 7*a*B)*Log[a^(1/3) - S
qrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/a^(5/6) + (Sqrt[3]*(
A*b - 7*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1
/3)*x])/a^(5/6))/(36*b^(13/6))
```

Maple [A] time = 0.06, size = 399, normalized size = 1.3

$$2\,\frac{B\sqrt{x}}{b^2}-\frac{A}{3\,b\,(bx^3+a)}\sqrt{x}+\frac{Ba}{3\,b^2\,(bx^3+a)}\sqrt{x}$$
$$-\frac{7\,B}{9\,b^2}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{7\,B\sqrt{3}}{36\,b^2}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{7\,B}{18\,b^2}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)-\frac{7\,B\sqrt{3}}{36\,b^2}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{7\,B}{18\,b^2}\sqrt[6]{\frac{a}{b}}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)+\frac{A}{9\,ab}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$-\frac{A\sqrt{3}}{36\,ab}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{A}{18\,ab}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$+\frac{A\sqrt{3}}{36\,ab}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{A}{18\,ab}\sqrt[6]{\frac{a}{b}}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 2*B*x^(1/2)/b^2-1/3/b*x^(1/2)/(b*x^3+a)*A+1/3/b^2*x^(1/2)/(b*x^3+
a)*B*a-7/9/b^2*B*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))+7/36/b^2
*B*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/
3))-7/18/b^2*B*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))
-7/36/b^2*B*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+
(a/b)^(1/3))-7/18/b^2*B*(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+
3^(1/2))+1/9/b*A/a*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))-1/36/b
*A/a*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(
```

```
1/3))+1/18/b*A/a*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6
))+1/36/b*A/a*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2
)+(a/b)^(1/3))+1/18/b*A/a*(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6
)+3^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a)^2,x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.287061, size = 3002, normalized size = 9.62

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a)^2,x, algorithm="fricas")

[Out] -1/36*(4*sqrt(3)*(b^3*x^3 + a*b^2)*(-(117649*B^6*a^6 - 100842*A*B
^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4
*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6)*arctan
(-sqrt(3)*a*b^2*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 36015*A^
2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*A
^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6)/(a*b^2*(-(117649*B^6*a^6
- 100842*A*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b
^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^
(1/6) + 2*(7*B*a - A*b)*sqrt(x) - 2*sqrt(a^2*b^4*(-(117649*B^6*a^
6 - 100842*A*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3
*b^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13)
)^(1/3) + (49*B^2*a^2 - 14*A*B*a*b + A^2*b^2)*x + (7*B*a^2*b^2 -
A*a*b^3)*sqrt(x)*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 36015*A
^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*
A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6)))) + 4*sqrt(3)*(b^3*x^3
+ a*b^2)*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 36015*A^2*B^4*a
^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*
b^5 + A^6*b^6)/(a^5*b^13))^(1/6)*arctan(sqrt(3)*a*b^2*(-(117649*B
^6*a^6 - 100842*A*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^
3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*
b^13))^(1/6)/(a*b^2*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 3601
5*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 -
42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6) - 2*(7*B*a - A*b)*sqr
t(x) + 2*sqrt(a^2*b^4*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 36
015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4
- 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/3) + (49*B^2*a^2 - 14*
A*B*a*b + A^2*b^2)*x - (7*B*a^2*b^2 - A*a*b^3)*sqrt(x)*(-(117649*
B^6*a^6 - 100842*A*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B
^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5
*b^13))^(1/6)))) + (b^3*x^3 + a*b^2)*(-(117649*B^6*a^6 - 100842*A
*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A
^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6)*log(
a^2*b^4*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 36015*A^2*B^4*a^
4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b
^5 + A^6*b^6)/(a^5*b^13))^(1/3) + (49*B^2*a^2 - 14*A*B*a*b + A^2*
b^2)*x + (7*B*a^2*b^2 - A*a*b^3)*sqrt(x)*(-(117649*B^6*a^6 - 1008
42*A*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 7
35*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6))
 - (b^3*x^3 + a*b^2)*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 360
15*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 -
 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6)*log(a^2*b^4*(-(11764
9*B^6*a^6 - 100842*A*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3
```

```
*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a
^5*b^13))^(1/3) + (49*B^2*a^2 - 14*A*B*a*b + A^2*b^2)*x - (7*B*a^
2*b^2 - A*a*b^3)*sqrt(x)*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b +
 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b
^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6)) - 2*(b^3*x^3 +
a*b^2)*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 36015*A^2*B^4*a^4
*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^
5 + A^6*b^6)/(a^5*b^13))^(1/6)*log(a*b^2*(-(117649*B^6*a^6 - 1008
42*A*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 7
35*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6)
- (7*B*a - A*b)*sqrt(x)) + 2*(b^3*x^3 + a*b^2)*(-(117649*B^6*a^6
- 100842*A*B^5*a^5*b + 36015*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b
^3 + 735*A^4*B^2*a^2*b^4 - 42*A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^
(1/6)*log(-a*b^2*(-(117649*B^6*a^6 - 100842*A*B^5*a^5*b + 36015*A
^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 735*A^4*B^2*a^2*b^4 - 42*
A^5*B*a*b^5 + A^6*b^6)/(a^5*b^13))^(1/6) - (7*B*a - A*b)*sqrt(x))
 - 12*(6*B*b*x^3 + 7*B*a - A*b)*sqrt(x))/(b^3*x^3 + a*b^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.228286, size = 423, normalized size = 1.36

$$\frac{2\,B\sqrt{x}}{b^2} - \frac{\sqrt{3}\left(7\,\left(ab^5\right)^{\frac{1}{6}} Ba - \left(ab^5\right)^{\frac{1}{6}} Ab\right)\ln\left(\sqrt{3}\sqrt{x}\,\left(\frac{a}{b}\right)^{\frac{1}{6}} + x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{36\,ab^3} + \frac{\sqrt{3}\left(7\,\left(ab^5\right)^{\frac{1}{6}} Ba - \left(ab^5\right)^{\frac{1}{6}} Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\,\left(\frac{a}{b}\right)^{\frac{1}{6}} + x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{36\,ab^3} + \frac{Ba\sqrt{x} - Ab\sqrt{x}}{3\,(bx^3 + a)b^2} - \frac{\left(7\,\left(ab^5\right)^{\frac{1}{6}} Ba - \left(ab^5\right)^{\frac{1}{6}} Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}} + 2\,\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{18\,ab^3} - \frac{\left(7\,\left(ab^5\right)^{\frac{1}{6}} Ba - \left(ab^5\right)^{\frac{1}{6}} Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}} - 2\,\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{18\,ab^3} - \frac{\left(7\,\left(ab^5\right)^{\frac{1}{6}} Ba - \left(ab^5\right)^{\frac{1}{6}} Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{9\,ab^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 2*B*sqrt(x)/b^2 - 1/36*sqrt(3)*(7*(a*b^5)^(1/6)*B*a - (a*b^5)^(1/
6)*A*b)*ln(sqrt(3)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a*b^3)
 + 1/36*sqrt(3)*(7*(a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*ln(-sqr
t(3)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a*b^3) + 1/3*(B*a*sq
rt(x) - A*b*sqrt(x))/((b*x^3 + a)*b^2) - 1/18*(7*(a*b^5)^(1/6)*B*
a - (a*b^5)^(1/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))/(
a/b)^(1/6))/(a*b^3) - 1/18*(7*(a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A
*b)*arctan(-(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6))/(a*b^3
) - 1/9*(7*(a*b^5)^(1/6)*B*a - (a*b^5)^(1/6)*A*b)*arctan(sqrt(x)/
(a/b)^(1/6))/(a*b^3)
```

3.165 $\int \frac{x^{3/2}(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=289

$$\frac{(5aB+Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{7/6}b^{11/6}}-\frac{(5aB+Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{7/6}b^{11/6}}-\frac{(5aB+Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{7/6}b^{11/6}}+\frac{(5aB+Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{7/6}b^{11/6}}+\frac{(5aB+Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{7/6}b^{11/6}}+\frac{x^{5/2}(Ab-aB)}{3ab(a+bx^3)}$$

```
[Out] ((A*b - a*B)*x^(5/2))/(3*a*b*(a + b*x^3)) - ((A*b + 5*a*B)*ArcTan
[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(7/6)*b^(11/6)) +
((A*b + 5*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18
*a^(7/6)*b^(11/6)) + ((A*b + 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1
/6)])/(9*a^(7/6)*b^(11/6)) + ((A*b + 5*a*B)*Log[a^(1/3) - Sqrt[3]
*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*a^(7/6)*b^(11/
6)) - ((A*b + 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x
] + b^(1/3)*x])/(12*Sqrt[3]*a^(7/6)*b^(11/6))
```

Rubi [A] time = 1.36544, antiderivative size = 289, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$\frac{(5aB+Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{7/6}b^{11/6}}-\frac{(5aB+Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{7/6}b^{11/6}}-\frac{(5aB+Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{7/6}b^{11/6}}+\frac{(5aB+Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{7/6}b^{11/6}}+\frac{(5aB+Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{7/6}b^{11/6}}+\frac{x^{5/2}(Ab-aB)}{3ab(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(3/2)*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((A*b - a*B)*x^(5/2))/(3*a*b*(a + b*x^3)) - ((A*b + 5*a*B)*ArcTan
[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(7/6)*b^(11/6)) +
((A*b + 5*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18
*a^(7/6)*b^(11/6)) + ((A*b + 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1
/6)])/(9*a^(7/6)*b^(11/6)) + ((A*b + 5*a*B)*Log[a^(1/3) - Sqrt[3]
*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*a^(7/6)*b^(11/
6)) - ((A*b + 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x
] + b^(1/3)*x])/(12*Sqrt[3]*a^(7/6)*b^(11/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)*(B*x**3+A)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.398464, size = 244, normalized size = 0.84

$$\frac{-\frac{12\sqrt[6]{a}b^{5/6}x^{5/2}(aB-Ab)}{a+bx^3}+\sqrt{3}(5aB+Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)-\sqrt{3}(5aB+Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)-2(}{36a^{7/6}b^{11/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(3/2)*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((-12*a^(1/6)*b^(5/6)*(-(A*b) + a*B)*x^(5/2))/(a + b*x^3) - 2*(A*
b + 5*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)] + 2*(A*b
 + 5*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)] + 4*(A*b
+ 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)] + Sqrt[3]*(A*b + 5*a*B
)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x] - Sq
rt[3]*(A*b + 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x]
 + b^(1/3)*x])/(36*a^(7/6)*b^(11/6))
```

Maple [A] time = 0.058, size = 381, normalized size = 1.3

$$\frac{Ab-Ba}{3\,ab\,(bx^3+a)}x^{\frac{5}{2}}+\frac{A}{9\,ab}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{5\,B}{9\,b^2}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$+\frac{\sqrt{3}A}{36\,a^2}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{5\,\sqrt{3}B}{36\,ab}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{A}{18\,ab}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{5\,B}{18\,b^2}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$-\frac{\sqrt{3}A}{36\,a^2}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{5\,\sqrt{3}B}{36\,ab}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{A}{18\,ab}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{5\,B}{18\,b^2}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)*(B*x^3+A)/(b*x^3+a)^2,x)
```

```
[Out] 1/3*(A*b-B*a)*x^(5/2)/a/b/(b*x^3+a)+1/9/b/a/(a/b)^(1/6)*arctan(x^
(1/2)/(a/b)^(1/6))*A+5/9/b^2/(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/
6))*B+1/36/a^2*(a/b)^(5/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/
2)+(a/b)^(1/3))*A+5/36/b/a*(a/b)^(5/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)
^(1/6)*x^(1/2)+(a/b)^(1/3))*B+1/18/b/a/(a/b)^(1/6)*arctan(-3^(1/2
)+2*x^(1/2)/(a/b)^(1/6))*A+5/18/b^2/(a/b)^(1/6)*arctan(-3^(1/2)+2
*x^(1/2)/(a/b)^(1/6))*B-1/36/a^2*3^(1/2)*(a/b)^(5/6)*ln(x+3^(1/2)
*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A-5/36/b/a*3^(1/2)*(a/b)^(5/6)*
ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B+1/18/b/a/(a/b)^(1
/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*A+5/18/b^2/(a/b)^(1/6)*
arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.29962, size = 4672, normalized size = 16.17

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] -1/36*(12*(B*a - A*b)*x^(5/2) - 4*sqrt(3)*(a*b^2*x^3 + a^2*b)*(-(
15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A
^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/
(a^7*b^11))^(1/6)*arctan(sqrt(3)*a^6*b^9*(-(15625*B^6*a^6 + 18750
*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*
A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(5/6)/(a^
6*b^9*(-(15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2
 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 +
A^6*b^6)/(a^7*b^11))^(5/6) + 2*(3125*B^5*a^5 + 3125*A*B^4*a^4*b +
 1250*A^2*B^3*a^3*b^2 + 250*A^3*B^2*a^2*b^3 + 25*A^4*B*a*b^4 + A^
5*b^5)*sqrt(x) + 2*sqrt((3125*B^5*a^11*b^9 + 3125*A*B^4*a^10*b^10
 + 1250*A^2*B^3*a^9*b^11 + 250*A^3*B^2*a^8*b^12 + 25*A^4*B*a^7*b^
13 + A^5*a^6*b^14)*sqrt(x)*(-(15625*B^6*a^6 + 18750*A*B^5*a^5*b +
 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^
4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(5/6) + (9765625*B^10*a
^10 + 19531250*A*B^9*a^9*b + 17578125*A^2*B^8*a^8*b^2 + 9375000*A
^3*B^7*a^7*b^3 + 3281250*A^4*B^6*a^6*b^4 + 787500*A^5*B^5*a^5*b^5
 + 131250*A^6*B^4*a^4*b^6 + 15000*A^7*B^3*a^3*b^7 + 1125*A^8*B^2*
a^2*b^8 + 50*A^9*B*a*b^9 + A^10*b^10)*x - (15625*B^6*a^11*b^7 + 1
8750*A*B^5*a^10*b^8 + 9375*A^2*B^4*a^9*b^9 + 2500*A^3*B^3*a^8*b^1
0 + 375*A^4*B^2*a^7*b^11 + 30*A^5*B*a^6*b^12 + A^6*a^5*b^13)*(-(1
5625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^
3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(
a^7*b^11))^(2/3)))) - 4*sqrt(3)*(a*b^2*x^3 + a^2*b)*(-(15625*B^6*
a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3
*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11)
)^(1/6)*arctan(-sqrt(3)*a^6*b^9*(-(15625*B^6*a^6 + 18750*A*B^5*a^
5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a
^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(5/6)/(a^6*b^9*(-(
15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A
^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/
(a^7*b^11))^(5/6) - 2*(3125*B^5*a^5 + 3125*A*B^4*a^4*b + 1250*A^2
*B^3*a^3*b^2 + 250*A^3*B^2*a^2*b^3 + 25*A^4*B*a*b^4 + A^5*b^5)*sq
rt(x) - 2*sqrt(-(3125*B^5*a^11*b^9 + 3125*A*B^4*a^10*b^10 + 1250*
A^2*B^3*a^9*b^11 + 250*A^3*B^2*a^8*b^12 + 25*A^4*B*a^7*b^13 + A^5
*a^6*b^14)*sqrt(x)*(-(15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^
2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A
^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(5/6) + (9765625*B^10*a^10 + 19
531250*A*B^9*a^9*b + 17578125*A^2*B^8*a^8*b^2 + 9375000*A^3*B^7*a
^7*b^3 + 3281250*A^4*B^6*a^6*b^4 + 787500*A^5*B^5*a^5*b^5 + 13125
0*A^6*B^4*a^4*b^6 + 15000*A^7*B^3*a^3*b^7 + 1125*A^8*B^2*a^2*b^8
+ 50*A^9*B*a*b^9 + A^10*b^10)*x - (15625*B^6*a^11*b^7 + 18750*A*B
^5*a^10*b^8 + 9375*A^2*B^4*a^9*b^9 + 2500*A^3*B^3*a^8*b^10 + 375*
A^4*B^2*a^7*b^11 + 30*A^5*B*a^6*b^12 + A^6*a^5*b^13)*(-(15625*B^6
*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^
3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11
))^(2/3)))) - 2*(a*b^2*x^3 + a^2*b)*(-(15625*B^6*a^6 + 18750*A*B^
5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B
^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(1/6)*log(a^6*
b^9*(-(15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 +
 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^
6*b^6)/(a^7*b^11))^(5/6) + (3125*B^5*a^5 + 3125*A*B^4*a^4*b + 125
0*A^2*B^3*a^3*b^2 + 250*A^3*B^2*a^2*b^3 + 25*A^4*B*a*b^4 + A^5*b^
5)*sqrt(x)) + 2*(a*b^2*x^3 + a^2*b)*(-(15625*B^6*a^6 + 18750*A*B^
5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B
^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(1/6)*log(-a^6
*b^9*(-(15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2
```

```
+ 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A
^6*b^6)/(a^7*b^11))^(5/6) + (3125*B^5*a^5 + 3125*A*B^4*a^4*b + 12
50*A^2*B^3*a^3*b^2 + 250*A^3*B^2*a^2*b^3 + 25*A^4*B*a*b^4 + A^5*b
^5)*sqrt(x)) - (a*b^2*x^3 + a^2*b)*(-(15625*B^6*a^6 + 18750*A*B^5
*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^
2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(1/6)*log((3125
*B^5*a^11*b^9 + 3125*A*B^4*a^10*b^10 + 1250*A^2*B^3*a^9*b^11 + 25
0*A^3*B^2*a^8*b^12 + 25*A^4*B*a^7*b^13 + A^5*a^6*b^14)*sqrt(x)*(-
(15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*
A^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)
/(a^7*b^11))^(5/6) + (9765625*B^10*a^10 + 19531250*A*B^9*a^9*b +
17578125*A^2*B^8*a^8*b^2 + 9375000*A^3*B^7*a^7*b^3 + 3281250*A^4*
B^6*a^6*b^4 + 787500*A^5*B^5*a^5*b^5 + 131250*A^6*B^4*a^4*b^6 + 1
5000*A^7*B^3*a^3*b^7 + 1125*A^8*B^2*a^2*b^8 + 50*A^9*B*a*b^9 + A^
10*b^10)*x - (15625*B^6*a^11*b^7 + 18750*A*B^5*a^10*b^8 + 9375*A^
2*B^4*a^9*b^9 + 2500*A^3*B^3*a^8*b^10 + 375*A^4*B^2*a^7*b^11 + 30
*A^5*B*a^6*b^12 + A^6*a^5*b^13)*(-(15625*B^6*a^6 + 18750*A*B^5*a^
5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a
^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(2/3)) + (a*b^2*x^
3 + a^2*b)*(-(15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^
4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b
^5 + A^6*b^6)/(a^7*b^11))^(1/6)*log(-(3125*B^5*a^11*b^9 + 3125*A*
B^4*a^10*b^10 + 1250*A^2*B^3*a^9*b^11 + 250*A^3*B^2*a^8*b^12 + 25
*A^4*B*a^7*b^13 + A^5*a^6*b^14)*sqrt(x)*(-(15625*B^6*a^6 + 18750*
A*B^5*a^5*b + 9375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A
^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5 + A^6*b^6)/(a^7*b^11))^(5/6) + (9
765625*B^10*a^10 + 19531250*A*B^9*a^9*b + 17578125*A^2*B^8*a^8*b^
2 + 9375000*A^3*B^7*a^7*b^3 + 3281250*A^4*B^6*a^6*b^4 + 787500*A^
5*B^5*a^5*b^5 + 131250*A^6*B^4*a^4*b^6 + 15000*A^7*B^3*a^3*b^7 +
1125*A^8*B^2*a^2*b^8 + 50*A^9*B*a*b^9 + A^10*b^10)*x - (15625*B^6
*a^11*b^7 + 18750*A*B^5*a^10*b^8 + 9375*A^2*B^4*a^9*b^9 + 2500*A^
3*B^3*a^8*b^10 + 375*A^4*B^2*a^7*b^11 + 30*A^5*B*a^6*b^12 + A^6*a
^5*b^13)*(-(15625*B^6*a^6 + 18750*A*B^5*a^5*b + 9375*A^2*B^4*a^4*
b^2 + 2500*A^3*B^3*a^3*b^3 + 375*A^4*B^2*a^2*b^4 + 30*A^5*B*a*b^5
 + A^6*b^6)/(a^7*b^11))^(2/3)))/(a*b^2*x^3 + a^2*b)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)*(B*x**3+A)/(b*x**3+a)**2,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.623231, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a)^2,x, algorithm="giac")

[Out] Done
```

3.166 $\int \frac{\sqrt{x}(A+Bx^3)}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=71

$$\frac{(aB+Ab)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3a^{3/2}b^{3/2}}+\frac{x^{3/2}(Ab-aB)}{3ab\,(a+bx^3)}$$

```
[Out] ((A*b - a*B)*x^(3/2))/(3*a*b*(a + b*x^3)) + ((A*b + a*B)*ArcTan[(
Sqrt[b]*x^(3/2))/Sqrt[a]])/(3*a^(3/2)*b^(3/2))
```

Rubi [A] time = 0.12672, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{(aB+Ab)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3a^{3/2}b^{3/2}}+\frac{x^{3/2}(Ab-aB)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[x]*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((A*b - a*B)*x^(3/2))/(3*a*b*(a + b*x^3)) + ((A*b + a*B)*ArcTan[(
Sqrt[b]*x^(3/2))/Sqrt[a]])/(3*a^(3/2)*b^(3/2))
```

Rubi in Sympy [A] time = 14.8777, size = 58, normalized size = 0.82

$$\frac{x^{\frac{3}{2}}\,(Ab-Ba)}{3ab\,(a+bx^3)}+\frac{(Ab+Ba)\,\mathrm{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3a^{\frac{3}{2}}b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*x**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] x**(3/2)*(A*b - B*a)/(3*a*b*(a + b*x**3)) + (A*b + B*a)*atan(sqrt
(b)*x**(3/2)/sqrt(a))/(3*a**(3/2)*b**(3/2))
```

Mathematica [A] time = 0.20188, size = 139, normalized size = 1.96

$$\frac{\frac{\sqrt{a}\sqrt{b}x^{3/2}(Ab-aB)}{a+bx^3}-(aB+Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)+(aB+Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)-(aB+Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{3a^{3/2}b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[x]*(A + B*x^3))/(a + b*x^3)^2,x]
```

```
[Out] ((Sqrt[a]*Sqrt[b]*(A*b - a*B)*x^(3/2))/(a + b*x^3) - (A*b + a*B)*
ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)] + (A*b + a*B)*ArcTa
n[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)] - (A*b + a*B)*ArcTan[(b^
(1/6)*Sqrt[x])/a^(1/6)])/(3*a^(3/2)*b^(3/2))
```

Maple [A] time = 0.014, size = 74, normalized size = 1.

$$\frac{Ab-Ba}{3\,ab\,(bx^3+a)}x^{\frac{3}{2}}+\frac{A}{3\,a}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}+\frac{B}{3\,b}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*x^(1/2)/(b*x^3+a)^2,x)
```

```
[Out] 1/3*(A*b-B*a)*x^(3/2)/a/b/(b*x^3+a)+1/3/a/(a*b)^(1/2)*arctan(x^(3
/2)*b/(a*b)^(1/2))*A+1/3/b/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/
2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.249534, size = 1, normalized size = 0.01

$$\left[-\frac{2\,(Ba-Ab)\sqrt{-ab}x^{\frac{3}{2}}-\left(\left(Bab+Ab^{2}\right)x^{3}+Ba^{2}+Aab\right)\log\left(\frac{2\,abx^{\frac{3}{2}}+(bx^{3}-a)\sqrt{-ab}}{bx^{3}+a}\right)}{6\,(ab^{2}x^{3}+a^{2}b)\sqrt{-ab}},\right.$$
$$\left.-\frac{(Ba-Ab)\sqrt{ab}x^{\frac{3}{2}}-\left(\left(Bab+Ab^{2}\right)x^{3}+Ba^{2}+Aab\right)\arctan\left(\frac{\sqrt{ab}x^{\frac{3}{2}}}{a}\right)}{3\,(ab^{2}x^{3}+a^{2}b)\sqrt{ab}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] [-1/6*(2*(B*a - A*b)*sqrt(-a*b)*x^(3/2) - ((B*a*b + A*b^2)*x^3 +
B*a^2 + A*a*b)*log((2*a*b*x^(3/2) + (b*x^3 - a)*sqrt(-a*b))/(b*x^
3 + a)))/((a*b^2*x^3 + a^2*b)*sqrt(-a*b)), -1/3*((B*a - A*b)*sqrt
(a*b)*x^(3/2) - ((B*a*b + A*b^2)*x^3 + B*a^2 + A*a*b)*arctan(sqrt
(a*b)*x^(3/2)/a))/((a*b^2*x^3 + a^2*b)*sqrt(a*b))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*x**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221267, size = 85, normalized size = 1.2

$$\frac{(Ba+Ab)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{3\,\sqrt{ab}ab}-\frac{Bax^{\frac{3}{2}}-Abx^{\frac{3}{2}}}{3\,(bx^{3}+a)ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/3*(B*a + A*b)*arctan(b*x^(3/2)/sqrt(a*b))/(sqrt(a*b)*a*b) - 1/3
*(B*a*x^(3/2) - A*b*x^(3/2))/((b*x^3 + a)*a*b)
```

3.167 $\int \frac{A+Bx^3}{\sqrt{x}(a+bx^3)^2}\,dx$

Optimal. Leaf size=289

$$-\frac{(aB+5Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{11/6}b^{7/6}}+\frac{(aB+5Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{11/6}b^{7/6}}-\frac{(aB+5Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{11/6}b^{7/6}}+\frac{(aB+5Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{11/6}b^{7/6}}+\frac{(aB+5Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{11/6}b^{7/6}}+\frac{\sqrt{x}(Ab-aB)}{3ab\,(a+bx^3)}$$

```
[Out] ((A*b - a*B)*Sqrt[x])/(3*a*b*(a + b*x^3)) - ((5*A*b + a*B)*ArcTan
[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(11/6)*b^(7/6)) +
((5*A*b + a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18
*a^(11/6)*b^(7/6)) + ((5*A*b + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1
/6)])/(9*a^(11/6)*b^(7/6)) - ((5*A*b + a*B)*Log[a^(1/3) - Sqrt[3]
*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*a^(11/6)*b^(7/
6)) + ((5*A*b + a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x
] + b^(1/3)*x])/(12*Sqrt[3]*a^(11/6)*b^(7/6))
```

Rubi [A] time = 1.02019, antiderivative size = 289, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$

$$-\frac{(aB+5Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{11/6}b^{7/6}}+\frac{(aB+5Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{11/6}b^{7/6}}-\frac{(aB+5Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{11/6}b^{7/6}}+\frac{(aB+5Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{11/6}b^{7/6}}+\frac{(aB+5Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{11/6}b^{7/6}}+\frac{\sqrt{x}(Ab-aB)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(Sqrt[x]*(a + b*x^3)^2),x]
```

```
[Out] ((A*b - a*B)*Sqrt[x])/(3*a*b*(a + b*x^3)) - ((5*A*b + a*B)*ArcTan
[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(11/6)*b^(7/6)) +
((5*A*b + a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18
*a^(11/6)*b^(7/6)) + ((5*A*b + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1
/6)])/(9*a^(11/6)*b^(7/6)) - ((5*A*b + a*B)*Log[a^(1/3) - Sqrt[3]
*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*a^(11/6)*b^(7/
6)) + ((5*A*b + a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x
] + b^(1/3)*x])/(12*Sqrt[3]*a^(11/6)*b^(7/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)**2/x**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.374282, size = 244, normalized size = 0.84

$$\frac{-\frac{12a^{5/6}\sqrt[6]{b}\sqrt{x}(aB-Ab)}{a+bx^3}-\sqrt{3}(aB+5Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)+\sqrt{3}(aB+5Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)-2(a}{36a^{11/6}b^{7/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(Sqrt[x]*(a + b*x^3)^2),x]
```

```
[Out] ((-12*a^(5/6)*b^(1/6)*(-(A*b) + a*B)*Sqrt[x])/(a + b*x^3) - 2*(5*
A*b + a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)] + 2*(5*A
*b + a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)] + 4*(5*A*
b + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)] - Sqrt[3]*(5*A*b + a*B
)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x] + Sq
rt[3]*(5*A*b + a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x]
 + b^(1/3)*x])/(36*a^(11/6)*b^(7/6))
```

Maple [A] time = 0.058, size = 381, normalized size = 1.3

$$\frac{Ab-Ba}{3\,ab\,(bx^3+a)}\sqrt{x}+\frac{5\,A}{9\,a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{B}{9\,ab}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$-\frac{5\sqrt{3}A}{36\,a^2}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{\sqrt{3}B}{36\,ab}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{5\,A}{18\,a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{B}{18\,ab}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$+\frac{5\sqrt{3}A}{36\,a^2}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{\sqrt{3}B}{36\,ab}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{5\,A}{18\,a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)+\frac{B}{18\,ab}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)^2/x^(1/2),x)
```

```
[Out] 1/3*(A*b-B*a)*x^(1/2)/a/b/(b*x^3+a)+5/9/a^2*(a/b)^(1/6)*arctan(x^
(1/2)/(a/b)^(1/6))*A+1/9/b/a*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/
6))*B-5/36/a^2*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/
2)+(a/b)^(1/3))*A-1/36/b/a*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)
^(1/6)*x^(1/2)+(a/b)^(1/3))*B+5/18/a^2*(a/b)^(1/6)*arctan(-3^(1/2
)+2*x^(1/2)/(a/b)^(1/6))*A+1/18/b/a*(a/b)^(1/6)*arctan(-3^(1/2)+2
*x^(1/2)/(a/b)^(1/6))*B+5/36/a^2*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)
*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A+1/36/b/a*3^(1/2)*(a/b)^(1/6)*
ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B+5/18/a^2*(a/b)^(1
/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*A+1/18/b/a*(a/b)^(1/6)*
arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^2*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.276739, size = 2988, normalized size = 10.34

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^2*sqrt(x)),x, algorithm="fricas")
```

```
[Out] -1/36*(4*sqrt(3)*(a*b^2*x^3 + a^2*b)*(-(B^6*a^6 + 30*A*B^5*a^5*b
+ 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b
^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/6)*arctan(
sqrt(3)*a^2*b*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 +
 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5
+ 15625*A^6*b^6)/(a^11*b^7))^(1/6)/(a^2*b*(-(B^6*a^6 + 30*A*B^5*a
^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*
a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/6) +
2*(B*a + 5*A*b)*sqrt(x) + 2*sqrt(a^4*b^2*(-(B^6*a^6 + 30*A*B^5*a^
5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a
^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/3) + (
B^2*a^2 + 10*A*B*a*b + 25*A^2*b^2)*x + (B*a^3*b + 5*A*a^2*b^2)*sq
rt(x)*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^
3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*
A^6*b^6)/(a^11*b^7))^(1/6)))) + 4*sqrt(3)*(a*b^2*x^3 + a^2*b)*(-(
B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3
*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/
(a^11*b^7))^(1/6)*arctan(-sqrt(3)*a^2*b*(-(B^6*a^6 + 30*A*B^5*a^5
*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^
2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/6)/(a^2
*b*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B
^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6
*b^6)/(a^11*b^7))^(1/6) - 2*(B*a + 5*A*b)*sqrt(x) - 2*sqrt(a^4*b^
2*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^
3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*
b^6)/(a^11*b^7))^(1/3) + (B^2*a^2 + 10*A*B*a*b + 25*A^2*b^2)*x -
(B*a^3*b + 5*A*a^2*b^2)*sqrt(x)*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375
*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 +
18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/6)))) - (a*b^2*
x^3 + a^2*b)*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 +
2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 +
 15625*A^6*b^6)/(a^11*b^7))^(1/6)*log(a^4*b^2*(-(B^6*a^6 + 30*A*B
^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*
B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/3
) + (B^2*a^2 + 10*A*B*a*b + 25*A^2*b^2)*x + (B*a^3*b + 5*A*a^2*b^
2)*sqrt(x)*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 25
00*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 1
5625*A^6*b^6)/(a^11*b^7))^(1/6)) + (a*b^2*x^3 + a^2*b)*(-(B^6*a^6
 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 +
9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b
^7))^(1/6)*log(a^4*b^2*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*
a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5
*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/3) + (B^2*a^2 + 10*A*B*a
*b + 25*A^2*b^2)*x - (B*a^3*b + 5*A*a^2*b^2)*sqrt(x)*(-(B^6*a^6 +
 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 93
75*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7
))^(1/6)) - 2*(a*b^2*x^3 + a^2*b)*(-(B^6*a^6 + 30*A*B^5*a^5*b + 3
75*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4
+ 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/6)*log(a^2*b*
(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*
a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^
6)/(a^11*b^7))^(1/6) + (B*a + 5*A*b)*sqrt(x)) + 2*(a*b^2*x^3 + a^
2*b)*(-(B^6*a^6 + 30*A*B^5*a^5*b + 375*A^2*B^4*a^4*b^2 + 2500*A^3
*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b^4 + 18750*A^5*B*a*b^5 + 15625*A
^6*b^6)/(a^11*b^7))^(1/6)*log(-a^2*b*(-(B^6*a^6 + 30*A*B^5*a^5*b
+ 375*A^2*B^4*a^4*b^2 + 2500*A^3*B^3*a^3*b^3 + 9375*A^4*B^2*a^2*b
^4 + 18750*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^7))^(1/6) + (B*a
```

```
+ 5*A*b)*sqrt(x)) + 12*(B*a - A*b)*sqrt(x))/(a*b^2*x^3 + a^2*b)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/(b*x**3+a)**2/x**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.236299, size = 408, normalized size = 1.41

$$\frac{\sqrt{3}\left(\left(ab^5\right)^{\frac{1}{6}}Ba + 5\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}} + x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{36\,a^2b^2} - \frac{\sqrt{3}\left(\left(ab^5\right)^{\frac{1}{6}}Ba + 5\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}} + x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{36\,a^2b^2} - \frac{Ba\sqrt{x} - Ab\sqrt{x}}{3\left(bx^3 + a\right)ab} + \frac{\left(\left(ab^5\right)^{\frac{1}{6}}Ba + 5\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}} + 2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{18\,a^2b^2} + \frac{\left(\left(ab^5\right)^{\frac{1}{6}}Ba + 5\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}} - 2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{18\,a^2b^2} + \frac{\left(\left(ab^5\right)^{\frac{1}{6}}Ba + 5\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{9\,a^2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^2*sqrt(x)),x, algorithm="giac")

[Out] 1/36*sqrt(3)*((a*b^5)^(1/6)*B*a + 5*(a*b^5)^(1/6)*A*b)*ln(sqrt(3)
*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^2*b^2) - 1/36*sqrt(3)*
((a*b^5)^(1/6)*B*a + 5*(a*b^5)^(1/6)*A*b)*ln(-sqrt(3)*sqrt(x)*(a/
b)^(1/6) + x + (a/b)^(1/3))/(a^2*b^2) - 1/3*(B*a*sqrt(x) - A*b*sq
rt(x))/((b*x^3 + a)*a*b) + 1/18*((a*b^5)^(1/6)*B*a + 5*(a*b^5)^(1
/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))/(a/b)^(1/6))/(a
^2*b^2) + 1/18*((a*b^5)^(1/6)*B*a + 5*(a*b^5)^(1/6)*A*b)*arctan(-
(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6))/(a^2*b^2) + 1/9*((
a*b^5)^(1/6)*B*a + 5*(a*b^5)^(1/6)*A*b)*arctan(sqrt(x)/(a/b)^(1/6
))/(a^2*b^2)
```

3.168 $\int \frac{A+Bx^3}{x^{3/2}(a+bx^3)^2}\,dx$

Optimal. Leaf size=318

$$-\frac{(7Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{13/6}b^{5/6}}+\frac{(7Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{13/6}b^{5/6}}+\frac{(7Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{13/6}b^{5/6}}-\frac{(7Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{13/6}b^{5/6}}-\frac{(7Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{13/6}b^{5/6}}-\frac{7Ab-aB}{3a^2b\sqrt{x}}+\frac{Ab-aB}{3ab\sqrt{x}\,(a+bx^3)}$$

```
[Out] -(7*A*b - a*B)/(3*a^2*b*Sqrt[x]) + (A*b - a*B)/(3*a*b*Sqrt[x]*(a
+ b*x^3)) + ((7*A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a
^(1/6)])/(18*a^(13/6)*b^(5/6)) - ((7*A*b - a*B)*ArcTan[Sqrt[3] +
(2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(13/6)*b^(5/6)) - ((7*A*b - a
*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(9*a^(13/6)*b^(5/6)) - ((7
*A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/
3)*x])/(12*Sqrt[3]*a^(13/6)*b^(5/6)) + ((7*A*b - a*B)*Log[a^(1/3)
 + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*a^(1
3/6)*b^(5/6))
```

Rubi [A] time = 1.60311, antiderivative size = 318, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$-\frac{(7Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{13/6}b^{5/6}}+\frac{(7Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{13/6}b^{5/6}}+\frac{(7Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{13/6}b^{5/6}}-\frac{(7Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{13/6}b^{5/6}}-\frac{(7Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{13/6}b^{5/6}}-\frac{7Ab-aB}{3a^2b\sqrt{x}}+\frac{Ab-aB}{3ab\sqrt{x}\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(3/2)*(a + b*x^3)^2),x]
```

```
[Out] -(7*A*b - a*B)/(3*a^2*b*Sqrt[x]) + (A*b - a*B)/(3*a*b*Sqrt[x]*(a
+ b*x^3)) + ((7*A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a
^(1/6)])/(18*a^(13/6)*b^(5/6)) - ((7*A*b - a*B)*ArcTan[Sqrt[3] +
(2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(13/6)*b^(5/6)) - ((7*A*b - a
*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(9*a^(13/6)*b^(5/6)) - ((7
*A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/
3)*x])/(12*Sqrt[3]*a^(13/6)*b^(5/6)) + ((7*A*b - a*B)*Log[a^(1/3)
 + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*a^(1
3/6)*b^(5/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.728351, size = 274, normalized size = 0.86

$$\frac{\frac{\sqrt{3}(aB-7Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{5/6}}+\frac{\sqrt{3}(7Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{5/6}}+\frac{2(7Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{b^{5/6}}-\frac{2(7Ab-aB)\tan^{-1}\left(2\cdots\right.}{b^{5/6}}\cdots}{36a^{13/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(3/2)*(a + b*x^3)^2),x]
```

```
[Out] ((-72*a^(1/6)*A)/Sqrt[x] + (12*a^(1/6)*(-(A*b) + a*B)*x^(5/2))/(a
 + b*x^3) + (2*(7*A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])
/a^(1/6)])/b^(5/6) - (2*(7*A*b - a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)
*Sqrt[x])/a^(1/6)])/b^(5/6) + (4*(-7*A*b + a*B)*ArcTan[(b^(1/6)*S
qrt[x])/a^(1/6)])/b^(5/6) + (Sqrt[3]*(-7*A*b + a*B)*Log[a^(1/3) -
 Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/b^(5/6) + (Sqrt[3]
*(7*A*b - a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^
(1/3)*x])/b^(5/6))/(36*a^(13/6))
```

Maple [A] time = 0.066, size = 395, normalized size = 1.2

$$
\begin{aligned}
&-2\,\frac{A}{a^2\sqrt{x}}-\frac{Ab}{3\,a^2\,(bx^3+a)}x^{\frac52}+\frac{B}{3\,a\,(bx^3+a)}x^{\frac52}\\
&-\frac{7\,A}{9\,a^2}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}-\frac{7\,Ab\sqrt{3}}{36\,a^3}\left(\frac{a}{b}\right)^{\frac56}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)\\
&-\frac{7\,A}{18\,a^2}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{7\,Ab\sqrt{3}}{36\,a^3}\left(\frac{a}{b}\right)^{\frac56}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)\\
&-\frac{7\,A}{18\,a^2}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{B}{9\,ab}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}\\
&+\frac{B\sqrt{3}}{36\,a^2}\left(\frac{a}{b}\right)^{\frac56}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{B}{18\,ab}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}\\
&-\frac{B\sqrt{3}}{36\,a^2}\left(\frac{a}{b}\right)^{\frac56}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{B}{18\,ab}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(3/2)/(b*x^3+a)^2,x)
```

```
[Out] -2*A/a^2/x^(1/2)-1/3/a^2*x^(5/2)/(b*x^3+a)*A*b+1/3/a*x^(5/2)/(b*x
^3+a)*B-7/9/a^2*A/(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))-7/36/a^
3*A*b*(a/b)^(5/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^
(1/3))-7/18/a^2*A/(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/
6))+7/36/a^3*A*b*3^(1/2)*(a/b)^(5/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(
1/2)+(a/b)^(1/3))-7/18/a^2*A/(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(
1/6)+3^(1/2))+1/9/a*B/b/(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))+1
/36/a^2*B*(a/b)^(5/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a
```

```
/b)^(1/3))+1/18/a*B/b/(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)
^(1/6))-1/36/a^2*B*3^(1/2)*(a/b)^(5/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x
^(1/2)+(a/b)^(1/3))+1/18/a*B/b/(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)
^(1/6)+3^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.303071, size = 4690, normalized size = 14.75

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(3/2)),x, algorithm="fricas")
```

```
[Out] 1/36*(12*(B*a - 7*A*b)*x^3 - 4*sqrt(3)*(a^2*b*x^3 + a^3)*sqrt(x)*
(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*
a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6
*b^6)/(a^13*b^5))^(1/6)*arctan(-sqrt(3)*a^11*b^4*(-(B^6*a^6 - 42*
A*B^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*
A^4*B^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5)
)^(5/6)/(a^11*b^4*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b
^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*A^5*B*
a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(5/6) + 2*(B^5*a^5 - 35*A*B^4
*a^4*b + 490*A^2*B^3*a^3*b^2 - 3430*A^3*B^2*a^2*b^3 + 12005*A^4*B
*a*b^4 - 16807*A^5*b^5)*sqrt(x) - 2*sqrt((B^5*a^16*b^4 - 35*A*B^4
*a^15*b^5 + 490*A^2*B^3*a^14*b^6 - 3430*A^3*B^2*a^13*b^7 + 12005*
A^4*B*a^12*b^8 - 16807*A^5*a^11*b^9)*sqrt(x)*(-(B^6*a^6 - 42*A*B^
5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*
B^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(5
/6) + (B^10*a^10 - 70*A*B^9*a^9*b + 2205*A^2*B^8*a^8*b^2 - 41160*
A^3*B^7*a^7*b^3 + 504210*A^4*B^6*a^6*b^4 - 4235364*A^5*B^5*a^5*b^
5 + 24706290*A^6*B^4*a^4*b^6 - 98825160*A^7*B^3*a^3*b^7 + 2594160
45*A^8*B^2*a^2*b^8 - 403536070*A^9*B*a*b^9 + 282475249*A^10*b^10)
*x - (B^6*a^15*b^3 - 42*A*B^5*a^14*b^4 + 735*A^2*B^4*a^13*b^5 - 6
860*A^3*B^3*a^12*b^6 + 36015*A^4*B^2*a^11*b^7 - 100842*A^5*B*a^10
*b^8 + 117649*A^6*a^9*b^9)*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*
B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 1008
42*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(2/3)))) - 4*sqrt(3)
*(a^2*b*x^3 + a^3)*sqrt(x)*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*
B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 1008
42*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(1/6)*arctan(sqrt(3)
*a^11*b^4*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 686
0*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*A^5*B*a*b^5 +
117649*A^6*b^6)/(a^13*b^5))^(5/6)/(a^11*b^4*(-(B^6*a^6 - 42*A*B^5
*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B
^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(5/
6) - 2*(B^5*a^5 - 35*A*B^4*a^4*b + 490*A^2*B^3*a^3*b^2 - 3430*A^3
*B^2*a^2*b^3 + 12005*A^4*B*a*b^4 - 16807*A^5*b^5)*sqrt(x) + 2*sqr
t(-(B^5*a^16*b^4 - 35*A*B^4*a^15*b^5 + 490*A^2*B^3*a^14*b^6 - 343
0*A^3*B^2*a^13*b^7 + 12005*A^4*B*a^12*b^8 - 16807*A^5*a^11*b^9)*s
qrt(x)*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A
^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117
649*A^6*b^6)/(a^13*b^5))^(5/6) + (B^10*a^10 - 70*A*B^9*a^9*b + 22
05*A^2*B^8*a^8*b^2 - 41160*A^3*B^7*a^7*b^3 + 504210*A^4*B^6*a^6*b
^4 - 4235364*A^5*B^5*a^5*b^5 + 24706290*A^6*B^4*a^4*b^6 - 9882516
0*A^7*B^3*a^3*b^7 + 259416045*A^8*B^2*a^2*b^8 - 403536070*A^9*B*a
```

```
*b^9 + 282475249*A^10*b^10)*x - (B^6*a^15*b^3 - 42*A*B^5*a^14*b^4
 + 735*A^2*B^4*a^13*b^5 - 6860*A^3*B^3*a^12*b^6 + 36015*A^4*B^2*a
^11*b^7 - 100842*A^5*B*a^10*b^8 + 117649*A^6*a^9*b^9)*(-(B^6*a^6
- 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 3
6015*A^4*B^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13
*b^5))^(2/3)))) - 2*(a^2*b*x^3 + a^3)*sqrt(x)*(-(B^6*a^6 - 42*A*B
^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4
*B^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(
1/6)*log(a^11*b^4*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b
^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*A^5*B*
a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(5/6) - (B^5*a^5 - 35*A*B^4*a
^4*b + 490*A^2*B^3*a^3*b^2 - 3430*A^3*B^2*a^2*b^3 + 12005*A^4*B*a
*b^4 - 16807*A^5*b^5)*sqrt(x)) + 2*(a^2*b*x^3 + a^3)*sqrt(x)*(-(B
^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*
b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6
)/(a^13*b^5))^(1/6)*log(-a^11*b^4*(-(B^6*a^6 - 42*A*B^5*a^5*b + 7
35*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4
 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(5/6) - (B^5*
a^5 - 35*A*B^4*a^4*b + 490*A^2*B^3*a^3*b^2 - 3430*A^3*B^2*a^2*b^3
 + 12005*A^4*B*a*b^4 - 16807*A^5*b^5)*sqrt(x)) + (a^2*b*x^3 + a^3
)*sqrt(x)*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 686
0*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*A^5*B*a*b^5 +
117649*A^6*b^6)/(a^13*b^5))^(1/6)*log((B^5*a^16*b^4 - 35*A*B^4*a^
15*b^5 + 490*A^2*B^3*a^14*b^6 - 3430*A^3*B^2*a^13*b^7 + 12005*A^4
*B*a^12*b^8 - 16807*A^5*a^11*b^9)*sqrt(x)*(-(B^6*a^6 - 42*A*B^5*a
^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2
*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(5/6)
 + (B^10*a^10 - 70*A*B^9*a^9*b + 2205*A^2*B^8*a^8*b^2 - 41160*A^3
*B^7*a^7*b^3 + 504210*A^4*B^6*a^6*b^4 - 4235364*A^5*B^5*a^5*b^5 +
 24706290*A^6*B^4*a^4*b^6 - 98825160*A^7*B^3*a^3*b^7 + 259416045*
A^8*B^2*a^2*b^8 - 403536070*A^9*B*a*b^9 + 282475249*A^10*b^10)*x
- (B^6*a^15*b^3 - 42*A*B^5*a^14*b^4 + 735*A^2*B^4*a^13*b^5 - 6860
*A^3*B^3*a^12*b^6 + 36015*A^4*B^2*a^11*b^7 - 100842*A^5*B*a^10*b^
8 + 117649*A^6*a^9*b^9)*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4
*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*
A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(2/3)) - (a^2*b*x^3 + a
^3)*sqrt(x)*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6
860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 100842*A^5*B*a*b^5
+ 117649*A^6*b^6)/(a^13*b^5))^(1/6)*log(-(B^5*a^16*b^4 - 35*A*B^4
*a^15*b^5 + 490*A^2*B^3*a^14*b^6 - 3430*A^3*B^2*a^13*b^7 + 12005*
A^4*B*a^12*b^8 - 16807*A^5*a^11*b^9)*sqrt(x)*(-(B^6*a^6 - 42*A*B^
5*a^5*b + 735*A^2*B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*
B^2*a^2*b^4 - 100842*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(5
/6) + (B^10*a^10 - 70*A*B^9*a^9*b + 2205*A^2*B^8*a^8*b^2 - 41160*
A^3*B^7*a^7*b^3 + 504210*A^4*B^6*a^6*b^4 - 4235364*A^5*B^5*a^5*b^
5 + 24706290*A^6*B^4*a^4*b^6 - 98825160*A^7*B^3*a^3*b^7 + 2594160
45*A^8*B^2*a^2*b^8 - 403536070*A^9*B*a*b^9 + 282475249*A^10*b^10)
*x - (B^6*a^15*b^3 - 42*A*B^5*a^14*b^4 + 735*A^2*B^4*a^13*b^5 - 6
860*A^3*B^3*a^12*b^6 + 36015*A^4*B^2*a^11*b^7 - 100842*A^5*B*a^10
*b^8 + 117649*A^6*a^9*b^9)*(-(B^6*a^6 - 42*A*B^5*a^5*b + 735*A^2*
B^4*a^4*b^2 - 6860*A^3*B^3*a^3*b^3 + 36015*A^4*B^2*a^2*b^4 - 1008
42*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^5))^(2/3)) - 72*A*a)/((a
^2*b*x^3 + a^3)*sqrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.308136, size = 414, normalized size = 1.3

$$\frac{Bax^3 - 7\,Abx^3 - 6\,Aa}{3\left(bx^{\frac{7}{2}} + a\sqrt{x}\right)a^2} - \frac{\sqrt{3}\left(\left(ab^5\right)^{\frac{5}{6}}Ba - 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}} + x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{36\,a^3b^5}$$
$$+ \frac{\sqrt{3}\left(\left(ab^5\right)^{\frac{5}{6}}Ba - 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}} + x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{36\,a^3b^5}$$
$$+ \frac{\left(\left(ab^5\right)^{\frac{5}{6}}Ba - 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{18\,a^3b^5}$$
$$+ \frac{\left(\left(ab^5\right)^{\frac{5}{6}}Ba - 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{18\,a^3b^5} + \frac{\left(\left(ab^5\right)^{\frac{5}{6}}Ba - 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{9\,a^3b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(3/2)),x, algorithm="giac")
```

```
[Out] 1/3*(B*a*x^3 - 7*A*b*x^3 - 6*A*a)/((b*x^(7/2) + a*sqrt(x))*a^2) -
 1/36*sqrt(3)*((a*b^5)^(5/6)*B*a - 7*(a*b^5)^(5/6)*A*b)*ln(sqrt(3
)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^3*b^5) + 1/36*sqrt(3)
*((a*b^5)^(5/6)*B*a - 7*(a*b^5)^(5/6)*A*b)*ln(-sqrt(3)*sqrt(x)*(a
/b)^(1/6) + x + (a/b)^(1/3))/(a^3*b^5) + 1/18*((a*b^5)^(5/6)*B*a
- 7*(a*b^5)^(5/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))/(
a/b)^(1/6))/(a^3*b^5) + 1/18*((a*b^5)^(5/6)*B*a - 7*(a*b^5)^(5/6)
*A*b)*arctan(-(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6))/(a^3
*b^5) + 1/9*((a*b^5)^(5/6)*B*a - 7*(a*b^5)^(5/6)*A*b)*arctan(sqrt
(x)/(a/b)^(1/6))/(a^3*b^5)
```

3.169 $\int \frac{A+Bx^3}{x^{5/2}(a+bx^3)^2}\,dx$

Optimal. Leaf size=97

$$-\frac{(3Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3a^{5/2}\sqrt{b}}-\frac{3Ab-aB}{3a^2bx^{3/2}}+\frac{Ab-aB}{3abx^{3/2}\left(a+bx^3\right)}$$

```
[Out] -(3*A*b - a*B)/(3*a^2*b*x^(3/2)) + (A*b - a*B)/(3*a*b*x^(3/2)*(a
+ b*x^3)) - ((3*A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a]])/(3*
a^(5/2)*Sqrt[b])
```

Rubi [A] time = 0.173487, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{(3Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{3a^{5/2}\sqrt{b}}-\frac{3Ab-aB}{3a^2bx^{3/2}}+\frac{Ab-aB}{3abx^{3/2}\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(5/2)*(a + b*x^3)^2),x]
```

```
[Out] -(3*A*b - a*B)/(3*a^2*b*x^(3/2)) + (A*b - a*B)/(3*a*b*x^(3/2)*(a
+ b*x^3)) - ((3*A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a]])/(3*
a^(5/2)*Sqrt[b])
```

Rubi in Sympy [A] time = 19.0133, size = 80, normalized size = 0.82

$$\frac{Ab-Ba}{3abx^{\frac{3}{2}}\left(a+bx^3\right)}-\frac{3Ab-Ba}{3a^2bx^{\frac{3}{2}}}-\frac{(3Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3a^{\frac{5}{2}}\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(5/2)/(b*x**3+a)**2,x)
```

```
[Out] (A*b - B*a)/(3*a*b*x**(3/2)*(a + b*x**3)) - (3*A*b - B*a)/(3*a**2
*b*x**(3/2)) - (3*A*b - B*a)*atan(sqrt(b)*x**(3/2)/sqrt(a))/(3*a*
*(5/2)*sqrt(b))
```

Mathematica [A] time = 0.389144, size = 162, normalized size = 1.67

$$\frac{\frac{\sqrt{a}x^{3/2}(aB-Ab)}{a+bx^3}+\frac{(3Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{\sqrt{b}}-\frac{(3Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{\sqrt{b}}+\frac{(3Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{\sqrt{b}}-\frac{2\sqrt{a}A}{x^{3/2}}}{3a^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(5/2)*(a + b*x^3)^2),x]
```

```
[Out] ((-2*Sqrt[a]*A)/x^(3/2) + (Sqrt[a]*(-(A*b) + a*B)*x^(3/2))/(a + b
*x^3) + ((3*A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/
6)])/Sqrt[b] - ((3*A*b - a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x]
)/a^(1/6)])/Sqrt[b] + ((3*A*b - a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(
1/6)])/Sqrt[b])/(3*a^(5/2))
```

Maple [A] time = 0.026, size = 93, normalized size = 1.

$$-\frac{2A}{3a^2}x^{-\frac{3}{2}}-\frac{Ab}{3a^2(bx^3+a)}x^{\frac{3}{2}}+\frac{B}{3a(bx^3+a)}x^{\frac{3}{2}}-\frac{Ab}{a^2}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}+\frac{B}{3a}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(5/2)/(b*x^3+a)^2,x)
```

```
[Out] -2/3*A/a^2/x^(3/2)-1/3/a^2*x^(3/2)/(b*x^3+a)*A*b+1/3/a*x^(3/2)/(b
*x^3+a)*B-1/a^2/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*A*b+1/3
/a/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(5/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.253117, size = 1, normalized size = 0.01

$$\left[-\frac{\left(\left(Bab-3Ab^2\right)x^4+\left(Ba^2-3Aab\right)x\right)\sqrt{x}\log\left(-\frac{2abx^{\frac{3}{2}}-(bx^3-a)\sqrt{-ab}}{bx^3+a}\right)-2\left((Ba-3Ab)x^3-2Aa\right)\sqrt{-ab}}{6\left(a^2bx^4+a^3x\right)\sqrt{-ab}\sqrt{x}},\ \frac{\left(\left(Bab-3Ab^2\right)x\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(5/2)),x, algorithm="fricas")
```

```
[Out] [-1/6*(((B*a*b - 3*A*b^2)*x^4 + (B*a^2 - 3*A*a*b)*x)*sqrt(x)*log(
-(2*a*b*x^(3/2) - (b*x^3 - a)*sqrt(-a*b))/(b*x^3 + a)) - 2*((B*a
- 3*A*b)*x^3 - 2*A*a)*sqrt(-a*b))/((a^2*b*x^4 + a^3*x)*sqrt(-a*b)
*sqrt(x)), 1/3*(((B*a*b - 3*A*b^2)*x^4 + (B*a^2 - 3*A*a*b)*x)*sqr
t(x)*arctan(sqrt(a*b)*x^(3/2)/a) + ((B*a - 3*A*b)*x^3 - 2*A*a)*sq
rt(a*b))/((a^2*b*x^4 + a^3*x)*sqrt(a*b)*sqrt(x))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(5/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222052, size = 89, normalized size = 0.92

$$\frac{(Ba - 3\,Ab)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{3\,\sqrt{ab}a^{2}} + \frac{Bax^{3} - 3\,Abx^{3} - 2\,Aa}{3\,\left(bx^{\frac{9}{2}} + ax^{\frac{3}{2}}\right)a^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(5/2)),x, algorithm="giac")
```

```
[Out] 1/3*(B*a - 3*A*b)*arctan(b*x^(3/2)/sqrt(a*b))/(sqrt(a*b)*a^2) + 1
/3*(B*a*x^3 - 3*A*b*x^3 - 2*A*a)/((b*x^(9/2) + a*x^(3/2))*a^2)
```

3.170 $\int \frac{A+Bx^3}{x^{7/2}(a+bx^3)^2}\,dx$

Optimal. Leaf size=318

$$\frac{(11Ab-5aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{17/6}\sqrt[6]{b}}-\frac{(11Ab-5aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{17/6}\sqrt[6]{b}}+\frac{(11Ab-5aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{17/6}\sqrt[6]{b}}-\frac{(11Ab-5aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{17/6}\sqrt[6]{b}}-\frac{(11Ab-5aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{17/6}\sqrt[6]{b}}-\frac{11Ab-5aB}{15a^2bx^{5/2}}+\frac{Ab-aB}{3abx^{5/2}\left(a+bx^3\right)}$$

```
[Out] -(11*A*b - 5*a*B)/(15*a^2*b*x^(5/2)) + (A*b - a*B)/(3*a*b*x^(5/2)
*(a + b*x^3)) + ((11*A*b - 5*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqr
t[x])/a^(1/6)])/(18*a^(17/6)*b^(1/6)) - ((11*A*b - 5*a*B)*ArcTan[
Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(17/6)*b^(1/6)) - (
(11*A*b - 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(9*a^(17/6)*b
^(1/6)) + ((11*A*b - 5*a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*a^(17/6)*b^(1/6)) - ((11*A*b -
 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x
])/(12*Sqrt[3]*a^(17/6)*b^(1/6))
```

Rubi [A] time = 1.12795, antiderivative size = 318, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.409$

$$\frac{(11Ab-5aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{17/6}\sqrt[6]{b}}-\frac{(11Ab-5aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{12\sqrt{3}a^{17/6}\sqrt[6]{b}}+\frac{(11Ab-5aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{18a^{17/6}\sqrt[6]{b}}-\frac{(11Ab-5aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{18a^{17/6}\sqrt[6]{b}}-\frac{(11Ab-5aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{9a^{17/6}\sqrt[6]{b}}-\frac{11Ab-5aB}{15a^2bx^{5/2}}+\frac{Ab-aB}{3abx^{5/2}\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(7/2)*(a + b*x^3)^2),x]
```

```
[Out] -(11*A*b - 5*a*B)/(15*a^2*b*x^(5/2)) + (A*b - a*B)/(3*a*b*x^(5/2)
*(a + b*x^3)) + ((11*A*b - 5*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqr
t[x])/a^(1/6)])/(18*a^(17/6)*b^(1/6)) - ((11*A*b - 5*a*B)*ArcTan[
Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(18*a^(17/6)*b^(1/6)) - (
(11*A*b - 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(9*a^(17/6)*b
^(1/6)) + ((11*A*b - 5*a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(12*Sqrt[3]*a^(17/6)*b^(1/6)) - ((11*A*b -
 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x
])/(12*Sqrt[3]*a^(17/6)*b^(1/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(7/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.540126, size = 278, normalized size = 0.87

$$\frac{\frac{60a^{5/6}\sqrt{x}(aB-Ab)}{a+bx^3} - \frac{72a^{5/6}A}{x^{5/2}} + \frac{5\sqrt{3}(11Ab-5aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[6]{b}} + \frac{5\sqrt{3}(5aB-11Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[6]{b}} + 10(11Ab-5aB)}{180a^{17/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(7/2)*(a + b*x^3)^2),x]
```

```
[Out] ((-72*a^(5/6)*A)/x^(5/2) + (60*a^(5/6)*(-(A*b) + a*B)*Sqrt[x])/(a
 + b*x^3) + (10*(11*A*b - 5*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt
[x])/a^(1/6)])/b^(1/6) - (10*(11*A*b - 5*a*B)*ArcTan[Sqrt[3] + (2
*b^(1/6)*Sqrt[x])/a^(1/6)])/b^(1/6) + (20*(-11*A*b + 5*a*B)*ArcTa
n[(b^(1/6)*Sqrt[x])/a^(1/6)])/b^(1/6) + (5*Sqrt[3]*(11*A*b - 5*a*
B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/b^
(1/6) + (5*Sqrt[3]*(-11*A*b + 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6
)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/b^(1/6))/(180*a^(17/6))
```

Maple [A] time = 0.063, size = 389, normalized size = 1.2

$$-\frac{2A}{5a^2}x^{-\frac{5}{2}} - \frac{Ab}{3a^2(bx^3+a)}\sqrt{x} + \frac{B}{3a(bx^3+a)}\sqrt{x}$$
$$-\frac{11Ab}{9a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right) + \frac{11Ab\sqrt{3}}{36a^3}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{11Ab}{18a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right) - \frac{11Ab\sqrt{3}}{36a^3}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{11Ab}{18a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right) + \frac{5B}{9a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$-\frac{5B\sqrt{3}}{36a^2}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right) + \frac{5B}{18a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$+\frac{5B\sqrt{3}}{36a^2}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right) + \frac{5B}{18a^2}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(7/2)/(b*x^3+a)^2,x)
```

```
[Out] -2/5*A/a^2/x^(5/2)-1/3/a^2*x^(1/2)/(b*x^3+a)*A*b+1/3/a*x^(1/2)/(b
*x^3+a)*B-11/9/a^3*A*b*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))+11
/36/a^3*A*b*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+
(a/b)^(1/3))-11/18/a^3*A*b*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/
(a/b)^(1/6))-11/36/a^3*A*b*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*(a/b)
^(1/6)*x^(1/2)+(a/b)^(1/3))-11/18/a^3*A*b*(a/b)^(1/6)*arctan(2*x^
(1/2)/(a/b)^(1/6)+3^(1/2))+5/9/a^2*B*(a/b)^(1/6)*arctan(x^(1/2)/(
a/b)^(1/6))-5/36/a^2*B*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/
```

```
6)*x^(1/2)+(a/b)^(1/3))+5/18/a^2*B*(a/b)^(1/6)*arctan(-3^(1/2)+2*
x^(1/2)/(a/b)^(1/6))+5/36/a^2*B*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*
(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))+5/18/a^2*B*(a/b)^(1/6)*arctan(2*
x^(1/2)/(a/b)^(1/6)+3^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(7/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.276996, size = 3048, normalized size = 9.58

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(7/2)),x, algorithm="fricas")
```

```
[Out] 1/180*(12*(5*B*a - 11*A*b)*x^3 + 20*sqrt(3)*(a^2*b*x^5 + a^3*x^2)
*sqrt(x)*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*
a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 483
1530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)*arctan(-sqrt(
3)*a^3*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*a^
4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 48315
30*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)/(a^3*(-(15625*B
^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*a^4*b^2 - 3327500*A
^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 4831530*A^5*B*a*b^5 +
1771561*A^6*b^6)/(a^17*b))^(1/6) + 2*(5*B*a - 11*A*b)*sqrt(x) - 2
*sqrt(a^6*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4
*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 48
31530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/3) + (25*B^2*a^
2 - 110*A*B*a*b + 121*A^2*b^2)*x + (5*B*a^4 - 11*A*a^3*b)*sqrt(x)
*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*a^4*b^2
- 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 4831530*A^5
*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)))) + 20*sqrt(3)*(a^2*
b*x^5 + a^3*x^2)*sqrt(x)*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b +
1134375*A^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B
^2*a^2*b^4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/
6)*arctan(sqrt(3)*a^3*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 113
4375*A^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*
a^2*b^4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)/
(a^3*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*a^4*
b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 4831530
*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6) - 2*(5*B*a - 11*A
*b)*sqrt(x) + 2*sqrt(a^6*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b +
1134375*A^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B
^2*a^2*b^4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/
3) + (25*B^2*a^2 - 110*A*B*a*b + 121*A^2*b^2)*x - (5*B*a^4 - 11*A
*a^3*b)*sqrt(x)*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A
^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^
4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)))) + 5
*(a^2*b*x^5 + a^3*x^2)*sqrt(x)*(-(15625*B^6*a^6 - 206250*A*B^5*a^
5*b + 1134375*A^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375
*A^4*B^2*a^2*b^4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b
))^(1/6)*log(a^6*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*
A^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b
^4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/3) + (25
*B^2*a^2 - 110*A*B*a*b + 121*A^2*b^2)*x + (5*B*a^4 - 11*A*a^3*b)*
sqrt(x)*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*a
^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 4831
```

```
530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)) - 5*(a^2*b*x^
5 + a^3*x^2)*sqrt(x)*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134
375*A^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a
^2*b^4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)*l
og(a^6*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*a^
4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 48315
30*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/3) + (25*B^2*a^2 -
 110*A*B*a*b + 121*A^2*b^2)*x - (5*B*a^4 - 11*A*a^3*b)*sqrt(x)*(-
(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*a^4*b^2 - 3
327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 4831530*A^5*B*
a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)) - 10*(a^2*b*x^5 + a^3*x
^2)*sqrt(x)*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B
^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 -
4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6)*log(a^3*(-
(15625*B^6*a^6 - 206250*A*B^5*a^5*b + 1134375*A^2*B^4*a^4*b^2 - 3
327500*A^3*B^3*a^3*b^3 + 5490375*A^4*B^2*a^2*b^4 - 4831530*A^5*B*
a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1/6) - (5*B*a - 11*A*b)*sqrt(
x)) + 10*(a^2*b*x^5 + a^3*x^2)*sqrt(x)*(-(15625*B^6*a^6 - 206250*
A*B^5*a^5*b + 1134375*A^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 +
 5490375*A^4*B^2*a^2*b^4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)
/(a^17*b))^(1/6)*log(-a^3*(-(15625*B^6*a^6 - 206250*A*B^5*a^5*b +
 1134375*A^2*B^4*a^4*b^2 - 3327500*A^3*B^3*a^3*b^3 + 5490375*A^4*
B^2*a^2*b^4 - 4831530*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b))^(1
/6) - (5*B*a - 11*A*b)*sqrt(x)) - 72*A*a)/((a^2*b*x^5 + a^3*x^2)*
sqrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(7/2)/(b*x**3+a)**2,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.235231, size = 423, normalized size = 1.33

$$\frac{\sqrt{3}\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{36\,a^3b} - \frac{\sqrt{3}\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{36\,a^3b} + \frac{Ba\sqrt{x}-Ab\sqrt{x}}{3\left(bx^3+a\right)a^2} + \frac{\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{18\,a^3b} + \frac{\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{18\,a^3b} + \frac{\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{9\,a^3b} - \frac{2\,A}{5\,a^2x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^2*x^(7/2)),x, algorithm="giac")

[Out] 1/36*sqrt(3)*(5*(a*b^5)^(1/6)*B*a - 11*(a*b^5)^(1/6)*A*b)*ln(sqrt
(3)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^3*b) - 1/36*sqrt(3)
*(5*(a*b^5)^(1/6)*B*a - 11*(a*b^5)^(1/6)*A*b)*ln(-sqrt(3)*sqrt(x)
```

```
*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^3*b) + 1/3*(B*a*sqrt(x) - A*b*
sqrt(x))/((b*x^3 + a)*a^2) + 1/18*(5*(a*b^5)^(1/6)*B*a - 11*(a*b^
5)^(1/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))/(a/b)^(1/6
))/(a^3*b) + 1/18*(5*(a*b^5)^(1/6)*B*a - 11*(a*b^5)^(1/6)*A*b)*ar
ctan(-(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6))/(a^3*b) + 1/
9*(5*(a*b^5)^(1/6)*B*a - 11*(a*b^5)^(1/6)*A*b)*arctan(sqrt(x)/(a/
b)^(1/6))/(a^3*b) - 2/5*A/(a^2*x^(5/2))
```

3.171 $\int \frac{x^{7/2}(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=104

$$\frac{(3aB+Ab)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{12a^{3/2}b^{5/2}}-\frac{x^{3/2}(3aB+Ab)}{12ab^2(a+bx^3)}+\frac{x^{9/2}(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*x^(9/2))/(6*a*b*(a + b*x^3)^2) - ((A*b + 3*a*B)*x^(3
/2))/(12*a*b^2*(a + b*x^3)) + ((A*b + 3*a*B)*ArcTan[(Sqrt[b]*x^(3
/2))/Sqrt[a]])/(12*a^(3/2)*b^(5/2))
```

Rubi [A] time = 0.173112, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{(3aB+Ab)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{12a^{3/2}b^{5/2}}-\frac{x^{3/2}(3aB+Ab)}{12ab^2(a+bx^3)}+\frac{x^{9/2}(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(7/2)*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - a*B)*x^(9/2))/(6*a*b*(a + b*x^3)^2) - ((A*b + 3*a*B)*x^(3
/2))/(12*a*b^2*(a + b*x^3)) + ((A*b + 3*a*B)*ArcTan[(Sqrt[b]*x^(3
/2))/Sqrt[a]])/(12*a^(3/2)*b^(5/2))
```

Rubi in Sympy [A] time = 19.3873, size = 88, normalized size = 0.85

$$\frac{x^{\frac{9}{2}}(Ab-Ba)}{6ab(a+bx^3)^2}-\frac{x^{\frac{3}{2}}(Ab+3Ba)}{12ab^2(a+bx^3)}+\frac{(Ab+3Ba)\,\mathrm{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{12a^{\frac{3}{2}}b^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(7/2)*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] x**(9/2)*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) - x**(3/2)*(A*b + 3*
B*a)/(12*a*b**2*(a + b*x**3)) + (A*b + 3*B*a)*atan(sqrt(b)*x**(3/
2)/sqrt(a))/(12*a**(3/2)*b**(5/2))
```

Mathematica [A] time = 0.33952, size = 179, normalized size = 1.72

$$\frac{-\frac{(3aB+Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{a^{3/2}}+\frac{(3aB+Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{a^{3/2}}-\frac{(3aB+Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{a^{3/2}}+\frac{\sqrt{b}x^{3/2}(Ab-5aB)}{a(a+bx^3)}-\frac{2\sqrt{b}x^{3/2}(Ab-aB)}{(a+bx^3)^2}}{12b^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(7/2)*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((-2*Sqrt[b]*(A*b - a*B)*x^(3/2))/(a + b*x^3)^2 + (Sqrt[b]*(A*b -
 5*a*B)*x^(3/2))/(a*(a + b*x^3)) - ((A*b + 3*a*B)*ArcTan[Sqrt[3]
- (2*b^(1/6)*Sqrt[x])/a^(1/6)])/a^(3/2) + ((A*b + 3*a*B)*ArcTan[S
qrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/a^(3/2) - ((A*b + 3*a*B)*A
```

```
rcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/a^(3/2))/(12*b^(5/2))
```

Maple [A] time = 0.025, size = 96, normalized size = 0.9

$$\frac{2}{3\,(bx^3+a)^2}\left(\frac{Ab-5\,Ba}{8\,ab}x^{\frac{9}{2}}-\frac{Ab+3\,Ba}{8\,b^2}x^{\frac{3}{2}}\right)+\frac{A}{12\,ab}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}+\frac{B}{4\,b^2}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(7/2)*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 2/3*(1/8*(A*b-5*B*a)/a/b*x^(9/2)-1/8*(A*b+3*B*a)/b^2*x^(3/2))/(b*
x^3+a)^2+1/12/b/a/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*A+1/4
/b^2/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.254935, size = 1, normalized size = 0.01

$$\left[-\frac{2\left(\left(5\,Bab-Ab^2\right)x^4+\left(3\,Ba^2+Aab\right)x\right)\sqrt{-ab}\sqrt{x}-\left(\left(3\,Bab^2+Ab^3\right)x^6+3\,Ba^3+Aa^2b+2\left(3\,Ba^2b+Aab^2\right)x^3\right)\log\left(\frac{2\,abx^{\frac{3}{2}}}{\cdots}\right.}{24\left(ab^4x^6+2\,a^2b^3x^3+a^3b^2\right)\sqrt{-ab}}\right.$$

$$-\frac{\left(\left(5\,Bab-Ab^2\right)x^4+\left(3\,Ba^2+Aab\right)x\right)\sqrt{ab}\sqrt{x}-\left(\left(3\,Bab^2+Ab^3\right)x^6+3\,Ba^3+Aa^2b+2\left(3\,Ba^2b+Aab^2\right)x^3\right)\arctan\left(\frac{\sqrt{ab}x^{\frac{3}{2}}}{a}\right.}{12\left(ab^4x^6+2\,a^2b^3x^3+a^3b^2\right)\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] [-1/24*(2*((5*B*a*b - A*b^2)*x^4 + (3*B*a^2 + A*a*b)*x)*sqrt(-a*b
)*sqrt(x) - ((3*B*a*b^2 + A*b^3)*x^6 + 3*B*a^3 + A*a^2*b + 2*(3*B
*a^2*b + A*a*b^2)*x^3)*log((2*a*b*x^(3/2) + (b*x^3 - a)*sqrt(-a*b
))/(b*x^3 + a)))/((a*b^4*x^6 + 2*a^2*b^3*x^3 + a^3*b^2)*sqrt(-a*b
)), -1/12*(((5*B*a*b - A*b^2)*x^4 + (3*B*a^2 + A*a*b)*x)*sqrt(a*b
)*sqrt(x) - ((3*B*a*b^2 + A*b^3)*x^6 + 3*B*a^3 + A*a^2*b + 2*(3*B
*a^2*b + A*a*b^2)*x^3)*arctan(sqrt(a*b)*x^(3/2)/a))/((a*b^4*x^6 +
 2*a^2*b^3*x^3 + a^3*b^2)*sqrt(a*b))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(7/2)*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222604, size = 113, normalized size = 1.09

$$\frac{(3\,Ba + Ab)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{12\,\sqrt{ab}ab^2} - \frac{5\,Babx^{\frac{9}{2}} - Ab^2x^{\frac{9}{2}} + 3\,Ba^2x^{\frac{3}{2}} + Aabx^{\frac{3}{2}}}{12\,(bx^3 + a)^2ab^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(7/2)/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] 1/12*(3*B*a + A*b)*arctan(b*x^(3/2)/sqrt(a*b))/(sqrt(a*b)*a*b^2)
- 1/12*(5*B*a*b*x^(9/2) - A*b^2*x^(9/2) + 3*B*a^2*x^(3/2) + A*a*b
*x^(3/2))/((b*x^3 + a)^2*a*b^2)
```

3.172 $\int \frac{x^{5/2}(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=327

$$-\frac{(7aB+5Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{11/6}b^{13/6}}+\frac{(7aB+5Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{11/6}b^{13/6}}-\frac{(7aB+5Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{11/6}b^{13/6}}+\frac{(7aB+5Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{11/6}b^{13/6}}+\frac{(7aB+5Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{11/6}b^{13/6}}-\frac{\sqrt{x}(7aB+5Ab)}{36ab^2(a+bx^3)}+\frac{x^{7/2}(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*x^(7/2))/(6*a*b*(a + b*x^3)^2) - ((5*A*b + 7*a*B)*Sq
rt[x])/(36*a*b^2*(a + b*x^3)) - ((5*A*b + 7*a*B)*ArcTan[Sqrt[3] -
 (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(11/6)*b^(13/6)) + ((5*A*b
+ 7*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(1
1/6)*b^(13/6)) + ((5*A*b + 7*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6
)])/(108*a^(11/6)*b^(13/6)) - ((5*A*b + 7*a*B)*Log[a^(1/3) - Sqrt
[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(11/6)*b
^(13/6)) + ((5*A*b + 7*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(11/6)*b^(13/6))
```

Rubi [A] time = 1.13326, antiderivative size = 327, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$-\frac{(7aB+5Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{11/6}b^{13/6}}+\frac{(7aB+5Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{11/6}b^{13/6}}-\frac{(7aB+5Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{11/6}b^{13/6}}+\frac{(7aB+5Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{11/6}b^{13/6}}+\frac{(7aB+5Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{11/6}b^{13/6}}-\frac{\sqrt{x}(7aB+5Ab)}{36ab^2(a+bx^3)}+\frac{x^{7/2}(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(5/2)*(A + B*x^3))/(a + b*x^3)^3,x]
```


```
[Out] ((A*b - a*B)*x^(7/2))/(6*a*b*(a + b*x^3)^2) - ((5*A*b + 7*a*B)*Sq
rt[x])/(36*a*b^2*(a + b*x^3)) - ((5*A*b + 7*a*B)*ArcTan[Sqrt[3] -
 (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(11/6)*b^(13/6)) + ((5*A*b
+ 7*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(1
1/6)*b^(13/6)) + ((5*A*b + 7*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6
)])/(108*a^(11/6)*b^(13/6)) - ((5*A*b + 7*a*B)*Log[a^(1/3) - Sqrt
[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(11/6)*b
^(13/6)) + ((5*A*b + 7*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(11/6)*b^(13/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.619069, size = 296, normalized size = 0.91

$$-\frac{\frac{\sqrt{3}(7aB+5Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{11/6}}+\frac{\sqrt{3}(7aB+5Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{a^{11/6}}-\frac{2(7aB+5Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{a^{11/6}}+\frac{2(7aB+5Ab)\tan}{a}}{432b^{13/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(5/2)*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((-72*b^(1/6)*(A*b - a*B)*Sqrt[x])/(a + b*x^3)^2 + (12*b^(1/6)*(A
*b - 13*a*B)*Sqrt[x])/(a*(a + b*x^3)) - (2*(5*A*b + 7*a*B)*ArcTan
[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)])/a^(11/6) + (2*(5*A*b + 7
*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/a^(11/6) + (
4*(5*A*b + 7*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/a^(11/6) - (
Sqrt[3]*(5*A*b + 7*a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqr
t[x] + b^(1/3)*x])/a^(11/6) + (Sqrt[3]*(5*A*b + 7*a*B)*Log[a^(1/3
) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/a^(11/6))/(432*
b^(13/6))
```

Maple [A] time = 0.064, size = 416, normalized size = 1.3

$$
\begin{aligned}
&2\,\frac{1}{(bx^3+a)^2}\left(\frac{(Ab-13\,Ba)\,x^{7/2}}{72\,ab}-\frac{(5\,Ab+7\,Ba)\,\sqrt{x}}{72\,b^2}\right)\\
&+\frac{5\,A}{108\,a^2b}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{7\,B}{108\,ab^2}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\\
&-\frac{5\,\sqrt{3}A}{432\,a^2b}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{7\,\sqrt{3}B}{432\,ab^2}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)\\
&+\frac{5\,A}{216\,a^2b}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{7\,B}{216\,ab^2}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\\
&+\frac{5\,\sqrt{3}A}{432\,a^2b}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{7\,\sqrt{3}B}{432\,ab^2}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)\\
&+\frac{5\,A}{216\,a^2b}\sqrt[6]{\frac{a}{b}}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)+\frac{7\,B}{216\,ab^2}\sqrt[6]{\frac{a}{b}}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 2*(1/72*(A*b-13*B*a)/a/b*x^(7/2)-1/72*(5*A*b+7*B*a)/b^2*x^(1/2))/
(b*x^3+a)^2+5/108/b/a^2*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*A
+7/108/b^2/a*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*B-5/432/b/a^
2*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3
))*A-7/432/b^2/a*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(
1/2)+(a/b)^(1/3))*B+5/216/b/a^2*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(
1/2)/(a/b)^(1/6))*A+7/216/b^2/a*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(
1/2)/(a/b)^(1/6))*B+5/432/b/a^2*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*
(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A+7/432/b^2/a*3^(1/2)*(a/b)^(1/6
)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B+5/216/b/a^2*(a/
b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*A+7/216/b^2/a*(a/b
)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.28697, size = 3208, normalized size = 9.81

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] -1/432*(4*sqrt(3)*(a*b^4*x^6 + 2*a^2*b^3*x^3 + a^3*b^2)*(-(117649
*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*A^2*B^4*a^4*b^2 + 857500*A
^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5 + 15
625*A^6*b^6)/(a^11*b^13))^(1/6)*arctan(sqrt(3)*a^2*b^2*(-(117649*
B^6*a^6 + 504210*A*B^5*a^5*b + 900375*A^2*B^4*a^4*b^2 + 857500*A^
3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5 + 156
25*A^6*b^6)/(a^11*b^13))^(1/6)/(a^2*b^2*(-(117649*B^6*a^6 + 50421
0*A*B^5*a^5*b + 900375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 +
 459375*A^4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^
11*b^13))^(1/6) + 2*(7*B*a + 5*A*b)*sqrt(x) + 2*sqrt(a^4*b^4*(-(1
17649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*A^2*B^4*a^4*b^2 + 857
500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5
 + 15625*A^6*b^6)/(a^11*b^13))^(1/3) + (49*B^2*a^2 + 70*A*B*a*b +
 25*A^2*b^2)*x + (7*B*a^3*b^2 + 5*A*a^2*b^3)*sqrt(x)*(-(117649*B^
6*a^6 + 504210*A*B^5*a^5*b + 900375*A^2*B^4*a^4*b^2 + 857500*A^3*
B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5 + 15625
*A^6*b^6)/(a^11*b^13))^(1/6)))) + 4*sqrt(3)*(a*b^4*x^6 + 2*a^2*b^
3*x^3 + a^3*b^2)*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*
A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4
 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/6)*arctan(
-sqrt(3)*a^2*b^2*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*
A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4
 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/6)/(a^2*b^
2*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*A^2*B^4*a^4*b^2
 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 + 131250*A^5*B
*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/6) - 2*(7*B*a + 5*A*b)*sq
rt(x) - 2*sqrt(a^4*b^4*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 9
00375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a
^2*b^4 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/3) +
 (49*B^2*a^2 + 70*A*B*a*b + 25*A^2*b^2)*x - (7*B*a^3*b^2 + 5*A*a^
2*b^3)*sqrt(x)*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*A^
2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 +
 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/6)))) - (a*b
^4*x^6 + 2*a^2*b^3*x^3 + a^3*b^2)*(-(117649*B^6*a^6 + 504210*A*B^
5*a^5*b + 900375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 45937
5*A^4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^1
3))^(1/6)*log(a^4*b^4*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 90
0375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^
2*b^4 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/3) +
(49*B^2*a^2 + 70*A*B*a*b + 25*A^2*b^2)*x + (7*B*a^3*b^2 + 5*A*a^2
*b^3)*sqrt(x)*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*A^2
*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 +
131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/6)) + (a*b^4*
x^6 + 2*a^2*b^3*x^3 + a^3*b^2)*(-(117649*B^6*a^6 + 504210*A*B^5*a
^5*b + 900375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A
^4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))
^(1/6)*log(a^4*b^4*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 90037
5*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b
```

```
^4 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/3) + (49
*B^2*a^2 + 70*A*B*a*b + 25*A^2*b^2)*x - (7*B*a^3*b^2 + 5*A*a^2*b^
3)*sqrt(x)*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*A^2*B^
4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 + 131
250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/6)) - 2*(a*b^4*x
^6 + 2*a^2*b^3*x^3 + a^3*b^2)*(-(117649*B^6*a^6 + 504210*A*B^5*a^
5*b + 900375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^
4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^
(1/6)*log(a^2*b^2*(-(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375
*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^
4 + 131250*A^5*B*a*b^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/6) + (7*B
*a + 5*A*b)*sqrt(x)) + 2*(a*b^4*x^6 + 2*a^2*b^3*x^3 + a^3*b^2)*(-
(117649*B^6*a^6 + 504210*A*B^5*a^5*b + 900375*A^2*B^4*a^4*b^2 + 8
57500*A^3*B^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 + 131250*A^5*B*a*b
^5 + 15625*A^6*b^6)/(a^11*b^13))^(1/6)*log(-a^2*b^2*(-(117649*B^6
*a^6 + 504210*A*B^5*a^5*b + 900375*A^2*B^4*a^4*b^2 + 857500*A^3*B
^3*a^3*b^3 + 459375*A^4*B^2*a^2*b^4 + 131250*A^5*B*a*b^5 + 15625*
A^6*b^6)/(a^11*b^13))^(1/6) + (7*B*a + 5*A*b)*sqrt(x)) + 12*((13*
B*a*b - A*b^2)*x^3 + 7*B*a^2 + 5*A*a*b)*sqrt(x))/(a*b^4*x^6 + 2*a
^2*b^3*x^3 + a^3*b^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.240097, size = 443, normalized size = 1.35

$$\frac{\sqrt{3}\left(7\,\left(ab^5\right)^{\frac{1}{6}}Ba+5\,\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^2b^3}-\frac{\sqrt{3}\left(7\,\left(ab^5\right)^{\frac{1}{6}}Ba+5\,\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^2b^3}+\frac{\left(7\,\left(ab^5\right)^{\frac{1}{6}}Ba+5\,\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^2b^3}+\frac{\left(7\,\left(ab^5\right)^{\frac{1}{6}}Ba+5\,\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^2b^3}+\frac{\left(7\,\left(ab^5\right)^{\frac{1}{6}}Ba+5\,\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{108\,a^2b^3}-\frac{13\,Babx^{\frac{7}{2}}-Ab^2x^{\frac{7}{2}}+7\,Ba^2\sqrt{x}+5\,Aab\sqrt{x}}{36\,\left(bx^3+a\right)^2ab^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(5/2)/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] 1/432*sqrt(3)*(7*(a*b^5)^(1/6)*B*a + 5*(a*b^5)^(1/6)*A*b)*ln(sqrt
(3)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^2*b^3) - 1/432*sqrt
(3)*(7*(a*b^5)^(1/6)*B*a + 5*(a*b^5)^(1/6)*A*b)*ln(-sqrt(3)*sqrt(
x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^2*b^3) + 1/216*(7*(a*b^5)^(1
/6)*B*a + 5*(a*b^5)^(1/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sq
rt(x))/(a/b)^(1/6))/(a^2*b^3) + 1/216*(7*(a*b^5)^(1/6)*B*a + 5*(a
*b^5)^(1/6)*A*b)*arctan(-(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^
(1/6))/(a^2*b^3) + 1/108*(7*(a*b^5)^(1/6)*B*a + 5*(a*b^5)^(1/6)*A
```

```
*b)*arctan(sqrt(x)/(a/b)^(1/6))/(a^2*b^3) - 1/36*(13*B*a*b*x^(7/2
) - A*b^2*x^(7/2) + 7*B*a^2*sqrt(x) + 5*A*a*b*sqrt(x))/((b*x^3 +
a)^2*a*b^2)
```

3.173 $\int \frac{x^{3/2}(A+Bx^3)}{(a+bx^3)^3}\,dx$

Optimal. Leaf size=327

$$\frac{(5aB+7Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{13/6}b^{11/6}}-\frac{(5aB+7Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{13/6}b^{11/6}}-\frac{(5aB+7Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{13/6}b^{11/6}}+\frac{(5aB+7Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{13/6}b^{11/6}}+\frac{(5aB+7Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{13/6}b^{11/6}}+\frac{x^{5/2}(5aB+7Ab)}{36a^2b(a+bx^3)}+\frac{x^{5/2}(Ab-aB)}{6ab(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*x^(5/2))/(6*a*b*(a + b*x^3)^2) + ((7*A*b + 5*a*B)*x^
(5/2))/(36*a^2*b*(a + b*x^3)) - ((7*A*b + 5*a*B)*ArcTan[Sqrt[3] -
 (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(13/6)*b^(11/6)) + ((7*A*b
+ 5*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(1
3/6)*b^(11/6)) + ((7*A*b + 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6
)])/(108*a^(13/6)*b^(11/6)) + ((7*A*b + 5*a*B)*Log[a^(1/3) - Sqrt
[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(13/6)*b
^(11/6)) - ((7*A*b + 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(13/6)*b^(11/6))
```

Rubi [A] time = 1.51375, antiderivative size = 327, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.409$

$$\frac{(5aB+7Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{13/6}b^{11/6}}-\frac{(5aB+7Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{13/6}b^{11/6}}-\frac{(5aB+7Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{13/6}b^{11/6}}+\frac{(5aB+7Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{13/6}b^{11/6}}+\frac{(5aB+7Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{13/6}b^{11/6}}+\frac{x^{5/2}(5aB+7Ab)}{36a^2b(a+bx^3)}+\frac{x^{5/2}(Ab-aB)}{6ab(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(3/2)*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - a*B)*x^(5/2))/(6*a*b*(a + b*x^3)^2) + ((7*A*b + 5*a*B)*x^
(5/2))/(36*a^2*b*(a + b*x^3)) - ((7*A*b + 5*a*B)*ArcTan[Sqrt[3] -
 (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(13/6)*b^(11/6)) + ((7*A*b
+ 5*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(1
3/6)*b^(11/6)) + ((7*A*b + 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6
)])/(108*a^(13/6)*b^(11/6)) + ((7*A*b + 5*a*B)*Log[a^(1/3) - Sqrt
[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(13/6)*b
^(11/6)) - ((7*A*b + 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(13/6)*b^(11/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.434342, size = 284, normalized size = 0.87

$$\frac{-\frac{72a^{7/6}b^{5/6}x^{5/2}(aB-Ab)}{(a+bx^3)^2}+\frac{12\sqrt[6]{a}b^{5/6}x^{5/2}(5aB+7Ab)}{a+bx^3}+\sqrt{3}(5aB+7Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)-\sqrt{3}(5aB+7Ab)\log\left(\sqrt{3}\sqrt[6]{}\right.}{432a}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(3/2)*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((-72*a^(7/6)*b^(5/6)*(-(A*b) + a*B)*x^(5/2))/(a + b*x^3)^2 + (12
*a^(1/6)*b^(5/6)*(7*A*b + 5*a*B)*x^(5/2))/(a + b*x^3) - 2*(7*A*b
+ 5*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)] + 2*(7*A*b
 + 5*a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)] + 4*(7*A*
b + 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)] + Sqrt[3]*(7*A*b + 5
*a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x]
- Sqrt[3]*(7*A*b + 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*S
qrt[x] + b^(1/3)*x])/(432*a^(13/6)*b^(11/6))
```

Maple [A] time = 0.063, size = 411, normalized size = 1.3

$$2\frac{1}{(bx^3+a)^2}\left(\frac{(7Ab+5Ba)x^{11/2}}{72a^2}+\frac{(13Ab-Ba)x^{5/2}}{72ab}\right)$$
$$+\frac{7A}{108a^2b}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{5B}{108ab^2}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$+\frac{7\sqrt{3}A}{432a^3}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{5\sqrt{3}B}{432a^2b}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{7A}{216a^2b}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{5B}{216ab^2}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$-\frac{7\sqrt{3}A}{432a^3}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{5\sqrt{3}B}{432a^2b}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{7A}{216a^2b}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{5B}{216ab^2}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)*(B*x^3+A)/(b*x^3+a)^3,x)
```

```
[Out] 2*(1/72*(7*A*b+5*B*a)/a^2*x^(11/2)+1/72*(13*A*b-B*a)/a/b*x^(5/2))
/(b*x^3+a)^2+7/108/a^2/b/(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*
A+5/108/a/b^2/(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*B+7/432/a^3
*(a/b)^(5/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3)
)*A+5/432/a^2/b*(a/b)^(5/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1
/2)+(a/b)^(1/3))*B+7/216/a^2/b/(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1
/2)/(a/b)^(1/6))*A+5/216/a/b^2/(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1
/2)/(a/b)^(1/6))*B-7/432/a^3*3^(1/2)*(a/b)^(5/6)*ln(x+3^(1/2)*(a/
b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A-5/432/a^2/b*3^(1/2)*(a/b)^(5/6)*l
n(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B+7/216/a^2/b/(a/b)^
(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*A+5/216/a/b^2/(a/b)^(
1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.304262, size = 4878, normalized size = 14.92

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/432*(4*sqrt(3)*(a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a^4*b)*(-(15625*B
^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3
*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 1176
49*A^6*b^6)/(a^13*b^11))^(1/6)*arctan(sqrt(3)*a^11*b^9*(-(15625*B
^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3
*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 1176
49*A^6*b^6)/(a^13*b^11))^(5/6)/(a^11*b^9*(-(15625*B^6*a^6 + 13125
0*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 +
 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a
^13*b^11))^(5/6) + 2*(3125*B^5*a^5 + 21875*A*B^4*a^4*b + 61250*A^
2*B^3*a^3*b^2 + 85750*A^3*B^2*a^2*b^3 + 60025*A^4*B*a*b^4 + 16807
*A^5*b^5)*sqrt(x) + 2*sqrt((3125*B^5*a^16*b^9 + 21875*A*B^4*a^15*
b^10 + 61250*A^2*B^3*a^14*b^11 + 85750*A^3*B^2*a^13*b^12 + 60025*
A^4*B*a^12*b^13 + 16807*A^5*a^11*b^14)*sqrt(x)*(-(15625*B^6*a^6 +
 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3
*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b
^6)/(a^13*b^11))^(5/6) + (9765625*B^10*a^10 + 136718750*A*B^9*a^9
*b + 861328125*A^2*B^8*a^8*b^2 + 3215625000*A^3*B^7*a^7*b^3 + 787
8281250*A^4*B^6*a^6*b^4 + 13235512500*A^5*B^5*a^5*b^5 + 154414312
50*A^6*B^4*a^4*b^6 + 12353145000*A^7*B^3*a^3*b^7 + 6485401125*A^8
*B^2*a^2*b^8 + 2017680350*A^9*B*a*b^9 + 282475249*A^10*b^10)*x -
(15625*B^6*a^15*b^7 + 131250*A*B^5*a^14*b^8 + 459375*A^2*B^4*a^13
*b^9 + 857500*A^3*B^3*a^12*b^10 + 900375*A^4*B^2*a^11*b^11 + 5042
10*A^5*B*a^10*b^12 + 117649*A^6*a^9*b^13)*(-(15625*B^6*a^6 + 1312
50*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3
+ 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(
a^13*b^11))^(2/3)))) + 4*sqrt(3)*(a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a
^4*b)*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4*
b^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A^
5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(1/6)*arctan(-sqrt(3)*a^
11*b^9*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4
*b^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A
^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(5/6)/(a^11*b^9*(-(1562
5*B^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*
A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 1
17649*A^6*b^6)/(a^13*b^11))^(5/6) - 2*(3125*B^5*a^5 + 21875*A*B^4
*a^4*b + 61250*A^2*B^3*a^3*b^2 + 85750*A^3*B^2*a^2*b^3 + 60025*A^
4*B*a*b^4 + 16807*A^5*b^5)*sqrt(x) - 2*sqrt(-(3125*B^5*a^16*b^9 +
 21875*A*B^4*a^15*b^10 + 61250*A^2*B^3*a^14*b^11 + 85750*A^3*B^2*
a^13*b^12 + 60025*A^4*B*a^12*b^13 + 16807*A^5*a^11*b^14)*sqrt(x)*
(-(15625*B^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 +
857500*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*
b^5 + 117649*A^6*b^6)/(a^13*b^11))^(5/6) + (9765625*B^10*a^10 + 1
36718750*A*B^9*a^9*b + 861328125*A^2*B^8*a^8*b^2 + 3215625000*A^3
*B^7*a^7*b^3 + 7878281250*A^4*B^6*a^6*b^4 + 13235512500*A^5*B^5*a
^5*b^5 + 15441431250*A^6*B^4*a^4*b^6 + 12353145000*A^7*B^3*a^3*b^
7 + 6485401125*A^8*B^2*a^2*b^8 + 2017680350*A^9*B*a*b^9 + 2824752
49*A^10*b^10)*x - (15625*B^6*a^15*b^7 + 131250*A*B^5*a^14*b^8 + 4
59375*A^2*B^4*a^13*b^9 + 857500*A^3*B^3*a^12*b^10 + 900375*A^4*B^
2*a^11*b^11 + 504210*A^5*B*a^10*b^12 + 117649*A^6*a^9*b^13)*(-(15
```

```
625*B^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 85750
0*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 +
 117649*A^6*b^6)/(a^13*b^11))^(2/3)))) + 2*(a^2*b^3*x^6 + 2*a^3*b
^2*x^3 + a^4*b)*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^
2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 +
 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(1/6)*log(a^11
*b^9*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b
^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 504210*A^5
*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(5/6) + (3125*B^5*a^5 + 2
1875*A*B^4*a^4*b + 61250*A^2*B^3*a^3*b^2 + 85750*A^3*B^2*a^2*b^3
+ 60025*A^4*B*a*b^4 + 16807*A^5*b^5)*sqrt(x)) - 2*(a^2*b^3*x^6 +
2*a^3*b^2*x^3 + a^4*b)*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*b + 45
9375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^
2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(1/6)*l
og(-a^11*b^9*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*b + 459375*A^2*B
^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a^2*b^4 + 50
4210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(5/6) + (3125*B^5
*a^5 + 21875*A*B^4*a^4*b + 61250*A^2*B^3*a^3*b^2 + 85750*A^3*B^2*
a^2*b^3 + 60025*A^4*B*a*b^4 + 16807*A^5*b^5)*sqrt(x)) + (a^2*b^3*
x^6 + 2*a^3*b^2*x^3 + a^4*b)*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*
b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*
B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(
1/6)*log((3125*B^5*a^16*b^9 + 21875*A*B^4*a^15*b^10 + 61250*A^2*B
^3*a^14*b^11 + 85750*A^3*B^2*a^13*b^12 + 60025*A^4*B*a^12*b^13 +
16807*A^5*a^11*b^14)*sqrt(x)*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*
b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*
B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(
5/6) + (9765625*B^10*a^10 + 136718750*A*B^9*a^9*b + 861328125*A^2
*B^8*a^8*b^2 + 3215625000*A^3*B^7*a^7*b^3 + 7878281250*A^4*B^6*a^
6*b^4 + 13235512500*A^5*B^5*a^5*b^5 + 15441431250*A^6*B^4*a^4*b^6
 + 12353145000*A^7*B^3*a^3*b^7 + 6485401125*A^8*B^2*a^2*b^8 + 201
7680350*A^9*B*a*b^9 + 282475249*A^10*b^10)*x - (15625*B^6*a^15*b^
7 + 131250*A*B^5*a^14*b^8 + 459375*A^2*B^4*a^13*b^9 + 857500*A^3*
B^3*a^12*b^10 + 900375*A^4*B^2*a^11*b^11 + 504210*A^5*B*a^10*b^12
 + 117649*A^6*a^9*b^13)*(-(15625*B^6*a^6 + 131250*A*B^5*a^5*b + 4
59375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 900375*A^4*B^2*a
^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*b^11))^(2/3))
 - (a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a^4*b)*(-(15625*B^6*a^6 + 13125
0*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 +
 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a
^13*b^11))^(1/6)*log(-(3125*B^5*a^16*b^9 + 21875*A*B^4*a^15*b^10
+ 61250*A^2*B^3*a^14*b^11 + 85750*A^3*B^2*a^13*b^12 + 60025*A^4*B
*a^12*b^13 + 16807*A^5*a^11*b^14)*sqrt(x)*(-(15625*B^6*a^6 + 1312
50*A*B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3
+ 900375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(
a^13*b^11))^(5/6) + (9765625*B^10*a^10 + 136718750*A*B^9*a^9*b +
861328125*A^2*B^8*a^8*b^2 + 3215625000*A^3*B^7*a^7*b^3 + 78782812
50*A^4*B^6*a^6*b^4 + 13235512500*A^5*B^5*a^5*b^5 + 15441431250*A^
6*B^4*a^4*b^6 + 12353145000*A^7*B^3*a^3*b^7 + 6485401125*A^8*B^2*
a^2*b^8 + 2017680350*A^9*B*a*b^9 + 282475249*A^10*b^10)*x - (1562
5*B^6*a^15*b^7 + 131250*A*B^5*a^14*b^8 + 459375*A^2*B^4*a^13*b^9
+ 857500*A^3*B^3*a^12*b^10 + 900375*A^4*B^2*a^11*b^11 + 504210*A^
5*B*a^10*b^12 + 117649*A^6*a^9*b^13)*(-(15625*B^6*a^6 + 131250*A*
B^5*a^5*b + 459375*A^2*B^4*a^4*b^2 + 857500*A^3*B^3*a^3*b^3 + 900
375*A^4*B^2*a^2*b^4 + 504210*A^5*B*a*b^5 + 117649*A^6*b^6)/(a^13*
b^11))^(2/3)) + 12*((5*B*a*b + 7*A*b^2)*x^5 - (B*a^2 - 13*A*a*b)*
x^2)*sqrt(x))/(a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a^4*b)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)*(B*x**3+A)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.272418, size = 443, normalized size = 1.35

$$\frac{5\,Babx^{\frac{11}{2}} + 7\,Ab^2x^{\frac{11}{2}} - Ba^2x^{\frac{5}{2}} + 13\,Aabx^{\frac{5}{2}}}{36\,(bx^3+a)^2a^2b} - \frac{\sqrt{3}\left(5\,\left(ab^5\right)^{\frac{5}{6}}Ba + 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}} + x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^3b^6} + \frac{\sqrt{3}\left(5\,\left(ab^5\right)^{\frac{5}{6}}Ba + 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}} + x + \left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^3b^6} + \frac{\left(5\,\left(ab^5\right)^{\frac{5}{6}}Ba + 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}} + 2\,\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^3b^6} + \frac{\left(5\,\left(ab^5\right)^{\frac{5}{6}}Ba + 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}} - 2\,\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^3b^6} + \frac{\left(5\,\left(ab^5\right)^{\frac{5}{6}}Ba + 7\,\left(ab^5\right)^{\frac{5}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{108\,a^3b^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^(3/2)/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] 1/36*(5*B*a*b*x^(11/2) + 7*A*b^2*x^(11/2) - B*a^2*x^(5/2) + 13*A*
a*b*x^(5/2))/((b*x^3 + a)^2*a^2*b) - 1/432*sqrt(3)*(5*(a*b^5)^(5/
6)*B*a + 7*(a*b^5)^(5/6)*A*b)*ln(sqrt(3)*sqrt(x)*(a/b)^(1/6) + x
+ (a/b)^(1/3))/(a^3*b^6) + 1/432*sqrt(3)*(5*(a*b^5)^(5/6)*B*a + 7
*(a*b^5)^(5/6)*A*b)*ln(-sqrt(3)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(
1/3))/(a^3*b^6) + 1/216*(5*(a*b^5)^(5/6)*B*a + 7*(a*b^5)^(5/6)*A*
b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))/(a/b)^(1/6))/(a^3*b^6
) + 1/216*(5*(a*b^5)^(5/6)*B*a + 7*(a*b^5)^(5/6)*A*b)*arctan(-(sq
rt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6))/(a^3*b^6) + 1/108*(5*
(a*b^5)^(5/6)*B*a + 7*(a*b^5)^(5/6)*A*b)*arctan(sqrt(x)/(a/b)^(1/
6))/(a^3*b^6)
```

3.174 $\int \frac{\sqrt{x}(A+Bx^3)}{(a+bx^3)^3} \, dx$

Optimal. Leaf size=104

$$\frac{(aB+3Ab)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{12a^{5/2}b^{3/2}}+\frac{x^{3/2}(aB+3Ab)}{12a^2b\,(a+bx^3)}+\frac{x^{3/2}(Ab-aB)}{6ab\,(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*x^(3/2))/(6*a*b*(a + b*x^3)^2) + ((3*A*b + a*B)*x^(3
/2))/(12*a^2*b*(a + b*x^3)) + ((3*A*b + a*B)*ArcTan[(Sqrt[b]*x^(3
/2))/Sqrt[a]])/(12*a^(5/2)*b^(3/2))
```

Rubi [A] time = 0.169202, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{(aB+3Ab)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{12a^{5/2}b^{3/2}}+\frac{x^{3/2}(aB+3Ab)}{12a^2b\,(a+bx^3)}+\frac{x^{3/2}(Ab-aB)}{6ab\,(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[x]*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((A*b - a*B)*x^(3/2))/(6*a*b*(a + b*x^3)^2) + ((3*A*b + a*B)*x^(3
/2))/(12*a^2*b*(a + b*x^3)) + ((3*A*b + a*B)*ArcTan[(Sqrt[b]*x^(3
/2))/Sqrt[a]])/(12*a^(5/2)*b^(3/2))
```

Rubi in Sympy [A] time = 19.3505, size = 88, normalized size = 0.85

$$\frac{x^{\frac{3}{2}}\,(Ab-Ba)}{6ab\,(a+bx^3)^2}+\frac{x^{\frac{3}{2}}\,(3Ab+Ba)}{12a^2b\,(a+bx^3)}+\frac{(3Ab+Ba)\,\mathrm{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{12a^{\frac{5}{2}}b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*x**(1/2)/(b*x**3+a)**3,x)
```

```
[Out] x**(3/2)*(A*b - B*a)/(6*a*b*(a + b*x**3)**2) + x**(3/2)*(3*A*b +
B*a)/(12*a**2*b*(a + b*x**3)) + (3*A*b + B*a)*atan(sqrt(b)*x**(3/
2)/sqrt(a))/(12*a**(5/2)*b**(3/2))
```

Mathematica [A] time = 0.256254, size = 176, normalized size = 1.69

$$\frac{-\frac{2a^{3/2}\sqrt{b}x^{3/2}(aB-Ab)}{(a+bx^3)^2}+\frac{\sqrt{a}\sqrt{b}x^{3/2}(aB+3Ab)}{a+bx^3}-(aB+3Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)+(aB+3Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)-(aB+3Ab)}{12a^{5/2}b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[x]*(A + B*x^3))/(a + b*x^3)^3,x]
```

```
[Out] ((-2*a^(3/2)*Sqrt[b]*(-(A*b) + a*B)*x^(3/2))/(a + b*x^3)^2 + (Sqr
t[a]*Sqrt[b]*(3*A*b + a*B)*x^(3/2))/(a + b*x^3) - (3*A*b + a*B)*A
rcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)] + (3*A*b + a*B)*ArcT
an[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)] - (3*A*b + a*B)*ArcTan[
(b^(1/6)*Sqrt[x])/a^(1/6)])/(12*a^(5/2)*b^(3/2))
```

Maple [A] time = 0.013, size = 97, normalized size = 0.9

$$\frac{2}{3\left(bx^{3}+a\right)^{2}}\left(\frac{3Ab+Ba}{8a^{2}}x^{\frac{9}{2}}+\frac{5Ab-Ba}{8ab}x^{\frac{3}{2}}\right)+\frac{A}{4a^{2}}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}+\frac{B}{12ab}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*x^(1/2)/(b*x^3+a)^3,x)
```

```
[Out] 2/3*(1/8*(3*A*b+B*a)/a^2*x^(9/2)+1/8*(5*A*b-B*a)/a/b*x^(3/2))/(b*
x^3+a)^2+1/4/a^2/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*A+1/12
/a/b/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.253216, size = 1, normalized size = 0.01

$$\left[\frac{2\left(\left(Bab+3Ab^{2}\right)x^{4}-\left(Ba^{2}-5Aab\right)x\right)\sqrt{-ab}\sqrt{x}+\left(\left(Bab^{2}+3Ab^{3}\right)x^{6}+Ba^{3}+3Aa^{2}b+2\left(Ba^{2}b+3Aab^{2}\right)x^{3}\right)\log\left(\frac{2abx^{\frac{3}{2}}+\cdots}{\cdots}\right.}{24\left(a^{2}b^{3}x^{6}+2a^{3}b^{2}x^{3}+a^{4}b\right)\sqrt{-ab}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a)^3,x, algorithm="fricas")
```

```
[Out] [1/24*(2*((B*a*b + 3*A*b^2)*x^4 - (B*a^2 - 5*A*a*b)*x)*sqrt(-a*b)
*sqrt(x) + ((B*a*b^2 + 3*A*b^3)*x^6 + B*a^3 + 3*A*a^2*b + 2*(B*a^
2*b + 3*A*a*b^2)*x^3)*log((2*a*b*x^(3/2) + (b*x^3 - a)*sqrt(-a*b)
)/(b*x^3 + a)))/((a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a^4*b)*sqrt(-a*b)
), 1/12*(((B*a*b + 3*A*b^2)*x^4 - (B*a^2 - 5*A*a*b)*x)*sqrt(a*b)*
sqrt(x) + ((B*a*b^2 + 3*A*b^3)*x^6 + B*a^3 + 3*A*a^2*b + 2*(B*a^2
*b + 3*A*a*b^2)*x^3)*arctan(sqrt(a*b)*x^(3/2)/a))/((a^2*b^3*x^6 +
 2*a^3*b^2*x^3 + a^4*b)*sqrt(a*b))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*x**(1/2)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223794, size = 113, normalized size = 1.09

$$\frac{(Ba + 3\,Ab)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{12\,\sqrt{ab}a^2b} + \frac{Babx^{\frac{9}{2}} + 3\,Ab^2x^{\frac{9}{2}} - Ba^2x^{\frac{3}{2}} + 5\,Aabx^{\frac{3}{2}}}{12\,(bx^3 + a)^2a^2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(x)/(b*x^3 + a)^3,x, algorithm="giac")
```

```
[Out] 1/12*(B*a + 3*A*b)*arctan(b*x^(3/2)/sqrt(a*b))/(sqrt(a*b)*a^2*b)
+ 1/12*(B*a*b*x^(9/2) + 3*A*b^2*x^(9/2) - B*a^2*x^(3/2) + 5*A*a*b
*x^(3/2))/((b*x^3 + a)^2*a^2*b)
```

3.175 $\int \frac{A+Bx^3}{\sqrt{x}(a+bx^3)^3}\,dx$

Optimal. Leaf size=321

$$-\frac{5(aB+11Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{17/6}b^{7/6}}+\frac{5(aB+11Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{17/6}b^{7/6}}-\frac{5(aB+11Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{17/6}b^{7/6}}+\frac{5(aB+11Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{17/6}b^{7/6}}+\frac{5(aB+11Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{17/6}b^{7/6}}+\frac{\sqrt{x}(aB+11Ab)}{36a^2b\,(a+bx^3)}+\frac{\sqrt{x}(Ab-aB)}{6ab\,(a+bx^3)^2}$$

```
[Out] ((A*b - a*B)*Sqrt[x])/(6*a*b*(a + b*x^3)^2) + ((11*A*b + a*B)*Sqr
t[x])/(36*a^2*b*(a + b*x^3)) - (5*(11*A*b + a*B)*ArcTan[Sqrt[3] -
 (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(17/6)*b^(7/6)) + (5*(11*A*
b + a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(1
7/6)*b^(7/6)) + (5*(11*A*b + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6
)])/(108*a^(17/6)*b^(7/6)) - (5*(11*A*b + a*B)*Log[a^(1/3) - Sqrt
[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(17/6)*b
^(7/6)) + (5*(11*A*b + a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(17/6)*b^(7/6))
```

Rubi [A] time = 1.32588, antiderivative size = 321, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.409$

$$-\frac{5(aB+11Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{17/6}b^{7/6}}+\frac{5(aB+11Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{17/6}b^{7/6}}-\frac{5(aB+11Ab)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{17/6}b^{7/6}}+\frac{5(aB+11Ab)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{17/6}b^{7/6}}+\frac{5(aB+11Ab)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{17/6}b^{7/6}}+\frac{\sqrt{x}(aB+11Ab)}{36a^2b\,(a+bx^3)}+\frac{\sqrt{x}(Ab-aB)}{6ab\,(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(Sqrt[x]*(a + b*x^3)^3),x]
```


```
[Out] ((A*b - a*B)*Sqrt[x])/(6*a*b*(a + b*x^3)^2) + ((11*A*b + a*B)*Sqr
t[x])/(36*a^2*b*(a + b*x^3)) - (5*(11*A*b + a*B)*ArcTan[Sqrt[3] -
 (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(17/6)*b^(7/6)) + (5*(11*A*
b + a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(1
7/6)*b^(7/6)) + (5*(11*A*b + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6
)])/(108*a^(17/6)*b^(7/6)) - (5*(11*A*b + a*B)*Log[a^(1/3) - Sqrt
[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(17/6)*b
^(7/6)) + (5*(11*A*b + a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(17/6)*b^(7/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)**3/x**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.491396, size = 279, normalized size = 0.87

$$-\frac{72a^{11/6}\sqrt[6]{b}\sqrt{x}(aB-Ab)}{(a+bx^3)^2}+\frac{12a^{5/6}\sqrt[6]{b}\sqrt{x}(aB+11Ab)}{a+bx^3}-5\sqrt{3}(aB+11Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)+5\sqrt{3}(aB+11Ab)\log\left(\sqrt{3}\right.$$

43

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(Sqrt[x]*(a + b*x^3)^3),x]
```

```
[Out] ((-72*a^(11/6)*b^(1/6)*(-(A*b) + a*B)*Sqrt[x])/(a + b*x^3)^2 + (1
2*a^(5/6)*b^(1/6)*(11*A*b + a*B)*Sqrt[x])/(a + b*x^3) - 10*(11*A*
b + a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)] + 10*(11*A
*b + a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)] + 20*(11*
A*b + a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)] - 5*Sqrt[3]*(11*A*b
+ a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x]
 + 5*Sqrt[3]*(11*A*b + a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)
*Sqrt[x] + b^(1/3)*x])/(432*a^(17/6)*b^(7/6))
```

Maple [A] time = 0.063, size = 401, normalized size = 1.3

$$2\frac{1}{(bx^3+a)^2}\left(\frac{(11\,Ab+Ba)\,x^{7/2}}{72\,a^2}+\frac{(17\,Ab-5\,Ba)\,\sqrt{x}}{72\,ab}\right)$$
$$+\frac{55\,A}{108\,a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{5\,B}{108\,a^2b}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$-\frac{55\,\sqrt{3}A}{432\,a^3}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)-\frac{5\,\sqrt{3}B}{432\,a^2b}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{55\,A}{216\,a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{5\,B}{216\,a^2b}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$+\frac{55\,\sqrt{3}A}{432\,a^3}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{5\,\sqrt{3}B}{432\,a^2b}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$+\frac{55\,A}{216\,a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)+\frac{5\,B}{216\,a^2b}\sqrt[6]{\frac{a}{b}}\arctan\left(2\,\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)^3/x^(1/2),x)
```

```
[Out] 2*(1/72*(11*A*b+B*a)/a^2*x^(7/2)+1/72*(17*A*b-5*B*a)/a/b*x^(1/2))
/(b*x^3+a)^2+55/108/a^3*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*A
+5/108/a^2/b*(a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))*B-55/432/a^3
*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3)
)*A-5/432/a^2/b*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1
/2)+(a/b)^(1/3))*B+55/216/a^3*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/
2)/(a/b)^(1/6))*A+5/216/a^2/b*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/
2)/(a/b)^(1/6))*B+55/432/a^3*3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*(a/
b)^(1/6)*x^(1/2)+(a/b)^(1/3))*A+5/432/a^2/b*3^(1/2)*(a/b)^(1/6)*l
n(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))*B+55/216/a^3*(a/b)^(
1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*A+5/216/a^2/b*(a/b)^(1
/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^3*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.283801, size = 3148, normalized size = 9.81

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^3*sqrt(x)),x, algorithm="fricas")
```

```
[Out] -1/432*(20*sqrt(3)*(a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a^4*b)*(-(B^6*a
^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^
3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6*b^6
)/(a^17*b^7))^(1/6)*arctan(sqrt(3)*a^3*b*(-(B^6*a^6 + 66*A*B^5*a^
5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^3 + 219615*A^4*B
^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1
/6)/(a^3*b*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 2
6620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^
5 + 1771561*A^6*b^6)/(a^17*b^7))^(1/6) + 2*(B*a + 11*A*b)*sqrt(x)
 + 2*sqrt(a^6*b^2*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*
b^2 + 26620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5
*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1/3) + (B^2*a^2 + 22*A*B
*a*b + 121*A^2*b^2)*x + (B*a^4*b + 11*A*a^3*b^2)*sqrt(x)*(-(B^6*a
^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^
3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6*b^6
)/(a^17*b^7))^(1/6)))) + 20*sqrt(3)*(a^2*b^3*x^6 + 2*a^3*b^2*x^3
+ a^4*b)*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 266
20*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5
+ 1771561*A^6*b^6)/(a^17*b^7))^(1/6)*arctan(-sqrt(3)*a^3*b*(-(B^6
*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*
b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6*b
^6)/(a^17*b^7))^(1/6)/(a^3*b*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A
^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 +
 966306*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1/6) - 2*(B*a
 + 11*A*b)*sqrt(x) - 2*sqrt(a^6*b^2*(-(B^6*a^6 + 66*A*B^5*a^5*b +
 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^
2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1/3) +
 (B^2*a^2 + 22*A*B*a*b + 121*A^2*b^2)*x - (B*a^4*b + 11*A*a^3*b^2
)*sqrt(x)*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26
620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5
 + 1771561*A^6*b^6)/(a^17*b^7))^(1/6)))) - 5*(a^2*b^3*x^6 + 2*a^3
*b^2*x^3 + a^4*b)*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*
b^2 + 26620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5
*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1/6)*log(25*a^6*b^2*(-(B
^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^
3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6
*b^6)/(a^17*b^7))^(1/3) + 25*(B^2*a^2 + 22*A*B*a*b + 121*A^2*b^2)
*x + 25*(B*a^4*b + 11*A*a^3*b^2)*sqrt(x)*(-(B^6*a^6 + 66*A*B^5*a^
5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^3 + 219615*A^4*B
^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1
/6)) + 5*(a^2*b^3*x^6 + 2*a^3*b^2*x^3 + a^4*b)*(-(B^6*a^6 + 66*A*
B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^3 + 219615
*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^
7))^(1/6)*log(25*a^6*b^2*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B
^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966
306*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1/3) + 25*(B^2*a^
2 + 22*A*B*a*b + 121*A^2*b^2)*x - 25*(B*a^4*b + 11*A*a^3*b^2)*sqr
t(x)*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A
^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 17
71561*A^6*b^6)/(a^17*b^7))^(1/6)) - 10*(a^2*b^3*x^6 + 2*a^3*b^2*x
```

```
^3 + a^4*b)*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 +
26620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b
^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1/6)*log(5*a^3*b*(-(B^6*a^6 +
66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a^3*b^3 + 2
19615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^
17*b^7))^(1/6) + 5*(B*a + 11*A*b)*sqrt(x)) + 10*(a^2*b^3*x^6 + 2*
a^3*b^2*x^3 + a^4*b)*(-(B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a
^4*b^2 + 26620*A^3*B^3*a^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*
A^5*B*a*b^5 + 1771561*A^6*b^6)/(a^17*b^7))^(1/6)*log(-5*a^3*b*(-(
B^6*a^6 + 66*A*B^5*a^5*b + 1815*A^2*B^4*a^4*b^2 + 26620*A^3*B^3*a
^3*b^3 + 219615*A^4*B^2*a^2*b^4 + 966306*A^5*B*a*b^5 + 1771561*A^
6*b^6)/(a^17*b^7))^(1/6) + 5*(B*a + 11*A*b)*sqrt(x)) - 12*((B*a*b
 + 11*A*b^2)*x^3 - 5*B*a^2 + 17*A*a*b)*sqrt(x))/(a^2*b^3*x^6 + 2*
a^3*b^2*x^3 + a^4*b)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a)**3/x**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.240282, size = 435, normalized size = 1.36

$$\frac{5\sqrt{3}\left(\left(ab^5\right)^{\frac{1}{6}}Ba+11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^3b^2} - \frac{5\sqrt{3}\left(\left(ab^5\right)^{\frac{1}{6}}Ba+11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^3b^2} + \frac{5\left(\left(ab^5\right)^{\frac{1}{6}}Ba+11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^3b^2} + \frac{5\left(\left(ab^5\right)^{\frac{1}{6}}Ba+11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^3b^2} + \frac{5\left(\left(ab^5\right)^{\frac{1}{6}}Ba+11\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{108\,a^3b^2} + \frac{Babx^{\frac{7}{2}}+11\,Ab^2x^{\frac{7}{2}}-5\,Ba^2\sqrt{x}+17\,Aab\sqrt{x}}{36\left(bx^3+a\right)^2a^2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*sqrt(x)),x, algorithm="giac")
```

```
[Out] 5/432*sqrt(3)*((a*b^5)^(1/6)*B*a + 11*(a*b^5)^(1/6)*A*b)*ln(sqrt(
3)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^3*b^2) - 5/432*sqrt(
3)*((a*b^5)^(1/6)*B*a + 11*(a*b^5)^(1/6)*A*b)*ln(-sqrt(3)*sqrt(x)
*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^3*b^2) + 5/216*((a*b^5)^(1/6)*
B*a + 11*(a*b^5)^(1/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(
x))/(a/b)^(1/6))/(a^3*b^2) + 5/216*((a*b^5)^(1/6)*B*a + 11*(a*b^5
)^(1/6)*A*b)*arctan(-(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6
))/(a^3*b^2) + 5/108*((a*b^5)^(1/6)*B*a + 11*(a*b^5)^(1/6)*A*b)*a
rctan(sqrt(x)/(a/b)^(1/6))/(a^3*b^2) + 1/36*(B*a*b*x^(7/2) + 11*A
*b^2*x^(7/2) - 5*B*a^2*sqrt(x) + 17*A*a*b*sqrt(x))/((b*x^3 + a)^2
*a^2*b)
```

3.176 $\int \frac{A+Bx^3}{x^{3/2}(a+bx^3)^3}\,dx$

Optimal. Leaf size=351

$$-\frac{7(13Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{19/6}b^{5/6}}+\frac{7(13Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{19/6}b^{5/6}}+\frac{7(13Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{19/6}b^{5/6}}-\frac{7(13Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{19/6}b^{5/6}}-\frac{7(13Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{19/6}b^{5/6}}-\frac{7(13Ab-aB)}{36a^3b\sqrt{x}}+\frac{13Ab-aB}{36a^2b\sqrt{x}(a+bx^3)}+\frac{Ab-aB}{6ab\sqrt{x}(a+bx^3)^2}$$

```
[Out] (-7*(13*A*b - a*B))/(36*a^3*b*Sqrt[x]) + (A*b - a*B)/(6*a*b*Sqrt[
x]*(a + b*x^3)^2) + (13*A*b - a*B)/(36*a^2*b*Sqrt[x]*(a + b*x^3))
 + (7*(13*A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)
])/(216*a^(19/6)*b^(5/6)) - (7*(13*A*b - a*B)*ArcTan[Sqrt[3] + (2
*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(19/6)*b^(5/6)) - (7*(13*A*b -
 a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(108*a^(19/6)*b^(5/6)) -
 (7*(13*A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x]
+ b^(1/3)*x])/(144*Sqrt[3]*a^(19/6)*b^(5/6)) + (7*(13*A*b - a*B)*
Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*
Sqrt[3]*a^(19/6)*b^(5/6))
```

Rubi [A] time = 1.61154, antiderivative size = 351, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 10, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.454$

$$-\frac{7(13Ab-aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{19/6}b^{5/6}}+\frac{7(13Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{19/6}b^{5/6}}+\frac{7(13Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{19/6}b^{5/6}}-\frac{7(13Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{19/6}b^{5/6}}-\frac{7(13Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{19/6}b^{5/6}}-\frac{7(13Ab-aB)}{36a^3b\sqrt{x}}+\frac{13Ab-aB}{36a^2b\sqrt{x}(a+bx^3)}+\frac{Ab-aB}{6ab\sqrt{x}(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(3/2)*(a + b*x^3)^3),x]
```


```
[Out] (-7*(13*A*b - a*B))/(36*a^3*b*Sqrt[x]) + (A*b - a*B)/(6*a*b*Sqrt[
x]*(a + b*x^3)^2) + (13*A*b - a*B)/(36*a^2*b*Sqrt[x]*(a + b*x^3))
 + (7*(13*A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)
])/(216*a^(19/6)*b^(5/6)) - (7*(13*A*b - a*B)*ArcTan[Sqrt[3] + (2
*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(19/6)*b^(5/6)) - (7*(13*A*b -
 a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(108*a^(19/6)*b^(5/6)) -
 (7*(13*A*b - a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x]
+ b^(1/3)*x])/(144*Sqrt[3]*a^(19/6)*b^(5/6)) + (7*(13*A*b - a*B)*
Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*
Sqrt[3]*a^(19/6)*b^(5/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(3/2)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.673809, size = 306, normalized size = 0.87

$$\frac{\frac{72a^{7/6}x^{5/2}(aB-Ab)}{(a+bx^3)^2}+\frac{7\sqrt{3}(aB-13Ab)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{5/6}}+\frac{7\sqrt{3}(13Ab-aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{b^{5/6}}+\frac{14(13Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{\ldots}}{\sqrt[6]{\ldots}}\ldots\right)}{b^{5/6}}\ldots}{432a^{19/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(3/2)*(a + b*x^3)^3),x]
```

```
[Out] ((-864*a^(1/6)*A)/Sqrt[x] + (72*a^(7/6)*(-(A*b) + a*B)*x^(5/2))/(
a + b*x^3)^2 + (12*a^(1/6)*(-19*A*b + 7*a*B)*x^(5/2))/(a + b*x^3)
 + (14*(13*A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6
)])/b^(5/6) - (14*(13*A*b - a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt
[x])/a^(1/6)])/b^(5/6) + (28*(-13*A*b + a*B)*ArcTan[(b^(1/6)*Sqrt
[x])/a^(1/6)])/b^(5/6) + (7*Sqrt[3]*(-13*A*b + a*B)*Log[a^(1/3) -
 Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/b^(5/6) + (7*Sqrt[
3]*(13*A*b - a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] +
 b^(1/3)*x])/b^(5/6))/(432*a^(19/6))
```

Maple [A] time = 0.069, size = 435, normalized size = 1.2

$$-2\,\frac{A}{a^3\sqrt{x}}-\frac{19\,b^2A}{36\,a^3\,(bx^3+a)^2}x^{\frac{11}{2}}+\frac{7\,Bb}{36\,a^2\,(bx^3+a)^2}x^{\frac{11}{2}}-\frac{25\,Ab}{36\,a^2\,(bx^3+a)^2}x^{\frac{5}{2}}+\frac{13\,B}{36\,a\,(bx^3+a)^2}x^{\frac{5}{2}}$$
$$-\frac{91\,A}{108\,a^3}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}-\frac{91\,Ab\sqrt{3}}{432\,a^4}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{91\,A}{216\,a^3}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{91\,Ab\sqrt{3}}{432\,a^4}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{91\,A}{216\,a^3}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}+\frac{7\,B}{108\,a^2b}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$+\frac{7\,B\sqrt{3}}{432\,a^3}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{7\,B}{216\,a^2b}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$
$$-\frac{7\,B\sqrt{3}}{432\,a^3}\left(\frac{a}{b}\right)^{\frac{5}{6}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{7\,B}{216\,a^2b}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)\frac{1}{\sqrt[6]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(3/2)/(b*x^3+a)^3,x)
```

```
[Out] -2*A/a^3/x^(1/2)-19/36/a^3/(b*x^3+a)^2*x^(11/2)*b^2*A+7/36/a^2/(b
*x^3+a)^2*x^(11/2)*b*B-25/36/a^2/(b*x^3+a)^2*A*x^(5/2)*b+13/36/a/
(b*x^3+a)^2*B*x^(5/2)-91/108/a^3*A/(a/b)^(1/6)*arctan(x^(1/2)/(a/
b)^(1/6))-91/432/a^4*A*b*(a/b)^(5/6)*3^(1/2)*ln(x-3^(1/2)*(a/b)^(
1/6)*x^(1/2)+(a/b)^(1/3))-91/216/a^3*A/(a/b)^(1/6)*arctan(-3^(1/2
)+2*x^(1/2)/(a/b)^(1/6))+91/432/a^4*A*b*3^(1/2)*(a/b)^(5/6)*ln(x+
3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))-91/216/a^3*A/(a/b)^(1/6)
```

```
*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))+7/108/a^2*B/b/(a/b)^(1/6)*
arctan(x^(1/2)/(a/b)^(1/6))+7/432/a^3*B*(a/b)^(5/6)*3^(1/2)*ln(x-
3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))+7/216/a^2*B/b/(a/b)^(1/6
)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))-7/432/a^3*B*3^(1/2)*(a/b
)^(5/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))+7/216/a^2*B
/b/(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.299662, size = 4833, normalized size = 13.77

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(3/2)),x, algorithm="fricas")
```

```
[Out] 1/432*(84*(B*a*b - 13*A*b^2)*x^6 + 156*(B*a^2 - 13*A*a*b)*x^3 - 2
8*sqrt(3)*(a^3*b^2*x^6 + 2*a^4*b*x^3 + a^5)*sqrt(x)*(-(B^6*a^6 -
78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 4
28415*A^4*B^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a
^19*b^5))^(1/6)*arctan(16807*sqrt(3)*a^16*b^4*(-(B^6*a^6 - 78*A*B
^5*a^5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*
A^4*B^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^
5))^(5/6)/(16807*a^16*b^4*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*
B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 22
27758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(5/6) - 33614*(B
^5*a^5 - 65*A*B^4*a^4*b + 1690*A^2*B^3*a^3*b^2 - 21970*A^3*B^2*a^
2*b^3 + 142805*A^4*B*a*b^4 - 371293*A^5*b^5)*sqrt(x) + 2*sqrt(-28
2475249*(B^5*a^21*b^4 - 65*A*B^4*a^20*b^5 + 1690*A^2*B^3*a^19*b^6
 - 21970*A^3*B^2*a^18*b^7 + 142805*A^4*B*a^17*b^8 - 371293*A^5*a^
16*b^9)*sqrt(x)*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^
2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 2227758*A^5*
B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(5/6) + 282475249*(B^10*a^
10 - 130*A*B^9*a^9*b + 7605*A^2*B^8*a^8*b^2 - 263640*A^3*B^7*a^7*
b^3 + 5997810*A^4*B^6*a^6*b^4 - 93565836*A^5*B^5*a^5*b^5 + 101362
9890*A^6*B^4*a^4*b^6 - 7529822040*A^7*B^3*a^3*b^7 + 36707882445*A
^8*B^2*a^2*b^8 - 106044993730*A^9*B*a*b^9 + 137858491849*A^10*b^1
0)*x - 282475249*(B^6*a^19*b^3 - 78*A*B^5*a^18*b^4 + 2535*A^2*B^4
*a^17*b^5 - 43940*A^3*B^3*a^16*b^6 + 428415*A^4*B^2*a^15*b^7 - 22
27758*A^5*B*a^14*b^8 + 4826809*A^6*a^13*b^9)*(-(B^6*a^6 - 78*A*B^
5*a^5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A
^4*B^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5
))^(2/3)))) - 28*sqrt(3)*(a^3*b^2*x^6 + 2*a^4*b*x^3 + a^5)*sqrt(x
)*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*
B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826
809*A^6*b^6)/(a^19*b^5))^(1/6)*arctan(-sqrt(3)*a^16*b^4*(-(B^6*a^
6 - 78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3
 + 428415*A^4*B^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6
)/(a^19*b^5))^(5/6)/(a^16*b^4*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*
A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4
- 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(5/6) + 2*(B
^5*a^5 - 65*A*B^4*a^4*b + 1690*A^2*B^3*a^3*b^2 - 21970*A^3*B^2*a^
2*b^3 + 142805*A^4*B*a*b^4 - 371293*A^5*b^5)*sqrt(x) - 2*sqrt((B^
5*a^21*b^4 - 65*A*B^4*a^20*b^5 + 1690*A^2*B^3*a^19*b^6 - 21970*A^
3*B^2*a^18*b^7 + 142805*A^4*B*a^17*b^8 - 371293*A^5*a^16*b^9)*sqr
t(x)*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A
```

```
^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4
826809*A^6*b^6)/(a^19*b^5))^(5/6) + (B^10*a^10 - 130*A*B^9*a^9*b
+ 7605*A^2*B^8*a^8*b^2 - 263640*A^3*B^7*a^7*b^3 + 5997810*A^4*B^6
*a^6*b^4 - 93565836*A^5*B^5*a^5*b^5 + 1013629890*A^6*B^4*a^4*b^6
- 7529822040*A^7*B^3*a^3*b^7 + 36707882445*A^8*B^2*a^2*b^8 - 1060
44993730*A^9*B*a*b^9 + 137858491849*A^10*b^10)*x - (B^6*a^19*b^3
- 78*A*B^5*a^18*b^4 + 2535*A^2*B^4*a^17*b^5 - 43940*A^3*B^3*a^16*
b^6 + 428415*A^4*B^2*a^15*b^7 - 2227758*A^5*B*a^14*b^8 + 4826809*
A^6*a^13*b^9)*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^2
- 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 2227758*A^5*B*
a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(2/3)))) - 864*A*a^2 - 14*(a
^3*b^2*x^6 + 2*a^4*b*x^3 + a^5)*sqrt(x)*(-(B^6*a^6 - 78*A*B^5*a^5
*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^
2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(1
/6)*log(16807*a^16*b^4*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*B^4
*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 22277
58*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(5/6) - 16807*(B^5*
a^5 - 65*A*B^4*a^4*b + 1690*A^2*B^3*a^3*b^2 - 21970*A^3*B^2*a^2*b
^3 + 142805*A^4*B*a*b^4 - 371293*A^5*b^5)*sqrt(x)) + 14*(a^3*b^2*
x^6 + 2*a^4*b*x^3 + a^5)*sqrt(x)*(-(B^6*a^6 - 78*A*B^5*a^5*b + 25
35*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b
^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(1/6)*log
(-16807*a^16*b^4*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b
^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 2227758*A^5
*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(5/6) - 16807*(B^5*a^5 -
65*A*B^4*a^4*b + 1690*A^2*B^3*a^3*b^2 - 21970*A^3*B^2*a^2*b^3 + 1
42805*A^4*B*a*b^4 - 371293*A^5*b^5)*sqrt(x)) + 7*(a^3*b^2*x^6 + 2
*a^4*b*x^3 + a^5)*sqrt(x)*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*
B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 22
27758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(1/6)*log(282475
249*(B^5*a^21*b^4 - 65*A*B^4*a^20*b^5 + 1690*A^2*B^3*a^19*b^6 - 2
1970*A^3*B^2*a^18*b^7 + 142805*A^4*B*a^17*b^8 - 371293*A^5*a^16*b
^9)*sqrt(x)*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^2 -
43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 2227758*A^5*B*a*
b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(5/6) + 282475249*(B^10*a^10 -
 130*A*B^9*a^9*b + 7605*A^2*B^8*a^8*b^2 - 263640*A^3*B^7*a^7*b^3
+ 5997810*A^4*B^6*a^6*b^4 - 93565836*A^5*B^5*a^5*b^5 + 1013629890
*A^6*B^4*a^4*b^6 - 7529822040*A^7*B^3*a^3*b^7 + 36707882445*A^8*B
^2*a^2*b^8 - 106044993730*A^9*B*a*b^9 + 137858491849*A^10*b^10)*x
 - 282475249*(B^6*a^19*b^3 - 78*A*B^5*a^18*b^4 + 2535*A^2*B^4*a^1
7*b^5 - 43940*A^3*B^3*a^16*b^6 + 428415*A^4*B^2*a^15*b^7 - 222775
8*A^5*B*a^14*b^8 + 4826809*A^6*a^13*b^9)*(-(B^6*a^6 - 78*A*B^5*a^
5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B
^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(
2/3)) - 7*(a^3*b^2*x^6 + 2*a^4*b*x^3 + a^5)*sqrt(x)*(-(B^6*a^6 -
78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 4
28415*A^4*B^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a
^19*b^5))^(1/6)*log(-282475249*(B^5*a^21*b^4 - 65*A*B^4*a^20*b^5
+ 1690*A^2*B^3*a^19*b^6 - 21970*A^3*B^2*a^18*b^7 + 142805*A^4*B*a
^17*b^8 - 371293*A^5*a^16*b^9)*sqrt(x)*(-(B^6*a^6 - 78*A*B^5*a^5*
b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3*B^3*a^3*b^3 + 428415*A^4*B^2
*a^2*b^4 - 2227758*A^5*B*a*b^5 + 4826809*A^6*b^6)/(a^19*b^5))^(5/
6) + 282475249*(B^10*a^10 - 130*A*B^9*a^9*b + 7605*A^2*B^8*a^8*b^
2 - 263640*A^3*B^7*a^7*b^3 + 5997810*A^4*B^6*a^6*b^4 - 93565836*A
^5*B^5*a^5*b^5 + 1013629890*A^6*B^4*a^4*b^6 - 7529822040*A^7*B^3*
a^3*b^7 + 36707882445*A^8*B^2*a^2*b^8 - 106044993730*A^9*B*a*b^9
+ 137858491849*A^10*b^10)*x - 282475249*(B^6*a^19*b^3 - 78*A*B^5*
a^18*b^4 + 2535*A^2*B^4*a^17*b^5 - 43940*A^3*B^3*a^16*b^6 + 42841
5*A^4*B^2*a^15*b^7 - 2227758*A^5*B*a^14*b^8 + 4826809*A^6*a^13*b^
9)*(-(B^6*a^6 - 78*A*B^5*a^5*b + 2535*A^2*B^4*a^4*b^2 - 43940*A^3
*B^3*a^3*b^3 + 428415*A^4*B^2*a^2*b^4 - 2227758*A^5*B*a*b^5 + 482
6809*A^6*b^6)/(a^19*b^5))^(2/3)))/((a^3*b^2*x^6 + 2*a^4*b*x^3 + a
^5)*sqrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(3/2)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.307894, size = 444, normalized size = 1.26

$$-\frac{2\,A}{a^{3}\sqrt{x}}+\frac{7\,Babx^{\frac{11}{2}}-19\,Ab^{2}x^{\frac{11}{2}}+13\,Ba^{2}x^{\frac{5}{2}}-25\,Aabx^{\frac{5}{2}}}{36\,(bx^{3}+a)^{2}a^{3}}-\frac{7\,\sqrt{3}\Big(\left(ab^{5}\right)^{\frac{5}{6}}Ba-13\,\left(ab^{5}\right)^{\frac{5}{6}}Ab\Big)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^{4}b^{5}}+\frac{7\,\sqrt{3}\Big(\left(ab^{5}\right)^{\frac{5}{6}}Ba-13\,\left(ab^{5}\right)^{\frac{5}{6}}Ab\Big)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^{4}b^{5}}+\frac{7\left(\left(ab^{5}\right)^{\frac{5}{6}}Ba-13\,\left(ab^{5}\right)^{\frac{5}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\,\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^{4}b^{5}}+\frac{7\left(\left(ab^{5}\right)^{\frac{5}{6}}Ba-13\,\left(ab^{5}\right)^{\frac{5}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\,\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^{4}b^{5}}+\frac{7\left(\left(ab^{5}\right)^{\frac{5}{6}}Ba-13\,\left(ab^{5}\right)^{\frac{5}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{108\,a^{4}b^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(3/2)),x, algorithm="giac")
```

```
[Out] -2*A/(a^3*sqrt(x)) + 1/36*(7*B*a*b*x^(11/2) - 19*A*b^2*x^(11/2) +
 13*B*a^2*x^(5/2) - 25*A*a*b*x^(5/2))/((b*x^3 + a)^2*a^3) - 7/432
*sqrt(3)*((a*b^5)^(5/6)*B*a - 13*(a*b^5)^(5/6)*A*b)*ln(sqrt(3)*sq
rt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^4*b^5) + 7/432*sqrt(3)*((
a*b^5)^(5/6)*B*a - 13*(a*b^5)^(5/6)*A*b)*ln(-sqrt(3)*sqrt(x)*(a/b
)^(1/6) + x + (a/b)^(1/3))/(a^4*b^5) + 7/216*((a*b^5)^(5/6)*B*a -
 13*(a*b^5)^(5/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*sqrt(x))/(
a/b)^(1/6))/(a^4*b^5) + 7/216*((a*b^5)^(5/6)*B*a - 13*(a*b^5)^(5/
6)*A*b)*arctan(-(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b)^(1/6))/(a
^4*b^5) + 7/108*((a*b^5)^(5/6)*B*a - 13*(a*b^5)^(5/6)*A*b)*arctan
(sqrt(x)/(a/b)^(1/6))/(a^4*b^5)
```

3.177 $\int \frac{A+Bx^3}{x^{5/2}(a+bx^3)^3} \, dx$

Optimal. Leaf size=130

$$-\frac{(5Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{4a^{7/2}\sqrt{b}}-\frac{5Ab-aB}{4a^3bx^{3/2}}+\frac{5Ab-aB}{12a^2bx^{3/2}(a+bx^3)}+\frac{Ab-aB}{6abx^{3/2}(a+bx^3)^2}$$

```
[Out] -(5*A*b - a*B)/(4*a^3*b*x^(3/2)) + (A*b - a*B)/(6*a*b*x^(3/2)*(a
+ b*x^3)^2) + (5*A*b - a*B)/(12*a^2*b*x^(3/2)*(a + b*x^3)) - ((5*
A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a]])/(4*a^(7/2)*Sqrt[b])
```

Rubi [A] time = 0.211944, antiderivative size = 130, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$-\frac{(5Ab-aB)\tan^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a}}\right)}{4a^{7/2}\sqrt{b}}-\frac{5Ab-aB}{4a^3bx^{3/2}}+\frac{5Ab-aB}{12a^2bx^{3/2}(a+bx^3)}+\frac{Ab-aB}{6abx^{3/2}(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(5/2)*(a + b*x^3)^3),x]
```

```
[Out] -(5*A*b - a*B)/(4*a^3*b*x^(3/2)) + (A*b - a*B)/(6*a*b*x^(3/2)*(a
+ b*x^3)^2) + (5*A*b - a*B)/(12*a^2*b*x^(3/2)*(a + b*x^3)) - ((5*
A*b - a*B)*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a]])/(4*a^(7/2)*Sqrt[b])
```

Rubi in Sympy [A] time = 23.6294, size = 109, normalized size = 0.84

$$\frac{Ab-Ba}{6abx^{\frac{3}{2}}(a+bx^3)^2}+\frac{5Ab-Ba}{12a^2bx^{\frac{3}{2}}(a+bx^3)}-\frac{5Ab-Ba}{4a^3bx^{\frac{3}{2}}}-\frac{(5Ab-Ba)\operatorname{atan}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{4a^{\frac{7}{2}}\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(5/2)/(b*x**3+a)**3,x)
```

```
[Out] (A*b - B*a)/(6*a*b*x**(3/2)*(a + b*x**3)**2) + (5*A*b - B*a)/(12*
a**2*b*x**(3/2)*(a + b*x**3)) - (5*A*b - B*a)/(4*a**3*b*x**(3/2))
 - (5*A*b - B*a)*atan(sqrt(b)*x**(3/2)/sqrt(a))/(4*a**(7/2)*sqrt(
b))
```

Mathematica [A] time = 0.337097, size = 194, normalized size = 1.49

$$\frac{\frac{2a^{3/2}x^{3/2}(aB-Ab)}{(a+bx^3)^2}+\frac{\sqrt{a}x^{3/2}(3aB-7Ab)}{a+bx^3}+\frac{3(5Ab-aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{\sqrt{b}}-\frac{3(5Ab-aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{\sqrt{b}}+\frac{3(5Ab-aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{\sqrt{b}}-\frac{8\sqrt{a}A}{x^{3/2}}}{12a^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(5/2)*(a + b*x^3)^3),x]
```

```
[Out] ((-8*Sqrt[a]*A)/x^(3/2) + (2*a^(3/2)*(-(A*b) + a*B)*x^(3/2))/(a +
 b*x^3)^2 + (Sqrt[a]*(-7*A*b + 3*a*B)*x^(3/2))/(a + b*x^3) + (3*(
5*A*b - a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/a^(1/6)])/Sqrt[
b] - (3*(5*A*b - a*B)*ArcTan[Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6
```

```
)])/Sqrt[b] + (3*(5*A*b - a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])
/Sqrt[b])/(12*a^(7/2))
```

Maple [A] time = 0.028, size = 133, normalized size = 1.

$$-\frac{2A}{3a^3}x^{-\frac{3}{2}}-\frac{7b^2A}{12a^3(bx^3+a)^2}x^{\frac{9}{2}}+\frac{Bb}{4a^2(bx^3+a)^2}x^{\frac{9}{2}}-\frac{3Ab}{4a^2(bx^3+a)^2}x^{\frac{3}{2}}+\frac{5B}{12a(bx^3+a)^2}x^{\frac{3}{2}}-\frac{5Ab}{4a^3}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}+\frac{B}{4a^2}\arctan\left(bx^{\frac{3}{2}}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(5/2)/(b*x^3+a)^3,x)
```

```
[Out] -2/3*A/a^3/x^(3/2)-7/12/a^3/(b*x^3+a)^2*x^(9/2)*b^2*A+1/4/a^2/(b*
x^3+a)^2*x^(9/2)*b*B-3/4/a^2/(b*x^3+a)^2*A*x^(3/2)*b+5/12/a/(b*x^
3+a)^2*B*x^(3/2)-5/4/a^3/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2)
)*A*b+1/4/a^2/(a*b)^(1/2)*arctan(x^(3/2)*b/(a*b)^(1/2))*B
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(5/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.292869, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(\left(Bab^2-5Ab^3\right)x^7+2\left(Ba^2b-5Aab^2\right)x^4+\left(Ba^3-5Aa^2b\right)x\right)\sqrt{x}\log\left(-\frac{2abx^{\frac{3}{2}}-(bx^3-a)\sqrt{-ab}}{bx^3+a}\right)-2\left(3\left(Bab-5Ab^2\right)x^6-\right.}{24(a^3b^2x^7+2a^4bx^4+a^5x)\sqrt{-ab}\sqrt{x}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(5/2)),x, algorithm="fricas")
```

```
[Out] [-1/24*(3*((B*a*b^2 - 5*A*b^3)*x^7 + 2*(B*a^2*b - 5*A*a*b^2)*x^4
+ (B*a^3 - 5*A*a^2*b)*x)*sqrt(x)*log(-(2*a*b*x^(3/2) - (b*x^3 - a
)*sqrt(-a*b))/(b*x^3 + a)) - 2*(3*(B*a*b - 5*A*b^2)*x^6 + 5*(B*a^
2 - 5*A*a*b)*x^3 - 8*A*a^2)*sqrt(-a*b))/((a^3*b^2*x^7 + 2*a^4*b*x
^4 + a^5*x)*sqrt(-a*b)*sqrt(x)), 1/12*(3*((B*a*b^2 - 5*A*b^3)*x^7
 + 2*(B*a^2*b - 5*A*a*b^2)*x^4 + (B*a^3 - 5*A*a^2*b)*x)*sqrt(x)*a
rctan(sqrt(a*b)*x^(3/2)/a) + (3*(B*a*b - 5*A*b^2)*x^6 + 5*(B*a^2
- 5*A*a*b)*x^3 - 8*A*a^2)*sqrt(a*b))/((a^3*b^2*x^7 + 2*a^4*b*x^4
+ a^5*x)*sqrt(a*b)*sqrt(x))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(5/2)/(b*x**3+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220152, size = 119, normalized size = 0.92

$$\frac{(Ba - 5\,Ab)\arctan\left(\frac{bx^{\frac{3}{2}}}{\sqrt{ab}}\right)}{4\,\sqrt{ab}a^3} - \frac{2\,A}{3\,a^3x^{\frac{3}{2}}} + \frac{3\,Babx^{\frac{9}{2}} - 7\,Ab^2x^{\frac{9}{2}} + 5\,Ba^2x^{\frac{3}{2}} - 9\,Aabx^{\frac{3}{2}}}{12\,(bx^3 + a)^2a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(5/2)),x, algorithm="giac")
```

```
[Out] 1/4*(B*a - 5*A*b)*arctan(b*x^(3/2)/sqrt(a*b))/(sqrt(a*b)*a^3) - 2
/3*A/(a^3*x^(3/2)) + 1/12*(3*B*a*b*x^(9/2) - 7*A*b^2*x^(9/2) + 5*
B*a^2*x^(3/2) - 9*A*a*b*x^(3/2))/((b*x^3 + a)^2*a^3)
```

3.178 $\int \frac{A+Bx^3}{x^{7/2}(a+bx^3)^3}\,dx$

Optimal. Leaf size=351

$$\frac{11(17Ab-5aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{23/6}\sqrt[6]{b}}-\frac{11(17Ab-5aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{23/6}\sqrt[6]{b}}+\frac{11(17Ab-5aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{23/6}\sqrt[6]{b}}-\frac{11(17Ab-5aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{23/6}\sqrt[6]{b}}-\frac{11(17Ab-5aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{23/6}\sqrt[6]{b}}-\frac{11(17Ab-5aB)}{180a^3bx^{5/2}}+\frac{17Ab-5aB}{36a^2bx^{5/2}(a+bx^3)}+\frac{Ab-aB}{6abx^{5/2}(a+bx^3)^2}$$

```
[Out] (-11*(17*A*b - 5*a*B))/(180*a^3*b*x^(5/2)) + (A*b - a*B)/(6*a*b*x
^(5/2)*(a + b*x^3)^2) + (17*A*b - 5*a*B)/(36*a^2*b*x^(5/2)*(a + b
*x^3)) + (11*(17*A*b - 5*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x]
)/a^(1/6)])/(216*a^(23/6)*b^(1/6)) - (11*(17*A*b - 5*a*B)*ArcTan[
Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(23/6)*b^(1/6)) -
(11*(17*A*b - 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(108*a^(2
3/6)*b^(1/6)) + (11*(17*A*b - 5*a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6
)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(23/6)*b^(1/6)) -
(11*(17*A*b - 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x
] + b^(1/3)*x])/(144*Sqrt[3]*a^(23/6)*b^(1/6))
```

Rubi [A] time = 1.20533, antiderivative size = 351, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 10, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.454$

$$\frac{11(17Ab-5aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{23/6}\sqrt[6]{b}}-\frac{11(17Ab-5aB)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{144\sqrt{3}a^{23/6}\sqrt[6]{b}}+\frac{11(17Ab-5aB)\tan^{-1}\left(\sqrt{3}-\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{216a^{23/6}\sqrt[6]{b}}-\frac{11(17Ab-5aB)\tan^{-1}\left(\frac{2\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}+\sqrt{3}\right)}{216a^{23/6}\sqrt[6]{b}}-\frac{11(17Ab-5aB)\tan^{-1}\left(\frac{\sqrt[6]{b}\sqrt{x}}{\sqrt[6]{a}}\right)}{108a^{23/6}\sqrt[6]{b}}-\frac{11(17Ab-5aB)}{180a^3bx^{5/2}}+\frac{17Ab-5aB}{36a^2bx^{5/2}(a+bx^3)}+\frac{Ab-aB}{6abx^{5/2}(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^(7/2)*(a + b*x^3)^3),x]
```

```
[Out] (-11*(17*A*b - 5*a*B))/(180*a^3*b*x^(5/2)) + (A*b - a*B)/(6*a*b*x
^(5/2)*(a + b*x^3)^2) + (17*A*b - 5*a*B)/(36*a^2*b*x^(5/2)*(a + b
*x^3)) + (11*(17*A*b - 5*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x]
)/a^(1/6)])/(216*a^(23/6)*b^(1/6)) - (11*(17*A*b - 5*a*B)*ArcTan[
Sqrt[3] + (2*b^(1/6)*Sqrt[x])/a^(1/6)])/(216*a^(23/6)*b^(1/6)) -
(11*(17*A*b - 5*a*B)*ArcTan[(b^(1/6)*Sqrt[x])/a^(1/6)])/(108*a^(2
3/6)*b^(1/6)) + (11*(17*A*b - 5*a*B)*Log[a^(1/3) - Sqrt[3]*a^(1/6
)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/(144*Sqrt[3]*a^(23/6)*b^(1/6)) -
(11*(17*A*b - 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x
] + b^(1/3)*x])/(144*Sqrt[3]*a^(23/6)*b^(1/6))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**(7/2)/(b*x**3+a)**3,x)
```

[Out] Timed out

Mathematica [A] time = 0.735093, size = 308, normalized size = 0.88

$$\frac{\frac{360a^{11/6}\sqrt{x}(aB-Ab)}{(a+bx^3)^2}+\frac{60a^{5/6}\sqrt{x}(11aB-23Ab)}{a+bx^3}-\frac{864a^{5/6}A}{x^{5/2}}+\frac{55\sqrt{3}(17Ab-5aB)\log\left(-\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}+\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt[6]{b}}+\frac{55\sqrt{3}(5aB-17Ab)\log\left(\sqrt{3}\sqrt[6]{a}\sqrt[6]{b}\sqrt{x}\right.}{\sqrt[6]{b}}}{2160a^{23/6}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^(7/2)*(a + b*x^3)^3),x]
```

```
[Out] ((-864*a^(5/6)*A)/x^(5/2) + (360*a^(11/6)*(-(A*b) + a*B)*Sqrt[x])
/(a + b*x^3)^2 + (60*a^(5/6)*(-23*A*b + 11*a*B)*Sqrt[x])/(a + b*x
^3) + (110*(17*A*b - 5*a*B)*ArcTan[Sqrt[3] - (2*b^(1/6)*Sqrt[x])/
a^(1/6)])/b^(1/6) - (110*(17*A*b - 5*a*B)*ArcTan[Sqrt[3] + (2*b^(
1/6)*Sqrt[x])/a^(1/6)])/b^(1/6) + (220*(-17*A*b + 5*a*B)*ArcTan[(
b^(1/6)*Sqrt[x])/a^(1/6)])/b^(1/6) + (55*Sqrt[3]*(17*A*b - 5*a*B)
*Log[a^(1/3) - Sqrt[3]*a^(1/6)*b^(1/6)*Sqrt[x] + b^(1/3)*x])/b^(1
/6) + (55*Sqrt[3]*(-17*A*b + 5*a*B)*Log[a^(1/3) + Sqrt[3]*a^(1/6)
*b^(1/6)*Sqrt[x] + b^(1/3)*x])/b^(1/6))/(2160*a^(23/6))
```

Maple [A] time = 0.068, size = 429, normalized size = 1.2

$$-\frac{2A}{5a^3}x^{-\frac{5}{2}}-\frac{23b^2A}{36a^3(bx^3+a)^2}x^{\frac{7}{2}}+\frac{11Bb}{36a^2(bx^3+a)^2}x^{\frac{7}{2}}-\frac{29Ab}{36a^2(bx^3+a)^2}\sqrt{x}+\frac{17B}{36a(bx^3+a)^2}\sqrt{x}$$
$$-\frac{187Ab}{108a^4}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)+\frac{187Ab\sqrt{3}}{432a^4}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{187Ab}{216a^4}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)-\frac{187Ab\sqrt{3}}{432a^4}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)$$
$$-\frac{187Ab}{216a^4}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)+\frac{55B}{108a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(1\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$-\frac{55B\sqrt{3}}{432a^3}\sqrt[6]{\frac{a}{b}}\ln\left(x-\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{55B}{216a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(-\sqrt{3}+2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}\right)$$
$$+\frac{55B\sqrt{3}}{432a^3}\sqrt[6]{\frac{a}{b}}\ln\left(x+\sqrt{3}\sqrt[6]{\frac{a}{b}}\sqrt{x}+\sqrt[3]{\frac{a}{b}}\right)+\frac{55B}{216a^3}\sqrt[6]{\frac{a}{b}}\arctan\left(2\sqrt{x}\frac{1}{\sqrt[6]{\frac{a}{b}}}+\sqrt{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^(7/2)/(b*x^3+a)^3,x)
```

```
[Out] -2/5*A/a^3/x^(5/2)-23/36/a^3/(b*x^3+a)^2*x^(7/2)*b^2*A+11/36/a^2/
(b*x^3+a)^2*x^(7/2)*b*B-29/36/a^2/(b*x^3+a)^2*A*x^(1/2)*b+17/36/a
/(b*x^3+a)^2*B*x^(1/2)-187/108/a^4*A*b*(a/b)^(1/6)*arctan(x^(1/2)
/(a/b)^(1/6))+187/432/a^4*A*b*3^(1/2)*(a/b)^(1/6)*ln(x-3^(1/2)*(a
/b)^(1/6)*x^(1/2)+(a/b)^(1/3))-187/216/a^4*A*b*(a/b)^(1/6)*arctan
(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))-187/432/a^4*A*b*3^(1/2)*(a/b)^(1
/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))-187/216/a^4*A*b
```

```
*(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))+55/108/a^3*B*(
a/b)^(1/6)*arctan(x^(1/2)/(a/b)^(1/6))-55/432/a^3*B*3^(1/2)*(a/b)
^(1/6)*ln(x-3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))+55/216/a^3*B
*(a/b)^(1/6)*arctan(-3^(1/2)+2*x^(1/2)/(a/b)^(1/6))+55/432/a^3*B*
3^(1/2)*(a/b)^(1/6)*ln(x+3^(1/2)*(a/b)^(1/6)*x^(1/2)+(a/b)^(1/3))
+55/216/a^3*B*(a/b)^(1/6)*arctan(2*x^(1/2)/(a/b)^(1/6)+3^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(7/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.290089, size = 3190, normalized size = 9.09

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(7/2)),x, algorithm="fricas")
```

```
[Out] 1/2160*(132*(5*B*a*b - 17*A*b^2)*x^6 + 204*(5*B*a^2 - 17*A*a*b)*x
^3 + 220*sqrt(3)*(a^3*b^2*x^8 + 2*a^4*b*x^5 + a^5*x^2)*sqrt(x)*(-
(15625*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 1
2282500*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5
*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/6)*arctan(-sqrt(3)*a^4*
(-(15625*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 -
 12282500*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*A
^5*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/6)/(a^4*(-(15625*B^6*
a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3
*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 +
24137569*A^6*b^6)/(a^23*b))^(1/6) + 2*(5*B*a - 17*A*b)*sqrt(x) -
2*sqrt(a^8*(-(15625*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^
4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 -
 42595710*A^5*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/3) + (25*B
^2*a^2 - 170*A*B*a*b + 289*A^2*b^2)*x + (5*B*a^5 - 17*A*a^4*b)*sq
rt(x)*(-(15625*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4
*b^2 - 12282500*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 4259
5710*A^5*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/6)))) + 220*sqr
t(3)*(a^3*b^2*x^8 + 2*a^4*b*x^5 + a^5*x^2)*sqrt(x)*(-(15625*B^6*a
^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*
B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 2
4137569*A^6*b^6)/(a^23*b))^(1/6)*arctan(sqrt(3)*a^4*(-(15625*B^6*
a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3
*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 +
24137569*A^6*b^6)/(a^23*b))^(1/6)/(a^4*(-(15625*B^6*a^6 - 318750*
A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^3
+ 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 24137569*A^6*
b^6)/(a^23*b))^(1/6) - 2*(5*B*a - 17*A*b)*sqrt(x) + 2*sqrt(a^8*(-
(15625*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 1
2282500*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5
*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/3) + (25*B^2*a^2 - 170*
A*B*a*b + 289*A^2*b^2)*x - (5*B*a^5 - 17*A*a^4*b)*sqrt(x)*(-(1562
5*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 122825
00*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*
b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/6)))) - 864*A*a^2 + 55*(a^3*
b^2*x^8 + 2*a^4*b*x^5 + a^5*x^2)*sqrt(x)*(-(15625*B^6*a^6 - 31875
0*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^
3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 24137569*A^
6*b^6)/(a^23*b))^(1/6)*log(121*a^8*(-(15625*B^6*a^6 - 318750*A*B^
5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^3 + 31
```

```
320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 24137569*A^6*b^6)
/(a^23*b))^(1/3) + 121*(25*B^2*a^2 - 170*A*B*a*b + 289*A^2*b^2)*x
 + 121*(5*B*a^5 - 17*A*a^4*b)*sqrt(x)*(-(15625*B^6*a^6 - 318750*A
*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^3 +
 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 24137569*A^6*b
^6)/(a^23*b))^(1/6)) - 55*(a^3*b^2*x^8 + 2*a^4*b*x^5 + a^5*x^2)*s
qrt(x)*(-(15625*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^
4*b^2 - 12282500*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 425
95710*A^5*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/6)*log(121*a^8
*(-(15625*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2
- 12282500*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 42595710*
A^5*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/3) + 121*(25*B^2*a^2
 - 170*A*B*a*b + 289*A^2*b^2)*x - 121*(5*B*a^5 - 17*A*a^4*b)*sqrt
(x)*(-(15625*B^6*a^6 - 318750*A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b
^2 - 12282500*A^3*B^3*a^3*b^3 + 31320375*A^4*B^2*a^2*b^4 - 425957
10*A^5*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b))^(1/6)) - 110*(a^3*b^
2*x^8 + 2*a^4*b*x^5 + a^5*x^2)*sqrt(x)*(-(15625*B^6*a^6 - 318750*
A*B^5*a^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^3
+ 31320375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 24137569*A^6*
b^6)/(a^23*b))^(1/6)*log(11*a^4*(-(15625*B^6*a^6 - 318750*A*B^5*a
^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^3 + 31320
375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 24137569*A^6*b^6)/(a
^23*b))^(1/6) - 11*(5*B*a - 17*A*b)*sqrt(x)) + 110*(a^3*b^2*x^8 +
 2*a^4*b*x^5 + a^5*x^2)*sqrt(x)*(-(15625*B^6*a^6 - 318750*A*B^5*a
^5*b + 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^3 + 31320
375*A^4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 24137569*A^6*b^6)/(a
^23*b))^(1/6)*log(-11*a^4*(-(15625*B^6*a^6 - 318750*A*B^5*a^5*b +
 2709375*A^2*B^4*a^4*b^2 - 12282500*A^3*B^3*a^3*b^3 + 31320375*A^
4*B^2*a^2*b^4 - 42595710*A^5*B*a*b^5 + 24137569*A^6*b^6)/(a^23*b)
)^(1/6) - 11*(5*B*a - 17*A*b)*sqrt(x)))/((a^3*b^2*x^8 + 2*a^4*b*x
^5 + a^5*x^2)*sqrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**(7/2)/(b*x**3+a)**3,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.242714, size = 451, normalized size = 1.28

$$\frac{11\sqrt{3}\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-17\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^4b}-\frac{11\sqrt{3}\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-17\left(ab^5\right)^{\frac{1}{6}}Ab\right)\ln\left(-\sqrt{3}\sqrt{x}\left(\frac{a}{b}\right)^{\frac{1}{6}}+x+\left(\frac{a}{b}\right)^{\frac{1}{3}}\right)}{432\,a^4b}+\frac{11\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-17\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}+2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^4b}+\frac{11\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-17\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(-\frac{\sqrt{3}\left(\frac{a}{b}\right)^{\frac{1}{6}}-2\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{216\,a^4b}+\frac{11\left(5\left(ab^5\right)^{\frac{1}{6}}Ba-17\left(ab^5\right)^{\frac{1}{6}}Ab\right)\arctan\left(\frac{\sqrt{x}}{\left(\frac{a}{b}\right)^{\frac{1}{6}}}\right)}{108\,a^4b}+\frac{11\,Babx^{\frac{7}{2}}-23\,Ab^2x^{\frac{7}{2}}+17\,Ba^2\sqrt{x}-29\,Aab\sqrt{x}}{36\left(bx^3+a\right)^2a^3}-\frac{2\,A}{5\,a^3x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^3*x^(7/2)),x, algorithm="giac")
```

```
[Out] 11/432*sqrt(3)*(5*(a*b^5)^(1/6)*B*a - 17*(a*b^5)^(1/6)*A*b)*ln(sq
rt(3)*sqrt(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^4*b) - 11/432*sqr
t(3)*(5*(a*b^5)^(1/6)*B*a - 17*(a*b^5)^(1/6)*A*b)*ln(-sqrt(3)*sqr
t(x)*(a/b)^(1/6) + x + (a/b)^(1/3))/(a^4*b) + 11/216*(5*(a*b^5)^(
1/6)*B*a - 17*(a*b^5)^(1/6)*A*b)*arctan((sqrt(3)*(a/b)^(1/6) + 2*
sqrt(x))/(a/b)^(1/6))/(a^4*b) + 11/216*(5*(a*b^5)^(1/6)*B*a - 17*
(a*b^5)^(1/6)*A*b)*arctan(-(sqrt(3)*(a/b)^(1/6) - 2*sqrt(x))/(a/b
)^(1/6))/(a^4*b) + 11/108*(5*(a*b^5)^(1/6)*B*a - 17*(a*b^5)^(1/6)
*A*b)*arctan(sqrt(x)/(a/b)^(1/6))/(a^4*b) + 1/36*(11*B*a*b*x^(7/2
) - 23*A*b^2*x^(7/2) + 17*B*a^2*sqrt(x) - 29*A*a*b*sqrt(x))/((b*x
^3 + a)^2*a^3) - 2/5*A/(a^3*x^(5/2))
```

3.179 $\int x^8\sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=103

$$\frac{2a^2\left(a+bx^3\right)^{3/2}(Ab-aB)}{9b^4}+\frac{2\left(a+bx^3\right)^{7/2}(Ab-3aB)}{21b^4}-\frac{2a\left(a+bx^3\right)^{5/2}(2Ab-3aB)}{15b^4}+\frac{2B\left(a+bx^3\right)^{9/2}}{27b^4}$$

```
[Out] (2*a^2*(A*b - a*B)*(a + b*x^3)^(3/2))/(9*b^4) - (2*a*(2*A*b - 3*a
*B)*(a + b*x^3)^(5/2))/(15*b^4) + (2*(A*b - 3*a*B)*(a + b*x^3)^(7
/2))/(21*b^4) + (2*B*(a + b*x^3)^(9/2))/(27*b^4)
```

Rubi [A] time = 0.255381, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2a^2\left(a+bx^3\right)^{3/2}(Ab-aB)}{9b^4}+\frac{2\left(a+bx^3\right)^{7/2}(Ab-3aB)}{21b^4}-\frac{2a\left(a+bx^3\right)^{5/2}(2Ab-3aB)}{15b^4}+\frac{2B\left(a+bx^3\right)^{9/2}}{27b^4}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*a^2*(A*b - a*B)*(a + b*x^3)^(3/2))/(9*b^4) - (2*a*(2*A*b - 3*a
*B)*(a + b*x^3)^(5/2))/(15*b^4) + (2*(A*b - 3*a*B)*(a + b*x^3)^(7
/2))/(21*b^4) + (2*B*(a + b*x^3)^(9/2))/(27*b^4)
```

Rubi in Sympy [A] time = 22.3575, size = 99, normalized size = 0.96

$$\frac{2B\left(a+bx^3\right)^{\frac{9}{2}}}{27b^4}+\frac{2a^2\left(a+bx^3\right)^{\frac{3}{2}}(Ab-Ba)}{9b^4}-\frac{2a\left(a+bx^3\right)^{\frac{5}{2}}(2Ab-3Ba)}{15b^4}+\frac{2\left(a+bx^3\right)^{\frac{7}{2}}(Ab-3Ba)}{21b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(9/2)/(27*b**4) + 2*a**2*(a + b*x**3)**(3/2)*(A
*b - B*a)/(9*b**4) - 2*a*(a + b*x**3)**(5/2)*(2*A*b - 3*B*a)/(15*
b**4) + 2*(a + b*x**3)**(7/2)*(A*b - 3*B*a)/(21*b**4)
```

Mathematica [A] time = 0.0931103, size = 75, normalized size = 0.73

$$\frac{2\left(a+bx^3\right)^{3/2}\left(-16a^3B+24a^2b\left(A+Bx^3\right)-6ab^2x^3\left(6A+5Bx^3\right)+5b^3x^6\left(9A+7Bx^3\right)\right)}{945b^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*(a + b*x^3)^(3/2)*(-16*a^3*B + 24*a^2*b*(A + B*x^3) - 6*a*b^2*
x^3*(6*A + 5*B*x^3) + 5*b^3*x^6*(9*A + 7*B*x^3)))/(945*b^4)
```

Maple [A] time = 0.01, size = 77, normalized size = 0.8

$$\frac{70\,Bx^9b^3+90\,Ab^3x^6-60\,Bab^2x^6-72\,Aab^2x^3+48\,Ba^2bx^3+48\,Aa^2b-32\,Ba^3}{945\,b^4}\left(bx^3+a\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^8*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] 2/945*(b*x^3+a)^(3/2)*(35*B*b^3*x^9+45*A*b^3*x^6-30*B*a*b^2*x^6-3
6*A*a*b^2*x^3+24*B*a^2*b*x^3+24*A*a^2*b-16*B*a^3)/b^4
```

Maxima [A] time = 1.37814, size = 159, normalized size = 1.54

$$\frac{2}{945}\,B\left(\frac{35\left(bx^3+a\right)^{\frac{9}{2}}}{b^4}-\frac{135\left(bx^3+a\right)^{\frac{7}{2}}a}{b^4}+\frac{189\left(bx^3+a\right)^{\frac{5}{2}}a^2}{b^4}-\frac{105\left(bx^3+a\right)^{\frac{3}{2}}a^3}{b^4}\right)+\frac{2}{315}\,A\left(\frac{15\left(bx^3+a\right)^{\frac{7}{2}}}{b^3}-\frac{42\left(bx^3+a\right)^{\frac{5}{2}}a}{b^3}+\frac{35\left(bx^3+a\right)^{\frac{3}{2}}a^2}{b^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^8,x, algorithm="maxima")
```

```
[Out] 2/945*B*(35*(b*x^3 + a)^(9/2)/b^4 - 135*(b*x^3 + a)^(7/2)*a/b^4 +
 189*(b*x^3 + a)^(5/2)*a^2/b^4 - 105*(b*x^3 + a)^(3/2)*a^3/b^4) +
 2/315*A*(15*(b*x^3 + a)^(7/2)/b^3 - 42*(b*x^3 + a)^(5/2)*a/b^3 +
 35*(b*x^3 + a)^(3/2)*a^2/b^3)
```

Fricas [A] time = 0.239531, size = 134, normalized size = 1.3

$$\frac{2\left(35\,Bb^4x^{12}+5\left(Bab^3+9\,Ab^4\right)x^9-3\left(2\,Ba^2b^2-3\,Aab^3\right)x^6-16\,Ba^4+24\,Aa^3b+4\left(2\,Ba^3b-3\,Aa^2b^2\right)x^3\right)\sqrt{bx^3+a}}{945\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^8,x, algorithm="fricas")
```

```
[Out] 2/945*(35*B*b^4*x^12 + 5*(B*a*b^3 + 9*A*b^4)*x^9 - 3*(2*B*a^2*b^2
 - 3*A*a*b^3)*x^6 - 16*B*a^4 + 24*A*a^3*b + 4*(2*B*a^3*b - 3*A*a^
2*b^2)*x^3)*sqrt(b*x^3 + a)/b^4
```

Sympy [A] time = 11.2344, size = 219, normalized size = 2.13

$$\begin{cases}\frac{16Aa^3\sqrt{a+bx^3}}{315b^3}-\frac{8Aa^2x^3\sqrt{a+bx^3}}{315b^2}+\frac{2Aax^6\sqrt{a+bx^3}}{105b}+\frac{2Ax^9\sqrt{a+bx^3}}{21}-\frac{32Ba^4\sqrt{a+bx^3}}{945b^4}+\frac{16Ba^3x^3\sqrt{a+bx^3}}{945b^3}-\frac{4Ba^2x^6\sqrt{a+bx^3}}{315b^2}+\frac{2Bax^9\sqrt{a+bx^3}}{189b}+2 \\ \sqrt{a}\left(\frac{Ax^9}{9}+\frac{Bx^{12}}{12}\right)\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**8*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] Piecewise((16*A*a**3*sqrt(a + b*x**3)/(315*b**3) - 8*A*a**2*x**3*
sqrt(a + b*x**3)/(315*b**2) + 2*A*a*x**6*sqrt(a + b*x**3)/(105*b)
 + 2*A*x**9*sqrt(a + b*x**3)/21 - 32*B*a**4*sqrt(a + b*x**3)/(945
*b**4) + 16*B*a**3*x**3*sqrt(a + b*x**3)/(945*b**3) - 4*B*a**2*x*
*6*sqrt(a + b*x**3)/(315*b**2) + 2*B*a*x**9*sqrt(a + b*x**3)/(189
*b) + 2*B*x**12*sqrt(a + b*x**3)/27, Ne(b, 0)), (sqrt(a)*(A*x**9/
9 + B*x**12/12), True))
```

GIAC/XCAS [A] time = 0.217445, size = 144, normalized size = 1.4

$$\frac{2\left(\frac{3\left(15\left(bx^3+a\right)^{\frac{7}{2}}-42\left(bx^3+a\right)^{\frac{5}{2}}a+35\left(bx^3+a\right)^{\frac{3}{2}}a^2\right)A}{b^2}+\frac{\left(35\left(bx^3+a\right)^{\frac{9}{2}}-135\left(bx^3+a\right)^{\frac{7}{2}}a+189\left(bx^3+a\right)^{\frac{5}{2}}a^2-105\left(bx^3+a\right)^{\frac{3}{2}}a^3\right)B}{b^3}\right)}{945\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^8,x, algorithm="giac")
```

```
[Out] 2/945*(3*(15*(b*x^3 + a)^(7/2) - 42*(b*x^3 + a)^(5/2)*a + 35*(b*x
^3 + a)^(3/2)*a^2)*A/b^2 + (35*(b*x^3 + a)^(9/2) - 135*(b*x^3 + a
)^(7/2)*a + 189*(b*x^3 + a)^(5/2)*a^2 - 105*(b*x^3 + a)^(3/2)*a^3
)*B/b^3)/b
```

3.180 $\int x^5\sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=73

$$\frac{2\left(a+bx^3\right)^{5/2}(Ab-2aB)}{15b^3}-\frac{2a\left(a+bx^3\right)^{3/2}(Ab-aB)}{9b^3}+\frac{2B\left(a+bx^3\right)^{7/2}}{21b^3}$$

```
[Out] (-2*a*(A*b - a*B)*(a + b*x^3)^(3/2))/(9*b^3) + (2*(A*b - 2*a*B)*(
a + b*x^3)^(5/2))/(15*b^3) + (2*B*(a + b*x^3)^(7/2))/(21*b^3)
```

Rubi [A] time = 0.191061, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2\left(a+bx^3\right)^{5/2}(Ab-2aB)}{15b^3}-\frac{2a\left(a+bx^3\right)^{3/2}(Ab-aB)}{9b^3}+\frac{2B\left(a+bx^3\right)^{7/2}}{21b^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^5*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (-2*a*(A*b - a*B)*(a + b*x^3)^(3/2))/(9*b^3) + (2*(A*b - 2*a*B)*(
a + b*x^3)^(5/2))/(15*b^3) + (2*B*(a + b*x^3)^(7/2))/(21*b^3)
```

Rubi in Sympy [A] time = 16.6756, size = 68, normalized size = 0.93

$$\frac{2B\left(a+bx^3\right)^{\frac{7}{2}}}{21b^3}-\frac{2a\left(a+bx^3\right)^{\frac{3}{2}}(Ab-Ba)}{9b^3}+\frac{2\left(a+bx^3\right)^{\frac{5}{2}}(Ab-2Ba)}{15b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**5*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(7/2)/(21*b**3) - 2*a*(a + b*x**3)**(3/2)*(A*b
- B*a)/(9*b**3) + 2*(a + b*x**3)**(5/2)*(A*b - 2*B*a)/(15*b**3)
```

Mathematica [A] time = 0.0611116, size = 57, normalized size = 0.78

$$\frac{2\left(a+bx^3\right)^{3/2}\left(8a^2B-2ab\left(7A+6Bx^3\right)+3b^2x^3\left(7A+5Bx^3\right)\right)}{315b^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*(a + b*x^3)^(3/2)*(8*a^2*B + 3*b^2*x^3*(7*A + 5*B*x^3) - 2*a*b
*(7*A + 6*B*x^3)))/(315*b^3)
```

Maple [A] time = 0.008, size = 53, normalized size = 0.7

$$-\frac{-30\,b^2Bx^6-42\,Ax^3b^2+24\,Bx^3ab+28\,abA-16\,a^2B}{315\,b^3}\left(bx^3+a\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] -2/315*(b*x^3+a)^(3/2)*(-15*B*b^2*x^6-21*A*b^2*x^3+12*B*a*b*x^3+1
4*A*a*b-8*B*a^2)/b^3
```

Maxima [A] time = 1.46076, size = 113, normalized size = 1.55

$$\frac{2}{315}B\left(\frac{15\left(bx^3+a\right)^{\frac{7}{2}}}{b^3}-\frac{42\left(bx^3+a\right)^{\frac{5}{2}}a}{b^3}+\frac{35\left(bx^3+a\right)^{\frac{3}{2}}a^2}{b^3}\right)+\frac{2}{45}A\left(\frac{3\left(bx^3+a\right)^{\frac{5}{2}}}{b^2}-\frac{5\left(bx^3+a\right)^{\frac{3}{2}}a}{b^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^5,x, algorithm="maxima")
```

```
[Out] 2/315*B*(15*(b*x^3 + a)^(7/2)/b^3 - 42*(b*x^3 + a)^(5/2)*a/b^3 +
35*(b*x^3 + a)^(3/2)*a^2/b^3) + 2/45*A*(3*(b*x^3 + a)^(5/2)/b^2 -
 5*(b*x^3 + a)^(3/2)*a/b^2)
```

Fricas [A] time = 0.248635, size = 101, normalized size = 1.38

$$\frac{2\left(15\,Bb^3x^9+3\left(Bab^2+7\,Ab^3\right)x^6+8\,Ba^3-14\,Aa^2b-\left(4\,Ba^2b-7\,Aab^2\right)x^3\right)\sqrt{bx^3+a}}{315\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^5,x, algorithm="fricas")
```

```
[Out] 2/315*(15*B*b^3*x^9 + 3*(B*a*b^2 + 7*A*b^3)*x^6 + 8*B*a^3 - 14*A*
a^2*b - (4*B*a^2*b - 7*A*a*b^2)*x^3)*sqrt(b*x^3 + a)/b^3
```

Sympy [A] time = 4.71401, size = 168, normalized size = 2.3

$$\begin{cases} -\frac{4Aa^2\sqrt{a+bx^3}}{45b^2}+\frac{2Aax^3\sqrt{a+bx^3}}{45b}+\frac{2Ax^6\sqrt{a+bx^3}}{15}+\frac{16Ba^3\sqrt{a+bx^3}}{315b^3}-\frac{8Ba^2x^3\sqrt{a+bx^3}}{315b^2}+\frac{2Bax^6\sqrt{a+bx^3}}{105b}+\frac{2Bx^9\sqrt{a+bx^3}}{21} & \text{for}\; b\neq 0\\ \sqrt{a}\left(\frac{Ax^6}{6}+\frac{Bx^9}{9}\right) & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] Piecewise((-4*A*a**2*sqrt(a + b*x**3)/(45*b**2) + 2*A*a*x**3*sqrt
(a + b*x**3)/(45*b) + 2*A*x**6*sqrt(a + b*x**3)/15 + 16*B*a**3*sq
rt(a + b*x**3)/(315*b**3) - 8*B*a**2*x**3*sqrt(a + b*x**3)/(315*b
**2) + 2*B*a*x**6*sqrt(a + b*x**3)/(105*b) + 2*B*x**9*sqrt(a + b*
x**3)/21, Ne(b, 0)), (sqrt(a)*(A*x**6/6 + B*x**9/9), True))
```

GIAC/XCAS [A] time = 0.218476, size = 107, normalized size = 1.47

$$\frac{2\left(\frac{7\left(3\left(bx^3+a\right)^{\frac{5}{2}}-5\left(bx^3+a\right)^{\frac{3}{2}}a\right)A}{b}+\frac{\left(15\left(bx^3+a\right)^{\frac{7}{2}}-42\left(bx^3+a\right)^{\frac{5}{2}}a+35\left(bx^3+a\right)^{\frac{3}{2}}a^2\right)B}{b^2}\right)}{315\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^5,x, algorithm="giac")
```

```
[Out] 2/315*(7*(3*(b*x^3 + a)^(5/2) - 5*(b*x^3 + a)^(3/2)*a)*A/b + (15*
(b*x^3 + a)^(7/2) - 42*(b*x^3 + a)^(5/2)*a + 35*(b*x^3 + a)^(3/2)
*a^2)*B/b^2)/b
```

3.181 $\int x^2\sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=46

$$\frac{2\left(a+bx^3\right)^{3/2}(Ab-aB)}{9b^2}+\frac{2B\left(a+bx^3\right)^{5/2}}{15b^2}$$

```
[Out] (2*(A*b - a*B)*(a + b*x^3)^(3/2))/(9*b^2) + (2*B*(a + b*x^3)^(5/2
))/(15*b^2)
```

Rubi [A] time = 0.128913, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2\left(a+bx^3\right)^{3/2}(Ab-aB)}{9b^2}+\frac{2B\left(a+bx^3\right)^{5/2}}{15b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*(A*b - a*B)*(a + b*x^3)^(3/2))/(9*b^2) + (2*B*(a + b*x^3)^(5/2
))/(15*b^2)
```

Rubi in Sympy [A] time = 12.0922, size = 41, normalized size = 0.89

$$\frac{2B\left(a+bx^3\right)^{\frac{5}{2}}}{15b^2}+\frac{2\left(a+bx^3\right)^{\frac{3}{2}}(Ab-Ba)}{9b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(5/2)/(15*b**2) + 2*(a + b*x**3)**(3/2)*(A*b -
B*a)/(9*b**2)
```

Mathematica [A] time = 0.0444034, size = 34, normalized size = 0.74

$$\frac{2\left(a+bx^3\right)^{3/2}\left(-2aB+5Ab+3bBx^3\right)}{45b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*(a + b*x^3)^(3/2)*(5*A*b - 2*a*B + 3*b*B*x^3))/(45*b^2)
```

Maple [A] time = 0.008, size = 31, normalized size = 0.7

$$\frac{6\,bBx^3+10\,Ab-4\,Ba}{45\,b^2}\left(bx^3+a\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] 2/45*(b*x^3+a)^(3/2)*(3*B*b*x^3+5*A*b-2*B*a)/b^2
```

Maxima [A] time = 1.37161, size = 66, normalized size = 1.43

$$\frac{2}{45}\,B\left(\frac{3\,(bx^3+a)^{\frac{5}{2}}}{b^2}-\frac{5\,(bx^3+a)^{\frac{3}{2}}a}{b^2}\right)+\frac{2\,(bx^3+a)^{\frac{3}{2}}A}{9\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^2,x, algorithm="maxima")
```

```
[Out] 2/45*B*(3*(b*x^3 + a)^(5/2)/b^2 - 5*(b*x^3 + a)^(3/2)*a/b^2) + 2/
9*(b*x^3 + a)^(3/2)*A/b
```

Fricas [A] time = 0.248056, size = 68, normalized size = 1.48

$$\frac{2\,\left(3\,Bb^2x^6+\left(Bab+5\,Ab^2\right)x^3-2\,Ba^2+5\,Aab\right)\sqrt{bx^3+a}}{45\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^2,x, algorithm="fricas")
```

```
[Out] 2/45*(3*B*b^2*x^6 + (B*a*b + 5*A*b^2)*x^3 - 2*B*a^2 + 5*A*a*b)*sq
rt(b*x^3 + a)/b^2
```

Sympy [A] time = 1.74213, size = 117, normalized size = 2.54

$$\begin{cases} \frac{2Aa\sqrt{a+bx^3}}{9b}+\frac{2Ax^3\sqrt{a+bx^3}}{9}-\frac{4Ba^2\sqrt{a+bx^3}}{45b^2}+\frac{2Bax^3\sqrt{a+bx^3}}{45b}+\frac{2Bx^6\sqrt{a+bx^3}}{15} & \text{for } b\neq 0 \\ \sqrt{a}\left(\frac{Ax^3}{3}+\frac{Bx^6}{6}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] Piecewise((2*A*a*sqrt(a + b*x**3)/(9*b) + 2*A*x**3*sqrt(a + b*x**
3)/9 - 4*B*a**2*sqrt(a + b*x**3)/(45*b**2) + 2*B*a*x**3*sqrt(a +
b*x**3)/(45*b) + 2*B*x**6*sqrt(a + b*x**3)/15, Ne(b, 0)), (sqrt(a
)*(A*x**3/3 + B*x**6/6), True))
```

GIAC/XCAS [A] time = 0.217607, size = 63, normalized size = 1.37

$$\frac{2\left(5\,(bx^3+a)^{\frac{3}{2}}A+\frac{\left(3\,(bx^3+a)^{\frac{5}{2}}-5\,(bx^3+a)^{\frac{3}{2}}a\right)B}{b}\right)}{45\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^2,x, algorithm="giac")
```

```
[Out] 2/45*(5*(b*x^3 + a)^(3/2)*A + (3*(b*x^3 + a)^(5/2) - 5*(b*x^3 + a
)^(3/2)*a)*B/b)/b
```

3.182 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{x}\,dx$

Optimal. Leaf size=64

$$\frac{2}{3}A\sqrt{a+bx^3}-\frac{2}{3}\sqrt{a}A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)+\frac{2B\left(a+bx^3\right)^{3/2}}{9b}$$

```
[Out] (2*A*Sqrt[a + b*x^3])/3 + (2*B*(a + b*x^3)^(3/2))/(9*b) - (2*Sqrt
[a]*A*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/3
```

Rubi [A] time = 0.144048, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{2}{3}A\sqrt{a+bx^3}-\frac{2}{3}\sqrt{a}A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)+\frac{2B\left(a+bx^3\right)^{3/2}}{9b}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x,x]
```

```
[Out] (2*A*Sqrt[a + b*x^3])/3 + (2*B*(a + b*x^3)^(3/2))/(9*b) - (2*Sqrt
[a]*A*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/3
```

Rubi in Sympy [A] time = 11.9359, size = 58, normalized size = 0.91

$$-\frac{2A\sqrt{a}\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3}+\frac{2A\sqrt{a+bx^3}}{3}+\frac{2B\left(a+bx^3\right)^{\frac{3}{2}}}{9b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x,x)
```

```
[Out] -2*A*sqrt(a)*atanh(sqrt(a + b*x**3)/sqrt(a))/3 + 2*A*sqrt(a + b*x
**3)/3 + 2*B*(a + b*x**3)**(3/2)/(9*b)
```

Mathematica [A] time = 0.260072, size = 62, normalized size = 0.97

$$\frac{2}{9}\sqrt{a+bx^3}\left(-\frac{3A\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{\sqrt{\frac{bx^3}{a}+1}}+\frac{aB}{b}+3A+Bx^3\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x,x]
```

```
[Out] (2*Sqrt[a + b*x^3]*(3*A + (a*B)/b + B*x^3 - (3*A*ArcTanh[Sqrt[1 +
 (b*x^3)/a]])/Sqrt[1 + (b*x^3)/a]))/9
```

Maple [A] time = 0.01, size = 50, normalized size = 0.8

$$A\left(\frac{2}{3}\sqrt{bx^3+a}-\frac{2}{3}\sqrt{a}Artanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)\right)+\frac{2\,B}{9\,b}\left(bx^3+a\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x,x)
```

```
[Out] A*(2/3*(b*x^3+a)^(1/2)-2/3*a^(1/2)*arctanh((b*x^3+a)^(1/2)/a^(1/2
)))+2/9*B*(b*x^3+a)^(3/2)/b
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.275826, size = 1, normalized size = 0.02

$$\left[\frac{3\,A\sqrt{a}b\log\left(\frac{bx^3-2\,\sqrt{bx^3+a}\sqrt{a}+2\,a}{x^3}\right)+2\,\left(Bbx^3+Ba+3\,Ab\right)\sqrt{bx^3+a}}{9\,b},\right.$$
$$\left.-\frac{2\left(3\,A\sqrt{-ab}\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)-\left(Bbx^3+Ba+3\,Ab\right)\sqrt{bx^3+a}\right)}{9\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x,x, algorithm="fricas")
```

```
[Out] [1/9*(3*A*sqrt(a)*b*log((b*x^3 - 2*sqrt(b*x^3 + a)*sqrt(a) + 2*a)
/x^3) + 2*(B*b*x^3 + B*a + 3*A*b)*sqrt(b*x^3 + a))/b, -2/9*(3*A*s
qrt(-a)*b*arctan(sqrt(b*x^3 + a)/sqrt(-a)) - (B*b*x^3 + B*a + 3*A
*b)*sqrt(b*x^3 + a))/b]
```

Sympy [A] time = 12.1838, size = 126, normalized size = 1.97

$$-\frac{2Aa\left(\begin{cases}-\frac{\operatorname{atan}\left(\frac{\sqrt{a+bx^3}}{\sqrt{-a}}\right)}{\sqrt{-a}} & \text{for}\ -a>0\\ \frac{\operatorname{acoth}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{\sqrt{a}} & \text{for}\ -a<0\wedge a<a+bx^3\\ \frac{\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{\sqrt{a}} & \text{for}\ a>a+bx^3\wedge -a<0\end{cases}\right)}{3}+\frac{2A\sqrt{a+bx^3}}{3}+\frac{2B\left(a+bx^3\right)^{\frac{3}{2}}}{9b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x,x)
```

```
[Out] -2*A*a*Piecewise((-atan(sqrt(a + b*x**3)/sqrt(-a))/sqrt(-a), -a >
 0), (acoth(sqrt(a + b*x**3)/sqrt(a))/sqrt(a), (-a < 0) & (a < a
+ b*x**3)), (atanh(sqrt(a + b*x**3)/sqrt(a))/sqrt(a), (-a < 0) &
(a > a + b*x**3)))/3 + 2*A*sqrt(a + b*x**3)/3 + 2*B*(a + b*x**3)*
*(3/2)/(9*b)
```

GIAC/XCAS [A] time = 0.221373, size = 82, normalized size = 1.28

$$\frac{2\,Aa\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{3\,\sqrt{-a}}+\frac{2\,\left(\left(bx^3+a\right)^{\frac{3}{2}}Bb^2+3\,\sqrt{bx^3+a}Ab^3\right)}{9\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x,x, algorithm="giac")
```

```
[Out] 2/3*A*a*arctan(sqrt(b*x^3 + a)/sqrt(-a))/sqrt(-a) + 2/9*((b*x^3 +
 a)^(3/2)*B*b^2 + 3*sqrt(b*x^3 + a)*A*b^3)/b^3
```

3.183 $\int \frac{\sqrt{a+bx^3}\left(A+Bx^3\right)}{x^4}\,dx$

Optimal. Leaf size=84

$$\frac{\sqrt{a+bx^3}(2aB+Ab)}{3a}-\frac{(2aB+Ab)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3\sqrt{a}}-\frac{A\left(a+bx^3\right)^{3/2}}{3ax^3}$$

```
[Out] ((A*b + 2*a*B)*Sqrt[a + b*x^3])/(3*a) - (A*(a + b*x^3)^(3/2))/(3*
a*x^3) - ((A*b + 2*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(3*Sqrt
[a])
```

Rubi [A] time = 0.199463, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{\sqrt{a+bx^3}(2aB+Ab)}{3a}-\frac{(2aB+Ab)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3\sqrt{a}}-\frac{A\left(a+bx^3\right)^{3/2}}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^4,x]
```

```
[Out] ((A*b + 2*a*B)*Sqrt[a + b*x^3])/(3*a) - (A*(a + b*x^3)^(3/2))/(3*
a*x^3) - ((A*b + 2*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(3*Sqrt
[a])
```

Rubi in Sympy [A] time = 14.1199, size = 75, normalized size = 0.89

$$-\frac{A\left(a+bx^3\right)^{\frac{3}{2}}}{3ax^3}+\frac{2\sqrt{a+bx^3}\left(\frac{Ab}{2}+Ba\right)}{3a}-\frac{2\left(\frac{Ab}{2}+Ba\right)\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**4,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(3*a*x**3) + 2*sqrt(a + b*x**3)*(A*b/2 + B
*a)/(3*a) - 2*(A*b/2 + B*a)*atanh(sqrt(a + b*x**3)/sqrt(a))/(3*sq
rt(a))
```

Mathematica [A] time = 0.262504, size = 67, normalized size = 0.8

$$\frac{1}{3}\sqrt{a+bx^3}\left(-\frac{(2aB+Ab)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{a\sqrt{\frac{bx^3}{a}+1}}-\frac{A}{x^3}+2B\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^4,x]
```

```
[Out] (Sqrt[a + b*x^3]*(2*B - A/x^3 - ((A*b + 2*a*B)*ArcTanh[Sqrt[1 + (
b*x^3)/a]])/(a*Sqrt[1 + (b*x^3)/a])))/3
```

Maple [A] time = 0.013, size = 72, normalized size = 0.9

$$A\left(-\frac{1}{3\,x^{3}}\sqrt{bx^{3}+a}-\frac{b}{3}\mathit{Artanh}\left(1\sqrt{bx^{3}+a}\frac{1}{\sqrt{a}}\right)\frac{1}{\sqrt{a}}\right)+B\left(\frac{2}{3}\sqrt{bx^{3}+a}-\frac{2}{3}\sqrt{a}\mathit{Artanh}\left(1\sqrt{bx^{3}+a}\frac{1}{\sqrt{a}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^4,x)
```

```
[Out] A*(-1/3*(b*x^3+a)^(1/2)/x^3-1/3*b*arctanh((b*x^3+a)^(1/2)/a^(1/2)
)/a^(1/2))+B*(2/3*(b*x^3+a)^(1/2)-2/3*a^(1/2)*arctanh((b*x^3+a)^(
1/2)/a^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.250217, size = 1, normalized size = 0.01

$$\left[\frac{(2\,Ba+Ab)x^{3}\log\left(\frac{(bx^{3}+2\,a)\sqrt{a}-2\sqrt{bx^{3}+a}a}{x^{3}}\right)+2\left(2\,Bx^{3}-A\right)\sqrt{bx^{3}+a}\sqrt{a}}{6\sqrt{a}x^{3}},\ \frac{(2\,Ba+Ab)x^{3}\arctan\left(\frac{a}{\sqrt{bx^{3}+a}\sqrt{-a}}\right)+\left(2\,Bx^{3}-A\right)\sqrt{\quad}}{3\sqrt{-a}x^{3}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^4,x, algorithm="fricas")
```

```
[Out] [1/6*((2*B*a + A*b)*x^3*log(((b*x^3 + 2*a)*sqrt(a) - 2*sqrt(b*x^3
 + a)*a)/x^3) + 2*(2*B*x^3 - A)*sqrt(b*x^3 + a)*sqrt(a))/(sqrt(a)
*x^3), 1/3*((2*B*a + A*b)*x^3*arctan(a/(sqrt(b*x^3 + a)*sqrt(-a))
) + (2*B*x^3 - A)*sqrt(b*x^3 + a)*sqrt(-a))/(sqrt(-a)*x^3)]
```

Sympy [A] time = 30.966, size = 134, normalized size = 1.6

$$-\frac{A\sqrt{b}\sqrt{\frac{a}{bx^{3}}+1}}{3x^{\frac{3}{2}}}-\frac{Ab\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{3\sqrt{a}}-\frac{2B\sqrt{a}\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{3}+\frac{2Ba}{3\sqrt{b}x^{\frac{3}{2}}\sqrt{\frac{a}{bx^{3}}+1}}+\frac{2B\sqrt{b}x^{\frac{3}{2}}}{3\sqrt{\frac{a}{bx^{3}}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**4,x)
```

```
[Out] -A*sqrt(b)*sqrt(a/(b*x**3) + 1)/(3*x**(3/2)) - A*b*asinh(sqrt(a)/
(sqrt(b)*x**(3/2)))/(3*sqrt(a)) - 2*B*sqrt(a)*asinh(sqrt(a)/(sqrt
(b)*x**(3/2)))/3 + 2*B*a/(3*sqrt(b)*x**(3/2)*sqrt(a/(b*x**3) + 1)
) + 2*B*sqrt(b)*x**(3/2)/(3*sqrt(a/(b*x**3) + 1))
```

GIAC/XCAS [A] time = 0.219514, size = 92, normalized size = 1.1

$$\frac{2\sqrt{bx^3+a}Bb + \frac{\left(2\,Bab+Ab^2\right)\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{\sqrt{-a}} - \frac{\sqrt{bx^3+a}Ab}{x^3}}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^4,x, algorithm="giac")
```

```
[Out] 1/3*(2*sqrt(b*x^3 + a)*B*b + (2*B*a*b + A*b^2)*arctan(sqrt(b*x^3
+ a)/sqrt(-a))/sqrt(-a) - sqrt(b*x^3 + a)*A*b/x^3)/b
```

3.184 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{x^7}\,dx$

Optimal. Leaf size=88

$$\frac{b(Ab-4aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{12a^{3/2}}+\frac{\sqrt{a+bx^3}(Ab-4aB)}{12ax^3}-\frac{A\left(a+bx^3\right)^{3/2}}{6ax^6}$$

```
[Out] ((A*b - 4*a*B)*Sqrt[a + b*x^3])/(12*a*x^3) - (A*(a + b*x^3)^(3/2)
)/(6*a*x^6) + (b*(A*b - 4*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/
(12*a^(3/2))
```

Rubi [A] time = 0.211303, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{b(Ab-4aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{12a^{3/2}}+\frac{\sqrt{a+bx^3}(Ab-4aB)}{12ax^3}-\frac{A\left(a+bx^3\right)^{3/2}}{6ax^6}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^7,x]
```

```
[Out] ((A*b - 4*a*B)*Sqrt[a + b*x^3])/(12*a*x^3) - (A*(a + b*x^3)^(3/2)
)/(6*a*x^6) + (b*(A*b - 4*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/
(12*a^(3/2))
```

Rubi in Sympy [A] time = 14.329, size = 76, normalized size = 0.86

$$-\frac{A\left(a+bx^3\right)^{\frac{3}{2}}}{6ax^6}+\frac{\sqrt{a+bx^3}\,(Ab-4Ba)}{12ax^3}+\frac{b\,(Ab-4Ba)\,\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{12a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**7,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(6*a*x**6) + sqrt(a + b*x**3)*(A*b - 4*B*a
)/(12*a*x**3) + b*(A*b - 4*B*a)*atanh(sqrt(a + b*x**3)/sqrt(a))/(
12*a**(3/2))
```

Mathematica [A] time = 0.332693, size = 82, normalized size = 0.93

$$\frac{\sqrt{a+bx^3}\left(\frac{b(Ab-4aB)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{\sqrt{\frac{bx^3}{a}+1}}-\frac{a\left(2a\left(A+2Bx^3\right)+Abx^3\right)}{x^6}\right)}{12a^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^7,x]
```

```
[Out] (Sqrt[a + b*x^3]*(-((a*(A*b*x^3 + 2*a*(A + 2*B*x^3)))/x^6) + (b*(
A*b - 4*a*B)*ArcTanh[Sqrt[1 + (b*x^3)/a]])/Sqrt[1 + (b*x^3)/a]))/
(12*a^2)
```

Maple [A] time = 0.012, size = 96, normalized size = 1.1

$$A\left(-\frac{1}{6\,x^{6}}\sqrt{b x^{3}+a}-\frac{b}{12\,a x^{3}}\sqrt{b x^{3}+a}+\frac{b^{2}}{12}\mathit{Artanh}\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{3}{2}}\right)+B\left(-\frac{1}{3\,x^{3}}\sqrt{b x^{3}+a}-\frac{b}{3}\mathit{Artanh}\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)\frac{1}{\sqrt{a}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^7,x)
```

```
[Out] A*(-1/6*(b*x^3+a)^(1/2)/x^6-1/12*b/a*(b*x^3+a)^(1/2)/x^3+1/12/a^(
3/2)*b^2*arctanh((b*x^3+a)^(1/2)/a^(1/2)))+B*(-1/3*(b*x^3+a)^(1/2
)/x^3-1/3*b*arctanh((b*x^3+a)^(1/2)/a^(1/2))/a^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^7,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.27319, size = 1, normalized size = 0.01

$$\left[-\frac{\left(4\,Bab-Ab^{2}\right)x^{6}\log\left(\frac{\left(bx^{3}+2\,a\right)\sqrt{a}+2\,\sqrt{bx^{3}+a}a}{x^{3}}\right)+2\,\left(\left(4\,Ba+Ab\right)x^{3}+2\,Aa\right)\sqrt{bx^{3}+a}\sqrt{a}}{24\,a^{\frac{3}{2}}x^{6}},\ \frac{\left(4\,Bab-Ab^{2}\right)x^{6}\arctan\left(\frac{a}{\sqrt{bx^{3}+a}\sqrt{-a}}\right) \cdots}{12 \cdots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^7,x, algorithm="fricas")
```

```
[Out] [-1/24*((4*B*a*b - A*b^2)*x^6*log(((b*x^3 + 2*a)*sqrt(a) + 2*sqrt
(b*x^3 + a)*a)/x^3) + 2*((4*B*a + A*b)*x^3 + 2*A*a)*sqrt(b*x^3 +
a)*sqrt(a))/(a^(3/2)*x^6), 1/12*((4*B*a*b - A*b^2)*x^6*arctan(a/(
sqrt(b*x^3 + a)*sqrt(-a))) - ((4*B*a + A*b)*x^3 + 2*A*a)*sqrt(b*x
^3 + a)*sqrt(-a))/(sqrt(-a)*a*x^6)]
```

Sympy [A] time = 68.8284, size = 160, normalized size = 1.82

$$-\frac{Aa}{6\sqrt{b}x^{\frac{15}{2}}\sqrt{\frac{a}{bx^{3}}+1}}-\frac{A\sqrt{b}}{4x^{\frac{9}{2}}\sqrt{\frac{a}{bx^{3}}+1}}-\frac{Ab^{\frac{3}{2}}}{12ax^{\frac{3}{2}}\sqrt{\frac{a}{bx^{3}}+1}}+\frac{Ab^{2}\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{12a^{\frac{3}{2}}}-\frac{B\sqrt{b}\sqrt{\frac{a}{bx^{3}}+1}}{3x^{\frac{3}{2}}}-\frac{Bb\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{3\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**7,x)
```

```
[Out] -A*a/(6*sqrt(b)*x**(15/2)*sqrt(a/(b*x**3) + 1)) - A*sqrt(b)/(4*x*
*(9/2)*sqrt(a/(b*x**3) + 1)) - A*b**(3/2)/(12*a*x**(3/2)*sqrt(a/(
```

```
b*x**3) + 1)) + A*b**2*asinh(sqrt(a)/(sqrt(b)*x**(3/2)))/(12*a**(
3/2)) - B*sqrt(b)*sqrt(a/(b*x**3) + 1)/(3*x**(3/2)) - B*b*asinh(s
qrt(a)/(sqrt(b)*x**(3/2)))/(3*sqrt(a))
```

GIAC/XCAS [A] time = 0.221622, size = 162, normalized size = 1.84

$$\frac{\frac{\left(4\,Bab^2-Ab^3\right)\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{\sqrt{-a}a}-\frac{4\left(bx^3+a\right)^{\frac{3}{2}}Bab^2-4\sqrt{bx^3+a}Ba^2b^2+\left(bx^3+a\right)^{\frac{3}{2}}Ab^3+\sqrt{bx^3+a}Aab^3}{ab^2x^6}}{12\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^7,x, algorithm="giac")
```

```
[Out] 1/12*((4*B*a*b^2 - A*b^3)*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sqrt(
-a)*a) - (4*(b*x^3 + a)^(3/2)*B*a*b^2 - 4*sqrt(b*x^3 + a)*B*a^2*b
^2 + (b*x^3 + a)^(3/2)*A*b^3 + sqrt(b*x^3 + a)*A*a*b^3)/(a*b^2*x^
6))/b
```

3.185 $\int x^3\sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=303

$$-\frac{4\,3^{3/4}\sqrt{2+\sqrt{3}}a^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{935b^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{6ax\sqrt{a+bx^3}(17Ab-8aB)}{935b^2}+\frac{2x^4\sqrt{a+bx^3}(17Ab-8aB)}{187b}+\frac{2Bx^4\left(a+bx^3\right)^{3/2}}{17b}$$

```
[Out] (6*a*(17*A*b - 8*a*B)*x*Sqrt[a + b*x^3])/(935*b^2) + (2*(17*A*b -
 8*a*B)*x^4*Sqrt[a + b*x^3])/(187*b) + (2*B*x^4*(a + b*x^3)^(3/2)
)/(17*b) - (4*3^(3/4)*Sqrt[2 + Sqrt[3]]*a^2*(17*A*b - 8*a*B)*(a^(
1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - S
qrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)]
, -7 - 4*Sqrt[3]])/(935*b^(7/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*
x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.444489, antiderivative size = 303, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{4\,3^{3/4}\sqrt{2+\sqrt{3}}a^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{935b^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{6ax\sqrt{a+bx^3}(17Ab-8aB)}{935b^2}+\frac{2x^4\sqrt{a+bx^3}(17Ab-8aB)}{187b}+\frac{2Bx^4\left(a+bx^3\right)^{3/2}}{17b}$$

Antiderivative was successfully verified.

```
[In]   Int[x^3*Sqrt[a + b*x^3]*(A + B*x^3),x]
```


```
[Out] (6*a*(17*A*b - 8*a*B)*x*Sqrt[a + b*x^3])/(935*b^2) + (2*(17*A*b -
 8*a*B)*x^4*Sqrt[a + b*x^3])/(187*b) + (2*B*x^4*(a + b*x^3)^(3/2)
)/(17*b) - (4*3^(3/4)*Sqrt[2 + Sqrt[3]]*a^2*(17*A*b - 8*a*B)*(a^(
1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - S
qrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)]
, -7 - 4*Sqrt[3]])/(935*b^(7/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*
x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 27.4925, size = 277, normalized size = 0.91

$$\frac{2Bx^4\left(a+bx^3\right)^{\frac{3}{2}}}{17b}-\frac{4\cdot 3^{\frac{3}{4}}a^2\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(17Ab-8Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{935b^{\frac{7}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{6ax\sqrt{a+bx^3}\,(17Ab-8Ba)}{935b^2}+\frac{2x^4\sqrt{a+bx^3}\,(17Ab-8Ba)}{187b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**3*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*x**4*(a + b*x**3)**(3/2)/(17*b) - 4*3**(3/4)*a**2*sqrt((a**(2
/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)
) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(17
*A*b - 8*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3
)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(935
*b**(7/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sq
rt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 6*a*x*sqrt(a + b*x**
3)*(17*A*b - 8*B*a)/(935*b**2) + 2*x**4*sqrt(a + b*x**3)*(17*A*b
- 8*B*a)/(187*b)
```

Mathematica [C]   time = 0.973052, size = 209, normalized size = 0.69

$$\sqrt{a+bx^3}\left(-\frac{6ax(8aB-17Ab)}{935b^2}+\frac{2x^4(3aB+17Ab)}{187b}+\frac{2Bx^7}{17}\right)-\frac{4i3^{3/4}a^{7/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(17Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{935\sqrt[3]{-b}b^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[x^3*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] Sqrt[a + b*x^3]*((-6*a*(-17*A*b + 8*a*B)*x)/(935*b^2) + (2*(17*A*
b + 3*a*B)*x^4)/(187*b) + (2*B*x^7)/17) - (((4*I)/935)*3^(3/4)*a^
(7/3)*(17*A*b - 8*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/
3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*
EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(
1/4)], (-1)^(1/3)])/((-b)^(1/3)*b^2*Sqrt[a + b*x^3])
```

Maple [B]   time = 0.01, size = 658, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^3*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] A*(2/11*x^4*(b*x^3+a)^(1/2)+6/55*a/b*x*(b*x^3+a)^(1/2)+4/55*I/b^2
*a^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a
*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/
3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(
-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*
(2/17*x^7*(b*x^3+a)^(1/2)+6/187*a/b*x^4*(b*x^3+a)^(1/2)-48/935*a^
2/b^2*x*(b*x^3+a)^(1/2)-32/935*I*a^3/b^3*3^(1/2)*(-a*b^2)^(1/3)*(
I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)
*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2
)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx^3 + A)\sqrt{bx^3 + a}x^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^3,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((Bx^6 + Ax^3)\sqrt{bx^3 + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^3,x, algorithm="fricas")
```

```
[Out] integral((B*x^6 + A*x^3)*sqrt(b*x^3 + a), x)
```

Sympy [A] time = 5.4515, size = 83, normalized size = 0.27

$$\frac{A\sqrt{a}x^4\Gamma\left(\frac{4}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{4}{3}\\ \frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{7}{3}\right)}+\frac{B\sqrt{a}x^7\Gamma\left(\frac{7}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{7}{3}\\ \frac{10}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{10}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] A*sqrt(a)*x**4*gamma(4/3)*hyper((-1/2, 4/3), (7/3,), b*x**3*exp_p
olar(I*pi)/a)/(3*gamma(7/3)) + B*sqrt(a)*x**7*gamma(7/3)*hyper((-
1/2, 7/3), (10/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(10/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx^3 + A)\sqrt{bx^3 + a}x^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^3,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^3, x)
```

3.186 $\int \sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=268

$$\frac{2\,3^{3/4}\sqrt{2+\sqrt{3}}a\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{55b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x\sqrt{a+bx^3}(11Ab-2aB)}{55b}+\frac{2Bx\left(a+bx^3\right)^{3/2}}{11b}$$

```
[Out] (2*(11*A*b - 2*a*B)*x*Sqrt[a + b*x^3])/(55*b) + (2*B*x*(a + b*x^3
)^(3/2))/(11*b) + (2*3^(3/4)*Sqrt[2 + Sqrt[3]]*a*(11*A*b - 2*a*B)
*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((
1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3
)*x)], -7 - 4*Sqrt[3]])/(55*b^(4/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1
/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.264174, antiderivative size = 268, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$\frac{2\,3^{3/4}\sqrt{2+\sqrt{3}}a\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{55b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x\sqrt{a+bx^3}(11Ab-2aB)}{55b}+\frac{2Bx\left(a+bx^3\right)^{3/2}}{11b}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*(11*A*b - 2*a*B)*x*Sqrt[a + b*x^3])/(55*b) + (2*B*x*(a + b*x^3
)^(3/2))/(11*b) + (2*3^(3/4)*Sqrt[2 + Sqrt[3]]*a*(11*A*b - 2*a*B)
*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((
1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3
)*x)], -7 - 4*Sqrt[3]])/(55*b^(4/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1
/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 16.7849, size = 241, normalized size = 0.9

$$\frac{2Bx\left(a+bx^3\right)^{\frac{3}{2}}}{11b}+\frac{2\cdot 3^{\frac{3}{4}}a\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-2Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{55b^{\frac{4}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{4x\sqrt{a+bx^3}\left(\frac{11Ab}{2}-Ba\right)}{55b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*x*(a + b*x**3)**(3/2)/(11*b) + 2*3**(3/4)*a*sqrt((a**(2/3) -
a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b*
*(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(11*A*b -
 2*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(
a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(55*b**(4/
3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 4*x*sqrt(a + b*x**3)*(11*A*
b/2 - B*a)/(55*b)
```

Mathematica [C] time = 1.29482, size = 182, normalized size = 0.68

$$-\frac{2\left(\sqrt[3]{-b}x\left(a+bx^3\right)\left(3aB+11Ab+5bBx^3\right)+i3^{3/4}a^{4/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(11Ab-2aB)F\left(\sin^{-1}\right.\right.}{55(-b)^{4/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (-2*((-b)^(1/3)*x*(a + b*x^3)*(11*A*b + 3*a*B + 5*b*B*x^3) + I*3^
(3/4)*a^(4/3)*(11*A*b - 2*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*
x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a
^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1
/3)]/3^(1/4)], (-1)^(1/3)]))/(55*(-b)^(4/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.007, size = 618, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] A*(2/5*x*(b*x^3+a)^(1/2)-2/5*I*a*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1
/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a
*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)
+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/
3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2
)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)
,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3)))^(1/2)))+B*(2/11*x^4*(b*x^3+a)^(1/2)+6/55*a/b*
x*(b*x^3+a)^(1/2)+4/55*I/b^2*a^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2
/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b
^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)
+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/
(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(
I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3+A\right)\sqrt{bx^3+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bx^3 + A\right)\sqrt{bx^3 + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a), x)
```

Sympy [A] time = 4.32853, size = 82, normalized size = 0.31

$$\frac{A\sqrt{a}x\,\Gamma\left(\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{1}{3}\\ \frac{4}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{4}{3}\right)} + \frac{B\sqrt{a}x^4\,\Gamma\left(\frac{4}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{4}{3}\\ \frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{7}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] A*sqrt(a)*x*gamma(1/3)*hyper((-1/2, 1/3), (4/3,), b*x**3*exp_pola
r(I*pi)/a)/(3*gamma(4/3)) + B*sqrt(a)*x**4*gamma(4/3)*hyper((-1/2
, 4/3), (7/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(7/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\sqrt{bx^3 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a), x)
```

3.187 $\int \frac{\sqrt{a+bx^3}\left(A+Bx^3\right)}{x^3}\,dx$

Optimal. Leaf size=269

$$\frac{3^{3/4}\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(4aB+5Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{10\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{x\sqrt{a+bx^3}(4aB+5Ab)}{10a}-\frac{A\left(a+bx^3\right)^{3/2}}{2ax^2}$$

```
[Out] ((5*A*b + 4*a*B)*x*Sqrt[a + b*x^3])/(10*a) - (A*(a + b*x^3)^(3/2)
)/(2*a*x^2) + (3^(3/4)*Sqrt[2 + Sqrt[3]]*(5*A*b + 4*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(10*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.28458, antiderivative size = 269, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{3^{3/4}\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(4aB+5Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{10\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{x\sqrt{a+bx^3}(4aB+5Ab)}{10a}-\frac{A\left(a+bx^3\right)^{3/2}}{2ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^3,x]
```

```
[Out] ((5*A*b + 4*a*B)*x*Sqrt[a + b*x^3])/(10*a) - (A*(a + b*x^3)^(3/2)
)/(2*a*x^2) + (3^(3/4)*Sqrt[2 + Sqrt[3]]*(5*A*b + 4*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(10*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 17.5068, size = 236, normalized size = 0.88

$$-\frac{A\left(a+bx^3\right)^{\frac{3}{2}}}{2ax^2}+\frac{3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(5Ab+4Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{10\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{x\sqrt{a+bx^3}\,(5Ab+4Ba)}{10a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**3,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(2*a*x**2) + 3**(3/4)*sqrt((a**(2/3) - a**
(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1
/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(5*A*b + 4*B
*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(
1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(10*b**(1/3)*s
qrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b*
*(1/3)*x)**2)*sqrt(a + b*x**3)) + x*sqrt(a + b*x**3)*(5*A*b + 4*B
*a)/(10*a)
```

Mathematica [C] time = 0.949484, size = 175, normalized size = 0.65

$$\sqrt{a+bx^3}\left(\frac{2Bx}{5}-\frac{A}{2x^2}\right)+\frac{i3^{3/4}\sqrt[3]{a}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(4aB+5Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{10\sqrt[3]{-b}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^3,x]
```

```
[Out] (-A/(2*x^2) + (2*B*x)/5)*Sqrt[a + b*x^3] + ((I/10)*3^(3/4)*a^(1/3
)*(5*A*b + 4*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*
Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*Ellip
ticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)]
, (-1)^(1/3)])/((-b)^(1/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.012, size = 596, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^3,x)
```

```
[Out] B*(2/5*x*(b*x^3+a)^(1/2)-2/5*I*a*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1
/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a
*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)
+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/
3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2
)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)
,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3)))^(1/2)))+A*(-1/2*(b*x^3+a)^(1/2)/x^2-1/2*I*3^(
1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1
/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2
)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(
1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2
)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^3,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^3,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^3, x)
```

Sympy [A] time = 5.24882, size = 85, normalized size = 0.32

$$\frac{A\sqrt{a}\,\Gamma\left(-\frac{2}{3}\right){}_2F_1\left(\begin{matrix}-\frac{2}{3}, -\frac{1}{2}\\ \frac{1}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x^2\,\Gamma\left(\frac{1}{3}\right)} + \frac{B\sqrt{a}x\,\Gamma\left(\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2}, \frac{1}{3}\\ \frac{4}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{4}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**3,x)
```

```
[Out] A*sqrt(a)*gamma(-2/3)*hyper((-2/3, -1/2), (1/3,), b*x**3*exp_pola
r(I*pi)/a)/(3*x**2*gamma(1/3)) + B*sqrt(a)*x*gamma(1/3)*hyper((-1
/2, 1/3), (4/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(4/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^3,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^3, x)
```

3.188 $\int \frac{\sqrt{a+bx^3}\,(A+Bx^3)}{x^6}\,dx$

Optimal. Leaf size=272

$$-\frac{3^{3/4}\sqrt{2+\sqrt{3}}\,b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\,(Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{20a\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(Ab-10aB)}{20ax^2}-\frac{A\left(a+bx^3\right)^{3/2}}{5ax^5}$$

```
[Out] ((A*b - 10*a*B)*Sqrt[a + b*x^3])/(20*a*x^2) - (A*(a + b*x^3)^(3/2
))/(5*a*x^5) - (3^(3/4)*Sqrt[2 + Sqrt[3]]*b^(2/3)*(A*b - 10*a*B)*
(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)
*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1
 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)
*x)], -7 - 4*Sqrt[3]])/(20*a*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))
/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.293264, antiderivative size = 272, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{3^{3/4}\sqrt{2+\sqrt{3}}\,b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\,(Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{20a\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(Ab-10aB)}{20ax^2}-\frac{A\left(a+bx^3\right)^{3/2}}{5ax^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^6,x]
```

```
[Out] ((A*b - 10*a*B)*Sqrt[a + b*x^3])/(20*a*x^2) - (A*(a + b*x^3)^(3/2
))/(5*a*x^5) - (3^(3/4)*Sqrt[2 + Sqrt[3]]*b^(2/3)*(A*b - 10*a*B)*
(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)
*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1
 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)
*x)], -7 - 4*Sqrt[3]])/(20*a*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))
/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 18.8483, size = 236, normalized size = 0.87

$$-\frac{A\left(a+bx^3\right)^{\frac{3}{2}}}{5ax^5}-\frac{3^{\frac{3}{4}}b^{\frac{2}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab-10Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{20a\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}\,(Ab-10Ba)}{20ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**6,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(5*a*x**5) - 3**(3/4)*b**(2/3)*sqrt((a**(2
/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)
) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(A*
b - 10*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*
x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(20*a*
sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b
**(1/3)*x)**2)*sqrt(a + b*x**3)) + sqrt(a + b*x**3)*(A*b - 10*B*a
)/(20*a*x**2)
```

Mathematica [C] time = 1.44219, size = 189, normalized size = 0.69

$$\sqrt{a+bx^3}\left(\frac{-10aB-3Ab}{20ax^2}-\frac{A}{5x^5}\right)+\frac{i3^{3/4}b\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(10aB-Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{20a^{2/3}\sqrt[3]{-b}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^6,x]
```

```
[Out] (-A/(5*x^5) + (-3*A*b - 10*a*B)/(20*a*x^2))*Sqrt[a + b*x^3] + ((I
/20)*3^(3/4)*b*(-(A*b) + 10*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3
)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)
/a^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^
(1/3)]/3^(1/4)], (-1)^(1/3)])/(a^(2/3)*(-b)^(1/3)*Sqrt[a + b*x^3]
)
```

Maple [B] time = 0.012, size = 616, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^6,x)
```

```
[Out] A*(-1/5*(b*x^3+a)^(1/2)/x^5-3/20*b/a*(b*x^3+a)^(1/2)/x^2+1/20*I/a
*b*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b
^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
)^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*
3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3
/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(-
1/2*(b*x^3+a)^(1/2)/x^2-1/2*I*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*
(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)
^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*
x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2
*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3
^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^6}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^6,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^6, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^6}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^6,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^6, x)
```

Sympy [A] time = 6.16277, size = 94, normalized size = 0.35

$$\frac{A\sqrt{a}\,\Gamma\left(-\frac{5}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{5}{3}, -\frac{1}{2} \\ -\frac{2}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3x^5\,\Gamma\left(-\frac{2}{3}\right)} + \frac{B\sqrt{a}\,\Gamma\left(-\frac{2}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{2}{3}, -\frac{1}{2} \\ \frac{1}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3x^2\,\Gamma\left(\frac{1}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**6,x)
```

```
[Out] A*sqrt(a)*gamma(-5/3)*hyper((-5/3, -1/2), (-2/3,), b*x**3*exp_pol
ar(I*pi)/a)/(3*x**5*gamma(-2/3)) + B*sqrt(a)*gamma(-2/3)*hyper((-
2/3, -1/2), (1/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**2*gamma(1/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^6}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^6,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^6, x)
```

3.189 $\int \frac{\sqrt{a+bx^3}\left(A+Bx^3\right)}{x^9}\,dx$

Optimal. Leaf size=305

$$\frac{3b\sqrt{a+bx^3}(7Ab-16aB)}{320a^2x^2}+\frac{3^{3/4}\sqrt{2+\sqrt{3}}\,b^{5/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-16aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{320a^2\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(7Ab-16aB)}{80ax^5}-\frac{A\left(a+bx^3\right)^{3/2}}{8ax^8}$$

```
[Out] ((7*A*b - 16*a*B)*Sqrt[a + b*x^3])/(80*a*x^5) + (3*b*(7*A*b - 16*
a*B)*Sqrt[a + b*x^3])/(320*a^2*x^2) - (A*(a + b*x^3)^(3/2))/(8*a*
x^8) + (3^(3/4)*Sqrt[2 + Sqrt[3]]*b^(5/3)*(7*A*b - 16*a*B)*(a^(1/
3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqr
t[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
-7 - 4*Sqrt[3]])/(320*a^2*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.385318, antiderivative size = 305, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{3b\sqrt{a+bx^3}(7Ab-16aB)}{320a^2x^2}+\frac{3^{3/4}\sqrt{2+\sqrt{3}}\,b^{5/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-16aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{320a^2\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(7Ab-16aB)}{80ax^5}-\frac{A\left(a+bx^3\right)^{3/2}}{8ax^8}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^9,x]
```

```
[Out] ((7*A*b - 16*a*B)*Sqrt[a + b*x^3])/(80*a*x^5) + (3*b*(7*A*b - 16*
a*B)*Sqrt[a + b*x^3])/(320*a^2*x^2) - (A*(a + b*x^3)^(3/2))/(8*a*
x^8) + (3^(3/4)*Sqrt[2 + Sqrt[3]]*b^(5/3)*(7*A*b - 16*a*B)*(a^(1/
3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqr
t[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
-7 - 4*Sqrt[3]])/(320*a^2*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 25.8674, size = 274, normalized size = 0.9

$$-\frac{A\left(a+bx^3\right)^{\frac{3}{2}}}{8ax^8}+\frac{\sqrt{a+bx^3}\,(7Ab-16Ba)}{80ax^5}+\frac{3^{\frac{3}{4}}b^{\frac{5}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(7Ab-16Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{320a^2\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3b\sqrt{a+bx^3}\,(7Ab-16Ba)}{320a^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**9,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(8*a*x**8) + sqrt(a + b*x**3)*(7*A*b - 16*
B*a)/(80*a*x**5) + 3**(3/4)*b**(5/3)*sqrt((a**(2/3) - a**(1/3)*b*
*(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**
2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(7*A*b - 16*B*a)*ell
iptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1
 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(320*a**2*sqrt(a**(1/
3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)*
*2)*sqrt(a + b*x**3)) + 3*b*sqrt(a + b*x**3)*(7*A*b - 16*B*a)/(32
0*a**2*x**2)
```

Mathematica [C] time = 1.70783, size = 206, normalized size = 0.68

$$-\frac{\sqrt{a+bx^3}\left(40a^2A-3bx^6(7Ab-16aB)+4ax^3(16aB+3Ab)\right)}{320a^2x^8}+\frac{i3^{3/4}(-b)^{5/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(7Ab-16aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{320a^{5/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^9,x]
```

```
[Out] -(Sqrt[a + b*x^3]*(40*a^2*A + 4*a*(3*A*b + 16*a*B)*x^3 - 3*b*(7*A
*b - 16*a*B)*x^6))/(320*a^2*x^8) + ((I/320)*3^(3/4)*(-b)^(5/3)*(7
*A*b - 16*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqr
t[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*Elliptic
F[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (
-1)^(1/3)])/(a^(5/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.013, size = 660, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^9,x)
```

```
[Out] A*(-1/8*(b*x^3+a)^(1/2)/x^8-3/80*b/a*(b*x^3+a)^(1/2)/x^5+21/320/a
^2*b^2*(b*x^3+a)^(1/2)/x^2-7/320*I/a^2*b^2*3^(1/2)*(-a*b^2)^(1/3)
*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/
```

```
2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b
^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(-1/5*(b*x^3+a)^(1/2)/x^5-3
/20*b/a*(b*x^3+a)^(1/2)/x^2+1/20*I/a*b*3^(1/2)*(-a*b^2)^(1/3)*(I*
(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b
/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(
1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^
(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^
(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(
1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^9}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^9,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^9, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^9}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^9,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^9, x)
```

Sympy [A] time = 9.17776, size = 97, normalized size = 0.32

$$\frac{A\sqrt{a}\,\Gamma\left(-\frac{8}{3}\right) {}_2F_1\left(\left.\begin{matrix} -\frac{8}{3}, -\frac{1}{2} \\ -\frac{5}{3} \end{matrix}\right| \frac{bx^3 e^{i\pi}}{a}\right)}{3x^8\,\Gamma\left(-\frac{5}{3}\right)} + \frac{B\sqrt{a}\,\Gamma\left(-\frac{5}{3}\right) {}_2F_1\left(\left.\begin{matrix} -\frac{5}{3}, -\frac{1}{2} \\ -\frac{2}{3} \end{matrix}\right| \frac{bx^3 e^{i\pi}}{a}\right)}{3x^5\,\Gamma\left(-\frac{2}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**9,x)
```

```
[Out] A*sqrt(a)*gamma(-8/3)*hyper((-8/3, -1/2), (-5/3,), b*x**3*exp_pol
ar(I*pi)/a)/(3*x**8*gamma(-5/3)) + B*sqrt(a)*gamma(-5/3)*hyper((-
5/3, -1/2), (-2/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**5*gamma(-2/3
))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^9}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^9,x, algorithm="giac")

[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^9, x)
```

3.190 $\int x^4\sqrt{a+bx^3}\,(A+Bx^3)\,dx$

Optimal. Leaf size=581

$$-\frac{8\sqrt{2}3^{3/4}a^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{1729b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{12\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-10aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{1729b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{24a^2\sqrt{a+bx^3}(19Ab-10aB)}{1729b^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{6ax^2\sqrt{a+bx^3}(19Ab-10aB)}{1729b^2}$$
$$+\frac{2x^5\sqrt{a+bx^3}(19Ab-10aB)}{247b}+\frac{2Bx^5\left(a+bx^3\right)^{3/2}}{19b}$$

```
[Out] (6*a*(19*A*b - 10*a*B)*x^2*Sqrt[a + b*x^3])/(1729*b^2) + (2*(19*A
*b - 10*a*B)*x^5*Sqrt[a + b*x^3])/(247*b) - (24*a^2*(19*A*b - 10*
a*B)*Sqrt[a + b*x^3])/(1729*b^(8/3)*((1 + Sqrt[3])*a^(1/3) + b^(1
/3)*x)) + (2*B*x^5*(a + b*x^3)^(3/2))/(19*b) + (12*3^(1/4)*Sqrt[2
 - Sqrt[3]]*a^(7/3)*(19*A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[
(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3
) + b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/
3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(172
9*b^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (8*Sqrt[2]*3^(3/4)*a^(7/3
)*(19*A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(1729*b^(8/3)*Sqrt[(a^
(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.875347, antiderivative size = 581, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$-\frac{8\sqrt{2}3^{3/4}a^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{1729b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{12\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-10aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{1729b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{24a^2\sqrt{a+bx^3}(19Ab-10aB)}{1729b^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{6ax^2\sqrt{a+bx^3}(19Ab-10aB)}{1729b^2}$$
$$+\frac{2x^5\sqrt{a+bx^3}(19Ab-10aB)}{247b}+\frac{2Bx^5\left(a+bx^3\right)^{3/2}}{19b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (6*a*(19*A*b - 10*a*B)*x^2*Sqrt[a + b*x^3])/(1729*b^2) + (2*(19*A
*b - 10*a*B)*x^5*Sqrt[a + b*x^3])/(247*b) - (24*a^2*(19*A*b - 10*
a*B)*Sqrt[a + b*x^3])/(1729*b^(8/3)*((1 + Sqrt[3])*a^(1/3) + b^(1
/3)*x)) + (2*B*x^5*(a + b*x^3)^(3/2))/(19*b) + (12*3^(1/4)*Sqrt[2
 - Sqrt[3]]*a^(7/3)*(19*A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[
(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3
) + b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/
3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(172
9*b^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (8*Sqrt[2]*3^(3/4)*a^(7/3
)*(19*A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(1729*b^(8/3)*Sqrt[(a^
(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 59.7768, size = 527, normalized size = 0.91

$$\frac{2Bx^5\left(a+bx^3\right)^{\frac{3}{2}}}{19b}+\frac{12\sqrt[4]{3}a^{\frac{7}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(19Ab-10Ba)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{1729b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{8\sqrt{2}\cdot 3^{\frac{3}{4}}a^{\frac{7}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(19Ab-10Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{1729b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{24a^2\sqrt{a+bx^3}(19Ab-10Ba)}{1729b^{\frac{8}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{6ax^2\sqrt{a+bx^3}(19Ab-10Ba)}{1729b^2}+\frac{2x^5\sqrt{a+bx^3}(19Ab-10Ba)}{247b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*x**5*(a + b*x**3)**(3/2)/(19*b) + 12*3**(1/4)*a**(7/3)*sqrt((
a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sq
rt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*
x)*(19*A*b - 10*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) +
b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3
))/(1729*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 8*sqrt(2)*3*
*(3/4)*a**(7/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x
**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/
3)*x)*(19*A*b - 10*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3))
 + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqr
t(3))/(1729*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1
/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 24*a**2*s
qrt(a + b*x**3)*(19*A*b - 10*B*a)/(1729*b**(8/3)*(a**(1/3)*(1 + s
qrt(3)) + b**(1/3)*x)) + 6*a*x**2*sqrt(a + b*x**3)*(19*A*b - 10*B
*a)/(1729*b**2) + 2*x**5*sqrt(a + b*x**3)*(19*A*b - 10*B*a)/(247*
b)
```

Mathematica [C] time = 0.654979, size = 263, normalized size = 0.45

$$\frac{2\left((-b)^{2/3}\left(a+bx^3\right)\left(7bx^5(3aB+19Ab)+3ax^2(19Ab-10aB)+91b^2Bx^8\right)+4(-1)^{2/3}3^{3/4}a^{8/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/}}{a^{2/}}}\right.}{1729(-b)^{8/3}\sqrt{}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*((-b)^(2/3)*(a + b*x^3)*(3*a*(19*A*b - 10*a*B)*x^2 + 7*b*(19*A
*b + 3*a*B)*x^5 + 91*b^2*B*x^8) + 4*(-1)^(2/3)*3^(3/4)*a^(8/3)*(1
9*A*b - 10*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sq
rt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(Sqrt[3
]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3
^(1/4)], (-1)^(1/3)] + (-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/
6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])))/(1729*(-b
)^(8/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.01, size = 966, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] A*(2/13*x^5*(b*x^3+a)^(1/2)+6/91*a/b*x^2*(b*x^3+a)^(1/2)+8/91*I/b
^2*a^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(
-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/
2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(
1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^
2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/
2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3)))^(1/2))))+B*(2/19*x^8*(b*x^3+a)^(1/2)+6/247*a/b*x^5*(b*
x^3+a)^(1/2)-60/1729*a^2/b^2*x^2*(b*x^3+a)^(1/2)-80/1729*I*a^3/b^
3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^
2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))
^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I
*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*
b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1
/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*
(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\left(Bx^3+A\right)\sqrt{bx^3+a}x^4\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^4,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^4, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bx^7 + Ax^4\right)\sqrt{bx^3 + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^4,x, algorithm="fricas")
```

```
[Out] integral((B*x^7 + A*x^4)*sqrt(b*x^3 + a), x)
```

Sympy [A] time = 6.02863, size = 83, normalized size = 0.14

$$\frac{A\sqrt{a}x^5\,\Gamma\left(\frac{5}{3}\right)\,{}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{5}{3} \\ \frac{8}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{8}{3}\right)} + \frac{B\sqrt{a}x^8\,\Gamma\left(\frac{8}{3}\right)\,{}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{8}{3} \\ \frac{11}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{11}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] A*sqrt(a)*x**5*gamma(5/3)*hyper((-1/2, 5/3), (8/3,), b*x**3*exp_p
olar(I*pi)/a)/(3*gamma(8/3)) + B*sqrt(a)*x**8*gamma(8/3)*hyper((-
1/2, 8/3), (11/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(11/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\sqrt{bx^3 + a}x^4\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^4,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x^4, x)
```

3.191 $\int x\sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=548

$$\frac{2\sqrt{2}3^{3/4}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{6a\sqrt{a+bx^3}(13Ab-4aB)}{91b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2\sqrt{a+bx^3}(13Ab-4aB)}{91b}+\frac{2Bx^2\left(a+bx^3\right)^{3/2}}{13b}$$

```
[Out] (2*(13*A*b - 4*a*B)*x^2*Sqrt[a + b*x^3])/(91*b) + (6*a*(13*A*b -
4*a*B)*Sqrt[a + b*x^3])/(91*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1
/3)*x)) + (2*B*x^2*(a + b*x^3)^(3/2))/(13*b) - (3*3^(1/4)*Sqrt[2
- Sqrt[3]]*a^(4/3)*(13*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a
^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3)
+ b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)
*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(91*b^
(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3)
 + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (2*Sqrt[2]*3^(3/4)*a^(4/3)*(1
3*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellip
ticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^
(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(91*b^(5/3)*Sqrt[(a^(1/3)*(
a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt
[a + b*x^3])
```

Rubi [A] time = 0.683879, antiderivative size = 548, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$\frac{2\sqrt{2}3^{3/4}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{6a\sqrt{a+bx^3}(13Ab-4aB)}{91b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2\sqrt{a+bx^3}(13Ab-4aB)}{91b}+\frac{2Bx^2\left(a+bx^3\right)^{3/2}}{13b}$$

Antiderivative was successfully verified.

```
[In]  Int[x*Sqrt[a + b*x^3]*(A + B*x^3),x]
```



```
[Out] (2*(13*A*b - 4*a*B)*x^2*Sqrt[a + b*x^3])/(91*b) + (6*a*(13*A*b -
4*a*B)*Sqrt[a + b*x^3])/(91*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1
```

```
/3)*x)) + (2*B*x^2*(a + b*x^3)^(3/2))/(13*b) - (3*3^(1/4)*Sqrt[2
- Sqrt[3]]*a^(4/3)*(13*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a
^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3)
+ b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)
*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(91*b^
(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3)
 + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (2*Sqrt[2]*3^(3/4)*a^(4/3)*(1
3*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellip
ticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^
(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(91*b^(5/3)*Sqrt[(a^(1/3)*(
a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt
[a + b*x^3])
```

Rubi in Sympy [A] time = 47.1311, size = 493, normalized size = 0.9

$$\frac{2Bx^2\left(a+bx^3\right)^{\frac{3}{2}}}{13b} - \frac{3\sqrt[4]{3}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(13Ab-4Ba\right)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{91b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{2\sqrt{2}\cdot 3^{\frac{3}{4}}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(13Ab-4Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{91b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{6a\sqrt{a+bx^3}\left(13Ab-4Ba\right)}{91b^{\frac{5}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)} + \frac{2x^2\sqrt{a+bx^3}\left(13Ab-4Ba\right)}{91b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*x**2*(a + b*x**3)**(3/2)/(13*b) - 3*3**(1/4)*a**(4/3)*sqrt((a
**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqr
t(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x
)*(13*A*b - 4*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b*
*(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))
/(91*b**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1
+ sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 2*sqrt(2)*3**(3/
4)*a**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)
/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x
)*(13*A*b - 4*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b*
*(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))
/(91*b**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1
+ sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 6*a*sqrt(a + b*x
**3)*(13*A*b - 4*B*a)/(91*b**(5/3)*(a**(1/3)*(1 + sqrt(3)) + b**(
1/3)*x)) + 2*x**2*sqrt(a + b*x**3)*(13*A*b - 4*B*a)/(91*b)
```

Mathematica [C] time = 0.520582, size = 246, normalized size = 0.45

$$\frac{2x^2\sqrt{a+bx^3}\left(3aB+13Ab+7bBx^3\right)}{91b} - \frac{2\sqrt[6]{-1}3^{3/4}a^{5/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(13Ab-4aB)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}}{91(-b)^{5/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[x*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*x^2*Sqrt[a + b*x^3]*(13*A*b + 3*a*B + 7*b*B*x^3))/(91*b) - (2*
(-1)^(1/6)*3^(3/4)*a^(5/3)*(13*A*b - 4*a*B)*Sqrt[(-1)^(5/6)*(-1 +
 ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)
^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5
/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3
)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3
^(1/4)], (-1)^(1/3)]))/(91*(-b)^(5/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.009, size = 926, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] A*(2/7*x^2*(b*x^3+a)^(1/2)-2/7*I*a*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x
+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(
-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/
3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(
1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1
/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(
1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(
x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/
(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(2/13*x^5*(b*
x^3+a)^(1/2)+6/91*a/b*x^2*(b*x^3+a)^(1/2)+8/91*I/b^2*a^2*3^(1/2)*
(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/
(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I
*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*
b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*
(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)
^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(
1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2
))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3+A\right)\sqrt{bx^3+a}\,x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bx^4 + Ax\right)\sqrt{bx^3 + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x,x, algorithm="fricas")
```

```
[Out] integral((B*x^4 + A*x)*sqrt(b*x^3 + a), x)
```

Sympy [A] time = 4.61429, size = 83, normalized size = 0.15

$$\frac{A\sqrt{a}x^2\,\Gamma\left(\frac{2}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{2}{3}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{5}{3}\right)} + \frac{B\sqrt{a}x^5\,\Gamma\left(\frac{5}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{5}{3}\\ \frac{8}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{8}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] A*sqrt(a)*x**2*gamma(2/3)*hyper((-1/2, 2/3), (5/3,), b*x**3*exp_p
olar(I*pi)/a)/(3*gamma(5/3)) + B*sqrt(a)*x**5*gamma(5/3)*hyper((-
1/2, 5/3), (8/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(8/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\sqrt{bx^3 + a}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*x, x)
```

3.192 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{x^2}\,dx$

Optimal. Leaf size=545

$$\frac{\sqrt{2}3^{3/4}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+7Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+7Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{14b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3\sqrt{a+bx^3}(2aB+7Ab)}{7b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{x^2\sqrt{a+bx^3}(2aB+7Ab)}{7a}-\frac{A\left(a+bx^3\right)^{3/2}}{ax}$$

```
[Out] ((7*A*b + 2*a*B)*x^2*Sqrt[a + b*x^3])/(7*a) + (3*(7*A*b + 2*a*B)*
Sqrt[a + b*x^3])/(7*b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x))
- (A*(a + b*x^3)^(3/2))/(a*x) - (3*3^(1/4)*Sqrt[2 - Sqrt[3]]*a^(1
/3)*(7*A*b + 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(14*b^(2/3)*Sqrt[(a^(1
/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*Sqrt[a + b*x^3]) + (Sqrt[2]*3^(3/4)*a^(1/3)*(7*A*b + 2*a*B)*(a^(
1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - S
qrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)]
, -7 - 4*Sqrt[3]])/(7*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x)
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.683565, antiderivative size = 545, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{\sqrt{2}3^{3/4}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+7Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+7Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{14b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3\sqrt{a+bx^3}(2aB+7Ab)}{7b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{x^2\sqrt{a+bx^3}(2aB+7Ab)}{7a}-\frac{A\left(a+bx^3\right)^{3/2}}{ax}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^2,x]
```

```
[Out] ((7*A*b + 2*a*B)*x^2*Sqrt[a + b*x^3])/(7*a) + (3*(7*A*b + 2*a*B)*
Sqrt[a + b*x^3])/(7*b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x))
```

```
- (A*(a + b*x^3)^(3/2))/(a*x) - (3*3^(1/4)*Sqrt[2 - Sqrt[3]]*a^(1
/3)*(7*A*b + 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(14*b^(2/3)*Sqrt[(a^(1
/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*Sqrt[a + b*x^3]) + (Sqrt[2]*3^(3/4)*a^(1/3)*(7*A*b + 2*a*B)*(a^(
1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - S
qrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)]
, -7 - 4*Sqrt[3]])/(7*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x)
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 47.8079, size = 486, normalized size = 0.89

$$-\frac{A\left(a+bx^3\right)^{\frac{3}{2}}}{ax}-\frac{3\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{7Ab}{2}+Ba\right)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{7b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{7Ab}{2}+Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{7b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{6\sqrt{a+bx^3}\left(\frac{7Ab}{2}+Ba\right)}{7b^{\frac{2}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{2x^2\sqrt{a+bx^3}\left(\frac{7Ab}{2}+Ba\right)}{7a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**2,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(a*x) - 3*3**(1/4)*a**(1/3)*sqrt((a**(2/3)
 - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) +
 b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(7*A*
b/2 + B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x
)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(7*b**(
2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)
) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 2*sqrt(2)*3**(3/4)*a**(1/
3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(7*A*b/
2 + B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(7*b**(2/
3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 6*sqrt(a + b*x**3)*(7*A*b/2
 + B*a)/(7*b**(2/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) + 2*x*
*2*sqrt(a + b*x**3)*(7*A*b/2 + B*a)/(7*a)
```

Mathematica [C] time = 0.372805, size = 236, normalized size = 0.43

$$\sqrt{a+bx^3}\left(\frac{2Bx^2}{7}-\frac{A}{x}\right)+\frac{\sqrt[6]{-1}3^{3/4}a^{2/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(2aB+7Ab)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\right.\right.}{7(-b)^{2/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^2,x]
```

```
[Out] (-(A/x) + (2*B*x^2)/7)*Sqrt[a + b*x^3] + ((-1)^(1/6)*3^(3/4)*a^(2
/3)*(7*A*b + 2*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))
]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-
I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a
^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[
-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(
7*(-b)^(2/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.012, size = 902, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^2,x)
```

```
[Out] A*(-(b*x^3+a)^(1/2)/x-I*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^
2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)
^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*El
lipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^
2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^
(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b
^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(2/7*x^2*(b*x^3+a)^(1/2)-2
/7*I*a*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b
*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b
*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*
b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(
1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^2,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^2,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^2, x)
```

Sympy [A] time = 5.15502, size = 85, normalized size = 0.16

$$\frac{A\sqrt{a}\,\Gamma\left(-\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},-\frac{1}{3}\\ \frac{2}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x\,\Gamma\left(\frac{2}{3}\right)}+\frac{B\sqrt{a}x^2\,\Gamma\left(\frac{2}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{2}{3}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{5}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**2,x)
```

```
[Out] A*sqrt(a)*gamma(-1/3)*hyper((-1/2, -1/3), (2/3,), b*x**3*exp_pola
r(I*pi)/a)/(3*x*gamma(2/3)) + B*sqrt(a)*x**2*gamma(2/3)*hyper((-1
/2, 2/3), (5/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(5/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^2,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^2, x)
```

3.193 $\int \frac{\sqrt{a+bx^3}\left(A+Bx^3\right)}{x^5}\,dx$

Optimal. Leaf size=546

$$\frac{3^{3/4}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{16a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{\sqrt{a+bx^3}(8aB+Ab)}{8ax}+\frac{3\sqrt[3]{b}\sqrt{a+bx^3}(8aB+Ab)}{8a\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{A\left(a+bx^3\right)^{3/2}}{4ax^4}$$

```
[Out] -((A*b + 8*a*B)*Sqrt[a + b*x^3])/(8*a*x) + (3*b^(1/3)*(A*b + 8*a*
B)*Sqrt[a + b*x^3])/(8*a*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (
A*(a + b*x^3)^(3/2))/(4*a*x^4) - (3*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(
1/3)*(A*b + 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*
b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*E
llipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3]
)*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(16*a^(2/3)*Sqrt[(a^(1/
3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
Sqrt[a + b*x^3]) + (3^(3/4)*b^(1/3)*(A*b + 8*a*B)*(a^(1/3) + b^(1
/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sq
rt[3]])/(4*Sqrt[2]*a^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.683323, antiderivative size = 546, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{3^{3/4}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{16a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{\sqrt{a+bx^3}(8aB+Ab)}{8ax}+\frac{3\sqrt[3]{b}\sqrt{a+bx^3}(8aB+Ab)}{8a\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{A\left(a+bx^3\right)^{3/2}}{4ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^5,x]
```

```
[Out] -((A*b + 8*a*B)*Sqrt[a + b*x^3])/(8*a*x) + (3*b^(1/3)*(A*b + 8*a*
B)*Sqrt[a + b*x^3])/(8*a*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (
```

```
A*(a + b*x^3)^(3/2))/(4*a*x^4) - (3*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(
1/3)*(A*b + 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*
b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*E
llipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3]
)*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(16*a^(2/3)*Sqrt[(a^(1/
3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
Sqrt[a + b*x^3]) + (3^(3/4)*b^(1/3)*(A*b + 8*a*B)*(a^(1/3) + b^(1
/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sq
rt[3]])/(4*Sqrt[2]*a^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 48.1624, size = 479, normalized size = 0.88

$$-\frac{A\left(a+bx^3\right)^{\frac{3}{2}}}{4ax^4}+\frac{3\sqrt[3]{b}\sqrt{a+bx^3}\,(Ab+8Ba)}{8a\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}-\frac{\sqrt{a+bx^3}\,(Ab+8Ba)}{8ax}-\frac{3\sqrt[4]{3}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab+8Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{16a^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab+8Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{8a^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**5,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(4*a*x**4) + 3*b**(1/3)*sqrt(a + b*x**3)*(
A*b + 8*B*a)/(8*a*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) - sqrt(a
 + b*x**3)*(A*b + 8*B*a)/(8*a*x) - 3*3**(1/4)*b**(1/3)*sqrt((a**(
2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3
)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(
A*b + 8*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)
*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(16*a
**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt
(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + sqrt(2)*3**(3/4)*b**(1
/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/
3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(A*b +
 8*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(
a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(8*a**(2/3
)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) +
 b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.58075, size = 249, normalized size = 0.46

$$\sqrt{a+bx^3}\left(\frac{-8aB-3Ab}{8ax}-\frac{A}{4x^4}\right)+\frac{\sqrt[6]{-1}3^{3/4}b\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\,(8aB+Ab)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\sin^{-1}\ldots\right.\right.}{8\sqrt[3]{a}(-b)^{2/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^5,x]
```

```
[Out] (-A/(4*x^4) + (-3*A*b - 8*a*B)/(8*a*x))*Sqrt[a + b*x^3] + ((-1)^(
1/6)*3^(3/4)*b*(A*b + 8*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)
/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(
2/3)]*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(
1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[Arc
Sin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(
1/3)]))/(8*a^(1/3)*(-b)^(2/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.012, size = 920, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^5,x)
```

```
[Out] A*(-1/4*(b*x^3+a)^(1/2)/x^4-3/8*b/a*(b*x^3+a)^(1/2)/x-1/8*I/a*b*3
^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^
(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1
/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x
+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(
-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)
*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a
*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
))^(1/2))))+B*(-(b*x^3+a)^(1/2)/x-I*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+
1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3
)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1
/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/
2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1
/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x
+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(
-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\sqrt{bx^3 + a}}{x^5}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^5,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^5, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\left(Bx^3 + A\right)\sqrt{bx^3 + a}}{x^5}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^5,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^5, x)
```

Sympy [A] time = 5.70785, size = 92, normalized size = 0.17

$$\frac{A\sqrt{a}\,\Gamma\left(-\frac{4}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{4}{3},-\frac{1}{2}\\ -\frac{1}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x^4\,\Gamma\left(-\frac{1}{3}\right)}+\frac{B\sqrt{a}\,\Gamma\left(-\frac{1}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},-\frac{1}{3}\\ \frac{2}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x\,\Gamma\left(\frac{2}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**5,x)
```

```
[Out] A*sqrt(a)*gamma(-4/3)*hyper((-4/3, -1/2), (-1/3,), b*x**3*exp_pol
ar(I*pi)/a)/(3*x**4*gamma(-1/3)) + B*sqrt(a)*gamma(-1/3)*hyper((-
1/2, -1/3), (2/3,), b*x**3*exp_polar(I*pi)/a)/(3*x*gamma(2/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)\sqrt{bx^3+a}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^5,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^5, x)
```

3.194 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{x^8}\,dx$

Optimal. Leaf size=581

$$-\frac{3^{3/4}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{56\sqrt{2}a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-14aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3b^{4/3}\sqrt{a+bx^3}(5Ab-14aB)}{112a^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{3b\sqrt{a+bx^3}(5Ab-14aB)}{112a^2x}+\frac{\sqrt{a+bx^3}(5Ab-14aB)}{56ax^4}-\frac{A\left(a+bx^3\right)^{3/2}}{7ax^7}$$

```
[Out] ((5*A*b - 14*a*B)*Sqrt[a + b*x^3])/(56*a*x^4) + (3*b*(5*A*b - 14*
a*B)*Sqrt[a + b*x^3])/(112*a^2*x) - (3*b^(4/3)*(5*A*b - 14*a*B)*S
qrt[a + b*x^3])/(112*a^2*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (
A*(a + b*x^3)^(3/2))/(7*a*x^7) + (3*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(
4/3)*(5*A*b - 14*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/
3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2
]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt
[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*a^(5/3)*Sqrt[(a
^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*Sqrt[a + b*x^3]) - (3^(3/4)*b^(4/3)*(5*A*b - 14*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(56*Sqrt[2]*a^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/
3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.821824, antiderivative size = 581, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$-\frac{3^{3/4}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{56\sqrt{2}a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-14aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3b^{4/3}\sqrt{a+bx^3}(5Ab-14aB)}{112a^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{3b\sqrt{a+bx^3}(5Ab-14aB)}{112a^2x}+\frac{\sqrt{a+bx^3}(5Ab-14aB)}{56ax^4}-\frac{A\left(a+bx^3\right)^{3/2}}{7ax^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^8,x]
```

```
[Out] ((5*A*b - 14*a*B)*Sqrt[a + b*x^3])/(56*a*x^4) + (3*b*(5*A*b - 14*
a*B)*Sqrt[a + b*x^3])/(112*a^2*x) - (3*b^(4/3)*(5*A*b - 14*a*B)*S
```

```
qrt[a + b*x^3])/(112*a^2*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (
A*(a + b*x^3)^(3/2))/(7*a*x^7) + (3*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(
4/3)*(5*A*b - 14*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/
3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2
]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt
[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*a^(5/3)*Sqrt[(a
^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*Sqrt[a + b*x^3]) - (3^(3/4)*b^(4/3)*(5*A*b - 14*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(56*Sqrt[2]*a^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/
3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 59.6972, size = 520, normalized size = 0.9

$$-\frac{A\left(a+bx^3\right)^{\frac{3}{2}}}{7ax^7}+\frac{\sqrt{a+bx^3}\,(5Ab-14Ba)}{56ax^4}-\frac{3b^{\frac{4}{3}}\sqrt{a+bx^3}\,(5Ab-14Ba)}{112a^2\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{3b\sqrt{a+bx^3}\,(5Ab-14Ba)}{112a^2x}$$

$$+\frac{3\sqrt[4]{3}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(5Ab-14Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{224a^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{\sqrt{2}\cdot 3^{\frac{3}{4}}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(5Ab-14Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{112a^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**8,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(7*a*x**7) + sqrt(a + b*x**3)*(5*A*b - 14*
B*a)/(56*a*x**4) - 3*b**(4/3)*sqrt(a + b*x**3)*(5*A*b - 14*B*a)/(
112*a**2*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) + 3*b*sqrt(a + b*
x**3)*(5*A*b - 14*B*a)/(112*a**2*x) + 3*3**(1/4)*b**(4/3)*sqrt((a
**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqr
t(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x
)*(5*A*b - 14*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b*
*(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))
/(224*a**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1
 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - sqrt(2)*3**(3/4
)*b**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)
*(5*A*b - 14*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**
(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/
(112*a**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1
+ sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.609738, size = 272, normalized size = 0.47

$$\sqrt{a+bx^3}\left(-\frac{3b(14aB-5Ab)}{112a^2x}+\frac{-14aB-3Ab}{56ax^4}-\frac{A}{7x^7}\right)$$

$$+\frac{\sqrt[6]{-1}3^{3/4}b^2\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(14aB-5Ab)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\right.\right.}{112a^{4/3}(-b)^{2/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^8,x]
```

```
[Out] (-A/(7*x^7) + (-3*A*b - 14*a*B)/(56*a*x^4) - (3*b*(-5*A*b + 14*a*
B))/(112*a^2*x))*Sqrt[a + b*x^3] + ((-1)^(1/6)*3^(3/4)*b^2*(-5*A*
b + 14*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1
 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[
3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/
3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5
/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(112*a^(4
/3)*(-b)^(2/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.051, size = 964, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^8,x)
```

```
[Out] A*(-1/7*(b*x^3+a)^(1/2)/x^7-3/56*b/a*(b*x^3+a)^(1/2)/x^4+15/112/a
^2*b^2*(b*x^3+a)^(1/2)/x+5/112*I/a^2*b^2*3^(1/2)*(-a*b^2)^(1/3)*(
I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)
*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I
*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*
(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2
)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-1/4*(b*
x^3+a)^(1/2)/x^4-3/8*b/a*(b*x^3+a)^(1/2)/x-1/8*I/a*b*3^(1/2)*(-a*
b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+
1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)
/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^8,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^8, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^8}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^8,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^8, x)
```

Sympy [A] time = 7.56132, size = 97, normalized size = 0.17

$$\frac{A\sqrt{a}\,\Gamma\left(-\frac{7}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{7}{3}, -\frac{1}{2} \\ -\frac{4}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^7\,\Gamma\left(-\frac{4}{3}\right)} + \frac{B\sqrt{a}\,\Gamma\left(-\frac{4}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{4}{3}, -\frac{1}{2} \\ -\frac{1}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^4\,\Gamma\left(-\frac{1}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**8,x)
```

```
[Out] A*sqrt(a)*gamma(-7/3)*hyper((-7/3, -1/2), (-4/3,), b*x**3*exp_pol
ar(I*pi)/a)/(3*x**7*gamma(-4/3)) + B*sqrt(a)*gamma(-4/3)*hyper((-
4/3, -1/2), (-1/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**4*gamma(-1/3
))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^8,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^8, x)
```

3.195 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{x^{11}}\,dx$

Optimal. Leaf size=614

$$\frac{3^{3/4}b^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-20aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224\sqrt{2}a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-20aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{896a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{3b^{7/3}\sqrt{a+bx^3}(11Ab-20aB)}{448a^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{3b^2\sqrt{a+bx^3}(11Ab-20aB)}{448a^3x}$$
$$+\frac{3b\sqrt{a+bx^3}(11Ab-20aB)}{1120a^2x^4}+\frac{\sqrt{a+bx^3}(11Ab-20aB)}{140ax^7}-\frac{A\left(a+bx^3\right)^{3/2}}{10ax^{10}}$$

```
[Out] ((11*A*b - 20*a*B)*Sqrt[a + b*x^3])/(140*a*x^7) + (3*b*(11*A*b -
20*a*B)*Sqrt[a + b*x^3])/(1120*a^2*x^4) - (3*b^2*(11*A*b - 20*a*B
)*Sqrt[a + b*x^3])/(448*a^3*x) + (3*b^(7/3)*(11*A*b - 20*a*B)*Sqr
t[a + b*x^3])/(448*a^3*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (A*
(a + b*x^3)^(3/2))/(10*a*x^10) - (3*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(
7/3)*(11*A*b - 20*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(896*a^(8/3)*Sqrt[(
a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x
)^2]*Sqrt[a + b*x^3]) + (3^(3/4)*b^(7/3)*(11*A*b - 20*a*B)*(a^(1/
3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqr
t[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
-7 - 4*Sqrt[3]])/(224*Sqrt[2]*a^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^
(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.948746, antiderivative size = 614, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$\frac{3^{3/4}b^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-20aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224\sqrt{2}a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-20aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{896a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{3b^{7/3}\sqrt{a+bx^3}(11Ab-20aB)}{448a^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{3b^2\sqrt{a+bx^3}(11Ab-20aB)}{448a^3x}$$
$$+\frac{3b\sqrt{a+bx^3}(11Ab-20aB)}{1120a^2x^4}+\frac{\sqrt{a+bx^3}(11Ab-20aB)}{140ax^7}-\frac{A\left(a+bx^3\right)^{3/2}}{10ax^{10}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^11,x]
```

```
[Out] ((11*A*b - 20*a*B)*Sqrt[a + b*x^3])/(140*a*x^7) + (3*b*(11*A*b -
20*a*B)*Sqrt[a + b*x^3])/(1120*a^2*x^4) - (3*b^2*(11*A*b - 20*a*B
)*Sqrt[a + b*x^3])/(448*a^3*x) + (3*b^(7/3)*(11*A*b - 20*a*B)*Sqr
t[a + b*x^3])/(448*a^3*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (A*
(a + b*x^3)^(3/2))/(10*a*x^10) - (3*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(
7/3)*(11*A*b - 20*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(896*a^(8/3)*Sqrt[(
a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x
)^2]*Sqrt[a + b*x^3]) + (3^(3/4)*b^(7/3)*(11*A*b - 20*a*B)*(a^(1/
3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqr
t[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
-7 - 4*Sqrt[3]])/(224*Sqrt[2]*a^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^
(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 71.572, size = 554, normalized size = 0.9

$$-\frac{A\left(a+bx^{3}\right)^{\frac{3}{2}}}{10ax^{10}}+\frac{\sqrt{a+bx^{3}}\,(11Ab-20Ba)}{140ax^{7}}+\frac{3b\sqrt{a+bx^{3}}\,(11Ab-20Ba)}{1120a^{2}x^{4}}+\frac{3b^{\frac{7}{3}}\sqrt{a+bx^{3}}\,(11Ab-20Ba)}{448a^{3}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}-\frac{3b^{2}\sqrt{a+bx^{3}}\,(11Ab-20Ba)}{448a^{3}x}-\frac{3\sqrt[4]{3}b^{\frac{7}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^{2}}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-20Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{896a^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^{2}}}\sqrt{a+bx^{3}}}+\frac{\sqrt{2}\cdot 3^{\frac{3}{4}}b^{\frac{7}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^{2}}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-20Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{448a^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^{2}}}\sqrt{a+bx^{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**11,x)
```

```
[Out] -A*(a + b*x**3)**(3/2)/(10*a*x**10) + sqrt(a + b*x**3)*(11*A*b -
20*B*a)/(140*a*x**7) + 3*b*sqrt(a + b*x**3)*(11*A*b - 20*B*a)/(11
20*a**2*x**4) + 3*b**(7/3)*sqrt(a + b*x**3)*(11*A*b - 20*B*a)/(44
8*a**3*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) - 3*b**2*sqrt(a + b
*x**3)*(11*A*b - 20*B*a)/(448*a**3*x) - 3*3**(1/4)*b**(7/3)*sqrt(
(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + s
qrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)
*x)*(11*A*b - 20*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) +
 b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(
3))/(896*a**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + sqrt(2)*3**(
3/4)*b**(7/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**
2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)
*x)*(11*A*b - 20*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) +
 b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(
3))/(448*a**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.868569, size = 284, normalized size = 0.46

$$-\frac{\sqrt{a+bx^3}\left(224a^3A+16a^2x^3(20aB+3Ab)+15b^2x^9(11Ab-20aB)+6abx^6(20aB-11Ab)\right)}{2240a^3x^{10}}+\frac{(-1)^{2/3}3^{3/4}(-b)^{7/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(11Ab-20aB)\left((-1)^{5/6}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right.\right.}{448a^{7/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^11,x]
```

```
[Out] -(Sqrt[a + b*x^3]*(224*a^3*A + 16*a^2*(3*A*b + 20*a*B)*x^3 + 6*a*
b*(-11*A*b + 20*a*B)*x^6 + 15*b^2*(11*A*b - 20*a*B)*x^9))/(2240*a
^3*x^10) + ((-1)^(2/3)*3^(3/4)*(-b)^(7/3)*(11*A*b - 20*a*B)*Sqrt[
(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)
/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(Sqrt[3]*EllipticE[ArcSin[Sq
rt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]
+ (-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)
/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(448*a^(7/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.039, size = 1006, normalized size = 1.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^11,x)
```

```
[Out] A*(-1/10*(b*x^3+a)^(1/2)/x^10-3/140*b/a*(b*x^3+a)^(1/2)/x^7+33/11
20/a^2*b^2*(b*x^3+a)^(1/2)/x^4-33/448/a^3*b^3*(b*x^3+a)^(1/2)/x-1
1/448*I/a^3*b^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)
-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*
((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*(
(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(
1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)
/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1
/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)
,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-1/7*(b*x^3+a)^(1/2)/x^7-3/56*b/a
*(b*x^3+a)^(1/2)/x^4+15/112/a^2*b^2*(b*x^3+a)^(1/2)/x+5/112*I/a^2
*b^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a
*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)
*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/
2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)
^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)
/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3+A)\sqrt{bx^3+a}}{x^{11}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^11,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^11, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bx^3 + A\right)\sqrt{bx^3 + a}}{x^{11}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^11,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^11, x)
```

Sympy [A] time = 12.8756, size = 97, normalized size = 0.16

$$\frac{A\sqrt{a}\,\Gamma\left(-\frac{10}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{10}{3}, -\frac{1}{2}\\ -\frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x^{10}\,\Gamma\left(-\frac{7}{3}\right)} + \frac{B\sqrt{a}\,\Gamma\left(-\frac{7}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{7}{3}, -\frac{1}{2}\\ -\frac{4}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x^7\,\Gamma\left(-\frac{4}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**11,x)
```

```
[Out] A*sqrt(a)*gamma(-10/3)*hyper((-10/3, -1/2), (-7/3,), b*x**3*exp_p
olar(I*pi)/a)/(3*x**10*gamma(-7/3)) + B*sqrt(a)*gamma(-7/3)*hyper
((-7/3, -1/2), (-4/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**7*gamma(-
4/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\sqrt{bx^3 + a}}{x^{11}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^11,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^11, x)
```

3.196 $\int x^8 \left(a+bx^3\right)^{3/2} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=103

$$\frac{2a^2\left(a+bx^3\right)^{5/2}(Ab-aB)}{15b^4}+\frac{2\left(a+bx^3\right)^{9/2}(Ab-3aB)}{27b^4}-\frac{2a\left(a+bx^3\right)^{7/2}(2Ab-3aB)}{21b^4}+\frac{2B\left(a+bx^3\right)^{11/2}}{33b^4}$$

```
[Out] (2*a^2*(A*b - a*B)*(a + b*x^3)^(5/2))/(15*b^4) - (2*a*(2*A*b - 3*
a*B)*(a + b*x^3)^(7/2))/(21*b^4) + (2*(A*b - 3*a*B)*(a + b*x^3)^(
9/2))/(27*b^4) + (2*B*(a + b*x^3)^(11/2))/(33*b^4)
```

Rubi [A] time = 0.255005, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{2a^2\left(a+bx^3\right)^{5/2}(Ab-aB)}{15b^4}+\frac{2\left(a+bx^3\right)^{9/2}(Ab-3aB)}{27b^4}-\frac{2a\left(a+bx^3\right)^{7/2}(2Ab-3aB)}{21b^4}+\frac{2B\left(a+bx^3\right)^{11/2}}{33b^4}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (2*a^2*(A*b - a*B)*(a + b*x^3)^(5/2))/(15*b^4) - (2*a*(2*A*b - 3*
a*B)*(a + b*x^3)^(7/2))/(21*b^4) + (2*(A*b - 3*a*B)*(a + b*x^3)^(
9/2))/(27*b^4) + (2*B*(a + b*x^3)^(11/2))/(33*b^4)
```

Rubi in Sympy [A] time = 22.5189, size = 99, normalized size = 0.96

$$\frac{2B\left(a+bx^3\right)^{\frac{11}{2}}}{33b^4}+\frac{2a^2\left(a+bx^3\right)^{\frac{5}{2}}(Ab-Ba)}{15b^4}-\frac{2a\left(a+bx^3\right)^{\frac{7}{2}}(2Ab-3Ba)}{21b^4}+\frac{2\left(a+bx^3\right)^{\frac{9}{2}}(Ab-3Ba)}{27b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] 2*B*(a + b*x**3)**(11/2)/(33*b**4) + 2*a**2*(a + b*x**3)**(5/2)*(
A*b - B*a)/(15*b**4) - 2*a*(a + b*x**3)**(7/2)*(2*A*b - 3*B*a)/(2
1*b**4) + 2*(a + b*x**3)**(9/2)*(A*b - 3*B*a)/(27*b**4)
```

Mathematica [A] time = 0.109946, size = 78, normalized size = 0.76

$$\frac{2\left(a+bx^3\right)^{5/2}\left(-48a^3B+8a^2b\left(11A+15Bx^3\right)-10ab^2x^3\left(22A+21Bx^3\right)+35b^3x^6\left(11A+9Bx^3\right)\right)}{10395b^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (2*(a + b*x^3)^(5/2)*(-48*a^3*B + 35*b^3*x^6*(11*A + 9*B*x^3) + 8
*a^2*b*(11*A + 15*B*x^3) - 10*a*b^2*x^3*(22*A + 21*B*x^3)))/(1039
5*b^4)
```

Maple [A] time = 0.01, size = 77, normalized size = 0.8

$$\frac{630\,Bx^9b^3+770\,Ab^3x^6-420\,Bab^2x^6-440\,Aab^2x^3+240\,Ba^2bx^3+176\,Aa^2b-96\,Ba^3}{10395\,b^4}\left(bx^3+a\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] 2/10395*(b*x^3+a)^(5/2)*(315*B*b^3*x^9+385*A*b^3*x^6-210*B*a*b^2*
x^6-220*A*a*b^2*x^3+120*B*a^2*b*x^3+88*A*a^2*b-48*B*a^3)/b^4
```

Maxima [A] time = 1.46222, size = 159, normalized size = 1.54

$$\frac{2}{945}\left(\frac{35\left(bx^3+a\right)^{\frac{9}{2}}}{b^3}-\frac{90\left(bx^3+a\right)^{\frac{7}{2}}a}{b^3}+\frac{63\left(bx^3+a\right)^{\frac{5}{2}}a^2}{b^3}\right)A+\frac{2}{3465}\left(\frac{105\left(bx^3+a\right)^{\frac{11}{2}}}{b^4}-\frac{385\left(bx^3+a\right)^{\frac{9}{2}}a}{b^4}+\frac{495\left(bx^3+a\right)^{\frac{7}{2}}a^2}{b^4}-\frac{231\left(bx^3+a\right)^{\frac{5}{2}}a^3}{b^4}\right)B$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^8,x, algorithm="maxima")
```

```
[Out] 2/945*(35*(b*x^3 + a)^(9/2)/b^3 - 90*(b*x^3 + a)^(7/2)*a/b^3 + 63
*(b*x^3 + a)^(5/2)*a^2/b^3)*A + 2/3465*(105*(b*x^3 + a)^(11/2)/b^
4 - 385*(b*x^3 + a)^(9/2)*a/b^4 + 495*(b*x^3 + a)^(7/2)*a^2/b^4 -
 231*(b*x^3 + a)^(5/2)*a^3/b^4)*B
```

Fricas [A] time = 0.24605, size = 167, normalized size = 1.62

$$\frac{2\left(315\,Bb^5x^{15}+35\left(12\,Bab^4+11\,Ab^5\right)x^{12}+5\left(3\,Ba^2b^3+110\,Aab^4\right)x^9-3\left(6\,Ba^3b^2-11\,Aa^2b^3\right)x^6-48\,Ba^5+88\,Aa^4b+4\,(\cdots}{10395\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^8,x, algorithm="fricas")
```

```
[Out] 2/10395*(315*B*b^5*x^15 + 35*(12*B*a*b^4 + 11*A*b^5)*x^12 + 5*(3*
B*a^2*b^3 + 110*A*a*b^4)*x^9 - 3*(6*B*a^3*b^2 - 11*A*a^2*b^3)*x^6
 - 48*B*a^5 + 88*A*a^4*b + 4*(6*B*a^4*b - 11*A*a^3*b^2)*x^3)*sqrt
(b*x^3 + a)/b^4
```

Sympy [A] time = 25.7318, size = 267, normalized size = 2.59

$$\begin{cases}\frac{16Aa^4\sqrt{a+bx^3}}{945b^3}-\frac{8Aa^3x^3\sqrt{a+bx^3}}{945b^2}+\frac{2Aa^2x^6\sqrt{a+bx^3}}{315b}+\frac{20Aax^9\sqrt{a+bx^3}}{189}+\frac{2Abx^{12}\sqrt{a+bx^3}}{27}-\frac{32Ba^5\sqrt{a+bx^3}}{3465b^4}+\frac{16Ba^4x^3\sqrt{a+bx^3}}{3465b^3}-\frac{4Ba^3x^6\sqrt{a+bx^3}}{1155b^2}\cdots \\ a^{\frac{3}{2}}\left(\frac{Ax^9}{9}+\frac{Bx^{12}}{12}\right)\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] Piecewise((16*A*a**4*sqrt(a + b*x**3)/(945*b**3) - 8*A*a**3*x**3*
sqrt(a + b*x**3)/(945*b**2) + 2*A*a**2*x**6*sqrt(a + b*x**3)/(315
*b) + 20*A*a*x**9*sqrt(a + b*x**3)/189 + 2*A*b*x**12*sqrt(a + b*x
**3)/27 - 32*B*a**5*sqrt(a + b*x**3)/(3465*b**4) + 16*B*a**4*x**3
*sqrt(a + b*x**3)/(3465*b**3) - 4*B*a**3*x**6*sqrt(a + b*x**3)/(1
155*b**2) + 2*B*a**2*x**9*sqrt(a + b*x**3)/(693*b) + 8*B*a*x**12*
sqrt(a + b*x**3)/99 + 2*B*b*x**15*sqrt(a + b*x**3)/33, Ne(b, 0)),
 (a**(3/2)*(A*x**9/9 + B*x**12/12), True))
```

GIAC/XCAS [A] time = 0.216535, size = 323, normalized size = 3.14

$$2\left(\frac{33\left(15\,(bx^3+a)^{\frac{7}{2}}-42\,(bx^3+a)^{\frac{5}{2}}a+35\,(bx^3+a)^{\frac{3}{2}}a^2\right)Aa}{b^2}+\frac{11\left(35\,(bx^3+a)^{\frac{9}{2}}-135\,(bx^3+a)^{\frac{7}{2}}a+189\,(bx^3+a)^{\frac{5}{2}}a^2-105\,(bx^3+a)^{\frac{3}{2}}a^3\right)Ba}{b^3}+\frac{11\left(35\,(bx^3+a)^{\frac{9}{2}}\cdots\right.}{\cdots}\right.$$

1039

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^8,x, algorithm="giac")
```

```
[Out] 2/10395*(33*(15*(b*x^3 + a)^(7/2) - 42*(b*x^3 + a)^(5/2)*a + 35*(
b*x^3 + a)^(3/2)*a^2)*A*a/b^2 + 11*(35*(b*x^3 + a)^(9/2) - 135*(b
*x^3 + a)^(7/2)*a + 189*(b*x^3 + a)^(5/2)*a^2 - 105*(b*x^3 + a)^(
3/2)*a^3)*B*a/b^3 + 11*(35*(b*x^3 + a)^(9/2) - 135*(b*x^3 + a)^(7
/2)*a + 189*(b*x^3 + a)^(5/2)*a^2 - 105*(b*x^3 + a)^(3/2)*a^3)*A/
b^2 + (315*(b*x^3 + a)^(11/2) - 1540*(b*x^3 + a)^(9/2)*a + 2970*(
b*x^3 + a)^(7/2)*a^2 - 2772*(b*x^3 + a)^(5/2)*a^3 + 1155*(b*x^3 +
 a)^(3/2)*a^4)*B/b^3)/b
```

3.197 $\int x^5 \left(a+bx^3\right)^{3/2} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=73

$$\frac{2\left(a+bx^3\right)^{7/2}(Ab-2aB)}{21b^3}-\frac{2a\left(a+bx^3\right)^{5/2}(Ab-aB)}{15b^3}+\frac{2B\left(a+bx^3\right)^{9/2}}{27b^3}$$

```
[Out] (-2*a*(A*b - a*B)*(a + b*x^3)^(5/2))/(15*b^3) + (2*(A*b - 2*a*B)*
(a + b*x^3)^(7/2))/(21*b^3) + (2*B*(a + b*x^3)^(9/2))/(27*b^3)
```

Rubi [A] time = 0.188063, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2\left(a+bx^3\right)^{7/2}(Ab-2aB)}{21b^3}-\frac{2a\left(a+bx^3\right)^{5/2}(Ab-aB)}{15b^3}+\frac{2B\left(a+bx^3\right)^{9/2}}{27b^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^5*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (-2*a*(A*b - a*B)*(a + b*x^3)^(5/2))/(15*b^3) + (2*(A*b - 2*a*B)*
(a + b*x^3)^(7/2))/(21*b^3) + (2*B*(a + b*x^3)^(9/2))/(27*b^3)
```

Rubi in Sympy [A] time = 16.9007, size = 68, normalized size = 0.93

$$\frac{2B\left(a+bx^3\right)^{\frac{9}{2}}}{27b^3}-\frac{2a\left(a+bx^3\right)^{\frac{5}{2}}(Ab-Ba)}{15b^3}+\frac{2\left(a+bx^3\right)^{\frac{7}{2}}(Ab-2Ba)}{21b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**5*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] 2*B*(a + b*x**3)**(9/2)/(27*b**3) - 2*a*(a + b*x**3)**(5/2)*(A*b
- B*a)/(15*b**3) + 2*(a + b*x**3)**(7/2)*(A*b - 2*B*a)/(21*b**3)
```

Mathematica [A] time = 0.0725725, size = 57, normalized size = 0.78

$$\frac{2\left(a+bx^3\right)^{5/2}\left(8a^2B-2ab\left(9A+10Bx^3\right)+5b^2x^3\left(9A+7Bx^3\right)\right)}{945b^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (2*(a + b*x^3)^(5/2)*(8*a^2*B + 5*b^2*x^3*(9*A + 7*B*x^3) - 2*a*b
*(9*A + 10*B*x^3)))/(945*b^3)
```

Maple [A] time = 0.009, size = 53, normalized size = 0.7

$$-\frac{-70\,b^2Bx^6-90\,Ax^3b^2+40\,Bx^3ab+36\,abA-16\,a^2B}{945\,b^3}\left(bx^3+a\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] -2/945*(b*x^3+a)^(5/2)*(-35*B*b^2*x^6-45*A*b^2*x^3+20*B*a*b*x^3+1
8*A*a*b-8*B*a^2)/b^3
```

Maxima [A] time = 1.47898, size = 113, normalized size = 1.55

$$\frac{2}{105}\left(\frac{5\left(bx^3+a\right)^{\frac{7}{2}}}{b^2}-\frac{7\left(bx^3+a\right)^{\frac{5}{2}}a}{b^2}\right)A+\frac{2}{945}\left(\frac{35\left(bx^3+a\right)^{\frac{9}{2}}}{b^3}-\frac{90\left(bx^3+a\right)^{\frac{7}{2}}a}{b^3}+\frac{63\left(bx^3+a\right)^{\frac{5}{2}}a^2}{b^3}\right)B$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^5,x, algorithm="maxima")
```

```
[Out] 2/105*(5*(b*x^3 + a)^(7/2)/b^2 - 7*(b*x^3 + a)^(5/2)*a/b^2)*A + 2
/945*(35*(b*x^3 + a)^(9/2)/b^3 - 90*(b*x^3 + a)^(7/2)*a/b^3 + 63*
(b*x^3 + a)^(5/2)*a^2/b^3)*B
```

Fricas [A] time = 0.243062, size = 134, normalized size = 1.84

$$\frac{2\left(35\,Bb^4x^{12}+5\left(10\,Bab^3+9\,Ab^4\right)x^9+3\left(Ba^2b^2+24\,Aab^3\right)x^6+8\,Ba^4-18\,Aa^3b-\left(4\,Ba^3b-9\,Aa^2b^2\right)x^3\right)\sqrt{bx^3+a}}{945\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^5,x, algorithm="fricas")
```

```
[Out] 2/945*(35*B*b^4*x^12 + 5*(10*B*a*b^3 + 9*A*b^4)*x^9 + 3*(B*a^2*b^
2 + 24*A*a*b^3)*x^6 + 8*B*a^4 - 18*A*a^3*b - (4*B*a^3*b - 9*A*a^2
*b^2)*x^3)*sqrt(b*x^3 + a)/b^3
```

Sympy [A] time = 13.3907, size = 216, normalized size = 2.96

$$\begin{cases}-\frac{4Aa^3\sqrt{a+bx^3}}{105b^2}+\frac{2Aa^2x^3\sqrt{a+bx^3}}{105b}+\frac{16Aax^6\sqrt{a+bx^3}}{105}+\frac{2Abx^9\sqrt{a+bx^3}}{21}+\frac{16Ba^4\sqrt{a+bx^3}}{945b^3}-\frac{8Ba^3x^3\sqrt{a+bx^3}}{945b^2}+\frac{2Ba^2x^6\sqrt{a+bx^3}}{315b}+\frac{20Bax^9\sqrt{a+bx^3}}{189}+ \\ a^{\frac{3}{2}}\left(\frac{Ax^6}{6}+\frac{Bx^9}{9}\right)\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] Piecewise((-4*A*a**3*sqrt(a + b*x**3)/(105*b**2) + 2*A*a**2*x**3*
sqrt(a + b*x**3)/(105*b) + 16*A*a*x**6*sqrt(a + b*x**3)/105 + 2*A
*b*x**9*sqrt(a + b*x**3)/21 + 16*B*a**4*sqrt(a + b*x**3)/(945*b**
3) - 8*B*a**3*x**3*sqrt(a + b*x**3)/(945*b**2) + 2*B*a**2*x**6*sq
rt(a + b*x**3)/(315*b) + 20*B*a*x**9*sqrt(a + b*x**3)/189 + 2*B*b
*x**12*sqrt(a + b*x**3)/27, Ne(b, 0)), (a**(3/2)*(A*x**6/6 + B*x*
*9/9), True))
```

GIAC/XCAS [A] time = 0.216874, size = 247, normalized size = 3.38

$$\frac{2\left(\frac{21\left(3\left(bx^3+a\right)^{\frac{5}{2}}-5\left(bx^3+a\right)^{\frac{3}{2}}a\right)Aa}{b}+\frac{3\left(15\left(bx^3+a\right)^{\frac{7}{2}}-42\left(bx^3+a\right)^{\frac{5}{2}}a+35\left(bx^3+a\right)^{\frac{3}{2}}a^2\right)Ba}{b^2}+\frac{3\left(15\left(bx^3+a\right)^{\frac{7}{2}}-42\left(bx^3+a\right)^{\frac{5}{2}}a+35\left(bx^3+a\right)^{\frac{3}{2}}a^2\right)A}{b}+\frac{(3}{}\right.}{945\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^5,x, algorithm="giac")
```

```
[Out] 2/945*(21*(3*(b*x^3 + a)^(5/2) - 5*(b*x^3 + a)^(3/2)*a)*A*a/b + 3
*(15*(b*x^3 + a)^(7/2) - 42*(b*x^3 + a)^(5/2)*a + 35*(b*x^3 + a)^
(3/2)*a^2)*B*a/b^2 + 3*(15*(b*x^3 + a)^(7/2) - 42*(b*x^3 + a)^(5/
2)*a + 35*(b*x^3 + a)^(3/2)*a^2)*A/b + (35*(b*x^3 + a)^(9/2) - 13
5*(b*x^3 + a)^(7/2)*a + 189*(b*x^3 + a)^(5/2)*a^2 - 105*(b*x^3 +
a)^(3/2)*a^3)*B/b^2)/b
```

3.198 $\int x^2 \left(a+bx^3\right)^{3/2} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=46

$$\frac{2 \left(a+bx^3\right)^{5/2} (Ab-aB)}{15b^2}+\frac{2B \left(a+bx^3\right)^{7/2}}{21b^2}$$

```
[Out] (2*(A*b - a*B)*(a + b*x^3)^(5/2))/(15*b^2) + (2*B*(a + b*x^3)^(7/
2))/(21*b^2)
```

Rubi [A] time = 0.141341, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2 \left(a+bx^3\right)^{5/2} (Ab-aB)}{15b^2}+\frac{2B \left(a+bx^3\right)^{7/2}}{21b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (2*(A*b - a*B)*(a + b*x^3)^(5/2))/(15*b^2) + (2*B*(a + b*x^3)^(7/
2))/(21*b^2)
```

Rubi in Sympy [A] time = 12.0758, size = 41, normalized size = 0.89

$$\frac{2B \left(a+bx^3\right)^{\frac{7}{2}}}{21b^2}+\frac{2 \left(a+bx^3\right)^{\frac{5}{2}} (Ab-Ba)}{15b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] 2*B*(a + b*x**3)**(7/2)/(21*b**2) + 2*(a + b*x**3)**(5/2)*(A*b -
B*a)/(15*b**2)
```

Mathematica [A] time = 0.0580398, size = 34, normalized size = 0.74

$$\frac{2 \left(a+bx^3\right)^{5/2} \left(-2aB+7Ab+5bBx^3\right)}{105b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (2*(a + b*x^3)^(5/2)*(7*A*b - 2*a*B + 5*b*B*x^3))/(105*b^2)
```

Maple [A] time = 0.009, size = 31, normalized size = 0.7

$$\frac{10\,bBx^3+14\,Ab-4\,Ba}{105\,b^2} \left(bx^3+a\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] 2/105*(b*x^3+a)^(5/2)*(5*B*b*x^3+7*A*b-2*B*a)/b^2
```

Maxima [A] time = 1.47614, size = 66, normalized size = 1.43

$$\frac{2\left(bx^3+a\right)^{\frac{5}{2}}A}{15\,b}+\frac{2}{105}\left(\frac{5\left(bx^3+a\right)^{\frac{7}{2}}}{b^2}-\frac{7\left(bx^3+a\right)^{\frac{5}{2}}a}{b^2}\right)B$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^2,x, algorithm="maxima")
```

```
[Out] 2/15*(b*x^3 + a)^(5/2)*A/b + 2/105*(5*(b*x^3 + a)^(7/2)/b^2 - 7*(
b*x^3 + a)^(5/2)*a/b^2)*B
```

Fricas [A] time = 0.24338, size = 99, normalized size = 2.15

$$\frac{2\left(5\,Bb^3x^9+\left(8\,Bab^2+7\,Ab^3\right)x^6-2\,Ba^3+7\,Aa^2b+\left(Ba^2b+14\,Aab^2\right)x^3\right)\sqrt{bx^3+a}}{105\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^2,x, algorithm="fricas")
```

```
[Out] 2/105*(5*B*b^3*x^9 + (8*B*a*b^2 + 7*A*b^3)*x^6 - 2*B*a^3 + 7*A*a^
2*b + (B*a^2*b + 14*A*a*b^2)*x^3)*sqrt(b*x^3 + a)/b^2
```

Sympy [A] time = 5.93264, size = 165, normalized size = 3.59

$$\begin{cases}\frac{2Aa^2\sqrt{a+bx^3}}{15b}+\frac{4Aax^3\sqrt{a+bx^3}}{15}+\frac{2Abx^6\sqrt{a+bx^3}}{15}-\frac{4Ba^3\sqrt{a+bx^3}}{105b^2}+\frac{2Ba^2x^3\sqrt{a+bx^3}}{105b}+\frac{16Bax^6\sqrt{a+bx^3}}{105}+\frac{2Bbx^9\sqrt{a+bx^3}}{21} & \text{for } b\neq 0\\ a^{\frac{3}{2}}\left(\frac{Ax^3}{3}+\frac{Bx^6}{6}\right) & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] Piecewise((2*A*a**2*sqrt(a + b*x**3)/(15*b) + 4*A*a*x**3*sqrt(a +
 b*x**3)/15 + 2*A*b*x**6*sqrt(a + b*x**3)/15 - 4*B*a**3*sqrt(a +
b*x**3)/(105*b**2) + 2*B*a**2*x**3*sqrt(a + b*x**3)/(105*b) + 16*
B*a*x**6*sqrt(a + b*x**3)/105 + 2*B*b*x**9*sqrt(a + b*x**3)/21, N
e(b, 0)), (a**(3/2)*(A*x**3/3 + B*x**6/6), True))
```

GIAC/XCAS [A] time = 0.215665, size = 162, normalized size = 3.52

$$\frac{2\left(35\left(bx^3+a\right)^{\frac{3}{2}}Aa+7\left(3\left(bx^3+a\right)^{\frac{5}{2}}-5\left(bx^3+a\right)^{\frac{3}{2}}a\right)A+\frac{7\left(3\left(bx^3+a\right)^{\frac{5}{2}}-5\left(bx^3+a\right)^{\frac{3}{2}}a\right)Ba}{b}+\frac{\left(15\left(bx^3+a\right)^{\frac{7}{2}}-42\left(bx^3+a\right)^{\frac{5}{2}}a+35\left(bx^3+a\right)\right.}{b}\right.}{315\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^2,x, algorithm="giac")
```

```
[Out] 2/315*(35*(b*x^3 + a)^(3/2)*A*a + 7*(3*(b*x^3 + a)^(5/2) - 5*(b*x
^3 + a)^(3/2)*a)*A + 7*(3*(b*x^3 + a)^(5/2) - 5*(b*x^3 + a)^(3/2)
```

```
*a)*B*a/b + (15*(b*x^3 + a)^(7/2) - 42*(b*x^3 + a)^(5/2)*a + 35*(
b*x^3 + a)^(3/2)*a^2)*B/b)/b
```

3.199 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x}\,dx$

Optimal. Leaf size=81

$$-\frac{2}{3}a^{3/2}A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)+\frac{2}{9}A\left(a+bx^3\right)^{3/2}+\frac{2}{3}aA\sqrt{a+bx^3}+\frac{2B\left(a+bx^3\right)^{5/2}}{15b}$$

```
[Out] (2*a*A*Sqrt[a + b*x^3])/3 + (2*A*(a + b*x^3)^(3/2))/9 + (2*B*(a +
 b*x^3)^(5/2))/(15*b) - (2*a^(3/2)*A*ArcTanh[Sqrt[a + b*x^3]/Sqrt
[a]])/3
```

Rubi [A] time = 0.202637, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{2}{3}a^{3/2}A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)+\frac{2}{9}A\left(a+bx^3\right)^{3/2}+\frac{2}{3}aA\sqrt{a+bx^3}+\frac{2B\left(a+bx^3\right)^{5/2}}{15b}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x,x]
```

```
[Out] (2*a*A*Sqrt[a + b*x^3])/3 + (2*A*(a + b*x^3)^(3/2))/9 + (2*B*(a +
 b*x^3)^(5/2))/(15*b) - (2*a^(3/2)*A*ArcTanh[Sqrt[a + b*x^3]/Sqrt
[a]])/3
```

Rubi in Sympy [A] time = 14.0243, size = 75, normalized size = 0.93

$$-\frac{2Aa^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3}+\frac{2Aa\sqrt{a+bx^3}}{3}+\frac{2A\left(a+bx^3\right)^{\frac{3}{2}}}{9}+\frac{2B\left(a+bx^3\right)^{\frac{5}{2}}}{15b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x,x)
```

```
[Out] -2*A*a**(3/2)*atanh(sqrt(a + b*x**3)/sqrt(a))/3 + 2*A*a*sqrt(a +
b*x**3)/3 + 2*A*(a + b*x**3)**(3/2)/9 + 2*B*(a + b*x**3)**(5/2)/(
15*b)
```

Mathematica [A] time = 0.379946, size = 83, normalized size = 1.02

$$\frac{2}{45}\sqrt{a+bx^3}\left(x^3(6aB+5Ab)+\frac{a(3aB+20Ab)}{b}-\frac{15aA\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{\sqrt{\frac{bx^3}{a}+1}}+3bBx^6\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x,x]
```

```
[Out] (2*Sqrt[a + b*x^3]*((a*(20*A*b + 3*a*B))/b + (5*A*b + 6*a*B)*x^3
+ 3*b*B*x^6 - (15*a*A*ArcTanh[Sqrt[1 + (b*x^3)/a]])/Sqrt[1 + (b*x
^3)/a]))/45
```

Maple [A] time = 0.01, size = 66, normalized size = 0.8

$$A\left(\frac{2\,b x^3}{9}\sqrt{b x^3+a}+\frac{8\,a}{9}\sqrt{b x^3+a}-\frac{2}{3}a^{\frac{3}{2}}\mathit{Artanh}\left(1\sqrt{b x^3+a}\frac{1}{\sqrt{a}}\right)\right)+\frac{2\,B}{15\,b}\left(b x^3+a\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/x,x)
```

```
[Out] A*(2/9*b*x^3*(b*x^3+a)^(1/2)+8/9*a*(b*x^3+a)^(1/2)-2/3*a^(3/2)*ar
ctanh((b*x^3+a)^(1/2)/a^(1/2)))+2/15*B*(b*x^3+a)^(5/2)/b
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.263777, size = 1, normalized size = 0.01

$$\left[\frac{15\,A a^{\frac{3}{2}} b \log\left(\frac{b x^3-2\,\sqrt{b x^3+a}\sqrt{a}+2\,a}{x^3}\right)+2\left(3\,B b^2 x^6+\left(6\,B a b+5\,A b^2\right)x^3+3\,B a^2+20\,A a b\right)\sqrt{b x^3+a}}{45\,b},\right.$$
$$\left.-\frac{2\left(15\,A\sqrt{-a}a b\arctan\left(\frac{\sqrt{b x^3+a}}{\sqrt{-a}}\right)-\left(3\,B b^2 x^6+\left(6\,B a b+5\,A b^2\right)x^3+3\,B a^2+20\,A a b\right)\sqrt{b x^3+a}\right)}{45\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x,x, algorithm="fricas")
```

```
[Out] [1/45*(15*A*a^(3/2)*b*log((b*x^3 - 2*sqrt(b*x^3 + a)*sqrt(a) + 2*
a)/x^3) + 2*(3*B*b^2*x^6 + (6*B*a*b + 5*A*b^2)*x^3 + 3*B*a^2 + 20
*A*a*b)*sqrt(b*x^3 + a))/b, -2/45*(15*A*sqrt(-a)*a*b*arctan(sqrt(
b*x^3 + a)/sqrt(-a)) - (3*B*b^2*x^6 + (6*B*a*b + 5*A*b^2)*x^3 + 3
*B*a^2 + 20*A*a*b)*sqrt(b*x^3 + a))/b]
```

Sympy [A] time = 19.8162, size = 144, normalized size = 1.78

$$-\frac{2Aa^2\left(\begin{cases}-\frac{\operatorname{atan}\left(\frac{\sqrt{a+bx^3}}{\sqrt{-a}}\right)}{\sqrt{-a}} & \text{for}\ -a>0\\ \frac{\operatorname{acoth}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{\sqrt{a}} & \text{for}\ -a<0\wedge a<a+bx^3\\ \frac{\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{\sqrt{a}} & \text{for}\ a>a+bx^3\wedge -a<0\end{cases}\right)}{3}+\frac{2Aa\sqrt{a+bx^3}}{3}+\frac{2A\left(a+bx^3\right)^{\frac{3}{2}}}{9}+\frac{2B\left(a+bx^3\right)^{\frac{5}{2}}}{15b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x,x)
```

```
[Out] -2*A*a**2*Piecewise((-atan(sqrt(a + b*x**3)/sqrt(-a))/sqrt(-a), -
a > 0), (acoth(sqrt(a + b*x**3)/sqrt(a))/sqrt(a), (-a < 0) & (a <
 a + b*x**3)), (atanh(sqrt(a + b*x**3)/sqrt(a))/sqrt(a), (-a < 0)
 & (a > a + b*x**3)))/3 + 2*A*a*sqrt(a + b*x**3)/3 + 2*A*(a + b*x
**3)**(3/2)/9 + 2*B*(a + b*x**3)**(5/2)/(15*b)
```

GIAC/XCAS [A] time = 0.218349, size = 108, normalized size = 1.33

$$\frac{2\,Aa^{2}\arctan\left(\frac{\sqrt{bx^{3}+a}}{\sqrt{-a}}\right)}{3\,\sqrt{-a}}+\frac{2\left(3\left(bx^{3}+a\right)^{\frac{5}{2}}Bb^{4}+5\left(bx^{3}+a\right)^{\frac{3}{2}}Ab^{5}+15\,\sqrt{bx^{3}+a}Aab^{5}\right)}{45\,b^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x,x, algorithm="giac")
```

```
[Out] 2/3*A*a^2*arctan(sqrt(b*x^3 + a)/sqrt(-a))/sqrt(-a) + 2/45*(3*(b*
x^3 + a)^(5/2)*B*b^4 + 5*(b*x^3 + a)^(3/2)*A*b^5 + 15*sqrt(b*x^3
+ a)*A*a*b^5)/b^5
```

3.200 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x^4}\,dx$

Optimal. Leaf size=110

$$\frac{(a+bx^3)^{3/2}(2aB+3Ab)}{9a}+\frac{1}{3}\sqrt{a+bx^3}(2aB+3Ab)-\frac{1}{3}\sqrt{a}(2aB+3Ab)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)-\frac{A(a+bx^3)^{5/2}}{3ax^3}$$

```
[Out] ((3*A*b + 2*a*B)*Sqrt[a + b*x^3])/3 + ((3*A*b + 2*a*B)*(a + b*x^3
)^(3/2))/(9*a) - (A*(a + b*x^3)^(5/2))/(3*a*x^3) - (Sqrt[a]*(3*A*
b + 2*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/3
```

Rubi [A] time = 0.240579, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{(a+bx^3)^{3/2}(2aB+3Ab)}{9a}+\frac{1}{3}\sqrt{a+bx^3}(2aB+3Ab)-\frac{1}{3}\sqrt{a}(2aB+3Ab)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)-\frac{A(a+bx^3)^{5/2}}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^4,x]
```

```
[Out] ((3*A*b + 2*a*B)*Sqrt[a + b*x^3])/3 + ((3*A*b + 2*a*B)*(a + b*x^3
)^(3/2))/(9*a) - (A*(a + b*x^3)^(5/2))/(3*a*x^3) - (Sqrt[a]*(3*A*
b + 2*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/3
```

Rubi in Sympy [A] time = 16.7957, size = 99, normalized size = 0.9

$$-\frac{A(a+bx^3)^{\frac{5}{2}}}{3ax^3}-\frac{2\sqrt{a}\left(\frac{3Ab}{2}+Ba\right)\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3}+\sqrt{a+bx^3}\left(Ab+\frac{2Ba}{3}\right)+\frac{2(a+bx^3)^{\frac{3}{2}}\left(\frac{3Ab}{2}+Ba\right)}{9a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**4,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(3*a*x**3) - 2*sqrt(a)*(3*A*b/2 + B*a)*ata
nh(sqrt(a + b*x**3)/sqrt(a))/3 + sqrt(a + b*x**3)*(A*b + 2*B*a/3)
 + 2*(a + b*x**3)**(3/2)*(3*A*b/2 + B*a)/(9*a)
```

Mathematica [A] time = 0.37275, size = 82, normalized size = 0.75

$$\frac{1}{3}\sqrt{a+bx^3}\left(-\frac{(2aB+3Ab)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{\sqrt{\frac{bx^3}{a}+1}}-\frac{aA}{x^3}+\frac{8aB}{3}+2Ab+\frac{2}{3}bBx^3\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^4,x]
```

```
[Out] (Sqrt[a + b*x^3]*(2*A*b + (8*a*B)/3 - (a*A)/x^3 + (2*b*B*x^3)/3 -
 ((3*A*b + 2*a*B)*ArcTanh[Sqrt[1 + (b*x^3)/a]])/Sqrt[1 + (b*x^3)/
a]))/3
```

Maple [A] time = 0.013, size = 101, normalized size = 0.9

$$A\left(-\frac{a}{3\,x^{3}}\sqrt{b x^{3}+a}+\frac{2\,b}{3}\sqrt{b x^{3}+a}-\sqrt{a}b Artanh\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)\right)+B\left(\frac{2\,b x^{3}}{9}\sqrt{b x^{3}+a}+\frac{8\,a}{9}\sqrt{b x^{3}+a}-\frac{2}{3}a^{\frac{3}{2}}Artanh\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/x^4,x)
```

```
[Out] A*(-1/3*a*(b*x^3+a)^(1/2)/x^3+2/3*b*(b*x^3+a)^(1/2)-a^(1/2)*b*arc
tanh((b*x^3+a)^(1/2)/a^(1/2)))+B*(2/9*b*x^3*(b*x^3+a)^(1/2)+8/9*a
*(b*x^3+a)^(1/2)-2/3*a^(3/2)*arctanh((b*x^3+a)^(1/2)/a^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.254448, size = 1, normalized size = 0.01

$$\left[\frac{3\,(2\,Ba+3\,Ab)\sqrt{a}x^{3}\log\left(\frac{bx^{3}-2\,\sqrt{bx^{3}+a}\sqrt{a}+2\,a}{x^{3}}\right)+2\,\left(2\,Bbx^{6}+2\,(4\,Ba+3\,Ab)x^{3}-3\,Aa\right)\sqrt{bx^{3}+a}}{18\,x^{3}},\right.$$
$$\left.-\frac{3\,(2\,Ba+3\,Ab)\sqrt{-a}x^{3}\arctan\left(\frac{\sqrt{bx^{3}+a}}{\sqrt{-a}}\right)-\left(2\,Bbx^{6}+2\,(4\,Ba+3\,Ab)x^{3}-3\,Aa\right)\sqrt{bx^{3}+a}}{9\,x^{3}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^4,x, algorithm="fricas")
```

```
[Out] [1/18*(3*(2*B*a + 3*A*b)*sqrt(a)*x^3*log((b*x^3 - 2*sqrt(b*x^3 +
a)*sqrt(a) + 2*a)/x^3) + 2*(2*B*b*x^6 + 2*(4*B*a + 3*A*b)*x^3 - 3
*A*a)*sqrt(b*x^3 + a))/x^3, -1/9*(3*(2*B*a + 3*A*b)*sqrt(-a)*x^3*
arctan(sqrt(b*x^3 + a)/sqrt(-a)) - (2*B*b*x^6 + 2*(4*B*a + 3*A*b)
*x^3 - 3*A*a)*sqrt(b*x^3 + a))/x^3]
```

Sympy [A] time = 42.0701, size = 223, normalized size = 2.03

$$-A\sqrt{a}b\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)-\frac{Aa\sqrt{b}\sqrt{\frac{a}{bx^{3}}+1}}{3x^{\frac{3}{2}}}+\frac{2Aa\sqrt{b}}{3x^{\frac{3}{2}}\sqrt{\frac{a}{bx^{3}}+1}}+\frac{2Ab^{\frac{3}{2}}x^{\frac{3}{2}}}{3\sqrt{\frac{a}{bx^{3}}+1}}-\frac{2Ba^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{3}+\frac{2Ba^{2}}{3\sqrt{b}x^{\frac{3}{2}}\sqrt{\frac{a}{bx^{3}}+1}}+\frac{2Ba\sqrt{b}x^{\frac{3}{2}}}{3\sqrt{\frac{a}{bx^{3}}+1}}+Bb\left(\begin{cases}\frac{\sqrt{a}x^{3}}{3} & \text{for}\: b=0\\\frac{2\left(a+bx^{3}\right)^{\frac{3}{2}}}{9b} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**4,x)
```

```
[Out] -A*sqrt(a)*b*asinh(sqrt(a)/(sqrt(b)*x**(3/2))) - A*a*sqrt(b)*sqrt
(a/(b*x**3) + 1)/(3*x**(3/2)) + 2*A*a*sqrt(b)/(3*x**(3/2)*sqrt(a/
(b*x**3) + 1)) + 2*A*b**(3/2)*x**(3/2)/(3*sqrt(a/(b*x**3) + 1)) -
 2*B*a**(3/2)*asinh(sqrt(a)/(sqrt(b)*x**(3/2)))/3 + 2*B*a**2/(3*s
qrt(b)*x**(3/2)*sqrt(a/(b*x**3) + 1)) + 2*B*a*sqrt(b)*x**(3/2)/(3
*sqrt(a/(b*x**3) + 1)) + B*b*Piecewise((sqrt(a)*x**3/3, Eq(b, 0))
, (2*(a + b*x**3)**(3/2)/(9*b), True))
```

GIAC/XCAS [A] time = 0.219951, size = 139, normalized size = 1.26

$$\frac{2\left(bx^3+a\right)^{\frac{3}{2}}Bb+6\sqrt{bx^3+a}Bab+6\sqrt{bx^3+a}Ab^2+\frac{3\left(2\,Ba^2b+3\,Aab^2\right)\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{\sqrt{-a}}-\frac{3\sqrt{bx^3+a}Aab}{x^3}}{9\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^4,x, algorithm="giac")
```

```
[Out] 1/9*(2*(b*x^3 + a)^(3/2)*B*b + 6*sqrt(b*x^3 + a)*B*a*b + 6*sqrt(b
*x^3 + a)*A*b^2 + 3*(2*B*a^2*b + 3*A*a*b^2)*arctan(sqrt(b*x^3 + a
)/sqrt(-a))/sqrt(-a) - 3*sqrt(b*x^3 + a)*A*a*b/x^3)/b
```

3.201 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x^7} dx$

Optimal. Leaf size=115

$$-\frac{(a+bx^3)^{3/2}(4aB+Ab)}{12ax^3}+\frac{b\sqrt{a+bx^3}(4aB+Ab)}{4a}-\frac{b(4aB+Ab)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{4\sqrt{a}}-\frac{A(a+bx^3)^{5/2}}{6ax^6}$$

```
[Out] (b*(A*b + 4*a*B)*Sqrt[a + b*x^3])/(4*a) - ((A*b + 4*a*B)*(a + b*x
^3)^(3/2))/(12*a*x^3) - (A*(a + b*x^3)^(5/2))/(6*a*x^6) - (b*(A*b
 + 4*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(4*Sqrt[a])
```

Rubi [A] time = 0.251023, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{(a+bx^3)^{3/2}(4aB+Ab)}{12ax^3}+\frac{b\sqrt{a+bx^3}(4aB+Ab)}{4a}-\frac{b(4aB+Ab)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{4\sqrt{a}}-\frac{A(a+bx^3)^{5/2}}{6ax^6}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^7,x]
```

```
[Out] (b*(A*b + 4*a*B)*Sqrt[a + b*x^3])/(4*a) - ((A*b + 4*a*B)*(a + b*x
^3)^(3/2))/(12*a*x^3) - (A*(a + b*x^3)^(5/2))/(6*a*x^6) - (b*(A*b
 + 4*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(4*Sqrt[a])
```

Rubi in Sympy [A] time = 17.1355, size = 100, normalized size = 0.87

$$-\frac{A(a+bx^3)^{\frac{5}{2}}}{6ax^6}+\frac{b\sqrt{a+bx^3}(Ab+4Ba)}{4a}-\frac{(a+bx^3)^{\frac{3}{2}}(Ab+4Ba)}{12ax^3}-\frac{b(Ab+4Ba)\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{4\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**7,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(6*a*x**6) + b*sqrt(a + b*x**3)*(A*b + 4*B
*a)/(4*a) - (a + b*x**3)**(3/2)*(A*b + 4*B*a)/(12*a*x**3) - b*(A*
b + 4*B*a)*atanh(sqrt(a + b*x**3)/sqrt(a))/(4*sqrt(a))
```

Mathematica [A] time = 0.417434, size = 84, normalized size = 0.73

$$\frac{1}{12}\sqrt{a+bx^3}\left(-\frac{4aB+5Ab}{x^3}-\frac{3b(4aB+Ab)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{a\sqrt{\frac{bx^3}{a}+1}}-\frac{2aA}{x^6}+8bB\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^7,x]
```

```
[Out] (Sqrt[a + b*x^3]*(8*b*B - (2*a*A)/x^6 - (5*A*b + 4*a*B)/x^3 - (3*
b*(A*b + 4*a*B)*ArcTanh[Sqrt[1 + (b*x^3)/a]])/(a*Sqrt[1 + (b*x^3)
/a])))/12
```

Maple [A] time = 0.012, size = 107, normalized size = 0.9

$$A\left(-\frac{a}{6\,x^{6}}\sqrt{b x^{3}+a}-\frac{5\,b}{12\,x^{3}}\sqrt{b x^{3}+a}-\frac{b^{2}}{4}Artanh\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)\frac{1}{\sqrt{a}}\right)+B\left(-\frac{a}{3\,x^{3}}\sqrt{b x^{3}+a}+\frac{2\,b}{3}\sqrt{b x^{3}+a}-\sqrt{a}bArtanh\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^3+a)^(3/2)*(B*x^3+A)/x^7,x)
```

```
[Out] A*(-1/6*a*(b*x^3+a)^(1/2)/x^6-5/12*b*(b*x^3+a)^(1/2)/x^3-1/4*b^2*
arctanh((b*x^3+a)^(1/2)/a^(1/2))/a^(1/2))+B*(-1/3*a*(b*x^3+a)^(1/
2)/x^3+2/3*b*(b*x^3+a)^(1/2)-a^(1/2)*b*arctanh((b*x^3+a)^(1/2)/a^
(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^7,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.264952, size = 1, normalized size = 0.01

$$\left[\frac{3\left(4\,Bab+Ab^{2}\right)x^{6}\log\left(\frac{(bx^{3}+2\,a)\sqrt{a}-2\sqrt{bx^{3}+a}a}{x^{3}}\right)+2\left(8\,Bbx^{6}-(4\,Ba+5\,Ab)x^{3}-2\,Aa\right)\sqrt{bx^{3}+a}\sqrt{a}}{24\sqrt{a}x^{6}},\ \frac{3\left(4\,Bab+Ab^{2}\right)x^{6}\arctan\ldots}{\ldots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^7,x, algorithm="fricas")
```

```
[Out] [1/24*(3*(4*B*a*b + A*b^2)*x^6*log(((b*x^3 + 2*a)*sqrt(a) - 2*sqr
t(b*x^3 + a)*a)/x^3) + 2*(8*B*b*x^6 - (4*B*a + 5*A*b)*x^3 - 2*A*a
)*sqrt(b*x^3 + a)*sqrt(a))/(sqrt(a)*x^6), 1/12*(3*(4*B*a*b + A*b^
2)*x^6*arctan(a/(sqrt(b*x^3 + a)*sqrt(-a))) + (8*B*b*x^6 - (4*B*a
 + 5*A*b)*x^3 - 2*A*a)*sqrt(b*x^3 + a)*sqrt(-a))/(sqrt(-a)*x^6)]
```

Sympy [A] time = 88.5395, size = 243, normalized size = 2.11

$$-\frac{Aa^{2}}{6\sqrt{b}x^{\frac{15}{2}}\sqrt{\frac{a}{bx^{3}}+1}}-\frac{Aa\sqrt{b}}{4x^{\frac{9}{2}}\sqrt{\frac{a}{bx^{3}}+1}}-\frac{Ab^{\frac{3}{2}}\sqrt{\frac{a}{bx^{3}}+1}}{3x^{\frac{3}{2}}}-\frac{Ab^{\frac{3}{2}}}{12x^{\frac{3}{2}}\sqrt{\frac{a}{bx^{3}}+1}}-\frac{Ab^{2}\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{4\sqrt{a}}-B\sqrt{a}b\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)-\frac{Ba\sqrt{b}\sqrt{\frac{a}{bx^{3}}+1}}{3x^{\frac{3}{2}}}+\frac{2Ba\sqrt{b}}{3x^{\frac{3}{2}}\sqrt{\frac{a}{bx^{3}}+1}}+\frac{2Bb^{\frac{3}{2}}x^{\frac{3}{2}}}{3\sqrt{\frac{a}{bx^{3}}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**7,x)
```

```
[Out] -A*a**2/(6*sqrt(b)*x**(15/2)*sqrt(a/(b*x**3) + 1)) - A*a*sqrt(b)/
(4*x**(9/2)*sqrt(a/(b*x**3) + 1)) - A*b**(3/2)*sqrt(a/(b*x**3) +
1)/(3*x**(3/2)) - A*b**(3/2)/(12*x**(3/2)*sqrt(a/(b*x**3) + 1)) -
 A*b**2*asinh(sqrt(a)/(sqrt(b)*x**(3/2)))/(4*sqrt(a)) - B*sqrt(a)
*b*asinh(sqrt(a)/(sqrt(b)*x**(3/2))) - B*a*sqrt(b)*sqrt(a/(b*x**3
) + 1)/(3*x**(3/2)) + 2*B*a*sqrt(b)/(3*x**(3/2)*sqrt(a/(b*x**3) +
 1)) + 2*B*b**(3/2)*x**(3/2)/(3*sqrt(a/(b*x**3) + 1))
```

GIAC/XCAS [A] time = 0.219918, size = 177, normalized size = 1.54

$$\frac{8\,\sqrt{bx^3+a}Bb^2 + \frac{3\,\left(4\,Bab^2+Ab^3\right)\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{\sqrt{-a}} - \frac{4\,\left(bx^3+a\right)^{\frac{3}{2}}Bab^2-4\,\sqrt{bx^3+a}Ba^2b^2+5\,\left(bx^3+a\right)^{\frac{3}{2}}Ab^3-3\,\sqrt{bx^3+a}Aab^3}{b^2x^6}}{12\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^7,x, algorithm="giac")
```

```
[Out] 1/12*(8*sqrt(b*x^3 + a)*B*b^2 + 3*(4*B*a*b^2 + A*b^3)*arctan(sqrt
(b*x^3 + a)/sqrt(-a))/sqrt(-a) - (4*(b*x^3 + a)^(3/2)*B*a*b^2 - 4
*sqrt(b*x^3 + a)*B*a^2*b^2 + 5*(b*x^3 + a)^(3/2)*A*b^3 - 3*sqrt(b
*x^3 + a)*A*a*b^3)/(b^2*x^6))/b
```

3.202 $\int x^3 \left(a+bx^3\right)^{3/2} \left(A+Bx^3\right)\, dx$

Optimal. Leaf size=336

$$\frac{54a^2x\sqrt{a+bx^3}(23Ab-8aB)}{21505b^2} - \frac{36\, 3^{3/4}\sqrt{2+\sqrt{3}}a^3\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(23Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{21505b^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{2x^4\left(a+bx^3\right)^{3/2}(23Ab-8aB)}{391b} + \frac{18ax^4\sqrt{a+bx^3}(23Ab-8aB)}{4301b} + \frac{2Bx^4\left(a+bx^3\right)^{5/2}}{23b}$$

```
[Out] (54*a^2*(23*A*b - 8*a*B)*x*Sqrt[a + b*x^3])/(21505*b^2) + (18*a*(
23*A*b - 8*a*B)*x^4*Sqrt[a + b*x^3])/(4301*b) + (2*(23*A*b - 8*a*
B)*x^4*(a + b*x^3)^(3/2))/(391*b) + (2*B*x^4*(a + b*x^3)^(5/2))/(
23*b) - (36*3^(3/4)*Sqrt[2 + Sqrt[3]]*a^3*(23*A*b - 8*a*B)*(a^(1/
3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqr
t[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
-7 - 4*Sqrt[3]])/(21505*b^(7/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*
x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.499769, antiderivative size = 336, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{54a^2x\sqrt{a+bx^3}(23Ab-8aB)}{21505b^2} - \frac{36\, 3^{3/4}\sqrt{2+\sqrt{3}}a^3\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(23Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{21505b^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{2x^4\left(a+bx^3\right)^{3/2}(23Ab-8aB)}{391b} + \frac{18ax^4\sqrt{a+bx^3}(23Ab-8aB)}{4301b} + \frac{2Bx^4\left(a+bx^3\right)^{5/2}}{23b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```



```
[Out] (54*a^2*(23*A*b - 8*a*B)*x*Sqrt[a + b*x^3])/(21505*b^2) + (18*a*(
23*A*b - 8*a*B)*x^4*Sqrt[a + b*x^3])/(4301*b) + (2*(23*A*b - 8*a*
B)*x^4*(a + b*x^3)^(3/2))/(391*b) + (2*B*x^4*(a + b*x^3)^(5/2))/(
23*b) - (36*3^(3/4)*Sqrt[2 + Sqrt[3]]*a^3*(23*A*b - 8*a*B)*(a^(1/
3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqr
t[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
-7 - 4*Sqrt[3]])/(21505*b^(7/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*
x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 34.3159, size = 309, normalized size = 0.92

$$\frac{2Bx^4\left(a+bx^3\right)^{\frac{5}{2}}}{23b}-\frac{36\cdot 3^{\frac{3}{4}}a^3\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(23Ab-8Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{21505b^{\frac{7}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{54a^2x\sqrt{a+bx^3}(23Ab-8Ba)}{21505b^2}+\frac{18ax^4\sqrt{a+bx^3}(23Ab-8Ba)}{4301b}+\frac{2x^4\left(a+bx^3\right)^{\frac{3}{2}}(23Ab-8Ba)}{391b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**3*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] 2*B*x**4*(a + b*x**3)**(5/2)/(23*b) - 36*3**(3/4)*a**3*sqrt((a**(
2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3
)) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(2
3*A*b - 8*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/
3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(21
505*b**(7/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 +
 sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 54*a**2*x*sqrt(a
+ b*x**3)*(23*A*b - 8*B*a)/(21505*b**2) + 18*a*x**4*sqrt(a + b*x*
*3)*(23*A*b - 8*B*a)/(4301*b) + 2*x**4*(a + b*x**3)**(3/2)*(23*A*
b - 8*B*a)/(391*b)
```

Mathematica [C] time = 1.10423, size = 229, normalized size = 0.68

$$\sqrt{a+bx^3}\left(-\frac{54a^2x(8aB-23Ab)}{21505b^2}+\frac{2}{391}x^7(26aB+23Ab)+\frac{2ax^4(27aB+460Ab)}{4301b}+\frac{2}{23}bBx^{10}\right)-\frac{36i3^{3/4}a^{10/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(23Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{21505\sqrt[3]{-b}b^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[x^3*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] Sqrt[a + b*x^3]*((-54*a^2*(-23*A*b + 8*a*B)*x)/(21505*b^2) + (2*a
*(460*A*b + 27*a*B)*x^4)/(4301*b) + (2*(23*A*b + 26*a*B)*x^7)/391
 + (2*b*B*x^10)/23) - (((36*I)/21505)*3^(3/4)*a^(10/3)*(23*A*b -
8*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((
-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin
[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3
)])/((-b)^(1/3)*b^2*Sqrt[a + b*x^3])
```

Maple [B] time = 0.01, size = 694, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^3*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] A*(2/17*b*x^7*(b*x^3+a)^(1/2)+40/187*a*x^4*(b*x^3+a)^(1/2)+54/935
/b*a^2*x*(b*x^3+a)^(1/2)+36/935*I/b^2*a^3*3^(1/2)*(-a*b^2)^(1/3)*
```

```
(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2
)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^
2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(2/23*b*x^10*(b*x^3+a)^(1/2)
+52/391*a*x^7*(b*x^3+a)^(1/2)+54/4301/b*a^2*x^4*(b*x^3+a)^(1/2)-4
32/21505*a^3/b^2*x*(b*x^3+a)^(1/2)-288/21505*I*a^4/b^3*3^(1/2)*(-
a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-
3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(
x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/
(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x
+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(
-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx^3 + A)(bx^3 + a)^{\frac{3}{2}} x^3 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^3,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bbx^9 + (Ba + Ab)x^6 + Aax^3\right)\sqrt{bx^3 + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^3,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^9 + (B*a + A*b)*x^6 + A*a*x^3)*sqrt(b*x^3 + a), x
)
```

Sympy [A] time = 11.866, size = 172, normalized size = 0.51

$$\frac{Aa^{\frac{3}{2}}x^4\,\Gamma\left(\frac{4}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{4}{3}\\\frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{7}{3}\right)} + \frac{A\sqrt{a}bx^7\,\Gamma\left(\frac{7}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{7}{3}\\\frac{10}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{10}{3}\right)} + \frac{Ba^{\frac{3}{2}}x^7\,\Gamma\left(\frac{7}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{7}{3}\\\frac{10}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{10}{3}\right)} + \frac{B\sqrt{a}bx^{10}\,\Gamma\left(\frac{10}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{10}{3}\\\frac{13}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{13}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] A*a**(3/2)*x**4*gamma(4/3)*hyper((-1/2, 4/3), (7/3,), b*x**3*exp_
polar(I*pi)/a)/(3*gamma(7/3)) + A*sqrt(a)*b*x**7*gamma(7/3)*hyper
((-1/2, 7/3), (10/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(10/3))
```

```
+ B*a**(3/2)*x**7*gamma(7/3)*hyper((-1/2, 7/3), (10/3,), b*x**3*e
xp_polar(I*pi)/a)/(3*gamma(10/3)) + B*sqrt(a)*b*x**10*gamma(10/3)
*hyper((-1/2, 10/3), (13/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(
13/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx^3 + A) (bx^3 + a)^{\frac{3}{2}} x^3 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^3,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^3, x)
```

3.203 $\int \left(a+bx^3\right)^{3/2}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=299

$$\frac{18\,3^{3/4}\sqrt{2+\sqrt{3}}a^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{935b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x\left(a+bx^3\right)^{3/2}(17Ab-2aB)}{187b}+\frac{18ax\sqrt{a+bx^3}(17Ab-2aB)}{935b}+\frac{2Bx\left(a+bx^3\right)^{5/2}}{17b}$$

```
[Out] (18*a*(17*A*b - 2*a*B)*x*Sqrt[a + b*x^3])/(935*b) + (2*(17*A*b -
2*a*B)*x*(a + b*x^3)^(3/2))/(187*b) + (2*B*x*(a + b*x^3)^(5/2))/(
17*b) + (18*3^(3/4)*Sqrt[2 + Sqrt[3]]*a^2*(17*A*b - 2*a*B)*(a^(1/
3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqr
t[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
-7 - 4*Sqrt[3]])/(935*b^(4/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x)
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.337921, antiderivative size = 299, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$\frac{18\,3^{3/4}\sqrt{2+\sqrt{3}}a^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{935b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x\left(a+bx^3\right)^{3/2}(17Ab-2aB)}{187b}+\frac{18ax\sqrt{a+bx^3}(17Ab-2aB)}{935b}+\frac{2Bx\left(a+bx^3\right)^{5/2}}{17b}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x^3)^(3/2)*(A + B*x^3),x]
```


```
[Out] (18*a*(17*A*b - 2*a*B)*x*Sqrt[a + b*x^3])/(935*b) + (2*(17*A*b -
2*a*B)*x*(a + b*x^3)^(3/2))/(187*b) + (2*B*x*(a + b*x^3)^(5/2))/(
17*b) + (18*3^(3/4)*Sqrt[2 + Sqrt[3]]*a^2*(17*A*b - 2*a*B)*(a^(1/
3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqr
t[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
-7 - 4*Sqrt[3]])/(935*b^(4/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x)
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 21.7025, size = 272, normalized size = 0.91

$$\frac{2Bx\left(a+bx^3\right)^{\frac{5}{2}}}{17b}+\frac{36\cdot 3^{\frac{3}{4}}a^2\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{17Ab}{2}-Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{935b^{\frac{4}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{18ax\sqrt{a+bx^3}\,(17Ab-2Ba)}{935b}+\frac{4x\left(a+bx^3\right)^{\frac{3}{2}}\left(\frac{17Ab}{2}-Ba\right)}{187b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] 2*B*x*(a + b*x**3)**(5/2)/(17*b) + 36*3**(3/4)*a**2*sqrt((a**(2/3
) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(17*A
*b/2 - B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*
x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(935*b
**(4/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt
(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 18*a*x*sqrt(a + b*x**3
)*(17*A*b - 2*B*a)/(935*b) + 4*x*(a + b*x**3)**(3/2)*(17*A*b/2 -
B*a)/(187*b)
```

Mathematica [C] time = 0.911788, size = 202, normalized size = 0.68

$$-\frac{2\left(\sqrt[3]{-b}\left(a+bx^3\right)\left(5bx^4(20aB+17Ab)+ax(27aB+238Ab)+55b^2Bx^7\right)+9i3^{3/4}a^{7/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\cdots}\right.}{935(-b)^{4/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (-2*((-b)^(1/3)*(a + b*x^3)*(a*(238*A*b + 27*a*B)*x + 5*b*(17*A*b
 + 20*a*B)*x^4 + 55*b^2*B*x^7) + (9*I)*3^(3/4)*a^(7/3)*(17*A*b -
2*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((
-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin
[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3
)]))/(935*(-b)^(4/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.007, size = 654, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] A*(2/11*b*x^4*(b*x^3+a)^(1/2)+28/55*a*x*(b*x^3+a)^(1/2)-18/55*I*a
^2*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a
*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/
3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(
-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*
(2/17*b*x^7*(b*x^3+a)^(1/2)+40/187*a*x^4*(b*x^3+a)^(1/2)+54/935/b
*a^2*x*(b*x^3+a)^(1/2)+36/935*I/b^2*a^3*3^(1/2)*(-a*b^2)^(1/3)*(I
*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*
b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)
^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^
(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2),x, algorithm="maxima")

[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(Bbx^6 + (Ba + Ab)x^3 + Aa\right)\sqrt{bx^3 + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2),x, algorithm="fricas")

[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a), x)
```

Sympy [A] time = 7.98849, size = 170, normalized size = 0.57

$$\frac{Aa^{\frac{3}{2}}x\,\Gamma\left(\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{1}{3}\\ \frac{4}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{4}{3}\right)} + \frac{A\sqrt{a}bx^4\,\Gamma\left(\frac{4}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{4}{3}\\ \frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{7}{3}\right)} + \frac{Ba^{\frac{3}{2}}x^4\,\Gamma\left(\frac{4}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{4}{3}\\ \frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{7}{3}\right)} + \frac{B\sqrt{a}bx^7\,\Gamma\left(\frac{7}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{7}{3}\\ \frac{10}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{10}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A),x)

[Out] A*a**(3/2)*x*gamma(1/3)*hyper((-1/2, 1/3), (4/3,), b*x**3*exp_pol
ar(I*pi)/a)/(3*gamma(4/3)) + A*sqrt(a)*b*x**4*gamma(4/3)*hyper((-
1/2, 4/3), (7/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(7/3)) + B*a
**(3/2)*x**4*gamma(4/3)*hyper((-1/2, 4/3), (7/3,), b*x**3*exp_pol
ar(I*pi)/a)/(3*gamma(7/3)) + B*sqrt(a)*b*x**7*gamma(7/3)*hyper((-
1/2, 7/3), (10/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(10/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2),x, algorithm="giac")

[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2), x)
```

3.204 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x^3}\,dx$

Optimal. Leaf size=295

$$\frac{9\,3^{3/4}\sqrt{2+\sqrt{3}}a\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(4aB+11Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{110\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{x\left(a+bx^3\right)^{3/2}(4aB+11Ab)}{22a}+\frac{9}{110}x\sqrt{a+bx^3}(4aB+11Ab)-\frac{A\left(a+bx^3\right)^{5/2}}{2ax^2}$$

```
[Out] (9*(11*A*b + 4*a*B)*x*Sqrt[a + b*x^3])/110 + ((11*A*b + 4*a*B)*x*
(a + b*x^3)^(3/2))/(22*a) - (A*(a + b*x^3)^(5/2))/(2*a*x^2) + (9*
3^(3/4)*Sqrt[2 + Sqrt[3]]*a*(11*A*b + 4*a*B)*(a^(1/3) + b^(1/3)*x
)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3)
+ b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]
])/(110*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.354178, antiderivative size = 295, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{9\,3^{3/4}\sqrt{2+\sqrt{3}}a\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(4aB+11Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{110\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{x\left(a+bx^3\right)^{3/2}(4aB+11Ab)}{22a}+\frac{9}{110}x\sqrt{a+bx^3}(4aB+11Ab)-\frac{A\left(a+bx^3\right)^{5/2}}{2ax^2}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^3,x]
```


```
[Out] (9*(11*A*b + 4*a*B)*x*Sqrt[a + b*x^3])/110 + ((11*A*b + 4*a*B)*x*
(a + b*x^3)^(3/2))/(22*a) - (A*(a + b*x^3)^(5/2))/(2*a*x^2) + (9*
3^(3/4)*Sqrt[2 + Sqrt[3]]*a*(11*A*b + 4*a*B)*(a^(1/3) + b^(1/3)*x
)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3)
+ b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]
])/(110*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 21.7028, size = 265, normalized size = 0.9

$$-\frac{A\left(a+bx^3\right)^{\frac{5}{2}}}{2ax^2}+\frac{9\cdot 3^{\frac{3}{4}}a\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab+4Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{110\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+x\sqrt{a+bx^3}\left(\frac{9Ab}{10}+\frac{18Ba}{55}\right)+\frac{x\left(a+bx^3\right)^{\frac{3}{2}}(11Ab+4Ba)}{22a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**3,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(2*a*x**2) + 9*3**(3/4)*a*sqrt((a**(2/3) -
 a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b
**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(11*A*b
+ 4*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(110*b**(
1/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)
) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + x*sqrt(a + b*x**3)*(9*A*b
/10 + 18*B*a/55) + x*(a + b*x**3)**(3/2)*(11*A*b + 4*B*a)/(22*a)
```

Mathematica [C] time = 1.23397, size = 193, normalized size = 0.65

$$\sqrt{a+bx^3}\left(\frac{2}{55}x(14aB+11Ab)-\frac{aA}{2x^2}+\frac{2}{11}bBx^4\right)+\frac{9i3^{3/4}a^{4/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(4aB+11Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{110\sqrt[3]{-b}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^3,x]
```

```
[Out] Sqrt[a + b*x^3]*(-(a*A)/(2*x^2) + (2*(11*A*b + 14*a*B)*x)/55 + (2
*b*B*x^4)/11) + (((9*I)/110)*3^(3/4)*a^(4/3)*(11*A*b + 4*a*B)*Sqr
t[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*
x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1
)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/((-b)^
(1/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.014, size = 629, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^3+a)^(3/2)*(B*x^3+A)/x^3,x)
```

```
[Out] B*(2/11*b*x^4*(b*x^3+a)^(1/2)+28/55*a*x*(b*x^3+a)^(1/2)-18/55*I*a
^2*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a
*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/
3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(
-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+A*
(-1/2*a*(b*x^3+a)^(1/2)/x^2+2/5*b*x*(b*x^3+a)^(1/2)-9/10*I*a*3^(1
/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/
3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)
*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)
*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/
2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^3,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bbx^6 + (Ba + Ab)x^3 + Aa)\sqrt{bx^3 + a}}{x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^3,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/x^3, x
)
```

Sympy [A] time = 9.49056, size = 172, normalized size = 0.58

$$\frac{Aa^{\frac{3}{2}}\Gamma\left(-\frac{2}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{2}{3}, -\frac{1}{2} \\ \frac{1}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^2\Gamma\left(\frac{1}{3}\right)} + \frac{A\sqrt{a}bx\Gamma\left(\frac{1}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{1}{3} \\ \frac{4}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{4}{3}\right)} + \frac{Ba^{\frac{3}{2}}x\Gamma\left(\frac{1}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{1}{3} \\ \frac{4}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{4}{3}\right)} + \frac{B\sqrt{a}bx^4\Gamma\left(\frac{4}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{4}{3} \\ \frac{7}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{7}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**3,x)
```

```
[Out] A*a**(3/2)*gamma(-2/3)*hyper((-2/3, -1/2), (1/3,), b*x**3*exp_pol
ar(I*pi)/a)/(3*x**2*gamma(1/3)) + A*sqrt(a)*b*x*gamma(1/3)*hyper(
(-1/2, 1/3), (4/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(4/3)) + B
*a**(3/2)*x*gamma(1/3)*hyper((-1/2, 1/3), (4/3,), b*x**3*exp_pola
r(I*pi)/a)/(3*gamma(4/3)) + B*sqrt(a)*b*x**4*gamma(4/3)*hyper((-1
/2, 4/3), (7/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(7/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^3,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^3, x)
```

3.205 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x^6}\,dx$

Optimal. Leaf size=297

$$\frac{9\,3^{3/4}\sqrt{2+\sqrt{3}}b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{20\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{9bx\sqrt{a+bx^3}(2aB+Ab)}{20a}-\frac{\left(a+bx^3\right)^{3/2}(2aB+Ab)}{4ax^2}-\frac{A\left(a+bx^3\right)^{5/2}}{5ax^5}$$

```
[Out] (9*b*(A*b + 2*a*B)*x*Sqrt[a + b*x^3])/(20*a) - ((A*b + 2*a*B)*(a
+ b*x^3)^(3/2))/(4*a*x^2) - (A*(a + b*x^3)^(5/2))/(5*a*x^5) + (9*
3^(3/4)*Sqrt[2 + Sqrt[3]]*b^(2/3)*(A*b + 2*a*B)*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/
3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt
[3]])/(20*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.344533, antiderivative size = 297, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{9\,3^{3/4}\sqrt{2+\sqrt{3}}b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{20\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{9bx\sqrt{a+bx^3}(2aB+Ab)}{20a}-\frac{\left(a+bx^3\right)^{3/2}(2aB+Ab)}{4ax^2}-\frac{A\left(a+bx^3\right)^{5/2}}{5ax^5}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^6,x]
```


```
[Out] (9*b*(A*b + 2*a*B)*x*Sqrt[a + b*x^3])/(20*a) - ((A*b + 2*a*B)*(a
+ b*x^3)^(3/2))/(4*a*x^2) - (A*(a + b*x^3)^(5/2))/(5*a*x^5) + (9*
3^(3/4)*Sqrt[2 + Sqrt[3]]*b^(2/3)*(A*b + 2*a*B)*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/
3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt
[3]])/(20*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 22.6463, size = 264, normalized size = 0.89

$$-\frac{A\left(a+bx^3\right)^{\frac{5}{2}}}{5ax^5}+\frac{9\cdot 3^{\frac{3}{4}}b^{\frac{2}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{Ab}{2}+Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{10\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{9bx\sqrt{a+bx^3}\left(Ab+2Ba\right)}{20a}-\frac{\left(a+bx^3\right)^{\frac{3}{2}}\left(\frac{Ab}{2}+Ba\right)}{2ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**6,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(5*a*x**5) + 9*3**(3/4)*b**(2/3)*sqrt((a**
(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(
3)) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(
A*b/2 + B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)
*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(10*s
qrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b*
*(1/3)*x)**2)*sqrt(a + b*x**3)) + 9*b*x*sqrt(a + b*x**3)*(A*b + 2
*B*a)/(20*a) - (a + b*x**3)**(3/2)*(A*b/2 + B*a)/(2*a*x**2)
```

Mathematica [C] time = 1.47563, size = 193, normalized size = 0.65

$$\sqrt{a+bx^3}\left(\frac{-10aB-13Ab}{20x^2}-\frac{aA}{5x^5}+\frac{2bBx}{5}\right)+\frac{9i3^{3/4}\sqrt[3]{a}b\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(2aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{20\sqrt[3]{-b}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^6,x]
```

```
[Out] (-(a*A)/(5*x^5) + (-13*A*b - 10*a*B)/(20*x^2) + (2*b*B*x)/5)*Sqrt
[a + b*x^3] + (((9*I)/20)*3^(3/4)*a^(1/3)*b*(A*b + 2*a*B)*Sqrt[(-
1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a
^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5
/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/((-b)^(1/3
)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.014, size = 626, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/x^6,x)
```

```
[Out] A*(-1/5*a*(b*x^3+a)^(1/2)/x^5-13/20*b*(b*x^3+a)^(1/2)/x^2-9/20*I*
b*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^
2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))
^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3
^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(-1
/2*a*(b*x^3+a)^(1/2)/x^2+2/5*b*x*(b*x^3+a)^(1/2)-9/10*I*a*3^(1/2)
*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))
/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-
I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)
*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I
*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*
b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^6,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^6, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bbx^6 + (Ba + Ab)x^3 + Aa)\sqrt{bx^3 + a}}{x^6}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^6,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/x^6, x
)
```

Sympy [A] time = 10.4413, size = 184, normalized size = 0.62

$$\frac{Aa^{\frac{3}{2}}\Gamma\left(-\frac{5}{3}\right){}_2F_1\left(\begin{matrix}-\frac{5}{3},-\frac{1}{2}\\-\frac{2}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x^5\Gamma\left(-\frac{2}{3}\right)} + \frac{A\sqrt{a}b\Gamma\left(-\frac{2}{3}\right){}_2F_1\left(\begin{matrix}-\frac{2}{3},-\frac{1}{2}\\\frac{1}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x^2\Gamma\left(\frac{1}{3}\right)} + \frac{Ba^{\frac{3}{2}}\Gamma\left(-\frac{2}{3}\right){}_2F_1\left(\begin{matrix}-\frac{2}{3},-\frac{1}{2}\\\frac{1}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x^2\Gamma\left(\frac{1}{3}\right)} + \frac{B\sqrt{a}bx\Gamma\left(\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{1}{3}\\\frac{4}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{4}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**6,x)
```

```
[Out] A*a**(3/2)*gamma(-5/3)*hyper((-5/3, -1/2), (-2/3,), b*x**3*exp_po
lar(I*pi)/a)/(3*x**5*gamma(-2/3)) + A*sqrt(a)*b*gamma(-2/3)*hyper
((-2/3, -1/2), (1/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**2*gamma(1/
3)) + B*a**(3/2)*gamma(-2/3)*hyper((-2/3, -1/2), (1/3,), b*x**3*e
xp_polar(I*pi)/a)/(3*x**2*gamma(1/3)) + B*sqrt(a)*b*x*gamma(1/3)*
hyper((-1/2, 1/3), (4/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(4/3
))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^6,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^6, x)
```

3.206 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x^9}\,dx$

Optimal. Leaf size=302

$$-\frac{9\,3^{3/4}\sqrt{2+\sqrt{3}}\,b^{5/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-16aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{320a\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\left(a+bx^3\right)^{3/2}(Ab-16aB)}{80ax^5}+\frac{9b\sqrt{a+bx^3}(Ab-16aB)}{320ax^2}-\frac{A\left(a+bx^3\right)^{5/2}}{8ax^8}$$

```
[Out] (9*b*(A*b - 16*a*B)*Sqrt[a + b*x^3])/(320*a*x^2) + ((A*b - 16*a*B
)*(a + b*x^3)^(3/2))/(80*a*x^5) - (A*(a + b*x^3)^(5/2))/(8*a*x^8)
 - (9*3^(3/4)*Sqrt[2 + Sqrt[3]]*b^(5/3)*(A*b - 16*a*B)*(a^(1/3) +
 b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1
+ Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3]
)*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 -
 4*Sqrt[3]])/(320*a*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.365562, antiderivative size = 302, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{9\,3^{3/4}\sqrt{2+\sqrt{3}}\,b^{5/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-16aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{320a\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\left(a+bx^3\right)^{3/2}(Ab-16aB)}{80ax^5}+\frac{9b\sqrt{a+bx^3}(Ab-16aB)}{320ax^2}-\frac{A\left(a+bx^3\right)^{5/2}}{8ax^8}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^9,x]
```

```
[Out] (9*b*(A*b - 16*a*B)*Sqrt[a + b*x^3])/(320*a*x^2) + ((A*b - 16*a*B
)*(a + b*x^3)^(3/2))/(80*a*x^5) - (A*(a + b*x^3)^(5/2))/(8*a*x^8)
 - (9*3^(3/4)*Sqrt[2 + Sqrt[3]]*b^(5/3)*(A*b - 16*a*B)*(a^(1/3) +
 b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1
+ Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3]
)*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 -
 4*Sqrt[3]])/(320*a*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 24.5001, size = 267, normalized size = 0.88

$$-\frac{A\left(a+bx^3\right)^{\frac{5}{2}}}{8ax^8}-\frac{9\cdot 3^{\frac{3}{4}}b^{\frac{5}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab-16Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{320a\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{9b\sqrt{a+bx^3}\,(Ab-16Ba)}{320ax^2}+\frac{\left(a+bx^3\right)^{\frac{3}{2}}(Ab-16Ba)}{80ax^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**9,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(8*a*x**8) - 9*3**(3/4)*b**(5/3)*sqrt((a**
(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(
3)) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(
A*b - 16*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3
)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(320
*a*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 9*b*sqrt(a + b*x**3)*(A*b -
 16*B*a)/(320*a*x**2) + (a + b*x**3)**(3/2)*(A*b - 16*B*a)/(80*a*
x**5)
```

Mathematica [C] time = 1.70377, size = 209, normalized size = 0.69

$$\sqrt{a+bx^3}\left(\frac{-16aB-19Ab}{80x^5}-\frac{b(208aB+27Ab)}{320ax^2}-\frac{aA}{8x^8}\right)+\frac{9i3^{3/4}b^2\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(16aB-Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{320a^{2/3}\sqrt[3]{-b}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^9,x]
```

```
[Out] (-(a*A)/(8*x^8) + (-19*A*b - 16*a*B)/(80*x^5) - (b*(27*A*b + 208*
a*B))/(320*a*x^2))*Sqrt[a + b*x^3] + (((9*I)/320)*3^(3/4)*b^2*(-(
A*b) + 16*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqr
t[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*Elliptic
F[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (
-1)^(1/3)])/(a^(2/3)*(-b)^(1/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.037, size = 653, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^3+a)^(3/2)*(B*x^3+A)/x^9,x)
```

```
[Out] A*(-1/8*a*(b*x^3+a)^(1/2)/x^8-19/80*b*(b*x^3+a)^(1/2)/x^5-27/320/
a*b^2*(b*x^3+a)^(1/2)/x^2+9/320*I/a*b^2*3^(1/2)*(-a*b^2)^(1/3)*(I
*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*
b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)
^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^
(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(-1/5*a*(b*x^3+a)^(1/2)/x^5-13
/20*b*(b*x^3+a)^(1/2)/x^2-9/20*I*b*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1
/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a
*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)
+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/
3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2
)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)
,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{x^9} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^9,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^9, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bbx^6 + (Ba + Ab)x^3 + Aa)\sqrt{bx^3 + a}}{x^9}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^9,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/x^9, x
)
```

Sympy [A] time = 15.1366, size = 196, normalized size = 0.65

$$\frac{Aa^{\frac{3}{2}}\Gamma\left(-\frac{8}{3}\right){}_2F_1\left(\begin{matrix} -\frac{8}{3}, -\frac{1}{2} \\ -\frac{5}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^8\Gamma\left(-\frac{5}{3}\right)} + \frac{A\sqrt{a}b\Gamma\left(-\frac{5}{3}\right){}_2F_1\left(\begin{matrix} -\frac{5}{3}, -\frac{1}{2} \\ -\frac{2}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^5\Gamma\left(-\frac{2}{3}\right)} + \frac{Ba^{\frac{3}{2}}\Gamma\left(-\frac{5}{3}\right){}_2F_1\left(\begin{matrix} -\frac{5}{3}, -\frac{1}{2} \\ -\frac{2}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^5\Gamma\left(-\frac{2}{3}\right)} + \frac{B\sqrt{a}b\Gamma\left(-\frac{2}{3}\right){}_2F_1\left(\begin{matrix} -\frac{2}{3}, -\frac{1}{2} \\ \frac{1}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^2\Gamma\left(\frac{1}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**9,x)
```

```
[Out] A*a**(3/2)*gamma(-8/3)*hyper((-8/3, -1/2), (-5/3,), b*x**3*exp_po
lar(I*pi)/a)/(3*x**8*gamma(-5/3)) + A*sqrt(a)*b*gamma(-5/3)*hyper
((-5/3, -1/2), (-2/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**5*gamma(-
2/3)) + B*a**(3/2)*gamma(-5/3)*hyper((-5/3, -1/2), (-2/3,), b*x**
3*exp_polar(I*pi)/a)/(3*x**5*gamma(-2/3)) + B*sqrt(a)*b*gamma(-2/
3)*hyper((-2/3, -1/2), (1/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**2*
gamma(1/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{x^9} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^9,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^9, x)
```

3.207 $\int x^4 \left(a+bx^3\right)^{3/2} \left(A+Bx^3\right)\,dx$

Optimal. Leaf size=614

$$-\frac{72\sqrt{2}3^{3/4}a^{10/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{8645b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{108\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{10/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{8645b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{216a^3\sqrt{a+bx^3}(5Ab-2aB)}{8645b^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{54a^2x^2\sqrt{a+bx^3}(5Ab-2aB)}{8645b^2}$$
$$+\frac{2x^5\left(a+bx^3\right)^{3/2}(5Ab-2aB)}{95b}+\frac{18ax^5\sqrt{a+bx^3}(5Ab-2aB)}{1235b}+\frac{2Bx^5\left(a+bx^3\right)^{5/2}}{25b}$$

```
[Out] (54*a^2*(5*A*b - 2*a*B)*x^2*Sqrt[a + b*x^3])/(8645*b^2) + (18*a*(
5*A*b - 2*a*B)*x^5*Sqrt[a + b*x^3])/(1235*b) - (216*a^3*(5*A*b -
2*a*B)*Sqrt[a + b*x^3])/(8645*b^(8/3)*((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)) + (2*(5*A*b - 2*a*B)*x^5*(a + b*x^3)^(3/2))/(95*b) + (2
*B*x^5*(a + b*x^3)^(5/2))/(25*b) + (108*3^(1/4)*Sqrt[2 - Sqrt[3]]
*a^(10/3)*(5*A*b - 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*
x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 +
Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(8645*b^(8/3)*Sq
rt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)^2]*Sqrt[a + b*x^3]) - (72*Sqrt[2]*3^(3/4)*a^(10/3)*(5*A*b -
 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(8645*b^(8/3)*Sqrt[(a^(1/3)*(a^(1/
3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a +
b*x^3])
```

Rubi [A] time = 0.982007, antiderivative size = 614, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$-\frac{72\sqrt{2}3^{3/4}a^{10/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{8645b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{108\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{10/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{8645b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{216a^3\sqrt{a+bx^3}(5Ab-2aB)}{8645b^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{54a^2x^2\sqrt{a+bx^3}(5Ab-2aB)}{8645b^2}$$
$$+\frac{2x^5\left(a+bx^3\right)^{3/2}(5Ab-2aB)}{95b}+\frac{18ax^5\sqrt{a+bx^3}(5Ab-2aB)}{1235b}+\frac{2Bx^5\left(a+bx^3\right)^{5/2}}{25b}$$

Antiderivative was successfully verified.

```
[In]   Int[x^4*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (54*a^2*(5*A*b - 2*a*B)*x^2*Sqrt[a + b*x^3])/(8645*b^2) + (18*a*(
5*A*b - 2*a*B)*x^5*Sqrt[a + b*x^3])/(1235*b) - (216*a^3*(5*A*b -
2*a*B)*Sqrt[a + b*x^3])/(8645*b^(8/3)*((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)) + (2*(5*A*b - 2*a*B)*x^5*(a + b*x^3)^(3/2))/(95*b) + (2
*B*x^5*(a + b*x^3)^(5/2))/(25*b) + (108*3^(1/4)*Sqrt[2 - Sqrt[3]]
*a^(10/3)*(5*A*b - 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*
x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 +
Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(8645*b^(8/3)*Sq
rt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)^2]*Sqrt[a + b*x^3]) - (72*Sqrt[2]*3^(3/4)*a^(10/3)*(5*A*b -
 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(8645*b^(8/3)*Sqrt[(a^(1/3)*(a^(1/
3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a +
b*x^3])
```

Rubi in Sympy [A] time = 70.9188, size = 559, normalized size = 0.91

$$\frac{2Bx^5\left(a+bx^3\right)^{\frac{5}{2}}}{25b}+\frac{216\sqrt[4]{3}a^{\frac{10}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{5Ab}{2}-Ba\right)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{8645b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{144\sqrt{2}\cdot 3^{\frac{3}{4}}a^{\frac{10}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{5Ab}{2}-Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{8645b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{432a^3\sqrt{a+bx^3}\left(\frac{5Ab}{2}-Ba\right)}{8645b^{\frac{8}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{108a^2x^2\sqrt{a+bx^3}\left(\frac{5Ab}{2}-Ba\right)}{8645b^2}$$

$$+\frac{18ax^5\sqrt{a+bx^3}\left(5Ab-2Ba\right)}{1235b}+\frac{4x^5\left(a+bx^3\right)^{\frac{3}{2}}\left(\frac{5Ab}{2}-Ba\right)}{95b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**4*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] 2*B*x**5*(a + b*x**3)**(5/2)/(25*b) + 216*3**(1/4)*a**(10/3)*sqrt
((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 +
sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3
)*x)*(5*A*b/2 - B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) +
b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3
))/(8645*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 144*sqrt(2)*
3**(3/4)*a**(10/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**
(1/3)*x)*(5*A*b/2 - B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)
) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sq
rt(3))/(8645*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(
1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 432*a**3
*sqrt(a + b*x**3)*(5*A*b/2 - B*a)/(8645*b**(8/3)*(a**(1/3)*(1 + s
qrt(3)) + b**(1/3)*x)) + 108*a**2*x**2*sqrt(a + b*x**3)*(5*A*b/2
- B*a)/(8645*b**2) + 18*a*x**5*sqrt(a + b*x**3)*(5*A*b - 2*B*a)/(
```

```
1235*b) + 4*x**5*(a + b*x**3)**(3/2)*(5*A*b/2 - B*a)/(95*b)
```

Mathematica [C] time = 0.661585, size = 283, normalized size = 0.46

$$2\left((-b)^{2/3}\left(a+bx^3\right)\left(135a^2x^2(5Ab-2aB)+91b^2x^8(28aB+25Ab)+7abx^5(27aB+550Ab)+1729b^3Bx^{11}\right)+180(-1)^{2/3}3^{3/4}\right.$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (2*((-b)^(2/3)*(a + b*x^3)*(135*a^2*(5*A*b - 2*a*B)*x^2 + 7*a*b*(
550*A*b + 27*a*B)*x^5 + 91*b^2*(25*A*b + 28*a*B)*x^8 + 1729*b^3*B
*x^11) + 180*(-1)^(2/3)*3^(3/4)*a^(11/3)*(5*A*b - 2*a*B)*Sqrt[(-1
)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^
(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(Sqrt[3]*EllipticE[ArcSin[Sqrt[
-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (
-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^
(1/3)]/3^(1/4)], (-1)^(1/3)])))/(43225*(-b)^(8/3)*Sqrt[a + b*x^3]
)
```

Maple [B] time = 0.011, size = 1002, normalized size = 1.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] A*(2/19*b*x^8*(b*x^3+a)^(1/2)+44/247*a*x^5*(b*x^3+a)^(1/2)+54/172
9/b*a^2*x^2*(b*x^3+a)^(1/2)+72/1729*I/b^2*a^3*3^(1/2)*(-a*b^2)^(1
/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^
(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^
(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1
/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/
2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(
1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(2/2
5*b*x^11*(b*x^3+a)^(1/2)+56/475*a*x^8*(b*x^3+a)^(1/2)+54/6175/b*a
^2*x^5*(b*x^3+a)^(1/2)-108/8645*a^3/b^2*x^2*(b*x^3+a)^(1/2)-144/8
645*I*a^4/b^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((
x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-
3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/
3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(
-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b
*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(
I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}} x^4 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^4,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^4, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bbx^{10} + (Ba + Ab)x^7 + Aax^4\right)\sqrt{bx^3 + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^4,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^10 + (B*a + A*b)*x^7 + A*a*x^4)*sqrt(b*x^3 + a),
x)
```

Sympy [A] time = 13.6494, size = 172, normalized size = 0.28

$$\frac{Aa^{\frac{3}{2}}x^5\,\Gamma\left(\frac{5}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{5}{3}\\\frac{8}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{8}{3}\right)} + \frac{A\sqrt{a}bx^8\,\Gamma\left(\frac{8}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{8}{3}\\\frac{11}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{11}{3}\right)} + \frac{Ba^{\frac{3}{2}}x^8\,\Gamma\left(\frac{8}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{8}{3}\\\frac{11}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{11}{3}\right)} + \frac{B\sqrt{a}bx^{11}\,\Gamma\left(\frac{11}{3}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{11}{3}\\\frac{14}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\,\Gamma\left(\frac{14}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] A*a**(3/2)*x**5*gamma(5/3)*hyper((-1/2, 5/3), (8/3,), b*x**3*exp_
polar(I*pi)/a)/(3*gamma(8/3)) + A*sqrt(a)*b*x**8*gamma(8/3)*hyper
((-1/2, 8/3), (11/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(11/3))
+ B*a**(3/2)*x**8*gamma(8/3)*hyper((-1/2, 8/3), (11/3,), b*x**3*e
xp_polar(I*pi)/a)/(3*gamma(11/3)) + B*sqrt(a)*b*x**11*gamma(11/3)
*hyper((-1/2, 11/3), (14/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(
14/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}} x^4 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^4,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x^4, x)
```

3.208 $\int x\left(a+bx^3\right)^{3/2}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=581

$$\frac{18\sqrt{2}3^{3/4}a^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{1729b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{1729b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{54a^2\sqrt{a+bx^3}(19Ab-4aB)}{1729b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2\left(a+bx^3\right)^{3/2}(19Ab-4aB)}{247b}+\frac{18ax^2\sqrt{a+bx^3}(19Ab-4aB)}{1729b}+\frac{2Bx^2\left(a+bx^3\right)^{5/2}}{19b}$$

```
[Out] (18*a*(19*A*b - 4*a*B)*x^2*Sqrt[a + b*x^3])/(1729*b) + (54*a^2*(1
9*A*b - 4*a*B)*Sqrt[a + b*x^3])/(1729*b^(5/3)*((1 + Sqrt[3])*a^(1
/3) + b^(1/3)*x)) + (2*(19*A*b - 4*a*B)*x^2*(a + b*x^3)^(3/2))/(2
47*b) + (2*B*x^2*(a + b*x^3)^(5/2))/(19*b) - (27*3^(1/4)*Sqrt[2 -
 Sqrt[3]]*a^(7/3)*(19*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^
(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*
x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(1729*b
^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3
) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (18*Sqrt[2]*3^(3/4)*a^(7/3)*
(19*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^
(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ell
ipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*
a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(1729*b^(5/3)*Sqrt[(a^(1/
3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
Sqrt[a + b*x^3])
```

Rubi [A] time = 0.808565, antiderivative size = 581, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$\frac{18\sqrt{2}3^{3/4}a^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{1729b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{1729b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{54a^2\sqrt{a+bx^3}(19Ab-4aB)}{1729b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2\left(a+bx^3\right)^{3/2}(19Ab-4aB)}{247b}+\frac{18ax^2\sqrt{a+bx^3}(19Ab-4aB)}{1729b}+\frac{2Bx^2\left(a+bx^3\right)^{5/2}}{19b}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (18*a*(19*A*b - 4*a*B)*x^2*Sqrt[a + b*x^3])/(1729*b) + (54*a^2*(1
9*A*b - 4*a*B)*Sqrt[a + b*x^3])/(1729*b^(5/3)*((1 + Sqrt[3])*a^(1
/3) + b^(1/3)*x)) + (2*(19*A*b - 4*a*B)*x^2*(a + b*x^3)^(3/2))/(2
47*b) + (2*B*x^2*(a + b*x^3)^(5/2))/(19*b) - (27*3^(1/4)*Sqrt[2 -
 Sqrt[3]]*a^(7/3)*(19*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^
(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*
x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(1729*b
^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3
) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (18*Sqrt[2]*3^(3/4)*a^(7/3)*
(19*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^
(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ell
ipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*
a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(1729*b^(5/3)*Sqrt[(a^(1/
3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 57.5465, size = 525, normalized size = 0.9

$$\frac{2Bx^2\left(a+bx^3\right)^{\frac{5}{2}}}{19b} - \frac{27\sqrt[4]{3}a^{\frac{7}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(19Ab-4Ba)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{1729b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{18\sqrt{2}\cdot 3^{\frac{3}{4}}a^{\frac{7}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(19Ab-4Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{1729b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{54a^2\sqrt{a+bx^3}(19Ab-4Ba)}{1729b^{\frac{5}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)} + \frac{18ax^2\sqrt{a+bx^3}(19Ab-4Ba)}{1729b} + \frac{2x^2\left(a+bx^3\right)^{\frac{3}{2}}(19Ab-4Ba)}{247b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] 2*B*x**2*(a + b*x**3)**(5/2)/(19*b) - 27*3**(1/4)*a**(7/3)*sqrt((
a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sq
rt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*
x)*(19*A*b - 4*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b
**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3)
)/(1729*b**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*
(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 18*sqrt(2)*3*
*(3/4)*a**(7/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x
**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/
3)*x)*(19*A*b - 4*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3))
+ b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt
(3))/(1729*b**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/
3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 54*a**2*sq
rt(a + b*x**3)*(19*A*b - 4*B*a)/(1729*b**(5/3)*(a**(1/3)*(1 + sqr
t(3)) + b**(1/3)*x)) + 18*a*x**2*sqrt(a + b*x**3)*(19*A*b - 4*B*a
)/(1729*b) + 2*x**2*(a + b*x**3)**(3/2)*(19*A*b - 4*B*a)/(247*b)
```

Mathematica [C] time = 0.60331, size = 262, normalized size = 0.45

$$-\frac{2\left((-b)^{2/3}\left(a+bx^3\right)\left(7bx^5(22aB+19Ab)+ax^2(27aB+304Ab)+91b^2Bx^8\right)-9(-1)^{2/3}3^{3/4}a^{8/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{(-\cdots}\right.}{1729(-b)^{5/3}\cdots}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (-2*((-b)^(2/3)*(a + b*x^3)*(a*(304*A*b + 27*a*B)*x^2 + 7*b*(19*A
*b + 22*a*B)*x^5 + 91*b^2*B*x^8) - 9*(-1)^(2/3)*3^(3/4)*a^(8/3)*(
19*A*b - 4*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sq
rt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(Sqrt[3
]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3
^(1/4)], (-1)^(1/3)] + (-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/
6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])))/(1729*(-b
)^(5/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.009, size = 962, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] A*(2/13*b*x^5*(b*x^3+a)^(1/2)+32/91*a*x^2*(b*x^3+a)^(1/2)-18/91*I
*a^2*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(
-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/
2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(
1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^
2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/
2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3)))^(1/2))))+B*(2/19*b*x^8*(b*x^3+a)^(1/2)+44/247*a*x^5*(b
*x^3+a)^(1/2)+54/1729/b*a^2*x^2*(b*x^3+a)^(1/2)+72/1729*I/b^2*a^3
*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2
)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^
(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*
(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b
/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/
3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(
-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}} x\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bbx^{7} + (Ba + Ab)x^{4} + Aax\right)\sqrt{bx^{3} + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^7 + (B*a + A*b)*x^4 + A*a*x)*sqrt(b*x^3 + a), x)
```

Sympy [A] time = 8.9003, size = 172, normalized size = 0.3

$$\frac{Aa^{\frac{3}{2}}x^{2}\Gamma\left(\frac{2}{3}\right){}_{2}F_{1}\left(\begin{matrix}-\frac{1}{2},\frac{2}{3}\\\frac{5}{3}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{5}{3}\right)} + \frac{A\sqrt{a}bx^{5}\Gamma\left(\frac{5}{3}\right){}_{2}F_{1}\left(\begin{matrix}-\frac{1}{2},\frac{5}{3}\\\frac{8}{3}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{8}{3}\right)} + \frac{Ba^{\frac{3}{2}}x^{5}\Gamma\left(\frac{5}{3}\right){}_{2}F_{1}\left(\begin{matrix}-\frac{1}{2},\frac{5}{3}\\\frac{8}{3}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{8}{3}\right)} + \frac{B\sqrt{a}bx^{8}\Gamma\left(\frac{8}{3}\right){}_{2}F_{1}\left(\begin{matrix}-\frac{1}{2},\frac{8}{3}\\\frac{11}{3}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{11}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] A*a**(3/2)*x**2*gamma(2/3)*hyper((-1/2, 2/3), (5/3,), b*x**3*exp_
polar(I*pi)/a)/(3*gamma(5/3)) + A*sqrt(a)*b*x**5*gamma(5/3)*hyper
((-1/2, 5/3), (8/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(8/3)) +
B*a**(3/2)*x**5*gamma(5/3)*hyper((-1/2, 5/3), (8/3,), b*x**3*exp_
polar(I*pi)/a)/(3*gamma(8/3)) + B*sqrt(a)*b*x**8*gamma(8/3)*hyper
((-1/2, 8/3), (11/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(11/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^{3} + A\right)\left(bx^{3} + a\right)^{\frac{3}{2}} x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*x, x)
```

3.209 $\int \frac{\left(a+bx^3\right)^{3/2}\left(A+Bx^3\right)}{x^2}\,dx$

Optimal. Leaf size=573

$$\frac{9\sqrt{2}\,3^{3/4}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+13Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+13Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{182b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$+\frac{27a\sqrt{a+bx^3}(2aB+13Ab)}{91b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{x^2\left(a+bx^3\right)^{3/2}(2aB+13Ab)}{13a}$$

$$+\frac{9}{91}x^2\sqrt{a+bx^3}(2aB+13Ab)-\frac{A\left(a+bx^3\right)^{5/2}}{ax}$$

```
[Out] (9*(13*A*b + 2*a*B)*x^2*Sqrt[a + b*x^3])/91 + (27*a*(13*A*b + 2*a
*B)*Sqrt[a + b*x^3])/(91*b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)
*x)) + ((13*A*b + 2*a*B)*x^2*(a + b*x^3)^(3/2))/(13*a) - (A*(a +
b*x^3)^(5/2))/(a*x) - (27*3^(1/4)*Sqrt[2 - Sqrt[3]]*a^(4/3)*(13*A
*b + 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)
*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Elliptic
E[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/
3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(182*b^(2/3)*Sqrt[(a^(1/3)*(a^
(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a
 + b*x^3]) + (9*Sqrt[2]*3^(3/4)*a^(4/3)*(13*A*b + 2*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(91*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.803494, antiderivative size = 573, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{9\sqrt{2}\,3^{3/4}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+13Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+13Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{182b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$+\frac{27a\sqrt{a+bx^3}(2aB+13Ab)}{91b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{x^2\left(a+bx^3\right)^{3/2}(2aB+13Ab)}{13a}$$

$$+\frac{9}{91}x^2\sqrt{a+bx^3}(2aB+13Ab)-\frac{A\left(a+bx^3\right)^{5/2}}{ax}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^2,x]
```

```
[Out] (9*(13*A*b + 2*a*B)*x^2*Sqrt[a + b*x^3])/91 + (27*a*(13*A*b + 2*a
*B)*Sqrt[a + b*x^3])/(91*b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)
*x)) + ((13*A*b + 2*a*B)*x^2*(a + b*x^3)^(3/2))/(13*a) - (A*(a +
b*x^3)^(5/2))/(a*x) - (27*3^(1/4)*Sqrt[2 - Sqrt[3]]*a^(4/3)*(13*A
*b + 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)
*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Elliptic
E[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/
3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(182*b^(2/3)*Sqrt[(a^(1/3)*(a^
(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a
 + b*x^3]) + (9*Sqrt[2]*3^(3/4)*a^(4/3)*(13*A*b + 2*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(91*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 57.42, size = 515, normalized size = 0.9

$$-\frac{A\left(a+bx^3\right)^{\frac{5}{2}}}{ax}-\frac{27\sqrt[4]{3}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{13Ab}{2}+Ba\right)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{91b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{18\sqrt{2}\cdot 3^{\frac{3}{4}}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{13Ab}{2}+Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{91b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{27a\sqrt{a+bx^3}\left(13Ab+2Ba\right)}{91b^{\frac{2}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+x^2\sqrt{a+bx^3}\left(\frac{9Ab}{7}+\frac{18Ba}{91}\right)+\frac{2x^2\left(a+bx^3\right)^{\frac{3}{2}}\left(\frac{13Ab}{2}+Ba\right)}{13a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**2,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(a*x) - 27*3**(1/4)*a**(4/3)*sqrt((a**(2/3
) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(13*
A*b/2 + B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)
*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(91*b
**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt
(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 18*sqrt(2)*3**(3/4)*a*
*(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**
(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(13
*A*b/2 + B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3
)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(91*
b**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqr
t(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 27*a*sqrt(a + b*x**3)
*(13*A*b + 2*B*a)/(91*b**(2/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)
*x)) + x**2*sqrt(a + b*x**3)*(9*A*b/7 + 18*B*a/91) + 2*x**2*(a +
b*x**3)**(3/2)*(13*A*b/2 + B*a)/(13*a)
```

Mathematica [C] time = 0.485564, size = 254, normalized size = 0.44

$$\sqrt{a+bx^3}\left(\frac{2}{91}x^2(16aB+13Ab)-\frac{aA}{x}+\frac{2}{13}bBx^5\right)+\frac{9\sqrt[6]{-1}3^{3/4}a^{5/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(2aB+13Ab)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)-i\sqrt{3}E\ldots\right)}{91(-b)^{2/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^2,x]
```

```
[Out] Sqrt[a + b*x^3]*(-((a*A)/x) + (2*(13*A*b + 16*a*B)*x^2)/91 + (2*b
*B*x^5)/13) + (9*(-1)^(1/6)*3^(3/4)*a^(5/3)*(13*A*b + 2*a*B)*Sqrt
[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x
)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*EllipticE[Arc
Sin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(
1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1
/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(91*(-b)^(2/3)*Sqrt[a + b
*x^3])
```

Maple [B] time = 0.013, size = 937, normalized size = 1.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/x^2,x)
```

```
[Out] A*(-a*(b*x^3+a)^(1/2)/x+2/7*b*x^2*(b*x^3+a)^(1/2)-9/7*I*a*3^(1/2)
*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))
/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-
I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)
*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b
*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2
)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)
+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*Ellip
ticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^
(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/
2))))+B*(2/13*b*x^5*(b*x^3+a)^(1/2)+32/91*a*x^2*(b*x^3+a)^(1/2)-1
8/91*I*a^2*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x
-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3
/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3
*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-
3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*
(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I
*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{(Bx^3+A)\,(bx^3+a)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^2,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bbx^6 + (Ba + Ab)x^3 + Aa\right)\sqrt{bx^3 + a}}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^2,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/x^2, x
)
```

Sympy [A] time = 9.76072, size = 173, normalized size = 0.3

$$\frac{Aa^{\frac{3}{2}}\Gamma\left(-\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},-\frac{1}{3}\\ \frac{2}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x\Gamma\left(\frac{2}{3}\right)} + \frac{A\sqrt{a}bx^2\Gamma\left(\frac{2}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{2}{3}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{5}{3}\right)} + \frac{Ba^{\frac{3}{2}}x^2\Gamma\left(\frac{2}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{2}{3}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{5}{3}\right)} + \frac{B\sqrt{a}bx^5\Gamma\left(\frac{5}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{5}{3}\\ \frac{8}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{8}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**2,x)
```

```
[Out] A*a**(3/2)*gamma(-1/3)*hyper((-1/2, -1/3), (2/3,), b*x**3*exp_pol
ar(I*pi)/a)/(3*x*gamma(2/3)) + A*sqrt(a)*b*x**2*gamma(2/3)*hyper(
(-1/2, 2/3), (5/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(5/3)) + B
*a**(3/2)*x**2*gamma(2/3)*hyper((-1/2, 2/3), (5/3,), b*x**3*exp_p
olar(I*pi)/a)/(3*gamma(5/3)) + B*sqrt(a)*b*x**5*gamma(5/3)*hyper(
(-1/2, 5/3), (8/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(8/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^2,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^2, x)
```

3.210 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x^5}\,dx$

Optimal. Leaf size=578

$$\frac{9\,3^{3/4}\sqrt[3]{a}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+7Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{28\sqrt{2}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+7Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{112\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\left(a+bx^3\right)^{3/2}(8aB+7Ab)}{8ax}+\frac{27\sqrt[3]{b}\sqrt{a+bx^3}(8aB+7Ab)}{56\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{9bx^2\sqrt{a+bx^3}(8aB+7Ab)}{56a}-\frac{A\left(a+bx^3\right)^{5/2}}{4ax^4}$$

```
[Out] (9*b*(7*A*b + 8*a*B)*x^2*Sqrt[a + b*x^3])/(56*a) + (27*b^(1/3)*(7
*A*b + 8*a*B)*Sqrt[a + b*x^3])/(56*((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)) - ((7*A*b + 8*a*B)*(a + b*x^3)^(3/2))/(8*a*x) - (A*(a + b*
x^3)^(5/2))/(4*a*x^4) - (27*3^(1/4)*Sqrt[2 - Sqrt[3]]*a^(1/3)*b^(
1/3)*(7*A*b + 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3
)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(112*Sqrt[(a^(1/3)*(a
^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[
a + b*x^3]) + (9*3^(3/4)*a^(1/3)*b^(1/3)*(7*A*b + 8*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(28*Sqrt[2]*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.795633, antiderivative size = 578, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$\frac{9\,3^{3/4}\sqrt[3]{a}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+7Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{28\sqrt{2}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+7Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{112\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\left(a+bx^3\right)^{3/2}(8aB+7Ab)}{8ax}+\frac{27\sqrt[3]{b}\sqrt{a+bx^3}(8aB+7Ab)}{56\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{9bx^2\sqrt{a+bx^3}(8aB+7Ab)}{56a}-\frac{A\left(a+bx^3\right)^{5/2}}{4ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^5,x]
```

```
[Out] (9*b*(7*A*b + 8*a*B)*x^2*Sqrt[a + b*x^3])/(56*a) + (27*b^(1/3)*(7
*A*b + 8*a*B)*Sqrt[a + b*x^3])/(56*((1 + Sqrt[3])*a^(1/3) + b^(1/
```

```
3)*x)) - ((7*A*b + 8*a*B)*(a + b*x^3)^(3/2))/(8*a*x) - (A*(a + b*
x^3)^(5/2))/(4*a*x^4) - (27*3^(1/4)*Sqrt[2 - Sqrt[3]]*a^(1/3)*b^(
1/3)*(7*A*b + 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3
)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(112*Sqrt[(a^(1/3)*(a
^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[
a + b*x^3]) + (9*3^(3/4)*a^(1/3)*b^(1/3)*(7*A*b + 8*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(28*Sqrt[2]*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 57.0619, size = 518, normalized size = 0.9

$$-\frac{A\left(a+bx^3\right)^{\frac{5}{2}}}{4ax^4}-\frac{27\sqrt[4]{3}\sqrt[3]{a}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(7Ab+8Ba)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{112\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{9\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{a}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(7Ab+8Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{56\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{27\sqrt[3]{b}\sqrt{a+bx^3}(7Ab+8Ba)}{56\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{9bx^2\sqrt{a+bx^3}(7Ab+8Ba)}{56a}-\frac{\left(a+bx^3\right)^{\frac{3}{2}}(7Ab+8Ba)}{8ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**5,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(4*a*x**4) - 27*3**(1/4)*a**(1/3)*b**(1/3)
*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*
(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b*
*(1/3)*x)*(7*A*b + 8*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3
)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*s
qrt(3))/(112*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 +
 sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 9*sqrt(2)*3**(3/4
)*a**(1/3)*b**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/
3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b*
*(1/3)*x)*(7*A*b + 8*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3
)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*s
qrt(3))/(56*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 +
sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 27*b**(1/3)*sqrt(a
 + b*x**3)*(7*A*b + 8*B*a)/(56*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)
*x)) + 9*b*x**2*sqrt(a + b*x**3)*(7*A*b + 8*B*a)/(56*a) - (a + b*
x**3)**(3/2)*(7*A*b + 8*B*a)/(8*a*x)
```

Mathematica [C] time = 0.627864, size = 254, normalized size = 0.44

$$-\frac{\sqrt{a+bx^3}\left(14a\left(A+4Bx^3\right)+bx^3\left(77A-16Bx^3\right)\right)}{56x^4}-\frac{9\sqrt[6]{-1}3^{3/4}a^{2/3}\sqrt[3]{-b}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(8aB+7Ab)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)-\right.}{56\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^5,x]
```

```
[Out] -(Sqrt[a + b*x^3]*(b*x^3*(77*A - 16*B*x^3) + 14*a*(A + 4*B*x^3)))
/(56*x^4) - (9*(-1)^(1/6)*3^(3/4)*a^(2/3)*(-b)^(1/3)*(7*A*b + 8*a
*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)
^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*Ellip
ticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)]
, (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I
*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(56*Sqrt[a + b*x^
3])
```

Maple [B] time = 0.013, size = 932, normalized size = 1.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/x^5,x)
```

```
[Out] A*(-1/4*a*(b*x^3+a)^(1/2)/x^4-11/8*b*(b*x^3+a)^(1/2)/x-9/8*I*b*3^
(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(
1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/
2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^
(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(
1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+
1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*
EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*
b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
)^(1/2))))+B*(-a*(b*x^3+a)^(1/2)/x+2/7*b*x^2*(b*x^3+a)^(1/2)-9/7*
I*a*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*
b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*
(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2
)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^
(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/
b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)\left(bx^3+a\right)^{\frac{3}{2}}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^5,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^5, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bbx^6 + (Ba + Ab)x^3 + Aa\right)\sqrt{bx^3 + a}}{x^5}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^5,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/x^5, x
)
```

Sympy [A] time = 10.0415, size = 182, normalized size = 0.31

$$\frac{Aa^{\frac{3}{2}}\Gamma\left(-\frac{4}{3}\right){}_2F_1\left(\begin{matrix}-\frac{4}{3}, -\frac{1}{2}\\ -\frac{1}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x^4\Gamma\left(-\frac{1}{3}\right)} + \frac{A\sqrt{a}b\Gamma\left(-\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2}, -\frac{1}{3}\\ \frac{2}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x\Gamma\left(\frac{2}{3}\right)} + \frac{Ba^{\frac{3}{2}}\Gamma\left(-\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2}, -\frac{1}{3}\\ \frac{2}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3x\Gamma\left(\frac{2}{3}\right)} + \frac{B\sqrt{a}bx^2\Gamma\left(\frac{2}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2}, \frac{2}{3}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{5}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**5,x)
```

```
[Out] A*a**(3/2)*gamma(-4/3)*hyper((-4/3, -1/2), (-1/3,), b*x**3*exp_po
lar(I*pi)/a)/(3*x**4*gamma(-1/3)) + A*sqrt(a)*b*gamma(-1/3)*hyper
((-1/2, -1/3), (2/3,), b*x**3*exp_polar(I*pi)/a)/(3*x*gamma(2/3))
 + B*a**(3/2)*gamma(-1/3)*hyper((-1/2, -1/3), (2/3,), b*x**3*exp_
polar(I*pi)/a)/(3*x*gamma(2/3)) + B*sqrt(a)*b*x**2*gamma(2/3)*hyp
er((-1/2, 2/3), (5/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(5/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}}}{x^5}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^5,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^5, x)
```

3.211 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x^8} \, dx$

Optimal. Leaf size=576

$$\frac{9\ 3^{3/4}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(14aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{56\sqrt{2}a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(14aB+Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{27b^{4/3}\sqrt{a+bx^3}(14aB+Ab)}{112a\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)} - \frac{9b\sqrt{a+bx^3}(14aB+Ab)}{112ax} - \frac{\left(a+bx^3\right)^{3/2}(14aB+Ab)}{56ax^4} - \frac{A\left(a+bx^3\right)^{5/2}}{7ax^7}$$

```
[Out] (-9*b*(A*b + 14*a*B)*Sqrt[a + b*x^3])/(112*a*x) + (27*b^(4/3)*(A*
b + 14*a*B)*Sqrt[a + b*x^3])/(112*a*((1 + Sqrt[3])*a^(1/3) + b^(1
/3)*x)) - ((A*b + 14*a*B)*(a + b*x^3)^(3/2))/(56*a*x^4) - (A*(a +
 b*x^3)^(5/2))/(7*a*x^7) - (27*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(4/3)*
(A*b + 14*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellip
ticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^
(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*a^(2/3)*Sqrt[(a^(1/3)*
(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqr
t[a + b*x^3]) + (9*3^(3/4)*b^(4/3)*(A*b + 14*a*B)*(a^(1/3) + b^(1
/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sq
rt[3]])/(56*Sqrt[2]*a^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.782591, antiderivative size = 576, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{9\ 3^{3/4}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(14aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{56\sqrt{2}a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(14aB+Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{27b^{4/3}\sqrt{a+bx^3}(14aB+Ab)}{112a\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)} - \frac{9b\sqrt{a+bx^3}(14aB+Ab)}{112ax} - \frac{\left(a+bx^3\right)^{3/2}(14aB+Ab)}{56ax^4} - \frac{A\left(a+bx^3\right)^{5/2}}{7ax^7}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^8,x]
```

```
[Out] (-9*b*(A*b + 14*a*B)*Sqrt[a + b*x^3])/(112*a*x) + (27*b^(4/3)*(A*
b + 14*a*B)*Sqrt[a + b*x^3])/(112*a*((1 + Sqrt[3])*a^(1/3) + b^(1
```

```
/3)*x)) - ((A*b + 14*a*B)*(a + b*x^3)^(3/2))/(56*a*x^4) - (A*(a +
 b*x^3)^(5/2))/(7*a*x^7) - (27*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(4/3)*
(A*b + 14*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellip
ticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^
(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*a^(2/3)*Sqrt[(a^(1/3)*
(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqr
t[a + b*x^3]) + (9*3^(3/4)*b^(4/3)*(A*b + 14*a*B)*(a^(1/3) + b^(1
/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sq
rt[3]])/(56*Sqrt[2]*a^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 57.5027, size = 510, normalized size = 0.89

$$-\frac{A\left(a+bx^3\right)^{\frac{5}{2}}}{7ax^7}+\frac{27b^{\frac{4}{3}}\sqrt{a+bx^3}\,(Ab+14Ba)}{112a\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}-\frac{9b\sqrt{a+bx^3}\,(Ab+14Ba)}{112ax}-\frac{\left(a+bx^3\right)^{\frac{3}{2}}(Ab+14Ba)}{56ax^4}$$

$$-\frac{27\sqrt[4]{3}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab+14Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{224a^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$+\frac{9\sqrt{2}\cdot 3^{\frac{3}{4}}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab+14Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{112a^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**8,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(7*a*x**7) + 27*b**(4/3)*sqrt(a + b*x**3)*
(A*b + 14*B*a)/(112*a*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) - 9*
b*sqrt(a + b*x**3)*(A*b + 14*B*a)/(112*a*x) - (a + b*x**3)**(3/2)
*(A*b + 14*B*a)/(56*a*x**4) - 27*3**(1/4)*b**(4/3)*sqrt((a**(2/3)
 - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) +
 b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(A*b
+ 14*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)
/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(224*a**
(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3
)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 9*sqrt(2)*3**(3/4)*b**(4
/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/
3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(A*b +
 14*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(112*a**(
2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)
) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.709829, size = 269, normalized size = 0.47

$$\sqrt{a+bx^3}\left(\frac{-14aB-17Ab}{56x^4}-\frac{b(154aB+27Ab)}{112ax}-\frac{aA}{7x^7}\right)$$

$$+\frac{9\sqrt[6]{-1}3^{3/4}b^2\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\,(14aB+Ab)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\mathrm{s}\right.\right.}{112\sqrt[3]{a}(-b)^{2/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^8,x]
```

```
[Out] (-(a*A)/(7*x^7) + (-17*A*b - 14*a*B)/(56*x^4) - (b*(27*A*b + 154*
a*B))/(112*a*x))*Sqrt[a + b*x^3] + (9*(-1)^(1/6)*3^(3/4)*b^2*(A*b
 + 14*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1
+ ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3
]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3
^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/
6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(112*a^(1/
3)*(-b)^(2/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.037, size = 957, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/x^8,x)
```

```
[Out] A*(-1/7*a*(b*x^3+a)^(1/2)/x^7-17/56*b*(b*x^3+a)^(1/2)/x^4-27/112/
a*b^2*(b*x^3+a)^(1/2)/x-9/112*I/a*b^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(
x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/
(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1
/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(
1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^
(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*
(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b
/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-1/4*a*(b*x
^3+a)^(1/2)/x^4-11/8*b*(b*x^3+a)^(1/2)/x-9/8*I*b*3^(1/2)*(-a*b^2)
^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^
2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)
^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^
(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*
3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3
/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^8,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^8, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bbx^6 + (Ba + Ab)x^3 + Aa\right)\sqrt{bx^3 + a}}{x^8}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^8,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/x^8, x
)
```

Sympy [A] time = 13.1644, size = 194, normalized size = 0.34

$$\frac{Aa^{\frac{3}{2}}\Gamma\left(-\frac{7}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{7}{3}, -\frac{1}{2} \\ -\frac{4}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3x^7\Gamma\left(-\frac{4}{3}\right)} + \frac{A\sqrt{a}b\Gamma\left(-\frac{4}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{4}{3}, -\frac{1}{2} \\ -\frac{1}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3x^4\Gamma\left(-\frac{1}{3}\right)} + \frac{Ba^{\frac{3}{2}}\Gamma\left(-\frac{4}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{4}{3}, -\frac{1}{2} \\ -\frac{1}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3x^4\Gamma\left(-\frac{1}{3}\right)} + \frac{B\sqrt{a}b\Gamma\left(-\frac{1}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{2}, -\frac{1}{3} \\ \frac{2}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3x\Gamma\left(\frac{2}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**8,x)
```

```
[Out] A*a**(3/2)*gamma(-7/3)*hyper((-7/3, -1/2), (-4/3,), b*x**3*exp_po
lar(I*pi)/a)/(3*x**7*gamma(-4/3)) + A*sqrt(a)*b*gamma(-4/3)*hyper
((-4/3, -1/2), (-1/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**4*gamma(-
1/3)) + B*a**(3/2)*gamma(-4/3)*hyper((-4/3, -1/2), (-1/3,), b*x**
3*exp_polar(I*pi)/a)/(3*x**4*gamma(-1/3)) + B*sqrt(a)*b*gamma(-1/
3)*hyper((-1/2, -1/3), (2/3,), b*x**3*exp_polar(I*pi)/a)/(3*x*gam
ma(2/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}}}{x^8}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^8,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^8, x)
```

3.212 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{x^{11}}\,dx$

Optimal. Leaf size=608

$$-\frac{9\,3^{3/4}b^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224\sqrt{2}a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{896a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{27b^{7/3}\sqrt{a+bx^3}(Ab-4aB)}{448a^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{27b^2\sqrt{a+bx^3}(Ab-4aB)}{448a^2x}+\frac{\left(a+bx^3\right)^{3/2}(Ab-4aB)}{28ax^7}+\frac{9b\sqrt{a+bx^3}(Ab-4aB)}{224ax^4}-\frac{A\left(a+bx^3\right)^{5/2}}{10ax^{10}}$$

```
[Out] (9*b*(A*b - 4*a*B)*Sqrt[a + b*x^3])/(224*a*x^4) + (27*b^2*(A*b -
4*a*B)*Sqrt[a + b*x^3])/(448*a^2*x) - (27*b^(7/3)*(A*b - 4*a*B)*S
qrt[a + b*x^3])/(448*a^2*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (
(A*b - 4*a*B)*(a + b*x^3)^(3/2))/(28*a*x^7) - (A*(a + b*x^3)^(5/2
))/(10*a*x^10) + (27*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(7/3)*(A*b - 4*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(896*a^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) +
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3
]) - (9*3^(3/4)*b^(7/3)*(A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[
(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3
) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/
3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224
*Sqrt[2]*a^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.937299, antiderivative size = 608, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$-\frac{9\,3^{3/4}b^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224\sqrt{2}a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{27\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{7/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{896a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{27b^{7/3}\sqrt{a+bx^3}(Ab-4aB)}{448a^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{27b^2\sqrt{a+bx^3}(Ab-4aB)}{448a^2x}+\frac{\left(a+bx^3\right)^{3/2}(Ab-4aB)}{28ax^7}+\frac{9b\sqrt{a+bx^3}(Ab-4aB)}{224ax^4}-\frac{A\left(a+bx^3\right)^{5/2}}{10ax^{10}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/x^11,x]
```

```
[Out] (9*b*(A*b - 4*a*B)*Sqrt[a + b*x^3])/(224*a*x^4) + (27*b^2*(A*b -
4*a*B)*Sqrt[a + b*x^3])/(448*a^2*x) - (27*b^(7/3)*(A*b - 4*a*B)*S
qrt[a + b*x^3])/(448*a^2*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (
(A*b - 4*a*B)*(a + b*x^3)^(3/2))/(28*a*x^7) - (A*(a + b*x^3)^(5/2
))/(10*a*x^10) + (27*3^(1/4)*Sqrt[2 - Sqrt[3]]*b^(7/3)*(A*b - 4*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(896*a^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) +
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3
]) - (9*3^(3/4)*b^(7/3)*(A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[
(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3
) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/
3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224
*Sqrt[2]*a^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 70.7057, size = 544, normalized size = 0.89

$$-\frac{A\left(a+bx^3\right)^{\frac{5}{2}}}{10ax^{10}}+\frac{9b\sqrt{a+bx^3}\,(Ab-4Ba)}{224ax^4}+\frac{\left(a+bx^3\right)^{\frac{3}{2}}(Ab-4Ba)}{28ax^7}-\frac{27b^{\frac{7}{3}}\sqrt{a+bx^3}\,(Ab-4Ba)}{448a^2\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{27b^2\sqrt{a+bx^3}\,(Ab-4Ba)}{448a^2x}+\frac{27\sqrt[4]{3}b^{\frac{7}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab-4Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{896a^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{9\sqrt{2}\cdot 3^{\frac{3}{4}}b^{\frac{7}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab-4Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{448a^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**11,x)
```

```
[Out] -A*(a + b*x**3)**(5/2)/(10*a*x**10) + 9*b*sqrt(a + b*x**3)*(A*b -
 4*B*a)/(224*a*x**4) + (a + b*x**3)**(3/2)*(A*b - 4*B*a)/(28*a*x*
*7) - 27*b**(7/3)*sqrt(a + b*x**3)*(A*b - 4*B*a)/(448*a**2*(a**(1
/3)*(1 + sqrt(3)) + b**(1/3)*x)) + 27*b**2*sqrt(a + b*x**3)*(A*b
- 4*B*a)/(448*a**2*x) + 27*3**(1/4)*b**(7/3)*sqrt((a**(2/3) - a**
(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1
/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(A*b - 4*B*
a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1
/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(896*a**(5/3)*s
qrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b*
*(1/3)*x)**2)*sqrt(a + b*x**3)) - 9*sqrt(2)*3**(3/4)*b**(7/3)*sqr
t((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 +
 sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(A*b - 4*B*a)
*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(448*a**(5/3)*sqr
t(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(
1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.91284, size = 282, normalized size = 0.46

$$-\frac{\sqrt{a+bx^3}\left(224a^3A+16a^2x^3(20aB+23Ab)-135b^2x^9(Ab-4aB)+2abx^6(340aB+27Ab)\right)}{2240a^2x^{10}}-\frac{9(-1)^{2/3}3^{3/4}(-b)^{7/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(Ab-4aB)\left((-1)^{5/6}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right.\right.}{448a^{4/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/x^11,x]
```

```
[Out] -(Sqrt[a + b*x^3]*(224*a^3*A + 16*a^2*(23*A*b + 20*a*B)*x^3 + 2*a
*b*(27*A*b + 340*a*B)*x^6 - 135*b^2*(A*b - 4*a*B)*x^9))/(2240*a^2
*x^10) - (9*(-1)^(2/3)*3^(3/4)*(-b)^(7/3)*(A*b - 4*a*B)*Sqrt[(-1)
^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(
1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(Sqrt[3]*EllipticE[ArcSin[Sqrt[-
(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-
1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(
1/3)]/3^(1/4)], (-1)^(1/3)]))/(448*a^(4/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.038, size = 1002, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^3+a)^(3/2)*(B*x^3+A)/x^11,x)
```

```
[Out] A*(-1/10*a*(b*x^3+a)^(1/2)/x^10-23/140*b*(b*x^3+a)^(1/2)/x^7-27/1
120/a*b^2*(b*x^3+a)^(1/2)/x^4+27/448/a^2*b^3*(b*x^3+a)^(1/2)/x+9/
448*I*b^3/a^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((
x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-
3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/
3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(
-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b
*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(
I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3)))^(1/2))))+B*(-1/7*a*(b*x^3+a)^(1/2)/x^7-17/56*b*
(b*x^3+a)^(1/2)/x^4-27/112/a*b^2*(b*x^3+a)^(1/2)/x-9/112*I/a*b^2*
3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)
^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(
1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*
3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(
x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/
(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3
)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-
a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{(Bx^3+A)\left(bx^3+a\right)^{\frac{3}{2}}}{x^{11}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^11,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^11, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bbx^6 + (Ba + Ab)x^3 + Aa\right)\sqrt{bx^3 + a}}{x^{11}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^11,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/x^11,
x)
```

Sympy [A] time = 20.2111, size = 199, normalized size = 0.33

$$\frac{Aa^{\frac{3}{2}}\Gamma\left(-\frac{10}{3}\right){}_2F_1\left(\begin{matrix} -\frac{10}{3}, -\frac{1}{2} \\ -\frac{7}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^{10}\Gamma\left(-\frac{7}{3}\right)} + \frac{A\sqrt{a}b\Gamma\left(-\frac{7}{3}\right){}_2F_1\left(\begin{matrix} -\frac{7}{3}, -\frac{1}{2} \\ -\frac{4}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^{7}\Gamma\left(-\frac{4}{3}\right)} + \frac{Ba^{\frac{3}{2}}\Gamma\left(-\frac{7}{3}\right){}_2F_1\left(\begin{matrix} -\frac{7}{3}, -\frac{1}{2} \\ -\frac{4}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^{7}\Gamma\left(-\frac{4}{3}\right)} + \frac{B\sqrt{a}b\Gamma\left(-\frac{4}{3}\right){}_2F_1\left(\begin{matrix} -\frac{4}{3}, -\frac{1}{2} \\ -\frac{1}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3x^{4}\Gamma\left(-\frac{1}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/x**11,x)
```

```
[Out] A*a**(3/2)*gamma(-10/3)*hyper((-10/3, -1/2), (-7/3,), b*x**3*exp_
polar(I*pi)/a)/(3*x**10*gamma(-7/3)) + A*sqrt(a)*b*gamma(-7/3)*hy
per((-7/3, -1/2), (-4/3,), b*x**3*exp_polar(I*pi)/a)/(3*x**7*gamm
a(-4/3)) + B*a**(3/2)*gamma(-7/3)*hyper((-7/3, -1/2), (-4/3,), b*
x**3*exp_polar(I*pi)/a)/(3*x**7*gamma(-4/3)) + B*sqrt(a)*b*gamma(
-4/3)*hyper((-4/3, -1/2), (-1/3,), b*x**3*exp_polar(I*pi)/a)/(3*x
**4*gamma(-1/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}}}{x^{11}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^11,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/x^11, x)
```

3.213 $\int \frac{x^8(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=103

$$\frac{2a^2\sqrt{a+bx^3}(Ab-aB)}{3b^4}+\frac{2\left(a+bx^3\right)^{5/2}(Ab-3aB)}{15b^4}-\frac{2a\left(a+bx^3\right)^{3/2}(2Ab-3aB)}{9b^4}+\frac{2B\left(a+bx^3\right)^{7/2}}{21b^4}$$

```
[Out] (2*a^2*(A*b - a*B)*Sqrt[a + b*x^3])/(3*b^4) - (2*a*(2*A*b - 3*a*B
)*(a + b*x^3)^(3/2))/(9*b^4) + (2*(A*b - 3*a*B)*(a + b*x^3)^(5/2)
)/(15*b^4) + (2*B*(a + b*x^3)^(7/2))/(21*b^4)
```

Rubi [A] time = 0.257071, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2a^2\sqrt{a+bx^3}(Ab-aB)}{3b^4}+\frac{2\left(a+bx^3\right)^{5/2}(Ab-3aB)}{15b^4}-\frac{2a\left(a+bx^3\right)^{3/2}(2Ab-3aB)}{9b^4}+\frac{2B\left(a+bx^3\right)^{7/2}}{21b^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*a^2*(A*b - a*B)*Sqrt[a + b*x^3])/(3*b^4) - (2*a*(2*A*b - 3*a*B
)*(a + b*x^3)^(3/2))/(9*b^4) + (2*(A*b - 3*a*B)*(a + b*x^3)^(5/2)
)/(15*b^4) + (2*B*(a + b*x^3)^(7/2))/(21*b^4)
```

Rubi in Sympy [A] time = 22.223, size = 99, normalized size = 0.96

$$\frac{2B\left(a+bx^3\right)^{\frac{7}{2}}}{21b^4}+\frac{2a^2\sqrt{a+bx^3}\,(Ab-Ba)}{3b^4}-\frac{2a\left(a+bx^3\right)^{\frac{3}{2}}(2Ab-3Ba)}{9b^4}+\frac{2\left(a+bx^3\right)^{\frac{5}{2}}(Ab-3Ba)}{15b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(7/2)/(21*b**4) + 2*a**2*sqrt(a + b*x**3)*(A*b
- B*a)/(3*b**4) - 2*a*(a + b*x**3)**(3/2)*(2*A*b - 3*B*a)/(9*b**4
) + 2*(a + b*x**3)**(5/2)*(A*b - 3*B*a)/(15*b**4)
```

Mathematica [A] time = 0.0832205, size = 78, normalized size = 0.76

$$\frac{2\sqrt{a+bx^3}\left(-48a^3B+8a^2b\left(7A+3Bx^3\right)-2ab^2x^3\left(14A+9Bx^3\right)+3b^3x^6\left(7A+5Bx^3\right)\right)}{315b^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*Sqrt[a + b*x^3]*(-48*a^3*B + 8*a^2*b*(7*A + 3*B*x^3) + 3*b^3*x
^6*(7*A + 5*B*x^3) - 2*a*b^2*x^3*(14*A + 9*B*x^3)))/(315*b^4)
```

Maple [A] time = 0.01, size = 77, normalized size = 0.8

$$\frac{30\,Bx^9b^3+42\,Ab^3x^6-36\,Bab^2x^6-56\,Aab^2x^3+48\,Ba^2bx^3+112\,Aa^2b-96\,Ba^3}{315\,b^4}\sqrt{bx^3+a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] 2/315*(b*x^3+a)^(1/2)*(15*B*b^3*x^9+21*A*b^3*x^6-18*B*a*b^2*x^6-2
8*A*a*b^2*x^3+24*B*a^2*b*x^3+56*A*a^2*b-48*B*a^3)/b^4
```

Maxima [A] time = 1.43124, size = 159, normalized size = 1.54

$$\frac{2}{105}\,B\left(\frac{5\,\left(bx^3+a\right)^{\frac{7}{2}}}{b^4}-\frac{21\,\left(bx^3+a\right)^{\frac{5}{2}}a}{b^4}+\frac{35\,\left(bx^3+a\right)^{\frac{3}{2}}a^2}{b^4}-\frac{35\,\sqrt{bx^3+a}a^3}{b^4}\right)+\frac{2}{45}\,A\left(\frac{3\,\left(bx^3+a\right)^{\frac{5}{2}}}{b^3}-\frac{10\,\left(bx^3+a\right)^{\frac{3}{2}}a}{b^3}+\frac{15\,\sqrt{bx^3+a}a^2}{b^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] 2/105*B*(5*(b*x^3 + a)^(7/2)/b^4 - 21*(b*x^3 + a)^(5/2)*a/b^4 + 3
5*(b*x^3 + a)^(3/2)*a^2/b^4 - 35*sqrt(b*x^3 + a)*a^3/b^4) + 2/45*
A*(3*(b*x^3 + a)^(5/2)/b^3 - 10*(b*x^3 + a)^(3/2)*a/b^3 + 15*sqrt
(b*x^3 + a)*a^2/b^3)
```

Fricas [A] time = 0.249319, size = 103, normalized size = 1.

$$\frac{2\,\left(15\,Bb^3x^9-3\,\left(6\,Bab^2-7\,Ab^3\right)x^6-48\,Ba^3+56\,Aa^2b+4\,\left(6\,Ba^2b-7\,Aab^2\right)x^3\right)\sqrt{bx^3+a}}{315\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 2/315*(15*B*b^3*x^9 - 3*(6*B*a*b^2 - 7*A*b^3)*x^6 - 48*B*a^3 + 56
*A*a^2*b + 4*(6*B*a^2*b - 7*A*a*b^2)*x^3)*sqrt(b*x^3 + a)/b^4
```

Sympy [A] time = 10.433, size = 175, normalized size = 1.7

$$\begin{cases}\frac{16Aa^2\sqrt{a+bx^3}}{45b^3}-\frac{8Aax^3\sqrt{a+bx^3}}{45b^2}+\frac{2Ax^6\sqrt{a+bx^3}}{15b}-\frac{32Ba^3\sqrt{a+bx^3}}{105b^4}+\frac{16Ba^2x^3\sqrt{a+bx^3}}{105b^3}-\frac{4Bax^6\sqrt{a+bx^3}}{35b^2}+\frac{2Bx^9\sqrt{a+bx^3}}{21b} & \text{for } b\neq 0\\ \frac{\frac{Ax^9}{9}+\frac{Bx^{12}}{12}}{\sqrt{a}} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] Piecewise((16*A*a**2*sqrt(a + b*x**3)/(45*b**3) - 8*A*a*x**3*sqrt
(a + b*x**3)/(45*b**2) + 2*A*x**6*sqrt(a + b*x**3)/(15*b) - 32*B*
a**3*sqrt(a + b*x**3)/(105*b**4) + 16*B*a**2*x**3*sqrt(a + b*x**3
)/(105*b**3) - 4*B*a*x**6*sqrt(a + b*x**3)/(35*b**2) + 2*B*x**9*s
qrt(a + b*x**3)/(21*b), Ne(b, 0)), ((A*x**9/9 + B*x**12/12)/sqrt(
a), True))
```

GIAC/XCAS [A] time = 0.21427, size = 140, normalized size = 1.36

$$\frac{2\left(15\left(bx^3+a\right)^{\frac{7}{2}}B-63\left(bx^3+a\right)^{\frac{5}{2}}Ba+105\left(bx^3+a\right)^{\frac{3}{2}}Ba^2-105\sqrt{bx^3+a}Ba^3+21\left(bx^3+a\right)^{\frac{5}{2}}Ab-70\left(bx^3+a\right)^{\frac{3}{2}}Aab+10\right.}{315\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 2/315*(15*(b*x^3 + a)^(7/2)*B - 63*(b*x^3 + a)^(5/2)*B*a + 105*(b
*x^3 + a)^(3/2)*B*a^2 - 105*sqrt(b*x^3 + a)*B*a^3 + 21*(b*x^3 + a
)^(5/2)*A*b - 70*(b*x^3 + a)^(3/2)*A*a*b + 105*sqrt(b*x^3 + a)*A*
a^2*b)/b^4
```

3.214 $\int \frac{x^5(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=73

$$\frac{2\left(a+bx^3\right)^{3/2}(Ab-2aB)}{9b^3}-\frac{2a\sqrt{a+bx^3}(Ab-aB)}{3b^3}+\frac{2B\left(a+bx^3\right)^{5/2}}{15b^3}$$

```
[Out] (-2*a*(A*b - a*B)*Sqrt[a + b*x^3])/(3*b^3) + (2*(A*b - 2*a*B)*(a
+ b*x^3)^(3/2))/(9*b^3) + (2*B*(a + b*x^3)^(5/2))/(15*b^3)
```

Rubi [A] time = 0.190431, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{2\left(a+bx^3\right)^{3/2}(Ab-2aB)}{9b^3}-\frac{2a\sqrt{a+bx^3}(Ab-aB)}{3b^3}+\frac{2B\left(a+bx^3\right)^{5/2}}{15b^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (-2*a*(A*b - a*B)*Sqrt[a + b*x^3])/(3*b^3) + (2*(A*b - 2*a*B)*(a
+ b*x^3)^(3/2))/(9*b^3) + (2*B*(a + b*x^3)^(5/2))/(15*b^3)
```

Rubi in Sympy [A] time = 16.6461, size = 68, normalized size = 0.93

$$\frac{2B\left(a+bx^3\right)^{\frac{5}{2}}}{15b^3}-\frac{2a\sqrt{a+bx^3}\,(Ab-Ba)}{3b^3}+\frac{2\left(a+bx^3\right)^{\frac{3}{2}}(Ab-2Ba)}{9b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(5/2)/(15*b**3) - 2*a*sqrt(a + b*x**3)*(A*b - B
*a)/(3*b**3) + 2*(a + b*x**3)**(3/2)*(A*b - 2*B*a)/(9*b**3)
```

Mathematica [A] time = 0.0631038, size = 56, normalized size = 0.77

$$\frac{2\sqrt{a+bx^3}\left(8a^2B-2ab\left(5A+2Bx^3\right)+b^2x^3\left(5A+3Bx^3\right)\right)}{45b^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*Sqrt[a + b*x^3]*(8*a^2*B - 2*a*b*(5*A + 2*B*x^3) + b^2*x^3*(5*
A + 3*B*x^3)))/(45*b^3)
```

Maple [A] time = 0.01, size = 53, normalized size = 0.7

$$-\frac{-6\,b^2Bx^6-10\,Ax^3b^2+8\,Bx^3ab+20\,abA-16\,a^2B}{45\,b^3}\sqrt{bx^3+a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] -2/45*(b*x^3+a)^(1/2)*(-3*B*b^2*x^6-5*A*b^2*x^3+4*B*a*b*x^3+10*A*
a*b-8*B*a^2)/b^3
```

Maxima [A] time = 1.40538, size = 112, normalized size = 1.53

$$\frac{2}{45}\,B\left(\frac{3\,\left(bx^3+a\right)^{\frac{5}{2}}}{b^3}-\frac{10\,\left(bx^3+a\right)^{\frac{3}{2}}a}{b^3}+\frac{15\,\sqrt{bx^3+a}a^2}{b^3}\right)+\frac{2}{9}\,A\left(\frac{\left(bx^3+a\right)^{\frac{3}{2}}}{b^2}-\frac{3\,\sqrt{bx^3+a}a}{b^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] 2/45*B*(3*(b*x^3 + a)^(5/2)/b^3 - 10*(b*x^3 + a)^(3/2)*a/b^3 + 15
*sqrt(b*x^3 + a)*a^2/b^3) + 2/9*A*((b*x^3 + a)^(3/2)/b^2 - 3*sqrt
(b*x^3 + a)*a/b^2)
```

Fricas [A] time = 0.239409, size = 70, normalized size = 0.96

$$\frac{2\,\left(3\,Bb^2x^6-\left(4\,Bab-5\,Ab^2\right)x^3+8\,Ba^2-10\,Aab\right)\sqrt{bx^3+a}}{45\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] 2/45*(3*B*b^2*x^6 - (4*B*a*b - 5*A*b^2)*x^3 + 8*B*a^2 - 10*A*a*b)
*sqrt(b*x^3 + a)/b^3
```

Sympy [A] time = 5.09375, size = 124, normalized size = 1.7

$$\begin{cases} -\frac{4Aa\sqrt{a+bx^3}}{9b^2}+\frac{2Ax^3\sqrt{a+bx^3}}{9b}+\frac{16Ba^2\sqrt{a+bx^3}}{45b^3}-\frac{8Bax^3\sqrt{a+bx^3}}{45b^2}+\frac{2Bx^6\sqrt{a+bx^3}}{15b} & \text{for } b\neq 0\\ \frac{\frac{Ax^6}{6}+\frac{Bx^9}{9}}{\sqrt{a}} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] Piecewise((-4*A*a*sqrt(a + b*x**3)/(9*b**2) + 2*A*x**3*sqrt(a + b
*x**3)/(9*b) + 16*B*a**2*sqrt(a + b*x**3)/(45*b**3) - 8*B*a*x**3*
sqrt(a + b*x**3)/(45*b**2) + 2*B*x**6*sqrt(a + b*x**3)/(15*b), Ne
(b, 0)), ((A*x**6/6 + B*x**9/9)/sqrt(a), True))
```

GIAC/XCAS [A] time = 0.213418, size = 99, normalized size = 1.36

$$\frac{2\,\left(3\,\left(bx^3+a\right)^{\frac{5}{2}}B-10\,\left(bx^3+a\right)^{\frac{3}{2}}Ba+15\,\sqrt{bx^3+a}Ba^2+5\,\left(bx^3+a\right)^{\frac{3}{2}}Ab-15\,\sqrt{bx^3+a}Aab\right)}{45\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 2/45*(3*(b*x^3 + a)^(5/2)*B - 10*(b*x^3 + a)^(3/2)*B*a + 15*sqrt(
b*x^3 + a)*B*a^2 + 5*(b*x^3 + a)^(3/2)*A*b - 15*sqrt(b*x^3 + a)*A
*a*b)/b^3
```

3.215 $\int \frac{x^2(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=46

$$\frac{2\sqrt{a+bx^3}(Ab-aB)}{3b^2}+\frac{2B\left(a+bx^3\right)^{3/2}}{9b^2}$$

```
[Out] (2*(A*b - a*B)*Sqrt[a + b*x^3])/(3*b^2) + (2*B*(a + b*x^3)^(3/2))
/(9*b^2)
```

Rubi [A] time = 0.132885, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2\sqrt{a+bx^3}(Ab-aB)}{3b^2}+\frac{2B\left(a+bx^3\right)^{3/2}}{9b^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*(A*b - a*B)*Sqrt[a + b*x^3])/(3*b^2) + (2*B*(a + b*x^3)^(3/2))
/(9*b^2)
```

Rubi in Sympy [A] time = 12.175, size = 41, normalized size = 0.89

$$\frac{2B\left(a+bx^3\right)^{\frac{3}{2}}}{9b^2}+\frac{2\sqrt{a+bx^3}\,(Ab-Ba)}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**2*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(3/2)/(9*b**2) + 2*sqrt(a + b*x**3)*(A*b - B*a)
/(3*b**2)
```

Mathematica [A] time = 0.0299018, size = 33, normalized size = 0.72

$$\frac{2\sqrt{a+bx^3}\left(-2aB+3Ab+bBx^3\right)}{9b^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*Sqrt[a + b*x^3]*(3*A*b - 2*a*B + b*B*x^3))/(9*b^2)
```

Maple [A] time = 0.009, size = 30, normalized size = 0.7

$$\frac{2\,bBx^3+6\,Ab-4\,Ba}{9\,b^2}\sqrt{bx^3+a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2*(B*x^3+A)/(b*x^3+a)^(1/2),x)

[Out] 2/9*(b*x^3+a)^(1/2)*(B*b*x^3+3*A*b-2*B*a)/b^2
```

Maxima [A] time = 1.37796, size = 65, normalized size = 1.41

$$\frac{2}{9}\,B\left(\frac{\left(bx^3+a\right)^{\frac{3}{2}}}{b^2}-\frac{3\,\sqrt{bx^3+a}a}{b^2}\right)+\frac{2\,\sqrt{bx^3+a}A}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x^2/sqrt(b*x^3 + a),x, algorithm="maxima")

[Out] 2/9*B*((b*x^3 + a)^(3/2)/b^2 - 3*sqrt(b*x^3 + a)*a/b^2) + 2/3*sqr
t(b*x^3 + a)*A/b
```

Fricas [A] time = 0.248998, size = 39, normalized size = 0.85

$$\frac{2\,\left(Bbx^3-2\,Ba+3\,Ab\right)\sqrt{bx^3+a}}{9\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x^2/sqrt(b*x^3 + a),x, algorithm="fricas")

[Out] 2/9*(B*b*x^3 - 2*B*a + 3*A*b)*sqrt(b*x^3 + a)/b^2
```

Sympy [A] time = 2.64358, size = 75, normalized size = 1.63

$$\begin{cases} \frac{2A\sqrt{a+bx^3}}{3b}-\frac{4Ba\sqrt{a+bx^3}}{9b^2}+\frac{2Bx^3\sqrt{a+bx^3}}{9b} & \text{for } b\neq 0 \\ \frac{\frac{Ax^3}{3}+\frac{Bx^6}{6}}{\sqrt{a}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**2*(B*x**3+A)/(b*x**3+a)**(1/2),x)

[Out] Piecewise((2*A*sqrt(a + b*x**3)/(3*b) - 4*B*a*sqrt(a + b*x**3)/(9
*b**2) + 2*B*x**3*sqrt(a + b*x**3)/(9*b), Ne(b, 0)), ((A*x**3/3 +
 B*x**6/6)/sqrt(a), True))
```

GIAC/XCAS [A] time = 0.211573, size = 58, normalized size = 1.26

$$\frac{2\,\left(\left(bx^3+a\right)^{\frac{3}{2}}B-3\,\sqrt{bx^3+a}aBa+3\,\sqrt{bx^3+a}aAb\right)}{9\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x^2/sqrt(b*x^3 + a),x, algorithm="giac")

[Out] 2/9*((b*x^3 + a)^(3/2)*B - 3*sqrt(b*x^3 + a)*B*a + 3*sqrt(b*x^3 +
 a)*A*b)/b^2
```

3.216 $\int \frac{A+Bx^3}{x\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=48

$$\frac{2B\sqrt{a+bx^3}}{3b}-\frac{2A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3\sqrt{a}}$$

```
[Out] (2*B*Sqrt[a + b*x^3])/(3*b) - (2*A*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a
]])/(3*Sqrt[a])
```

Rubi [A] time = 0.122553, antiderivative size = 48, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{2B\sqrt{a+bx^3}}{3b}-\frac{2A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3\sqrt{a}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x*Sqrt[a + b*x^3]),x]
```

```
[Out] (2*B*Sqrt[a + b*x^3])/(3*b) - (2*A*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a
]])/(3*Sqrt[a])
```

Rubi in Sympy [A] time = 10.174, size = 42, normalized size = 0.88

$$-\frac{2A\,\mathrm{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3\sqrt{a}}+\frac{2B\sqrt{a+bx^3}}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x/(b*x**3+a)**(1/2),x)
```

```
[Out] -2*A*atanh(sqrt(a + b*x**3)/sqrt(a))/(3*sqrt(a)) + 2*B*sqrt(a + b
*x**3)/(3*b)
```

Mathematica [A] time = 0.12216, size = 61, normalized size = 1.27

$$\frac{2\left(B\left(a+bx^3\right)-Ab\sqrt{\frac{bx^3}{a}+1}\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)\right)}{3b\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x*Sqrt[a + b*x^3]),x]
```

```
[Out] (2*(B*(a + b*x^3) - A*b*Sqrt[1 + (b*x^3)/a]*ArcTanh[Sqrt[1 + (b*x
^3)/a]]))/(3*b*Sqrt[a + b*x^3])
```

Maple [A] time = 0.011, size = 37, normalized size = 0.8

$$-\frac{2A}{3}\mathit{Artanh}\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)\frac{1}{\sqrt{a}}+\frac{2B}{3b}\sqrt{bx^3+a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x/(b*x^3+a)^(1/2),x)
```

```
[Out] -2/3*A*arctanh((b*x^3+a)^(1/2)/a^(1/2))/a^(1/2)+2/3*B*(b*x^3+a)^(
1/2)/b
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.265625, size = 1, normalized size = 0.02

$$\left[\frac{Ab\log\left(\frac{(bx^3+2a)\sqrt{a}-2\sqrt{bx^3+a}a}{x^3}\right)+2\sqrt{bx^3+a}B\sqrt{a}}{3\sqrt{a}b}, \frac{2\left(Ab\arctan\left(\frac{a}{\sqrt{bx^3+a}\sqrt{-a}}\right)+\sqrt{bx^3+a}B\sqrt{-a}\right)}{3\sqrt{-a}b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x),x, algorithm="fricas")
```

```
[Out] [1/3*(A*b*log(((b*x^3 + 2*a)*sqrt(a) - 2*sqrt(b*x^3 + a)*a)/x^3)
+ 2*sqrt(b*x^3 + a)*B*sqrt(a))/(sqrt(a)*b), 2/3*(A*b*arctan(a/(sq
rt(b*x^3 + a)*sqrt(-a))) + sqrt(b*x^3 + a)*B*sqrt(-a))/(sqrt(-a)*
b)]
```

Sympy [A] time = 7.97656, size = 143, normalized size = 2.98

$$\frac{2A\left(\begin{cases}\frac{\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{a}}\sqrt{a+bx^3}}\right)}{a\sqrt{-\frac{1}{a}}} & \text{for } -\frac{1}{a}>0\\ -\frac{\operatorname{acoth}\left(\frac{1}{\sqrt{a+bx^3}\sqrt{\frac{1}{a}}}\right)}{a\sqrt{\frac{1}{a}}} & \text{for } -\frac{1}{a}<0\wedge\frac{1}{a}<\frac{1}{a+bx^3}\\ -\frac{\operatorname{atanh}\left(\frac{1}{\sqrt{a+bx^3}\sqrt{\frac{1}{a}}}\right)}{a\sqrt{\frac{1}{a}}} & \text{for } \frac{1}{a}>\frac{1}{a+bx^3}\wedge-\frac{1}{a}<0\end{cases}\right)}{3}+\frac{2B\sqrt{a+bx^3}}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*A*Piecewise((atan(1/(sqrt(-1/a)*sqrt(a + b*x**3)))/(a*sqrt(-1/a
)), -1/a > 0), (-acoth(1/(sqrt(a + b*x**3)*sqrt(1/a)))/(a*sqrt(1/
a)), (-1/a < 0) & (1/a < 1/(a + b*x**3))), (-atanh(1/(sqrt(a + b*
x**3)*sqrt(1/a)))/(a*sqrt(1/a)), (-1/a < 0) & (1/a > 1/(a + b*x**
3))))/3 + 2*B*sqrt(a + b*x**3)/(3*b)
```

GIAC/XCAS [A] time = 0.217321, size = 54, normalized size = 1.12

$$\frac{2\,A\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{3\,\sqrt{-a}}+\frac{2\,\sqrt{bx^3+a}B}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x),x, algorithm="giac")
```

```
[Out] 2/3*A*arctan(sqrt(b*x^3 + a)/sqrt(-a))/sqrt(-a) + 2/3*sqrt(b*x^3
+ a)*B/b
```

3.217 $\int \frac{A+Bx^3}{x^4\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=58

$$\frac{(Ab-2aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{3/2}}-\frac{A\sqrt{a+bx^3}}{3ax^3}$$

```
[Out] -(A*Sqrt[a + b*x^3])/(3*a*x^3) + ((A*b - 2*a*B)*ArcTanh[Sqrt[a +
b*x^3]/Sqrt[a]])/(3*a^(3/2))
```

Rubi [A] time = 0.158416, antiderivative size = 58, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{(Ab-2aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{3/2}}-\frac{A\sqrt{a+bx^3}}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^4*Sqrt[a + b*x^3]),x]
```

```
[Out] -(A*Sqrt[a + b*x^3])/(3*a*x^3) + ((A*b - 2*a*B)*ArcTanh[Sqrt[a +
b*x^3]/Sqrt[a]])/(3*a^(3/2))
```

Rubi in Sympy [A] time = 11.3931, size = 51, normalized size = 0.88

$$-\frac{A\sqrt{a+bx^3}}{3ax^3}+\frac{2\left(\frac{Ab}{2}-Ba\right)\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**4/(b*x**3+a)**(1/2),x)
```

```
[Out] -A*sqrt(a + b*x**3)/(3*a*x**3) + 2*(A*b/2 - B*a)*atanh(sqrt(a + b
*x**3)/sqrt(a))/(3*a**(3/2))
```

Mathematica [A] time = 0.240244, size = 64, normalized size = 1.1

$$\frac{\sqrt{a+bx^3}\left(\frac{(Ab-2aB)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{\sqrt{\frac{bx^3}{a}+1}}-\frac{aA}{x^3}\right)}{3a^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^4*Sqrt[a + b*x^3]),x]
```

```
[Out] (Sqrt[a + b*x^3]*(-((a*A)/x^3) + ((A*b - 2*a*B)*ArcTanh[Sqrt[1 +
(b*x^3)/a]])/Sqrt[1 + (b*x^3)/a]))/(3*a^2)
```

Maple [A] time = 0.012, size = 62, normalized size = 1.1

$$A\left(-\frac{1}{3\,ax^3}\sqrt{bx^3+a}+\frac{b}{3}Artanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{3}{2}}\right)-\frac{2\,B}{3}Artanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)\frac{1}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^4/(b*x^3+a)^(1/2),x)
```

```
[Out] A*(-1/3/a*(b*x^3+a)^(1/2)/x^3+1/3*b/a^(3/2)*arctanh((b*x^3+a)^(1/
2)/a^(1/2)))-2/3*B*arctanh((b*x^3+a)^(1/2)/a^(1/2))/a^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^4),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.25743, size = 1, normalized size = 0.02

$$\left[-\frac{(2\,Ba-Ab)x^3\log\left(\frac{(bx^3+2\,a)\sqrt{a}+2\,\sqrt{bx^3+a}a}{x^3}\right)+2\,\sqrt{bx^3+a}A\sqrt{a}}{6\,a^{\frac{3}{2}}x^3},\ \frac{(2\,Ba-Ab)x^3\arctan\left(\frac{a}{\sqrt{bx^3+a}\sqrt{-a}}\right)-\sqrt{bx^3+a}A\sqrt{-a}}{3\,\sqrt{-a}ax^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/6*((2*B*a - A*b)*x^3*log(((b*x^3 + 2*a)*sqrt(a) + 2*sqrt(b*x^
3 + a)*a)/x^3) + 2*sqrt(b*x^3 + a)*A*sqrt(a))/(a^(3/2)*x^3), 1/3*
((2*B*a - A*b)*x^3*arctan(a/(sqrt(b*x^3 + a)*sqrt(-a))) - sqrt(b*
x^3 + a)*A*sqrt(-a))/(sqrt(-a)*a*x^3)]
```

Sympy [A] time = 23.8201, size = 80, normalized size = 1.38

$$-\frac{A\sqrt{b}\sqrt{\frac{a}{bx^3}+1}}{3ax^{\frac{3}{2}}}+\frac{Ab\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{3a^{\frac{3}{2}}}-\frac{2B\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{3\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**4/(b*x**3+a)**(1/2),x)
```

```
[Out] -A*sqrt(b)*sqrt(a/(b*x**3) + 1)/(3*a*x**(3/2)) + A*b*asinh(sqrt(a
)/(sqrt(b)*x**(3/2)))/(3*a**(3/2)) - 2*B*asinh(sqrt(a)/(sqrt(b)*x
**(3/2)))/(3*sqrt(a))
```

GIAC/XCAS [A] time = 0.219299, size = 84, normalized size = 1.45

$$\frac{\frac{(2\,Bab-Ab^2)\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{\sqrt{-a}a}-\frac{\sqrt{bx^3+a}Ab}{ax^3}}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*((2*B*a*b - A*b^2)*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sqrt(-a)
*a) - sqrt(b*x^3 + a)*A*b/(a*x^3))/b
```

3.218 $\int \frac{A+Bx^3}{x^7\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=90

$$-\frac{b(3Ab-4aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{12a^{5/2}}+\frac{\sqrt{a+bx^3}(3Ab-4aB)}{12a^2x^3}-\frac{A\sqrt{a+bx^3}}{6ax^6}$$

```
[Out] -(A*Sqrt[a + b*x^3])/(6*a*x^6) + ((3*A*b - 4*a*B)*Sqrt[a + b*x^3]
)/(12*a^2*x^3) - (b*(3*A*b - 4*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[
a]])/(12*a^(5/2))
```

Rubi [A] time = 0.216429, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$-\frac{b(3Ab-4aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{12a^{5/2}}+\frac{\sqrt{a+bx^3}(3Ab-4aB)}{12a^2x^3}-\frac{A\sqrt{a+bx^3}}{6ax^6}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^7*Sqrt[a + b*x^3]),x]
```

```
[Out] -(A*Sqrt[a + b*x^3])/(6*a*x^6) + ((3*A*b - 4*a*B)*Sqrt[a + b*x^3]
)/(12*a^2*x^3) - (b*(3*A*b - 4*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[
a]])/(12*a^(5/2))
```

Rubi in Sympy [A] time = 14.5486, size = 82, normalized size = 0.91

$$-\frac{A\sqrt{a+bx^3}}{6ax^6}+\frac{\sqrt{a+bx^3}\,(3Ab-4Ba)}{12a^2x^3}-\frac{b\,(3Ab-4Ba)\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{12a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**7/(b*x**3+a)**(1/2),x)
```

```
[Out] -A*sqrt(a + b*x**3)/(6*a*x**6) + sqrt(a + b*x**3)*(3*A*b - 4*B*a)
/(12*a**2*x**3) - b*(3*A*b - 4*B*a)*atanh(sqrt(a + b*x**3)/sqrt(a
))/(12*a**(5/2))
```

Mathematica [A] time = 0.170723, size = 101, normalized size = 1.12

$$\frac{b\sqrt{a+bx^3}(4aB-3Ab)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{12a^3\sqrt{\frac{bx^3}{a}+1}}+\sqrt{a+bx^3}\left(\frac{3Ab-4aB}{12a^2x^3}-\frac{A}{6ax^6}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^7*Sqrt[a + b*x^3]),x]
```

```
[Out] (-A/(6*a*x^6) + (3*A*b - 4*a*B)/(12*a^2*x^3))*Sqrt[a + b*x^3] + (
b*(-3*A*b + 4*a*B)*Sqrt[a + b*x^3]*ArcTanh[Sqrt[1 + (b*x^3)/a]])/
(12*a^3*Sqrt[1 + (b*x^3)/a])
```

Maple [A] time = 0.012, size = 102, normalized size = 1.1

$$A\left(-\frac{1}{6\,a x^{6}}\sqrt{b x^{3}+a}+\frac{b}{4\,a^{2} x^{3}}\sqrt{b x^{3}+a}-\frac{b^{2}}{4}\mathit{Artanh}\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{5}{2}}\right)+B\left(-\frac{1}{3\,a x^{3}}\sqrt{b x^{3}+a}+\frac{b}{3}\mathit{Artanh}\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{3}{2}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^7/(b*x^3+a)^(1/2),x)
```

```
[Out] A*(-1/6/a*(b*x^3+a)^(1/2)/x^6+1/4*b/a^2*(b*x^3+a)^(1/2)/x^3-1/4/a
^(5/2)*b^2*arctanh((b*x^3+a)^(1/2)/a^(1/2)))+B*(-1/3/a*(b*x^3+a)^
(1/2)/x^3+1/3*b/a^(3/2)*arctanh((b*x^3+a)^(1/2)/a^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^7),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.274893, size = 1, normalized size = 0.01

$$\left[-\frac{\left(4\,Bab-3\,Ab^{2}\right)x^{6}\log\left(\frac{\left(bx^{3}+2\,a\right)\sqrt{a}-2\,\sqrt{bx^{3}+a}a}{x^{3}}\right)+2\,\left(\left(4\,Ba-3\,Ab\right)x^{3}+2\,Aa\right)\sqrt{bx^{3}+a}\sqrt{a}}{24\,a^{\frac{5}{2}}x^{6}},\ -\frac{\left(4\,Bab-3\,Ab^{2}\right)x^{6}\arctan\left(\frac{a}{\sqrt{bx^{3}+a}\sqrt{-a}}\right)+\left(\left(4\,Ba-3\,Ab\right)x^{3}+2\,Aa\right)\sqrt{bx^{3}+a}\sqrt{-a}}{12\,\sqrt{-a}a^{2}x^{6}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^7),x, algorithm="fricas")
```

```
[Out] [-1/24*((4*B*a*b - 3*A*b^2)*x^6*log(((b*x^3 + 2*a)*sqrt(a) - 2*sq
rt(b*x^3 + a)*a)/x^3) + 2*((4*B*a - 3*A*b)*x^3 + 2*A*a)*sqrt(b*x^
3 + a)*sqrt(a))/(a^(5/2)*x^6), -1/12*((4*B*a*b - 3*A*b^2)*x^6*arc
tan(a/(sqrt(b*x^3 + a)*sqrt(-a))) + ((4*B*a - 3*A*b)*x^3 + 2*A*a)
*sqrt(b*x^3 + a)*sqrt(-a))/(sqrt(-a)*a^2*x^6)]
```

Sympy [A] time = 50.3168, size = 163, normalized size = 1.81

$$-\frac{A}{6\sqrt{b}x^{\frac{15}{2}}\sqrt{\frac{a}{bx^{3}}+1}}+\frac{A\sqrt{b}}{12ax^{\frac{9}{2}}\sqrt{\frac{a}{bx^{3}}+1}}+\frac{Ab^{\frac{3}{2}}}{4a^{2}x^{\frac{3}{2}}\sqrt{\frac{a}{bx^{3}}+1}}-\frac{Ab^{2}\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{4a^{\frac{5}{2}}}-\frac{B\sqrt{b}\sqrt{\frac{a}{bx^{3}}+1}}{3ax^{\frac{3}{2}}}+\frac{Bb\operatorname{asinh}\left(\frac{\sqrt{a}}{\sqrt{b}x^{\frac{3}{2}}}\right)}{3a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**7/(b*x**3+a)**(1/2),x)
```

```
[Out] -A/(6*sqrt(b)*x**(15/2)*sqrt(a/(b*x**3) + 1)) + A*sqrt(b)/(12*a*x
**(9/2)*sqrt(a/(b*x**3) + 1)) + A*b**(3/2)/(4*a**2*x**(3/2)*sqrt(
a/(b*x**3) + 1)) - A*b**2*asinh(sqrt(a)/(sqrt(b)*x**(3/2)))/(4*a*
*(5/2)) - B*sqrt(b)*sqrt(a/(b*x**3) + 1)/(3*a*x**(3/2)) + B*b*asi
nh(sqrt(a)/(sqrt(b)*x**(3/2)))/(3*a**(3/2))
```

GIAC/XCAS [A] time = 0.219377, size = 163, normalized size = 1.81

$$-\frac{\frac{\left(4\,Bab^2-3\,Ab^3\right)\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{\sqrt{-a}a^2}+\frac{4\,\left(bx^3+a\right)^{\frac{3}{2}}Bab^2-4\,\sqrt{bx^3+a}Ba^2b^2-3\,\left(bx^3+a\right)^{\frac{3}{2}}Ab^3+5\,\sqrt{bx^3+a}Aab^3}{a^2b^2x^6}}{12\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^7),x, algorithm="giac")
```

```
[Out] -1/12*((4*B*a*b^2 - 3*A*b^3)*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sq
rt(-a)*a^2) + (4*(b*x^3 + a)^(3/2)*B*a*b^2 - 4*sqrt(b*x^3 + a)*B*
a^2*b^2 - 3*(b*x^3 + a)^(3/2)*A*b^3 + 5*sqrt(b*x^3 + a)*A*a*b^3)/
(a^2*b^2*x^6))/b
```

3.219 $\int \frac{x^3(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=270

$$-\frac{4\sqrt{2+\sqrt{3}}a\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{55\sqrt[4]{3}b^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x\sqrt{a+bx^3}(11Ab-8aB)}{55b^2}+\frac{2Bx^4\sqrt{a+bx^3}}{11b}$$

```
[Out] (2*(11*A*b - 8*a*B)*x*Sqrt[a + b*x^3])/(55*b^2) + (2*B*x^4*Sqrt[a
 + b*x^3])/(11*b) - (4*Sqrt[2 + Sqrt[3]]*a*(11*A*b - 8*a*B)*(a^(1
/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)
/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sq
rt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
 -7 - 4*Sqrt[3]])/(55*3^(1/4)*b^(7/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^
(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.327228, antiderivative size = 270, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$-\frac{4\sqrt{2+\sqrt{3}}a\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{55\sqrt[4]{3}b^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x\sqrt{a+bx^3}(11Ab-8aB)}{55b^2}+\frac{2Bx^4\sqrt{a+bx^3}}{11b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*(11*A*b - 8*a*B)*x*Sqrt[a + b*x^3])/(55*b^2) + (2*B*x^4*Sqrt[a
 + b*x^3])/(11*b) - (4*Sqrt[2 + Sqrt[3]]*a*(11*A*b - 8*a*B)*(a^(1
/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)
/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sq
rt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)],
 -7 - 4*Sqrt[3]])/(55*3^(1/4)*b^(7/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^
(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 20.7881, size = 245, normalized size = 0.91

$$\frac{2Bx^4\sqrt{a+bx^3}}{11b}-\frac{4\cdot 3^{\frac{3}{4}}a\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-8Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{165b^{\frac{7}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x\sqrt{a+bx^3}(11Ab-8Ba)}{55b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**3*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*x**4*sqrt(a + b*x**3)/(11*b) - 4*3**(3/4)*a*sqrt((a**(2/3) -
a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b*
*(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(11*A*b -
 8*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(
a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(165*b**(7
/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3))
 + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 2*x*sqrt(a + b*x**3)*(11*A
*b - 8*B*a)/(55*b**2)
```

Mathematica [C]   time = 0.689661, size = 189, normalized size = 0.7

$$\frac{6\sqrt[3]{-b}x\left(a+bx^3\right)\left(-8aB+11Ab+5bBx^3\right)-4i3^{3/4}a^{4/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(11Ab-8aB)F\left(\sin^{-1}\left(\right.\right.}{165(-b)^{7/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[(x^3*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (6*(-b)^(1/3)*x*(a + b*x^3)*(11*A*b - 8*a*B + 5*b*B*x^3) - (4*I)*
3^(3/4)*a^(4/3)*(11*A*b - 8*a*B)*Sqrt[((-1)^(5/6)*(-a^(1/3) + (-b
)^(1/3)*x))/a^(1/3)]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3
)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)
*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/(165*(-b)^(7/3)*Sqrt[a + b*x^
3])
```

Maple [B]   time = 0.01, size = 624, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^3*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] A*(2/5/b*x*(b*x^3+a)^(1/2)+4/15*I*a/b^2*3^(1/2)*(-a*b^2)^(1/3)*(I
*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*
b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)
^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^
(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(2/11/b*x^4*(b*x^3+a)^(1/2)-16
/55*a/b^2*x*(b*x^3+a)^(1/2)-32/165*I*a^2/b^3*3^(1/2)*(-a*b^2)^(1/
3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(
1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(
1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a
*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1
/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2
*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^3}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^3/sqrt(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^6 + Ax^3}{\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*x^6 + A*x^3)/sqrt(b*x^3 + a), x)
```

Sympy [A] time = 5.4758, size = 80, normalized size = 0.3

$$\frac{Ax^4\Gamma\left(\frac{4}{3}\right){}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{4}{3}\\ \frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{7}{3}\right)} + \frac{Bx^7\Gamma\left(\frac{7}{3}\right){}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{7}{3}\\ \frac{10}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{10}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] A*x**4*gamma(4/3)*hyper((1/2, 4/3), (7/3,), b*x**3*exp_polar(I*pi
)/a)/(3*sqrt(a)*gamma(7/3)) + B*x**7*gamma(7/3)*hyper((1/2, 7/3),
 (10/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(10/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^3}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^3/sqrt(b*x^3 + a), x)
```

3.220 $\int \frac{A+Bx^3}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=239

$$\frac{2\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{5\sqrt[4]{3}b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{2Bx\sqrt{a+bx^3}}{5b}$$

```
[Out] (2*B*x*Sqrt[a + b*x^3])/(5*b) + (2*Sqrt[2 + Sqrt[3]]*(5*A*b - 2*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(5*3^(1/4)*b^(4/3)*Sqrt[(a^(1/3)*(a^(1
/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a +
 b*x^3])
```

Rubi [A] time = 0.19772, antiderivative size = 239, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$

$$\frac{2\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{5\sqrt[4]{3}b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{2Bx\sqrt{a+bx^3}}{5b}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/Sqrt[a + b*x^3],x]
```

```
[Out] (2*B*x*Sqrt[a + b*x^3])/(5*b) + (2*Sqrt[2 + Sqrt[3]]*(5*A*b - 2*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(5*3^(1/4)*b^(4/3)*Sqrt[(a^(1/3)*(a^(1
/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a +
 b*x^3])
```

Rubi in Sympy [A] time = 12.3021, size = 212, normalized size = 0.89

$$\frac{2Bx\sqrt{a+bx^3}}{5b} + \frac{4\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{5Ab}{2}-Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{15b^{\frac{4}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*x*sqrt(a + b*x**3)/(5*b) + 4*3**(3/4)*sqrt((a**(2/3) - a**(1/
3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)
*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(5*A*b/2 - B*a)
*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(15*b**(4/3)*sqrt
(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1
/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.952387, size = 168, normalized size = 0.7

$$\frac{2Bx\sqrt{a+bx^3}}{5b} - \frac{2i\sqrt[3]{a}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(5Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{5\sqrt[4]{3}(-b)^{4/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[(A + B*x^3)/Sqrt[a + b*x^3],x]
```

```
[Out] (2*B*x*Sqrt[a + b*x^3])/(5*b) - (((2*I)/5)*a^(1/3)*(5*A*b - 2*a*B
)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(
1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sqrt
[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/(
3^(1/4)*(-b)^(4/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.007, size = 586, normalized size = 2.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] -2/3*I*A*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1
/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(
1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2
))+B*(2/5/b*x*(b*x^3+a)^(1/2)+4/15*I*a/b^2*3^(1/2)*(-a*b^2)^(1/3)
*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/
2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b
^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/sqrt(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/sqrt(b*x^3 + a), x)
```

Sympy [A] time = 4.03855, size = 78, normalized size = 0.33

$$\frac{Ax\Gamma\left(\frac{1}{3}\right){}_2F_1\left(\begin{matrix}\frac{1}{3},\frac{1}{2}\\\frac{4}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{4}{3}\right)} + \frac{Bx^4\Gamma\left(\frac{4}{3}\right){}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{4}{3}\\\frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{7}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] A*x*gamma(1/3)*hyper((1/3, 1/2), (4/3,), b*x**3*exp_polar(I*pi)/a
)/(3*sqrt(a)*gamma(4/3)) + B*x**4*gamma(4/3)*hyper((1/2, 4/3), (7
/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(7/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/sqrt(b*x^3 + a), x)
```

3.221 $\int \frac{A+Bx^3}{x^3\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=243

$$-\frac{\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2\sqrt[4]{3}a\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A\sqrt{a+bx^3}}{2ax^2}$$

```
[Out] -(A*Sqrt[a + b*x^3])/(2*a*x^2) - (Sqrt[2 + Sqrt[3]]*(A*b - 4*a*B)
*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((
1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3
)*x)], -7 - 4*Sqrt[3]])/(2*3^(1/4)*a*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/
3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a +
b*x^3])
```

Rubi [A] time = 0.220397, antiderivative size = 243, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2\sqrt[4]{3}a\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A\sqrt{a+bx^3}}{2ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^3*Sqrt[a + b*x^3]),x]
```

```
[Out] -(A*Sqrt[a + b*x^3])/(2*a*x^2) - (Sqrt[2 + Sqrt[3]]*(A*b - 4*a*B)
*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((
1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3
)*x)], -7 - 4*Sqrt[3]])/(2*3^(1/4)*a*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/
3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a +
b*x^3])
```

Rubi in Sympy [A] time = 13.8017, size = 212, normalized size = 0.87

$$-\frac{A\sqrt{a+bx^3}}{2ax^2}-\frac{3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab-4Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{6a\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**3/(b*x**3+a)**(1/2),x)
```

```
[Out] -A*sqrt(a + b*x**3)/(2*a*x**2) - 3**(3/4)*sqrt((a**(2/3) - a**(1/
3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)
*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(A*b - 4*B*a)*e
lliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*
(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(6*a*b**(1/3)*sqrt(
a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/
3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.830281, size = 170, normalized size = 0.7

$$-\frac{A\sqrt{a+bx^3}}{2ax^2}+\frac{i\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(4aB-Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{2\sqrt[4]{3}a^{2/3}\sqrt[3]{-b}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^3*Sqrt[a + b*x^3]),x]
```

```
[Out] -(A*Sqrt[a + b*x^3])/(2*a*x^2) + ((I/2)*(-(A*b) + 4*a*B)*Sqrt[(-1
)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^
(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/
6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/(3^(1/4)*a^
(2/3)*(-b)^(1/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.013, size = 587, normalized size = 2.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^3/(b*x^3+a)^(1/2),x)
```

```
[Out] -2/3*I*B*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1
/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(
1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2
))+A*(-1/2/a*(b*x^3+a)^(1/2)/x^2+1/6*I/a*3^(1/2)*(-a*b^2)^(1/3)*(
I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)
*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2
)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3+A}{\sqrt{bx^3+ax^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^3),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + a}x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^3),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(sqrt(b*x^3 + a)*x^3), x)
```

Sympy [A] time = 4.604, size = 82, normalized size = 0.34

$$\frac{A\left(-\frac{2}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{2}{3}, \frac{1}{2} \\ \frac{1}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}x^2\left(\frac{1}{3}\right)} + \frac{Bx\left(\frac{1}{3}\right) {}_2F_1\left(\begin{matrix} \frac{1}{3}, \frac{1}{2} \\ \frac{4}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\left(\frac{4}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**3/(b*x**3+a)**(1/2),x)
```

```
[Out] A*gamma(-2/3)*hyper((-2/3, 1/2), (1/3,), b*x**3*exp_polar(I*pi)/a
)/(3*sqrt(a)*x**2*gamma(1/3)) + B*x*gamma(1/3)*hyper((1/3, 1/2),
(4/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(4/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^3),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^3), x)
```

3.222 $\int \frac{A+Bx^3}{x^6\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=274

$$\frac{\sqrt{a+bx^3}(7Ab-10aB)}{20a^2x^2}+\frac{\sqrt{2+\sqrt{3}}b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{20\sqrt[4]{3}a^2\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A\sqrt{a+bx^3}}{5ax^5}$$

```
[Out] -(A*Sqrt[a + b*x^3])/(5*a*x^5) + ((7*A*b - 10*a*B)*Sqrt[a + b*x^3
])/(20*a^2*x^2) + (Sqrt[2 + Sqrt[3]]*b^(2/3)*(7*A*b - 10*a*B)*(a^
(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^
2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 -
Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
], -7 - 4*Sqrt[3]])/(20*3^(1/4)*a^2*Sqrt[(a^(1/3)*(a^(1/3) + b^(1
/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.304673, antiderivative size = 274, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{\sqrt{a+bx^3}(7Ab-10aB)}{20a^2x^2}+\frac{\sqrt{2+\sqrt{3}}b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{20\sqrt[4]{3}a^2\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A\sqrt{a+bx^3}}{5ax^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^6*Sqrt[a + b*x^3]),x]
```



```
[Out] -(A*Sqrt[a + b*x^3])/(5*a*x^5) + ((7*A*b - 10*a*B)*Sqrt[a + b*x^3
])/(20*a^2*x^2) + (Sqrt[2 + Sqrt[3]]*b^(2/3)*(7*A*b - 10*a*B)*(a^
(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^
2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 -
Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
], -7 - 4*Sqrt[3]])/(20*3^(1/4)*a^2*Sqrt[(a^(1/3)*(a^(1/3) + b^(1
/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 19.7536, size = 243, normalized size = 0.89

$$-\frac{A\sqrt{a+bx^3}}{5ax^5}+\frac{3^{\frac{3}{4}}b^{\frac{2}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(7Ab-10Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{60a^2\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}\,(7Ab-10Ba)}{20a^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**6/(b*x**3+a)**(1/2),x)
```

```
[Out] -A*sqrt(a + b*x**3)/(5*a*x**5) + 3**(3/4)*b**(2/3)*sqrt((a**(2/3)
 - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) +
 b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(7*A*b
 - 10*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x
)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(60*a**
2*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) +
 b**(1/3)*x)**2)*sqrt(a + b*x**3)) + sqrt(a + b*x**3)*(7*A*b - 10
*B*a)/(20*a**2*x**2)
```

Mathematica [C] time = 1.40949, size = 188, normalized size = 0.69

$$-\frac{\sqrt{a+bx^3}\left(4aA+10aBx^3-7Abx^3\right)}{20a^2x^5}+\frac{i(-b)^{2/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(10aB-7Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{20\sqrt[4]{3}a^{5/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^6*Sqrt[a + b*x^3]),x]
```

```
[Out] -(Sqrt[a + b*x^3]*(4*a*A - 7*A*b*x^3 + 10*a*B*x^3))/(20*a^2*x^5)
+ ((I/20)*(-b)^(2/3)*(-7*A*b + 10*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b
)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3
)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)
*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/(3^(1/4)*a^(5/3)*Sqrt[a + b*x
^3])
```

Maple [B] time = 0.012, size = 625, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^6/(b*x^3+a)^(1/2),x)
```

```
[Out] A*(-1/5/a*(b*x^3+a)^(1/2)/x^5+7/20*b/a^2*(b*x^3+a)^(1/2)/x^2-7/60
*I/a^2*b*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b
*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
```

```
(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*Elliptic
F(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/
3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))
)+B*(-1/2/a*(b*x^3+a)^(1/2)/x^2+1/6*I/a*3^(1/2)*(-a*b^2)^(1/3)*(I
*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*
b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)
^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^
(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + ax^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^6),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^6), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + ax^6}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^6),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(sqrt(b*x^3 + a)*x^6), x)
```

Sympy [A] time = 6.27502, size = 90, normalized size = 0.33

$$\frac{A\,\Gamma\left(-\frac{5}{3}\right)\,{}_{2}F_{1}\left(\left.\begin{matrix}-\frac{5}{3}, \frac{1}{2}\\ -\frac{2}{3}\end{matrix}\right|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}x^5\,\Gamma\left(-\frac{2}{3}\right)} + \frac{B\,\Gamma\left(-\frac{2}{3}\right)\,{}_{2}F_{1}\left(\left.\begin{matrix}-\frac{2}{3}, \frac{1}{2}\\ \frac{1}{3}\end{matrix}\right|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}x^2\,\Gamma\left(\frac{1}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**6/(b*x**3+a)**(1/2),x)
```

```
[Out] A*gamma(-5/3)*hyper((-5/3, 1/2), (-2/3,), b*x**3*exp_polar(I*pi)/
a)/(3*sqrt(a)*x**5*gamma(-2/3)) + B*gamma(-2/3)*hyper((-2/3, 1/2)
, (1/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*x**2*gamma(1/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + ax^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^6),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^6), x)
```

3.223 $\int \frac{x^4(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=548

$$-\frac{8\sqrt{2}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91\sqrt[4]{3}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{4\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-10aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{8a\sqrt{a+bx^3}(13Ab-10aB)}{91b^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2\sqrt{a+bx^3}(13Ab-10aB)}{91b^2}+\frac{2Bx^5\sqrt{a+bx^3}}{13b}$$

```
[Out] (2*(13*A*b - 10*a*B)*x^2*Sqrt[a + b*x^3])/(91*b^2) + (2*B*x^5*Sqr
t[a + b*x^3])/(13*b) - (8*a*(13*A*b - 10*a*B)*Sqrt[a + b*x^3])/(9
1*b^(8/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (4*3^(1/4)*Sqrt[
2 - Sqrt[3]]*a^(4/3)*(13*A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt
[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/
3) + b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1
/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(91
*b^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1
/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (8*Sqrt[2]*a^(4/3)*(13*A*b
 - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*
x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF
[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3
) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(91*3^(1/4)*b^(8/3)*Sqrt[(a^(1/
3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
Sqrt[a + b*x^3])
```

Rubi [A] time = 0.707275, antiderivative size = 548, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$-\frac{8\sqrt{2}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91\sqrt[4]{3}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{4\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-10aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{91b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{8a\sqrt{a+bx^3}(13Ab-10aB)}{91b^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2\sqrt{a+bx^3}(13Ab-10aB)}{91b^2}+\frac{2Bx^5\sqrt{a+bx^3}}{13b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*(13*A*b - 10*a*B)*x^2*Sqrt[a + b*x^3])/(91*b^2) + (2*B*x^5*Sqr
t[a + b*x^3])/(13*b) - (8*a*(13*A*b - 10*a*B)*Sqrt[a + b*x^3])/(9
```

```
1*b^(8/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (4*3^(1/4)*Sqrt[
2 - Sqrt[3]]*a^(4/3)*(13*A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt
[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/
3) + b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1
/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(91
*b^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1
/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (8*Sqrt[2]*a^(4/3)*(13*A*b
 - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*
x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF
[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3
) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(91*3^(1/4)*b^(8/3)*Sqrt[(a^(1/
3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*
Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 48.5042, size = 495, normalized size = 0.9

$$\frac{2Bx^5\sqrt{a+bx^3}}{13b} + \frac{4\sqrt[4]{3}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(13Ab-10Ba)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{91b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{8\sqrt{2}\cdot 3^{\frac{3}{4}}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(13Ab-10Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{273b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{8a\sqrt{a+bx^3}(13Ab-10Ba)}{91b^{\frac{8}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)} + \frac{2x^2\sqrt{a+bx^3}(13Ab-10Ba)}{91b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*x**5*sqrt(a + b*x**3)/(13*b) + 4*3**(1/4)*a**(4/3)*sqrt((a**(
2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3
)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(
13*A*b - 10*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(
1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(
91*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 +
sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 8*sqrt(2)*3**(3/4)
*a**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(
a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*
(13*A*b - 10*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**
(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/
(273*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1
+ sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 8*a*sqrt(a + b*x
**3)*(13*A*b - 10*B*a)/(91*b**(8/3)*(a**(1/3)*(1 + sqrt(3)) + b**
(1/3)*x)) + 2*x**2*sqrt(a + b*x**3)*(13*A*b - 10*B*a)/(91*b**2)
```

Mathematica [C] time = 0.603484, size = 243, normalized size = 0.44

$$\frac{2\left(3(-b)^{2/3}x^2\left(a+bx^3\right)\left(-10aB+13Ab+7bBx^3\right)+4(-1)^{2/3}3^{3/4}a^{5/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(13Ab-\right.}{273(-b)^{8/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*(3*(-b)^(2/3)*x^2*(a + b*x^3)*(13*A*b - 10*a*B + 7*b*B*x^3) +
4*(-1)^(2/3)*3^(3/4)*a^(5/3)*(13*A*b - 10*a*B)*Sqrt[(-1)^(5/6)*(-
1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((
-b)^(2/3)*x^2)/a^(2/3)]*(Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6
) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(5/6)*
EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(
1/4)], (-1)^(1/3)])))/(273*(-b)^(8/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.01, size = 932, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] A*(2/7/b*x^2*(b*x^3+a)^(1/2)+8/21*I*a/b^2*3^(1/2)*(-a*b^2)^(1/3)*
(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2
)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(
I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)
*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/
2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(2/13/b*
x^5*(b*x^3+a)^(1/2)-20/91*a/b^2*x^2*(b*x^3+a)^(1/2)-80/273*I*a^2/
b^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*
b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*
(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2
)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^
(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/
b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)x^4}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^4/sqrt(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{Bx^7 + Ax^4}{\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*x^7 + A*x^4)/sqrt(b*x^3 + a), x)
```

Sympy [A] time = 5.99231, size = 80, normalized size = 0.15

$$\frac{Ax^{5}\,\Gamma\left(\frac{5}{3}\right)\,{}_{2}F_{1}\left(\left.\begin{matrix}\frac{1}{2},\frac{5}{3}\\\frac{8}{3}\end{matrix}\right|\frac{bx^{3}e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{8}{3}\right)}+\frac{Bx^{8}\,\Gamma\left(\frac{8}{3}\right)\,{}_{2}F_{1}\left(\left.\begin{matrix}\frac{1}{2},\frac{8}{3}\\\frac{11}{3}\end{matrix}\right|\frac{bx^{3}e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{11}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] A*x**5*gamma(5/3)*hyper((1/2, 5/3), (8/3,), b*x**3*exp_polar(I*pi
)/a)/(3*sqrt(a)*gamma(8/3)) + B*x**8*gamma(8/3)*hyper((1/2, 8/3),
 (11/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(11/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^{3}+A\right)x^{4}}{\sqrt{bx^{3}+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^4/sqrt(b*x^3 + a), x)
```

3.224 $\int \frac{x(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=517

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}(7Ab-4aB)}{7b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2Bx^2\sqrt{a+bx^3}}{7b}$$

```
[Out] (2*B*x^2*Sqrt[a + b*x^3])/(7*b) + (2*(7*A*b - 4*a*B)*Sqrt[a + b*x
^3])/(7*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (3^(1/4)*S
qrt[2 - Sqrt[3]]*a^(1/3)*(7*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sq
rt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^
(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(
7*b^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (2*Sqrt[2]*a^(1/3)*(7*A*b
 - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
 + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[
ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3)
 + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*3^(1/4)*b^(5/3)*Sqrt[(a^(1/3)
*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sq
rt[a + b*x^3])
```

Rubi [A] time = 0.557967, antiderivative size = 517, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}(7Ab-4aB)}{7b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2Bx^2\sqrt{a+bx^3}}{7b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(A + B*x^3))/Sqrt[a + b*x^3],x]
```


```
[Out] (2*B*x^2*Sqrt[a + b*x^3])/(7*b) + (2*(7*A*b - 4*a*B)*Sqrt[a + b*x
^3])/(7*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (3^(1/4)*S
```

```
qrt[2 - Sqrt[3]]*a^(1/3)*(7*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sq
rt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^
(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(
7*b^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (2*Sqrt[2]*a^(1/3)*(7*A*b
 - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
 + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[
ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3)
 + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*3^(1/4)*b^(5/3)*Sqrt[(a^(1/3)
*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sq
rt[a + b*x^3])
```

Rubi in Sympy [A] time = 37.6063, size = 461, normalized size = 0.89

$$\frac{2Bx^2\sqrt{a+bx^3}}{7b} - \frac{\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(7Ab-4Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{7b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{2\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(7Ab-4Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{21b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{2\sqrt{a+bx^3}\,(7Ab-4Ba)}{7b^{\frac{5}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*x**2*sqrt(a + b*x**3)/(7*b) - 3**(1/4)*a**(1/3)*sqrt((a**(2/3
) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(7*A
*b - 4*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*
x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(7*b**
(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3
)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 2*sqrt(2)*3**(3/4)*a**(1
/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/
3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(7*A*b
 - 4*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)
/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(21*b**(
5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)
) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 2*sqrt(a + b*x**3)*(7*A*b
 - 4*B*a)/(7*b**(5/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x))
```

Mathematica [C] time = 0.577171, size = 231, normalized size = 0.45

$$\frac{2Bx^2\sqrt{a+bx^3}}{7b} - \frac{2\sqrt[6]{-1}a^{2/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(7Ab-4aB)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\text{si}\right.\right.}{7\sqrt[4]{3}(-b)^{5/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*B*x^2*Sqrt[a + b*x^3])/(7*b) - (2*(-1)^(1/6)*a^(2/3)*(7*A*b -
4*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((
-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*El
lipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/
4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) -
 (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(7*3^(1/4)*(-b
)^(5/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.01, size = 892, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] -2/3*I*A*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1
/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2
/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3
^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-
a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2
*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3
^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3)))^(1/2)))+B*(2/7/b*x^2*(b*x^3+a)^(1/2)+8/21*I*a/b^2*
3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)
^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(
1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*
3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(
x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/
(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3
)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-
a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x/sqrt(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{Bx^4 + Ax}{\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*x^4 + A*x)/sqrt(b*x^3 + a), x)
```

Sympy [A] time = 4.73715, size = 80, normalized size = 0.15

$$\frac{Ax^2\,\Gamma\left(\frac{2}{3}\right)\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{2}{3}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{5}{3}\right)}+\frac{Bx^5\,\Gamma\left(\frac{5}{3}\right)\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{5}{3}\\ \frac{8}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{8}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] A*x**2*gamma(2/3)*hyper((1/2, 2/3), (5/3,), b*x**3*exp_polar(I*pi
)/a)/(3*sqrt(a)*gamma(5/3)) + B*x**5*gamma(5/3)*hyper((1/2, 5/3),
 (8/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(8/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)x}{\sqrt{bx^3+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x/sqrt(b*x^3 + a), x)
```

3.225 $\int \frac{A+Bx^3}{x^2\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=509

$$\frac{\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}a^{2/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2a^{2/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(2aB+Ab)}{ab^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{A\sqrt{a+bx^3}}{ax}$$

```
[Out] -((A*Sqrt[a + b*x^3])/(a*x)) + ((A*b + 2*a*B)*Sqrt[a + b*x^3])/(a
*b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (3^(1/4)*Sqrt[2 -
 Sqrt[3]]*(A*b + 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(2*a^(2/3)*b^(2/3)
*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)^2]*Sqrt[a + b*x^3]) + (Sqrt[2]*(A*b + 2*a*B)*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 +
 Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])
*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 -
4*Sqrt[3]])/(3^(1/4)*a^(2/3)*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(
1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.554554, antiderivative size = 509, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}a^{2/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2a^{2/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(2aB+Ab)}{ab^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{A\sqrt{a+bx^3}}{ax}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^2*Sqrt[a + b*x^3]),x]
```

```
[Out] -((A*Sqrt[a + b*x^3])/(a*x)) + ((A*b + 2*a*B)*Sqrt[a + b*x^3])/(a
*b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (3^(1/4)*Sqrt[2 -
 Sqrt[3]]*(A*b + 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(
```

```
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(2*a^(2/3)*b^(2/3)
*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)^2]*Sqrt[a + b*x^3]) + (Sqrt[2]*(A*b + 2*a*B)*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 +
 Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])
*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 -
4*Sqrt[3]])/(3^(1/4)*a^(2/3)*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(
1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 38.192, size = 449, normalized size = 0.88

$$-\frac{A\sqrt{a+bx^3}}{ax}+\frac{2\sqrt{a+bx^3}\left(\frac{Ab}{2}+Ba\right)}{ab^{\frac{2}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{bx}\right)}-\frac{\sqrt[4]{3}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{bx}+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{bx}\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{bx}\right)\left(\frac{Ab}{2}+Ba\right)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{bx}}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{bx}}\right)\middle|-7-4\sqrt{3}\right)}{a^{\frac{2}{3}}b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{bx}\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{bx}\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{bx}+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{bx}\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{bx}\right)\left(\frac{Ab}{2}+Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{bx}}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{bx}}\right)\middle|-7-4\sqrt{3}\right)}{3a^{\frac{2}{3}}b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{bx}\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{bx}\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**2/(b*x**3+a)**(1/2),x)
```

```
[Out] -A*sqrt(a + b*x**3)/(a*x) + 2*sqrt(a + b*x**3)*(A*b/2 + B*a)/(a*b
**(2/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) - 3**(1/4)*sqrt((a
**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqr
t(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x
)*(A*b/2 + B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1
/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(a
**(2/3)*b**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*
(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 2*sqrt(2)*3**
(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(
1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(A*b
/2 + B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)
/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(3*a**(2
/3)*b**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 +
 sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.388467, size = 225, normalized size = 0.44

$$-\frac{A\sqrt{a+bx^3}}{ax}+\frac{\sqrt[6]{-1}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(2aB+Ab)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\sin^{-1}\left(\right.\right.\right.}{\sqrt[4]{3}\sqrt[3]{a}(-b)^{2/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^2*Sqrt[a + b*x^3]),x]
```

```
[Out] -((A*Sqrt[a + b*x^3])/(a*x)) + ((-1)^(1/6)*(A*b + 2*a*B)*Sqrt[(-1
)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^
(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*EllipticE[ArcSin[
Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)
] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*
x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(3^(1/4)*a^(1/3)*(-b)^(2/3)*S
qrt[a + b*x^3])
```

Maple [B] time = 0.012, size = 891, normalized size = 1.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((B*x^3+A)/x^2/(b*x^3+a)^(1/2),x)
```

```
[Out] A*(-1/a*(b*x^3+a)^(1/2)/x-1/3*I/a*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/
2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*
b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3
)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)
/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2
)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1
/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a
*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(
1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))-2/3*I*B*3^(1/2)/b*
(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/
(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I
*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*
b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*
(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)
^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(
1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2
)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + a}x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(sqrt(b*x^3 + a)*x^2), x)
```

Sympy [A] time = 4.45754, size = 82, normalized size = 0.16

$$\frac{A\Gamma\left(-\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{3},\frac{1}{2}\\ \frac{2}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}x\Gamma\left(\frac{2}{3}\right)}+\frac{Bx^2\Gamma\left(\frac{2}{3}\right){}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{2}{3}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\Gamma\left(\frac{5}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**2/(b*x**3+a)**(1/2),x)
```

```
[Out] A*gamma(-1/3)*hyper((-1/3, 1/2), (2/3,), b*x**3*exp_polar(I*pi)/a
)/(3*sqrt(a)*x*gamma(2/3)) + B*x**2*gamma(2/3)*hyper((1/2, 2/3),
(5/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(5/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^2), x)
```

3.226 $\int \frac{A+Bx^3}{x^5\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=550

$$-\frac{\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt[4]{3}a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-8aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{16a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(5Ab-8aB)}{8a^2x}-\frac{\sqrt[3]{b}\sqrt{a+bx^3}(5Ab-8aB)}{8a^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{A\sqrt{a+bx^3}}{4ax^4}$$

```
[Out] -(A*Sqrt[a + b*x^3])/(4*a*x^4) + ((5*A*b - 8*a*B)*Sqrt[a + b*x^3]
)/(8*a^2*x) - (b^(1/3)*(5*A*b - 8*a*B)*Sqrt[a + b*x^3])/(8*a^2*((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (3^(1/4)*Sqrt[2 - Sqrt[3]]*b
^(1/3)*(5*A*b - 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(16*a^(5/3)*Sqrt[(a
^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*Sqrt[a + b*x^3]) - (b^(1/3)*(5*A*b - 8*a*B)*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/
3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt
[3]])/(4*Sqrt[2]*3^(1/4)*a^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)
*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.6744, antiderivative size = 550, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt[4]{3}a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-8aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{16a^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(5Ab-8aB)}{8a^2x}-\frac{\sqrt[3]{b}\sqrt{a+bx^3}(5Ab-8aB)}{8a^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{A\sqrt{a+bx^3}}{4ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^5*Sqrt[a + b*x^3]),x]
```

```
[Out] -(A*Sqrt[a + b*x^3])/(4*a*x^4) + ((5*A*b - 8*a*B)*Sqrt[a + b*x^3]
)/(8*a^2*x) - (b^(1/3)*(5*A*b - 8*a*B)*Sqrt[a + b*x^3])/(8*a^2*((
```

```
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (3^(1/4)*Sqrt[2 - Sqrt[3]]*b
^(1/3)*(5*A*b - 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(16*a^(5/3)*Sqrt[(a
^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*Sqrt[a + b*x^3]) - (b^(1/3)*(5*A*b - 8*a*B)*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/
3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt
[3]])/(4*Sqrt[2]*3^(1/4)*a^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)
*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 48.8695, size = 486, normalized size = 0.88

$$-\frac{A\sqrt{a+bx^3}}{4ax^4}-\frac{\sqrt[3]{b}\sqrt{a+bx^3}\,(5Ab-8Ba)}{8a^2\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{\sqrt{a+bx^3}\,(5Ab-8Ba)}{8a^2x}$$
$$+\frac{\sqrt[4]{3}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(5Ab-8Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{16a^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(5Ab-8Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{24a^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**5/(b*x**3+a)**(1/2),x)
```

```
[Out] -A*sqrt(a + b*x**3)/(4*a*x**4) - b**(1/3)*sqrt(a + b*x**3)*(5*A*b
 - 8*B*a)/(8*a**2*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) + sqrt(a
 + b*x**3)*(5*A*b - 8*B*a)/(8*a**2*x) + 3**(1/4)*b**(1/3)*sqrt((a
**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqr
t(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x
)*(5*A*b - 8*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**
(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/
(16*a**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 +
 sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - sqrt(2)*3**(3/4)*
b**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a
**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(
5*A*b - 8*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/
3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(24
*a**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sq
rt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.582742, size = 249, normalized size = 0.45

$$\frac{\sqrt{a+bx^3}\left(5Abx^3-2a\left(A+4Bx^3\right)\right)}{8a^2x^4}$$
$$-\frac{\sqrt[6]{-1}\sqrt[3]{-b}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\,(8aB-5Ab)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\sin\cdots\right)\right)}{8\sqrt[4]{3}a^{4/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^5*Sqrt[a + b*x^3]),x]
```

```
[Out] (Sqrt[a + b*x^3]*(5*A*b*x^3 - 2*a*(A + 4*B*x^3)))/(8*a^2*x^4) - (
(-1)^(1/6)*(-b)^(1/3)*(-5*A*b + 8*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b
)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3
)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) -
 (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*Ell
ipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4
)], (-1)^(1/3)]))/(8*3^(1/4)*a^(4/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.013, size = 929, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^5/(b*x^3+a)^(1/2),x)
```

```
[Out] A*(-1/4/a*(b*x^3+a)^(1/2)/x^4+5/8*b/a^2*(b*x^3+a)^(1/2)/x+5/24*I/
a^2*b*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-
a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2
)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2
)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2
)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2))))+B*(-1/a*(b*x^3+a)^(1/2)/x-1/3*I/a*3^(1/2)*(-a*
b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+
1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)
/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^5),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + a}x^5}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^5),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(sqrt(b*x^3 + a)*x^5), x)
```

Sympy [A] time = 5.6525, size = 88, normalized size = 0.16

$$\frac{A\Gamma\left(-\frac{4}{3}\right){}_2F_1\left(\begin{matrix}-\frac{4}{3},\frac{1}{2}\\-\frac{1}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}x^4\Gamma\left(-\frac{1}{3}\right)}+\frac{B\Gamma\left(-\frac{1}{3}\right){}_2F_1\left(\begin{matrix}-\frac{1}{3},\frac{1}{2}\\\frac{2}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}x\Gamma\left(\frac{2}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**5/(b*x**3+a)**(1/2),x)
```

```
[Out] A*gamma(-4/3)*hyper((-4/3, 1/2), (-1/3,), b*x**3*exp_polar(I*pi)/
a)/(3*sqrt(a)*x**4*gamma(-1/3)) + B*gamma(-1/3)*hyper((-1/3, 1/2)
, (2/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*x*gamma(2/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^5),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^5), x)
```

3.227 $\int \frac{A+Bx^3}{x^8\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=581

$$\frac{5b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{56\sqrt{2}\sqrt[4]{3}a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{5\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-14aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{5b^{4/3}\sqrt{a+bx^3}(11Ab-14aB)}{112a^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{5b\sqrt{a+bx^3}(11Ab-14aB)}{112a^3x}+\frac{\sqrt{a+bx^3}(11Ab-14aB)}{56a^2x^4}-\frac{A\sqrt{a+bx^3}}{7ax^7}$$

```
[Out] -(A*Sqrt[a + b*x^3])/(7*a*x^7) + ((11*A*b - 14*a*B)*Sqrt[a + b*x^
3])/(56*a^2*x^4) - (5*b*(11*A*b - 14*a*B)*Sqrt[a + b*x^3])/(112*a
^3*x) + (5*b^(4/3)*(11*A*b - 14*a*B)*Sqrt[a + b*x^3])/(112*a^3*((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (5*3^(1/4)*Sqrt[2 - Sqrt[3]]
*b^(4/3)*(11*A*b - 14*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) -
a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)
*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 +
 Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*a^(8/3)*Sq
rt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)^2]*Sqrt[a + b*x^3]) + (5*b^(4/3)*(11*A*b - 14*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(56*Sqrt[2]*3^(1/4)*a^(8/3)*Sqrt[(a^(1/3)*(a^(1/3)
 + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*
x^3])
```

Rubi [A] time = 0.818777, antiderivative size = 581, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{5b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{56\sqrt{2}\sqrt[4]{3}a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{5\sqrt[4]{3}\sqrt{2-\sqrt{3}}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-14aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{5b^{4/3}\sqrt{a+bx^3}(11Ab-14aB)}{112a^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{5b\sqrt{a+bx^3}(11Ab-14aB)}{112a^3x}+\frac{\sqrt{a+bx^3}(11Ab-14aB)}{56a^2x^4}-\frac{A\sqrt{a+bx^3}}{7ax^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^8*Sqrt[a + b*x^3]),x]
```

```
[Out] -(A*Sqrt[a + b*x^3])/(7*a*x^7) + ((11*A*b - 14*a*B)*Sqrt[a + b*x^
3])/(56*a^2*x^4) - (5*b*(11*A*b - 14*a*B)*Sqrt[a + b*x^3])/(112*a
^3*x) + (5*b^(4/3)*(11*A*b - 14*a*B)*Sqrt[a + b*x^3])/(112*a^3*((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (5*3^(1/4)*Sqrt[2 - Sqrt[3]]
*b^(4/3)*(11*A*b - 14*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) -
a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)
*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 +
 Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*a^(8/3)*Sq
rt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)^2]*Sqrt[a + b*x^3]) + (5*b^(4/3)*(11*A*b - 14*a*B)*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(56*Sqrt[2]*3^(1/4)*a^(8/3)*Sqrt[(a^(1/3)*(a^(1/3)
 + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*
x^3])
```

Rubi in Sympy [A] time = 60.0869, size = 524, normalized size = 0.9

$$-\frac{A\sqrt{a+bx^3}}{7ax^7}+\frac{\sqrt{a+bx^3}\,(11Ab-14Ba)}{56a^2x^4}+\frac{5b^{\frac{4}{3}}\sqrt{a+bx^3}\,(11Ab-14Ba)}{112a^3\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}-\frac{5b\sqrt{a+bx^3}\,(11Ab-14Ba)}{112a^3x}$$
$$-\frac{5\sqrt[4]{3}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-14Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{224a^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{5\sqrt{2}\cdot3^{\frac{3}{4}}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-14Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{336a^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]    rubi_integrate((B*x**3+A)/x**8/(b*x**3+a)**(1/2),x)
```

```
[Out] -A*sqrt(a + b*x**3)/(7*a*x**7) + sqrt(a + b*x**3)*(11*A*b - 14*B*
a)/(56*a**2*x**4) + 5*b**(4/3)*sqrt(a + b*x**3)*(11*A*b - 14*B*a)
/(112*a**3*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) - 5*b*sqrt(a +
b*x**3)*(11*A*b - 14*B*a)/(112*a**3*x) - 5*3**(1/4)*b**(4/3)*sqrt
((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 +
sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3
)*x)*(11*A*b - 14*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3))
+ b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt
(3))/(224*a**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 5*sqrt(2)*3
**(3/4)*b**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*
x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1
/3)*x)*(11*A*b - 14*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)
) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sq
rt(3))/(336*a**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1
/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.741358, size = 269, normalized size = 0.46

$$\frac{-\frac{3\left(a+bx^3\right)\left(16a^2A+5bx^6(11Ab-14aB)+2ax^3(14aB-11Ab)\right)}{x^7}+5\sqrt[6]{-1}3^{3/4}a^{2/3}(-b)^{4/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(11Ab-}{336a^3\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^8*Sqrt[a + b*x^3]),x]
```

```
[Out] ((-3*(a + b*x^3)*(16*a^2*A + 2*a*(-11*A*b + 14*a*B)*x^3 + 5*b*(11
*A*b - 14*a*B)*x^6))/x^7 + 5*(-1)^(1/6)*3^(3/4)*a^(2/3)*(-b)^(4/3
)*(11*A*b - 14*a*B)*Sqrt[((-1)^(5/6)*(-a^(1/3) + (-b)^(1/3)*x))/a
^(1/3)]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3
)]*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3
)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin
[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3
)]))/(336*a^3*Sqrt[a + b*x^3])
```

Maple [B] time = 0.033, size = 970, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^8/(b*x^3+a)^(1/2),x)
```

```
[Out] A*(-1/7/a*(b*x^3+a)^(1/2)/x^7+11/56*b/a^2*(b*x^3+a)^(1/2)/x^4-55/
112/a^3*b^2*(b*x^3+a)^(1/2)/x-55/336*I/a^3*b^2*3^(1/2)*(-a*b^2)^(
1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)
^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(
1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1
/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^
(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*
3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2
/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-1
/4/a*(b*x^3+a)^(1/2)/x^4+5/8*b/a^2*(b*x^3+a)^(1/2)/x+5/24*I/a^2*b
*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2
)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^
(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*
(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b
/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/
3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(
-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^8),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^8), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + a}x^8}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^8),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(sqrt(b*x^3 + a)*x^8), x)
```

Sympy [A] time = 8.16279, size = 94, normalized size = 0.16

$$\frac{A\Gamma\left(-\frac{7}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{7}{3}, \frac{1}{2} \\ -\frac{4}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3\sqrt{a}x^7\Gamma\left(-\frac{4}{3}\right)} + \frac{B\Gamma\left(-\frac{4}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{4}{3}, \frac{1}{2} \\ -\frac{1}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3\sqrt{a}x^4\Gamma\left(-\frac{1}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**8/(b*x**3+a)**(1/2),x)
```

```
[Out] A*gamma(-7/3)*hyper((-7/3, 1/2), (-4/3,), b*x**3*exp_polar(I*pi)/
a)/(3*sqrt(a)*x**7*gamma(-4/3)) + B*gamma(-4/3)*hyper((-4/3, 1/2)
, (-1/3,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*x**4*gamma(-1/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}x^8}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^8),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*x^8), x)
```

3.228 $\int \frac{x^8(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=103

$$-\frac{2a^2(Ab-aB)}{3b^4\sqrt{a+bx^3}}+\frac{2\left(a+bx^3\right)^{3/2}(Ab-3aB)}{9b^4}-\frac{2a\sqrt{a+bx^3}(2Ab-3aB)}{3b^4}+\frac{2B\left(a+bx^3\right)^{5/2}}{15b^4}$$

```
[Out] (-2*a^2*(A*b - a*B))/(3*b^4*Sqrt[a + b*x^3]) - (2*a*(2*A*b - 3*a*
B)*Sqrt[a + b*x^3])/(3*b^4) + (2*(A*b - 3*a*B)*(a + b*x^3)^(3/2))
/(9*b^4) + (2*B*(a + b*x^3)^(5/2))/(15*b^4)
```

Rubi [A] time = 0.257579, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$-\frac{2a^2(Ab-aB)}{3b^4\sqrt{a+bx^3}}+\frac{2\left(a+bx^3\right)^{3/2}(Ab-3aB)}{9b^4}-\frac{2a\sqrt{a+bx^3}(2Ab-3aB)}{3b^4}+\frac{2B\left(a+bx^3\right)^{5/2}}{15b^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (-2*a^2*(A*b - a*B))/(3*b^4*Sqrt[a + b*x^3]) - (2*a*(2*A*b - 3*a*
B)*Sqrt[a + b*x^3])/(3*b^4) + (2*(A*b - 3*a*B)*(a + b*x^3)^(3/2))
/(9*b^4) + (2*B*(a + b*x^3)^(5/2))/(15*b^4)
```

Rubi in Sympy [A] time = 21.999, size = 99, normalized size = 0.96

$$\frac{2B\left(a+bx^3\right)^{\frac{5}{2}}}{15b^4}-\frac{2a^2\left(Ab-Ba\right)}{3b^4\sqrt{a+bx^3}}-\frac{2a\sqrt{a+bx^3}\left(2Ab-3Ba\right)}{3b^4}+\frac{2\left(a+bx^3\right)^{\frac{3}{2}}\left(Ab-3Ba\right)}{9b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(5/2)/(15*b**4) - 2*a**2*(A*b - B*a)/(3*b**4*sq
rt(a + b*x**3)) - 2*a*sqrt(a + b*x**3)*(2*A*b - 3*B*a)/(3*b**4) +
 2*(a + b*x**3)**(3/2)*(A*b - 3*B*a)/(9*b**4)
```

Mathematica [A] time = 0.0921842, size = 77, normalized size = 0.75

$$\frac{2\left(48a^3B-8a^2b\left(5A-3Bx^3\right)-2ab^2x^3\left(10A+3Bx^3\right)+b^3x^6\left(5A+3Bx^3\right)\right)}{45b^4\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(48*a^3*B - 8*a^2*b*(5*A - 3*B*x^3) + b^3*x^6*(5*A + 3*B*x^3)
- 2*a*b^2*x^3*(10*A + 3*B*x^3)))/(45*b^4*Sqrt[a + b*x^3])
```

Maple [A] time = 0.01, size = 77, normalized size = 0.8

$$-\frac{-6\,Bx^9b^3-10\,Ab^3x^6+12\,Bab^2x^6+40\,Aab^2x^3-48\,Ba^2bx^3+80\,Aa^2b-96\,Ba^3}{45\,b^4}\frac{1}{\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] -2/45/(b*x^3+a)^(1/2)*(-3*B*b^3*x^9-5*A*b^3*x^6+6*B*a*b^2*x^6+20*
A*a*b^2*x^3-24*B*a^2*b*x^3+40*A*a^2*b-48*B*a^3)/b^4
```

Maxima [A] time = 1.41615, size = 157, normalized size = 1.52

$$\frac{2}{15}B\left(\frac{(bx^3+a)^{\frac{5}{2}}}{b^4}-\frac{5\,(bx^3+a)^{\frac{3}{2}}a}{b^4}+\frac{15\,\sqrt{bx^3+a}a^2}{b^4}+\frac{5\,a^3}{\sqrt{bx^3+a}b^4}\right)+\frac{2}{9}A\left(\frac{(bx^3+a)^{\frac{3}{2}}}{b^3}-\frac{6\,\sqrt{bx^3+a}a}{b^3}-\frac{3\,a^2}{\sqrt{bx^3+a}b^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] 2/15*B*((b*x^3 + a)^(5/2)/b^4 - 5*(b*x^3 + a)^(3/2)*a/b^4 + 15*sq
rt(b*x^3 + a)*a^2/b^4 + 5*a^3/(sqrt(b*x^3 + a)*b^4)) + 2/9*A*((b*
x^3 + a)^(3/2)/b^3 - 6*sqrt(b*x^3 + a)*a/b^3 - 3*a^2/(sqrt(b*x^3
+ a)*b^3))
```

Fricas [A] time = 0.251996, size = 103, normalized size = 1.

$$\frac{2\left(3\,Bb^3x^9-\left(6\,Bab^2-5\,Ab^3\right)x^6+48\,Ba^3-40\,Aa^2b+4\left(6\,Ba^2b-5\,Aab^2\right)x^3\right)}{45\,\sqrt{bx^3+a}b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] 2/45*(3*B*b^3*x^9 - (6*B*a*b^2 - 5*A*b^3)*x^6 + 48*B*a^3 - 40*A*a
^2*b + 4*(6*B*a^2*b - 5*A*a*b^2)*x^3)/(sqrt(b*x^3 + a)*b^4)
```

Sympy [A] time = 11.6515, size = 175, normalized size = 1.7

$$\begin{cases} -\frac{16Aa^2}{9b^3\sqrt{a+bx^3}}-\frac{8Aax^3}{9b^2\sqrt{a+bx^3}}+\frac{2Ax^6}{9b\sqrt{a+bx^3}}+\frac{32Ba^3}{15b^4\sqrt{a+bx^3}}+\frac{16Ba^2x^3}{15b^3\sqrt{a+bx^3}}-\frac{4Bax^6}{15b^2\sqrt{a+bx^3}}+\frac{2Bx^9}{15b\sqrt{a+bx^3}} & \text{for } b\neq 0 \\ \frac{\frac{Ax^9}{9}+\frac{Bx^{12}}{12}}{a^{\frac{3}{2}}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] Piecewise((-16*A*a**2/(9*b**3*sqrt(a + b*x**3)) - 8*A*a*x**3/(9*b
**2*sqrt(a + b*x**3)) + 2*A*x**6/(9*b*sqrt(a + b*x**3)) + 32*B*a*
*3/(15*b**4*sqrt(a + b*x**3)) + 16*B*a**2*x**3/(15*b**3*sqrt(a +
b*x**3)) - 4*B*a*x**6/(15*b**2*sqrt(a + b*x**3)) + 2*B*x**9/(15*b
*sqrt(a + b*x**3)), Ne(b, 0)), ((A*x**9/9 + B*x**12/12)/a**(3/2),
 True))
```

GIAC/XCAS [A] time = 0.215409, size = 131, normalized size = 1.27

$$\frac{2\left(3\,(bx^3+a)^{\frac{5}{2}}B-15\,(bx^3+a)^{\frac{3}{2}}Ba+45\,\sqrt{bx^3+a}Ba^2+5\,(bx^3+a)^{\frac{3}{2}}Ab-30\,\sqrt{bx^3+a}Aab+\frac{15\,(Ba^3-Aa^2b)}{\sqrt{bx^3+a}}\right)}{45\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] 2/45*(3*(b*x^3 + a)^(5/2)*B - 15*(b*x^3 + a)^(3/2)*B*a + 45*sqrt(
b*x^3 + a)*B*a^2 + 5*(b*x^3 + a)^(3/2)*A*b - 30*sqrt(b*x^3 + a)*A
*a*b + 15*(B*a^3 - A*a^2*b)/sqrt(b*x^3 + a))/b^4
```

3.229 $\int \frac{x^5(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=73

$$\frac{2\sqrt{a+bx^3}(Ab-2aB)}{3b^3}+\frac{2a(Ab-aB)}{3b^3\sqrt{a+bx^3}}+\frac{2B\left(a+bx^3\right)^{3/2}}{9b^3}$$

```
[Out] (2*a*(A*b - a*B))/(3*b^3*Sqrt[a + b*x^3]) + (2*(A*b - 2*a*B)*Sqrt
[a + b*x^3])/(3*b^3) + (2*B*(a + b*x^3)^(3/2))/(9*b^3)
```

Rubi [A] time = 0.1899, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2\sqrt{a+bx^3}(Ab-2aB)}{3b^3}+\frac{2a(Ab-aB)}{3b^3\sqrt{a+bx^3}}+\frac{2B\left(a+bx^3\right)^{3/2}}{9b^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*a*(A*b - a*B))/(3*b^3*Sqrt[a + b*x^3]) + (2*(A*b - 2*a*B)*Sqrt
[a + b*x^3])/(3*b^3) + (2*B*(a + b*x^3)^(3/2))/(9*b^3)
```

Rubi in Sympy [A] time = 16.5213, size = 68, normalized size = 0.93

$$\frac{2B\left(a+bx^3\right)^{\frac{3}{2}}}{9b^3}+\frac{2a\left(Ab-Ba\right)}{3b^3\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}\left(Ab-2Ba\right)}{3b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(3/2)/(9*b**3) + 2*a*(A*b - B*a)/(3*b**3*sqrt(a
 + b*x**3)) + 2*sqrt(a + b*x**3)*(A*b - 2*B*a)/(3*b**3)
```

Mathematica [A] time = 0.0676921, size = 55, normalized size = 0.75

$$\frac{2\left(-8a^2B+a\left(6Ab-4bBx^3\right)+b^2x^3\left(3A+Bx^3\right)\right)}{9b^3\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(-8*a^2*B + b^2*x^3*(3*A + B*x^3) + a*(6*A*b - 4*b*B*x^3)))/(9
*b^3*Sqrt[a + b*x^3])
```

Maple [A] time = 0.009, size = 52, normalized size = 0.7

$$\frac{2\,b^2Bx^6+6\,Ax^3b^2-8\,Bx^3ab+12\,abA-16\,a^2B}{9\,b^3}\frac{1}{\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] 2/9/(b*x^3+a)^(1/2)*(B*b^2*x^6+3*A*b^2*x^3-4*B*a*b*x^3+6*A*a*b-8*
B*a^2)/b^3
```

Maxima [A] time = 1.38358, size = 109, normalized size = 1.49

$$\frac{2}{9}\,B\left(\frac{\left(bx^3+a\right)^{\frac{3}{2}}}{b^3}-\frac{6\,\sqrt{bx^3+a}a}{b^3}-\frac{3\,a^2}{\sqrt{bx^3+a}b^3}\right)+\frac{2}{3}\,A\left(\frac{\sqrt{bx^3+a}}{b^2}+\frac{a}{\sqrt{bx^3+a}b^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] 2/9*B*((b*x^3 + a)^(3/2)/b^3 - 6*sqrt(b*x^3 + a)*a/b^3 - 3*a^2/(s
qrt(b*x^3 + a)*b^3)) + 2/3*A*(sqrt(b*x^3 + a)/b^2 + a/(sqrt(b*x^3
 + a)*b^2))
```

Fricas [A] time = 0.264255, size = 69, normalized size = 0.95

$$\frac{2\,\left(Bb^2x^6-\left(4\,Bab-3\,Ab^2\right)x^3-8\,Ba^2+6\,Aab\right)}{9\,\sqrt{bx^3+a}b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] 2/9*(B*b^2*x^6 - (4*B*a*b - 3*A*b^2)*x^3 - 8*B*a^2 + 6*A*a*b)/(sq
rt(b*x^3 + a)*b^3)
```

Sympy [A] time = 5.7932, size = 124, normalized size = 1.7

$$\begin{cases} \frac{4Aa}{3b^2\sqrt{a+bx^3}}+\frac{2Ax^3}{3b\sqrt{a+bx^3}}-\frac{16Ba^2}{9b^3\sqrt{a+bx^3}}-\frac{8Bax^3}{9b^2\sqrt{a+bx^3}}+\frac{2Bx^6}{9b\sqrt{a+bx^3}} & \text{for } b\neq 0 \\ \frac{\frac{Ax^6}{6}+\frac{Bx^9}{9}}{a^{\frac{3}{2}}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] Piecewise((4*A*a/(3*b**2*sqrt(a + b*x**3)) + 2*A*x**3/(3*b*sqrt(a
 + b*x**3)) - 16*B*a**2/(9*b**3*sqrt(a + b*x**3)) - 8*B*a*x**3/(9
*b**2*sqrt(a + b*x**3)) + 2*B*x**6/(9*b*sqrt(a + b*x**3)), Ne(b,
0)), ((A*x**6/6 + B*x**9/9)/a**(3/2), True))
```

GIAC/XCAS [A] time = 0.216163, size = 88, normalized size = 1.21

$$\frac{2\left(\left(bx^3+a\right)^{\frac{3}{2}}B-6\,\sqrt{bx^3+a}Ba+3\,\sqrt{bx^3+a}Ab-\frac{3\left(Ba^2-Aab\right)}{\sqrt{bx^3+a}}\right)}{9\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] 2/9*((b*x^3 + a)^(3/2)*B - 6*sqrt(b*x^3 + a)*B*a + 3*sqrt(b*x^3 +
 a)*A*b - 3*(B*a^2 - A*a*b)/sqrt(b*x^3 + a))/b^3
```

3.230 $\int \frac{x^2(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=46

$$\frac{2B\sqrt{a+bx^3}}{3b^2}-\frac{2(Ab-aB)}{3b^2\sqrt{a+bx^3}}$$

```
[Out] (-2*(A*b - a*B))/(3*b^2*Sqrt[a + b*x^3]) + (2*B*Sqrt[a + b*x^3])/
(3*b^2)
```

Rubi [A] time = 0.131313, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{2B\sqrt{a+bx^3}}{3b^2}-\frac{2(Ab-aB)}{3b^2\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (-2*(A*b - a*B))/(3*b^2*Sqrt[a + b*x^3]) + (2*B*Sqrt[a + b*x^3])/
(3*b^2)
```

Rubi in Sympy [A] time = 12.0311, size = 42, normalized size = 0.91

$$\frac{2B\sqrt{a+bx^3}}{3b^2}-\frac{2\left(Ab-Ba\right)}{3b^2\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*B*sqrt(a + b*x**3)/(3*b**2) - 2*(A*b - B*a)/(3*b**2*sqrt(a + b*
x**3))
```

Mathematica [A] time = 0.0303689, size = 33, normalized size = 0.72

$$\frac{2\left(2aB-Ab+bBx^3\right)}{3b^2\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(-(A*b) + 2*a*B + b*B*x^3))/(3*b^2*Sqrt[a + b*x^3])
```

Maple [A] time = 0.01, size = 30, normalized size = 0.7

$$-\frac{-2\,bBx^3+2\,Ab-4\,Ba}{3\,b^2}\frac{1}{\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] -2/3/(b*x^3+a)^(1/2)*(-B*b*x^3+A*b-2*B*a)/b^2
```

Maxima [A] time = 1.36576, size = 63, normalized size = 1.37

$$\frac{2}{3}\,B\left(\frac{\sqrt{bx^3+a}}{b^2}+\frac{a}{\sqrt{bx^3+a}b^2}\right)-\frac{2\,A}{3\,\sqrt{bx^3+a}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] 2/3*B*(sqrt(b*x^3 + a)/b^2 + a/(sqrt(b*x^3 + a)*b^2)) - 2/3*A/(sq
rt(b*x^3 + a)*b)
```

Fricas [A] time = 0.249605, size = 39, normalized size = 0.85

$$\frac{2\,\left(Bbx^3+2\,Ba-Ab\right)}{3\,\sqrt{bx^3+a}b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] 2/3*(B*b*x^3 + 2*B*a - A*b)/(sqrt(b*x^3 + a)*b^2)
```

Sympy [A] time = 3.07461, size = 75, normalized size = 1.63

$$\begin{cases} -\frac{2A}{3b\sqrt{a+bx^3}}+\frac{4Ba}{3b^2\sqrt{a+bx^3}}+\frac{2Bx^3}{3b\sqrt{a+bx^3}} & \text{for}\ b\neq 0 \\ \frac{\frac{Ax^3}{3}+\frac{Bx^6}{6}}{a^{\frac{3}{2}}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] Piecewise((-2*A/(3*b*sqrt(a + b*x**3)) + 4*B*a/(3*b**2*sqrt(a + b
*x**3)) + 2*B*x**3/(3*b*sqrt(a + b*x**3)), Ne(b, 0)), ((A*x**3/3
+ B*x**6/6)/a**(3/2), True))
```

GIAC/XCAS [A] time = 0.213419, size = 47, normalized size = 1.02

$$\frac{2\,\left(\sqrt{bx^3+a}B+\frac{Ba-Ab}{\sqrt{bx^3+a}}\right)}{3\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^2/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] 2/3*(sqrt(b*x^3 + a)*B + (B*a - A*b)/sqrt(b*x^3 + a))/b^2
```

3.231 $\int \frac{A+Bx^3}{x(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=58

$$\frac{2(Ab-aB)}{3ab\sqrt{a+bx^3}}-\frac{2A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{3/2}}$$

```
[Out] (2*(A*b - a*B))/(3*a*b*Sqrt[a + b*x^3]) - (2*A*ArcTanh[Sqrt[a + b
*x^3]/Sqrt[a]])/(3*a^(3/2))
```

Rubi [A] time = 0.143756, antiderivative size = 58, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{2(Ab-aB)}{3ab\sqrt{a+bx^3}}-\frac{2A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x*(a + b*x^3)^(3/2)),x]
```

```
[Out] (2*(A*b - a*B))/(3*a*b*Sqrt[a + b*x^3]) - (2*A*ArcTanh[Sqrt[a + b
*x^3]/Sqrt[a]])/(3*a^(3/2))
```

Rubi in Sympy [A] time = 11.5889, size = 51, normalized size = 0.88

$$-\frac{2A\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{\frac{3}{2}}}+\frac{2\left(Ab-Ba\right)}{3ab\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x/(b*x**3+a)**(3/2),x)
```

```
[Out] -2*A*atanh(sqrt(a + b*x**3)/sqrt(a))/(3*a**(3/2)) + 2*(A*b - B*a)
/(3*a*b*sqrt(a + b*x**3))
```

Mathematica [A] time = 0.242802, size = 61, normalized size = 1.05

$$-\frac{2\left(Ab\sqrt{\frac{bx^3}{a}+1}\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)+aB-Ab\right)}{3ab\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x*(a + b*x^3)^(3/2)),x]
```

```
[Out] (-2*(-(A*b) + a*B + A*b*Sqrt[1 + (b*x^3)/a]*ArcTanh[Sqrt[1 + (b*x
^3)/a]]))/(3*a*b*Sqrt[a + b*x^3])
```

Maple [A] time = 0.01, size = 57, normalized size = 1.

$$A\left(\frac{2}{3\,a}\frac{1}{\sqrt{\left(x^3+\frac{a}{b}\right)b}}-\frac{2}{3}Artanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{3}{2}}\right)-\frac{2\,B}{3\,b}\frac{1}{\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(2/3/a/((x^3+a/b)*b)^(1/2)-2/3/a^(3/2)*arctanh((b*x^3+a)^(1/2)/
a^(1/2)))-2/3*B/b/(b*x^3+a)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.265079, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{bx^3+a}Ab\log\left(\frac{(bx^3+2\,a)\sqrt{a}-2\,\sqrt{bx^3+a}a}{x^3}\right)-2\,(Ba-Ab)\sqrt{a}}{3\,\sqrt{bx^3+a}a^{\frac{3}{2}}b}, \frac{2\left(\sqrt{bx^3+a}Ab\arctan\left(\frac{a}{\sqrt{bx^3+a}\sqrt{-a}}\right)-(Ba-Ab)\sqrt{-a}\right)}{3\,\sqrt{bx^3+a}\sqrt{-a}ab}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x),x, algorithm="fricas")
```

```
[Out] [1/3*(sqrt(b*x^3 + a)*A*b*log(((b*x^3 + 2*a)*sqrt(a) - 2*sqrt(b*x
^3 + a)*a)/x^3) - 2*(B*a - A*b)*sqrt(a))/(sqrt(b*x^3 + a)*a^(3/2)
*b), 2/3*(sqrt(b*x^3 + a)*A*b*arctan(a/(sqrt(b*x^3 + a)*sqrt(-a))
) - (B*a - A*b)*sqrt(-a))/(sqrt(b*x^3 + a)*sqrt(-a)*a*b)]
```

Sympy [A] time = 57.5709, size = 214, normalized size = 3.69

$$A\left(\frac{2a^3\sqrt{1+\frac{bx^3}{a}}}{3a^{\frac{9}{2}}+3a^{\frac{7}{2}}bx^3}+\frac{a^3\log\left(\frac{bx^3}{a}\right)}{3a^{\frac{9}{2}}+3a^{\frac{7}{2}}bx^3}-\frac{2a^3\log\left(\sqrt{1+\frac{bx^3}{a}}+1\right)}{3a^{\frac{9}{2}}+3a^{\frac{7}{2}}bx^3}+\frac{a^2bx^3\log\left(\frac{bx^3}{a}\right)}{3a^{\frac{9}{2}}+3a^{\frac{7}{2}}bx^3}-\frac{2a^2bx^3\log\left(\sqrt{1+\frac{bx^3}{a}}+1\right)}{3a^{\frac{9}{2}}+3a^{\frac{7}{2}}bx^3}\right)+B\left(\begin{cases}-\frac{2}{3b\sqrt{a+bx^3}} & \text{for } b\neq 0\\ \frac{x^3}{3a^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x/(b*x**3+a)**(3/2),x)
```

```
[Out] A*(2*a**3*sqrt(1 + b*x**3/a)/(3*a**(9/2) + 3*a**(7/2)*b*x**3) + a
**3*log(b*x**3/a)/(3*a**(9/2) + 3*a**(7/2)*b*x**3) - 2*a**3*log(s
qrt(1 + b*x**3/a) + 1)/(3*a**(9/2) + 3*a**(7/2)*b*x**3) + a**2*b*
x**3*log(b*x**3/a)/(3*a**(9/2) + 3*a**(7/2)*b*x**3) - 2*a**2*b*x*
*3*log(sqrt(1 + b*x**3/a) + 1)/(3*a**(9/2) + 3*a**(7/2)*b*x**3))
+ B*Piecewise((-2/(3*b*sqrt(a + b*x**3)), Ne(b, 0)), (x**3/(3*a**
(3/2)), True))
```

GIAC/XCAS [A] time = 0.218203, size = 72, normalized size = 1.24

$$\frac{2\,A\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{3\,\sqrt{-a}a} - \frac{2\,(Ba - Ab)}{3\,\sqrt{bx^3 + a}ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x),x, algorithm="giac")
```

```
[Out] 2/3*A*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sqrt(-a)*a) - 2/3*(B*a -
A*b)/(sqrt(b*x^3 + a)*a*b)
```

3.232 $\int \frac{A+Bx^3}{x^4(a+bx^3)^{3/2}} \, dx$

Optimal. Leaf size=86

$$\frac{(3Ab-2aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{5/2}}-\frac{3Ab-2aB}{3a^2\sqrt{a+bx^3}}-\frac{A}{3ax^3\sqrt{a+bx^3}}$$

```
[Out] -(3*A*b - 2*a*B)/(3*a^2*Sqrt[a + b*x^3]) - A/(3*a*x^3*Sqrt[a + b*
x^3]) + ((3*A*b - 2*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(3*a^(
5/2))
```

Rubi [A] time = 0.214431, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{(3Ab-2aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{5/2}}-\frac{3Ab-2aB}{3a^2\sqrt{a+bx^3}}-\frac{A}{3ax^3\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^4*(a + b*x^3)^(3/2)),x]
```

```
[Out] -(3*A*b - 2*a*B)/(3*a^2*Sqrt[a + b*x^3]) - A/(3*a*x^3*Sqrt[a + b*
x^3]) + ((3*A*b - 2*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(3*a^(
5/2))
```

Rubi in Sympy [A] time = 15.0876, size = 78, normalized size = 0.91

$$-\frac{A}{3ax^3\sqrt{a+bx^3}}-\frac{2\left(\frac{3Ab}{2}-Ba\right)}{3a^2\sqrt{a+bx^3}}+\frac{2\left(\frac{3Ab}{2}-Ba\right)\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**4/(b*x**3+a)**(3/2),x)
```

```
[Out] -A/(3*a*x**3*sqrt(a + b*x**3)) - 2*(3*A*b/2 - B*a)/(3*a**2*sqrt(a
 + b*x**3)) + 2*(3*A*b/2 - B*a)*atanh(sqrt(a + b*x**3)/sqrt(a))/(
3*a**(5/2))
```

Mathematica [A] time = 0.424707, size = 73, normalized size = 0.85

$$\frac{\sqrt{\frac{bx^3}{a}+1}(3Ab-2aB)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)-\frac{aA}{x^3}+2aB-3Ab}{3a^2\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^4*(a + b*x^3)^(3/2)),x]
```

```
[Out] (-3*A*b + 2*a*B - (a*A)/x^3 + (3*A*b - 2*a*B)*Sqrt[1 + (b*x^3)/a]
*ArcTanh[Sqrt[1 + (b*x^3)/a]])/(3*a^2*Sqrt[a + b*x^3])
```

Maple [A] time = 0.012, size = 100, normalized size = 1.2

$$A\left(-\frac{1}{3\,a^{2}x^{3}}\sqrt{b x^{3}+a}-\frac{2\,b}{3\,a^{2}}\frac{1}{\sqrt{\left(x^{3}+\frac{a}{b}\right)b}}+b Artanh\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{5}{2}}\right)+B\left(\frac{2}{3\,a}\frac{1}{\sqrt{\left(x^{3}+\frac{a}{b}\right)b}}-\frac{2}{3}Artanh\left(1\sqrt{b x^{3}+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{3}{2}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^4/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(-1/3/a^2*(b*x^3+a)^(1/2)/x^3-2/3*b/a^2/((x^3+a/b)*b)^(1/2)+b/a
^(5/2)*arctanh((b*x^3+a)^(1/2)/a^(1/2)))+B*(2/3/a/((x^3+a/b)*b)^(
1/2)-2/3/a^(3/2)*arctanh((b*x^3+a)^(1/2)/a^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^4),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.255995, size = 1, normalized size = 0.01

$$\left[-\frac{\sqrt{b x^{3}+a}(2\,Ba-3\,Ab)x^{3}\log\left(\frac{(bx^{3}+2\,a)\sqrt{a}+2\,\sqrt{bx^{3}+a}a}{x^{3}}\right)-2\left((2\,Ba-3\,Ab)x^{3}-Aa\right)\sqrt{a}}{6\,\sqrt{b x^{3}+a}a^{\frac{5}{2}}x^{3}},\ \frac{\sqrt{b x^{3}+a}(2\,Ba-3\,Ab)x^{3}\arctan\left(\frac{}{\sqrt{b}}\right.}{3\,\sqrt{bx^{3}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/6*(sqrt(b*x^3 + a)*(2*B*a - 3*A*b)*x^3*log(((b*x^3 + 2*a)*sqr
t(a) + 2*sqrt(b*x^3 + a)*a)/x^3) - 2*((2*B*a - 3*A*b)*x^3 - A*a)*
sqrt(a))/(sqrt(b*x^3 + a)*a^(5/2)*x^3), 1/3*(sqrt(b*x^3 + a)*(2*B
*a - 3*A*b)*x^3*arctan(a/(sqrt(b*x^3 + a)*sqrt(-a))) + ((2*B*a -
3*A*b)*x^3 - A*a)*sqrt(-a))/(sqrt(b*x^3 + a)*sqrt(-a)*a^2*x^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**4/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220098, size = 134, normalized size = 1.56

$$\frac{(2\,Ba-3\,Ab)\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{3\,\sqrt{-a}a^2}+\frac{2\,\left(bx^3+a\right)Ba-2\,Ba^2-3\,\left(bx^3+a\right)Ab+2\,Aab}{3\,\left(\left(bx^3+a\right)^{\frac{3}{2}}-\sqrt{bx^3+a}a\right)a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*(2*B*a - 3*A*b)*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sqrt(-a)*a^
2) + 1/3*(2*(b*x^3 + a)*B*a - 2*B*a^2 - 3*(b*x^3 + a)*A*b + 2*A*a
*b)/(((b*x^3 + a)^(3/2) - sqrt(b*x^3 + a)*a)*a^2)
```

3.233 $\int \frac{A+Bx^3}{x^7(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=120

$$-\frac{b(5Ab-4aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{4a^{7/2}}+\frac{\sqrt{a+bx^3}(5Ab-4aB)}{4a^3x^3}-\frac{5Ab-4aB}{6a^2x^3\sqrt{a+bx^3}}-\frac{A}{6ax^6\sqrt{a+bx^3}}$$

```
[Out] -A/(6*a*x^6*Sqrt[a + b*x^3]) - (5*A*b - 4*a*B)/(6*a^2*x^3*Sqrt[a
+ b*x^3]) + ((5*A*b - 4*a*B)*Sqrt[a + b*x^3])/(4*a^3*x^3) - (b*(5
*A*b - 4*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(4*a^(7/2))
```

Rubi [A] time = 0.273545, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{b(5Ab-4aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{4a^{7/2}}+\frac{\sqrt{a+bx^3}(5Ab-4aB)}{4a^3x^3}-\frac{5Ab-4aB}{6a^2x^3\sqrt{a+bx^3}}-\frac{A}{6ax^6\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^7*(a + b*x^3)^(3/2)),x]
```

```
[Out] -A/(6*a*x^6*Sqrt[a + b*x^3]) - (5*A*b - 4*a*B)/(6*a^2*x^3*Sqrt[a
+ b*x^3]) + ((5*A*b - 4*a*B)*Sqrt[a + b*x^3])/(4*a^3*x^3) - (b*(5
*A*b - 4*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(4*a^(7/2))
```

Rubi in Sympy [A] time = 18.1814, size = 110, normalized size = 0.92

$$-\frac{A}{6ax^6\sqrt{a+bx^3}}-\frac{5Ab-4Ba}{6a^2x^3\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}\,(5Ab-4Ba)}{4a^3x^3}-\frac{b\,(5Ab-4Ba)\,\mathrm{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{4a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**7/(b*x**3+a)**(3/2),x)
```

```
[Out] -A/(6*a*x**6*sqrt(a + b*x**3)) - (5*A*b - 4*B*a)/(6*a**2*x**3*sqr
t(a + b*x**3)) + sqrt(a + b*x**3)*(5*A*b - 4*B*a)/(4*a**3*x**3) -
 b*(5*A*b - 4*B*a)*atanh(sqrt(a + b*x**3)/sqrt(a))/(4*a**(7/2))
```

Mathematica [A] time = 0.597257, size = 95, normalized size = 0.79

$$\frac{-\frac{2a^2(A+2Bx^3)}{x^6}+ab\left(\frac{5A}{x^3}-12B\right)+3b\sqrt{\frac{bx^3}{a}+1}(4aB-5Ab)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)+15Ab^2}{12a^3\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^7*(a + b*x^3)^(3/2)),x]
```

```
[Out] (15*A*b^2 + a*b*(-12*B + (5*A)/x^3) - (2*a^2*(A + 2*B*x^3))/x^6 +
 3*b*(-5*A*b + 4*a*B)*Sqrt[1 + (b*x^3)/a]*ArcTanh[Sqrt[1 + (b*x^3
)/a]])/(12*a^3*Sqrt[a + b*x^3])
```

Maple [A] time = 0.013, size = 141, normalized size = 1.2

$$A\left(-\frac{1}{6\,a^{2}x^{6}}\sqrt{bx^{3}+a}+\frac{7\,b}{12\,a^{3}x^{3}}\sqrt{bx^{3}+a}+\frac{2\,b^{2}}{3\,a^{3}}\frac{1}{\sqrt{\left(x^{3}+\frac{a}{b}\right)b}}-\frac{5\,b^{2}}{4}Artanh\left(1\sqrt{bx^{3}+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{7}{2}}\right)$$
$$+B\left(-\frac{1}{3\,a^{2}x^{3}}\sqrt{bx^{3}+a}-\frac{2\,b}{3\,a^{2}}\frac{1}{\sqrt{\left(x^{3}+\frac{a}{b}\right)b}}+bArtanh\left(1\sqrt{bx^{3}+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{5}{2}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^7/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(-1/6/a^2*(b*x^3+a)^(1/2)/x^6+7/12/a^3*b*(b*x^3+a)^(1/2)/x^3+2/
3*b^2/a^3/((x^3+a/b)*b)^(1/2)-5/4/a^(7/2)*b^2*arctanh((b*x^3+a)^(
1/2)/a^(1/2)))+B*(-1/3/a^2*(b*x^3+a)^(1/2)/x^3-2/3*b/a^2/((x^3+a/
b)*b)^(1/2)+b/a^(5/2)*arctanh((b*x^3+a)^(1/2)/a^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^7),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.270753, size = 1, normalized size = 0.01

$$\left[-\frac{3\sqrt{bx^{3}+a}\left(4\,Bab-5\,Ab^{2}\right)x^{6}\log\left(\frac{\left(bx^{3}+2\,a\right)\sqrt{a}-2\sqrt{bx^{3}+a}a}{x^{3}}\right)+2\left(3\left(4\,Bab-5\,Ab^{2}\right)x^{6}+\left(4\,Ba^{2}-5\,Aab\right)x^{3}+2\,Aa^{2}\right)\sqrt{a}}{24\sqrt{bx^{3}+a}a^{\frac{7}{2}}x^{6}},\right.$$
$$\left.-\frac{3\sqrt{bx^{3}+a}\left(4\,Bab-5\,Ab^{2}\right)x^{6}\arctan\left(\frac{a}{\sqrt{bx^{3}+a}\sqrt{-a}}\right)+\left(3\left(4\,Bab-5\,Ab^{2}\right)x^{6}+\left(4\,Ba^{2}-5\,Aab\right)x^{3}+2\,Aa^{2}\right)\sqrt{-a}}{12\sqrt{bx^{3}+a}\sqrt{-a}a^{3}x^{6}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^7),x, algorithm="fricas")
```

```
[Out] [-1/24*(3*sqrt(b*x^3 + a)*(4*B*a*b - 5*A*b^2)*x^6*log(((b*x^3 + 2
*a)*sqrt(a) - 2*sqrt(b*x^3 + a)*a)/x^3) + 2*(3*(4*B*a*b - 5*A*b^2
)*x^6 + (4*B*a^2 - 5*A*a*b)*x^3 + 2*A*a^2)*sqrt(a))/(sqrt(b*x^3 +
 a)*a^(7/2)*x^6), -1/12*(3*sqrt(b*x^3 + a)*(4*B*a*b - 5*A*b^2)*x^
6*arctan(a/(sqrt(b*x^3 + a)*sqrt(-a))) + (3*(4*B*a*b - 5*A*b^2)*x
^6 + (4*B*a^2 - 5*A*a*b)*x^3 + 2*A*a^2)*sqrt(-a))/(sqrt(b*x^3 + a
)*sqrt(-a)*a^3*x^6)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**7/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221717, size = 185, normalized size = 1.54

$$-\frac{\left(4\,Bab-5\,Ab^{2}\right)\arctan\left(\frac{\sqrt{bx^{3}+a}}{\sqrt{-a}}\right)}{4\,\sqrt{-a}a^{3}}-\frac{2\,\left(Bab-Ab^{2}\right)}{3\,\sqrt{bx^{3}+a}a^{3}}-\frac{4\,\left(bx^{3}+a\right)^{\frac{3}{2}}Bab-4\,\sqrt{bx^{3}+a}Ba^{2}b-7\,\left(bx^{3}+a\right)^{\frac{3}{2}}Ab^{2}+9\,\sqrt{bx^{3}+a}Aab^{2}}{12\,a^{3}b^{2}x^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^7),x, algorithm="giac")
```

```
[Out] -1/4*(4*B*a*b - 5*A*b^2)*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sqrt(-
a)*a^3) - 2/3*(B*a*b - A*b^2)/(sqrt(b*x^3 + a)*a^3) - 1/12*(4*(b*
x^3 + a)^(3/2)*B*a*b - 4*sqrt(b*x^3 + a)*B*a^2*b - 7*(b*x^3 + a)^
(3/2)*A*b^2 + 9*sqrt(b*x^3 + a)*A*a*b^2)/(a^3*b^2*x^6)
```

3.234 $\int \frac{x^6 (A+Bx^3)}{(a+bx^3)^{3/2}} \, dx$

Optimal. Leaf size=300

$$-\frac{32\sqrt{2+\sqrt{3}}a\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{165\sqrt[4]{3}b^{10/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{16x\sqrt{a+bx^3}(11Ab-14aB)}{165b^3}-\frac{2x^4(11Ab-14aB)}{33b^2\sqrt{a+bx^3}}+\frac{2Bx^7}{11b\sqrt{a+bx^3}}$$

```
[Out] (-2*(11*A*b - 14*a*B)*x^4)/(33*b^2*Sqrt[a + b*x^3]) + (2*B*x^7)/(
11*b*Sqrt[a + b*x^3]) + (16*(11*A*b - 14*a*B)*x*Sqrt[a + b*x^3])/
(165*b^3) - (32*Sqrt[2 + Sqrt[3]]*a*(11*A*b - 14*a*B)*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 +
 Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])
*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 -
4*Sqrt[3]])/(165*3^(1/4)*b^(10/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3
)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.411705, antiderivative size = 300, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{32\sqrt{2+\sqrt{3}}a\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{165\sqrt[4]{3}b^{10/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{16x\sqrt{a+bx^3}(11Ab-14aB)}{165b^3}-\frac{2x^4(11Ab-14aB)}{33b^2\sqrt{a+bx^3}}+\frac{2Bx^7}{11b\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^6*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (-2*(11*A*b - 14*a*B)*x^4)/(33*b^2*Sqrt[a + b*x^3]) + (2*B*x^7)/(
11*b*Sqrt[a + b*x^3]) + (16*(11*A*b - 14*a*B)*x*Sqrt[a + b*x^3])/
(165*b^3) - (32*Sqrt[2 + Sqrt[3]]*a*(11*A*b - 14*a*B)*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 +
 Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])
*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 -
4*Sqrt[3]])/(165*3^(1/4)*b^(10/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3
)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 25.9981, size = 275, normalized size = 0.92

$$\frac{2Bx^7}{11b\sqrt{a+bx^3}}-\frac{32\cdot 3^{\frac{3}{4}}a\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-14Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{495b^{\frac{10}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2x^4(11Ab-14Ba)}{33b^2\sqrt{a+bx^3}}+\frac{16x\sqrt{a+bx^3}(11Ab-14Ba)}{165b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**6*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*B*x**7/(11*b*sqrt(a + b*x**3)) - 32*3**(3/4)*a*sqrt((a**(2/3) -
 a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b
**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(11*A*b
- 14*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)
/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(495*b**
(10/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(
3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 2*x**4*(11*A*b - 14*B*a
)/(33*b**2*sqrt(a + b*x**3)) + 16*x*sqrt(a + b*x**3)*(11*A*b - 14
*B*a)/(165*b**3)
```

Mathematica [C] time = 0.909361, size = 205, normalized size = 0.68

$$\frac{-6\sqrt[3]{-b}x\left(-112a^2B+a\left(88Ab-42bBx^3\right)+3b^2x^3\left(11A+5Bx^3\right)\right)+32i3^{3/4}a^{4/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}}{495(-b)^{10/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[(x^6*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (-6*(-b)^(1/3)*x*(-112*a^2*B + 3*b^2*x^3*(11*A + 5*B*x^3) + a*(88
*A*b - 42*b*B*x^3)) + (32*I)*3^(3/4)*a^(4/3)*(11*A*b - 14*a*B)*Sq
rt[((-1)^(5/6)*(-a^(1/3) + (-b)^(1/3)*x))/a^(1/3)]*Sqrt[1 + ((-b)
^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sq
rt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])
/(495*(-b)^(10/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.032, size = 666, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^6*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(2/3/b^2*a*x/((x^3+a/b)*b)^(1/2)+2/5/b^2*x*(b*x^3+a)^(1/2)+32/4
5*I*a/b^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/
b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*Ellipti
cF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1
/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)
))+B*(-2/3/b^3*a^2*x/((x^3+a/b)*b)^(1/2)+2/11/b^2*x^4*(b*x^3+a)^(
1/2)-38/55*a/b^3*x*(b*x^3+a)^(1/2)-448/495*I*a^2/b^4*3^(1/2)*(-a*
b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+
1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1
/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a
*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(
1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^6}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^9 + Ax^6}{(bx^3 + a)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^9 + A*x^6)/(b*x^3 + a)^(3/2), x)
```

Sympy [A] time = 173.336, size = 80, normalized size = 0.27

$$\frac{Ax^7\,\Gamma\left(\frac{7}{3}\right)\,{}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{7}{3}\\\frac{10}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\,\Gamma\left(\frac{10}{3}\right)} + \frac{Bx^{10}\,\Gamma\left(\frac{10}{3}\right)\,{}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{10}{3}\\\frac{13}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\,\Gamma\left(\frac{13}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] A*x**7*gamma(7/3)*hyper((3/2, 7/3), (10/3,), b*x**3*exp_polar(I*p
i)/a)/(3*a**(3/2)*gamma(10/3)) + B*x**10*gamma(10/3)*hyper((3/2,
10/3), (13/3,), b*x**3*exp_polar(I*pi)/a)/(3*a**(3/2)*gamma(13/3)
)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^6}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(3/2), x)
```

3.235 $\int \frac{x^3(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=269

$$\frac{4\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{15\sqrt[4]{3}b^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{2x(5Ab-8aB)}{15b^2\sqrt{a+bx^3}} + \frac{2Bx^4}{5b\sqrt{a+bx^3}}$$

```
[Out] (-2*(5*A*b - 8*a*B)*x)/(15*b^2*Sqrt[a + b*x^3]) + (2*B*x^4)/(5*b*
Sqrt[a + b*x^3]) + (4*Sqrt[2 + Sqrt[3]]*(5*A*b - 8*a*B)*(a^(1/3)
+ b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1
 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3
])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
- 4*Sqrt[3]])/(15*3^(1/4)*b^(7/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3
)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.311588, antiderivative size = 269, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{4\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{15\sqrt[4]{3}b^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{2x(5Ab-8aB)}{15b^2\sqrt{a+bx^3}} + \frac{2Bx^4}{5b\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (-2*(5*A*b - 8*a*B)*x)/(15*b^2*Sqrt[a + b*x^3]) + (2*B*x^4)/(5*b*
Sqrt[a + b*x^3]) + (4*Sqrt[2 + Sqrt[3]]*(5*A*b - 8*a*B)*(a^(1/3)
+ b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1
 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3
])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
- 4*Sqrt[3]])/(15*3^(1/4)*b^(7/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3
)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 20.9078, size = 243, normalized size = 0.9

$$\frac{2Bx^4}{5b\sqrt{a+bx^3}} - \frac{2x\,(5Ab-8Ba)}{15b^2\sqrt{a+bx^3}} + \frac{4\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(5Ab-8Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{45b^{\frac{7}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*B*x**4/(5*b*sqrt(a + b*x**3)) - 2*x*(5*A*b - 8*B*a)/(15*b**2*sq
rt(a + b*x**3)) + 4*3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x
 + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(
sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(5*A*b - 8*B*a)*elliptic_f(a
sin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3
)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(45*b**(7/3)*sqrt(a**(1/3)*(a*
*(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sq
rt(a + b*x**3))
```

Mathematica [C] time = 0.600434, size = 182, normalized size = 0.68

$$\frac{6\sqrt[3]{-b}x\left(8aB-5Ab+3bBx^3\right)+4i3^{3/4}\sqrt[3]{a}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(5Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/}}}{\sqrt[4]{3}}\right.\right.}{45(-b)^{7/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^3*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (6*(-b)^(1/3)*x*(-5*A*b + 8*a*B + 3*b*B*x^3) + (4*I)*3^(3/4)*a^(1
/3)*(5*A*b - 8*a*B)*Sqrt[((-1)^(5/6)*(-a^(1/3) + (-b)^(1/3)*x))/a
^(1/3)]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3
)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/
3^(1/4)], (-1)^(1/3)])/(45*(-b)^(7/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.01, size = 627, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(-2/3/b*x/((x^3+a/b)*b)^(1/2)-4/9*I/b^2*3^(1/2)*(-a*b^2)^(1/3)*
(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2
)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^
2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(2/3/b^2*a*x/((x^3+a/b)*b)^(
1/2)+2/5/b^2*x*(b*x^3+a)^(1/2)+32/45*I*a/b^3*3^(1/2)*(-a*b^2)^(1/
3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(
1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(
1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a
*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1
/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2
*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)x^3}{\left(bx^3+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^6 + Ax^3}{(bx^3 + a)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^6 + A*x^3)/(b*x^3 + a)^(3/2), x)
```

Sympy [A] time = 55.7549, size = 80, normalized size = 0.3

$$\frac{Ax^4\,\Gamma\left(\frac{4}{3}\right)\,{}_2F_1\left(\begin{matrix}\frac{4}{3},\frac{3}{2}\\ \frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\,\Gamma\left(\frac{7}{3}\right)} + \frac{Bx^7\,\Gamma\left(\frac{7}{3}\right)\,{}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{7}{3}\\ \frac{10}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\,\Gamma\left(\frac{10}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] A*x**4*gamma(4/3)*hyper((4/3, 3/2), (7/3,), b*x**3*exp_polar(I*pi
)/a)/(3*a**(3/2)*gamma(7/3)) + B*x**7*gamma(7/3)*hyper((3/2, 7/3)
, (10/3,), b*x**3*exp_polar(I*pi)/a)/(3*a**(3/2)*gamma(10/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\,x^3}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(3/2), x)
```

3.236 $\int \frac{A+Bx^3}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=251

$$\frac{2\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{3\sqrt[4]{3}ab^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x(Ab-aB)}{3ab\sqrt{a+bx^3}}$$

```
[Out] (2*(A*b - a*B)*x)/(3*a*b*Sqrt[a + b*x^3]) + (2*Sqrt[2 + Sqrt[3]]*
(A*b + 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/
3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellipt
icF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3*3^(1/4)*a*b^(4/3)*Sqrt[(a
^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.20803, antiderivative size = 251, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$

$$\frac{2\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{3\sqrt[4]{3}ab^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x(Ab-aB)}{3ab\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(A*b - a*B)*x)/(3*a*b*Sqrt[a + b*x^3]) + (2*Sqrt[2 + Sqrt[3]]*
(A*b + 2*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/
3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellipt
icF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3*3^(1/4)*a*b^(4/3)*Sqrt[(a
^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 13.6957, size = 219, normalized size = 0.87

$$\frac{2x\left(Ab-Ba\right)}{3ab\sqrt{a+bx^3}}+\frac{4\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{Ab}{2}+Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{9ab^{\frac{4}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*x*(A*b - B*a)/(3*a*b*sqrt(a + b*x**3)) + 4*3**(3/4)*sqrt((a**(2
/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)
```

```
) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(A*
b/2 + B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x
)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(9*a*b*
*(4/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(
3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.905129, size = 176, normalized size = 0.7

$$-\frac{6\sqrt[3]{-b}x(Ab-aB)+2i3^{3/4}\sqrt[3]{a}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(2aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{9a(-b)^{4/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(a + b*x^3)^(3/2),x]
```

```
[Out] -(6*(-b)^(1/3)*(A*b - a*B)*x + (2*I)*3^(3/4)*a^(1/3)*(A*b + 2*a*B
)*Sqrt[((-1)^(5/6)*(-a^(1/3) + (-b)^(1/3)*x))/a^(1/3)]*Sqrt[1 + (
(-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSi
n[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/
3)])/(9*a*(-b)^(4/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.007, size = 613, normalized size = 2.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(2/3/a*x/((x^3+a/b)*b)^(1/2)-2/9*I/a*3^(1/2)/b*(-a*b^2)^(1/3)*(
I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)
*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2
)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(-2/3/b*x/((x^3+a/b)*b)^(1/2)
-4/9*I/b^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1
/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(
1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2
)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(b*x^3 + a)^(3/2), x)
```

Sympy [A] time = 34.4522, size = 78, normalized size = 0.31

$$\frac{Ax\Gamma\left(\frac{1}{3}\right){}_2F_1\left(\begin{matrix}\frac{1}{3},\frac{3}{2}\\ \frac{4}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\Gamma\left(\frac{4}{3}\right)} + \frac{Bx^4\Gamma\left(\frac{4}{3}\right){}_2F_1\left(\begin{matrix}\frac{4}{3},\frac{3}{2}\\ \frac{7}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\Gamma\left(\frac{7}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] A*x*gamma(1/3)*hyper((1/3, 3/2), (4/3,), b*x**3*exp_polar(I*pi)/a
)/(3*a**(3/2)*gamma(4/3)) + B*x**4*gamma(4/3)*hyper((4/3, 3/2), (
7/3,), b*x**3*exp_polar(I*pi)/a)/(3*a**(3/2)*gamma(7/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(b*x^3 + a)^(3/2), x)
```

3.237 $\int \frac{A+Bx^3}{x^3(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=272

$$-\frac{x(7Ab-4aB)}{6a^2\sqrt{a+bx^3}}-\frac{\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{6\sqrt[4]{3}a^2\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A}{2ax^2\sqrt{a+bx^3}}$$

```
[Out] -A/(2*a*x^2*Sqrt[a + b*x^3]) - ((7*A*b - 4*a*B)*x)/(6*a^2*Sqrt[a
+ b*x^3]) - (Sqrt[2 + Sqrt[3]]*(7*A*b - 4*a*B)*(a^(1/3) + b^(1/3)
*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3
) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[
3]])/(6*3^(1/4)*a^2*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.292284, antiderivative size = 272, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$-\frac{x(7Ab-4aB)}{6a^2\sqrt{a+bx^3}}-\frac{\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{6\sqrt[4]{3}a^2\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A}{2ax^2\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^3*(a + b*x^3)^(3/2)),x]
```

```
[Out] -A/(2*a*x^2*Sqrt[a + b*x^3]) - ((7*A*b - 4*a*B)*x)/(6*a^2*Sqrt[a
+ b*x^3]) - (Sqrt[2 + Sqrt[3]]*(7*A*b - 4*a*B)*(a^(1/3) + b^(1/3)
*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3
) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[
3]])/(6*3^(1/4)*a^2*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 18.7496, size = 243, normalized size = 0.89

$$-\frac{A}{2ax^2\sqrt{a+bx^3}}-\frac{x\left(7Ab-4Ba\right)}{6a^2\sqrt{a+bx^3}}-\frac{3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(7Ab-4Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{18a^2\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((B*x**3+A)/x**3/(b*x**3+a)**(3/2),x)
```

```
[Out] -A/(2*a*x**2*sqrt(a + b*x**3)) - x*(7*A*b - 4*B*a)/(6*a**2*sqrt(a
 + b*x**3)) - 3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**
(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(sqrt(3
) + 2)*(a**(1/3) + b**(1/3)*x)*(7*A*b - 4*B*a)*elliptic_f(asin((-
a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b
**(1/3)*x)), -7 - 4*sqrt(3))/(18*a**2*b**(1/3)*sqrt(a**(1/3)*(a**
(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqr
t(a + b*x**3))
```

Mathematica [C]   time = 0.600519, size = 193, normalized size = 0.71

$$\frac{-3\sqrt[3]{-b}\left(3aA-4aBx^3+7Abx^3\right)-i3^{3/4}\sqrt[3]{a}x^2\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(7Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-\cdots}}{\sqrt[4]{3}}\right.\right.}{18a^2\sqrt[3]{-b}x^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[(A + B*x^3)/(x^3*(a + b*x^3)^(3/2)),x]
```

```
[Out] (-3*(-b)^(1/3)*(3*a*A + 7*A*b*x^3 - 4*a*B*x^3) - I*3^(3/4)*a^(1/3
)*(7*A*b - 4*a*B)*x^2*Sqrt[((-1)^(5/6)*(-a^(1/3) + (-b)^(1/3)*x))
/a^(1/3)]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2
/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)
]/3^(1/4)], (-1)^(1/3)])/(18*a^2*(-b)^(1/3)*x^2*Sqrt[a + b*x^3])
```

Maple [B]   time = 0.013, size = 631, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((B*x^3+A)/x^3/(b*x^3+a)^(3/2),x)
```

```
[Out] B*(2/3/a*x/((x^3+a/b)*b)^(1/2)-2/9*I/a*3^(1/2)/b*(-a*b^2)^(1/3)*(
I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)
*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2
)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+A*(-2/3*b/a^2*x/((x^3+a/b)*b)^(
1/2)-1/2/a^2*(b*x^3+a)^(1/2)/x^2+7/18*I/a^2*3^(1/2)*(-a*b^2)^(1/3
)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1
/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3+A}{(bx^3+a)^{\frac{3}{2}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^3),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(bx^6 + ax^3)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^3),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b*x^6 + a*x^3)*sqrt(b*x^3 + a)), x)
```

Sympy [A] time = 116.562, size = 82, normalized size = 0.3

$$\frac{A\,\Gamma\left(-\frac{2}{3}\right)\,{}_{2}F_{1}\left(\begin{matrix}-\frac{2}{3},\frac{3}{2}\\ \frac{1}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}x^2\,\Gamma\left(\frac{1}{3}\right)}+\frac{Bx\,\Gamma\left(\frac{1}{3}\right)\,{}_{2}F_{1}\left(\begin{matrix}\frac{1}{3},\frac{3}{2}\\ \frac{4}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\,\Gamma\left(\frac{4}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**3/(b*x**3+a)**(3/2),x)
```

```
[Out] A*gamma(-2/3)*hyper((-2/3, 3/2), (1/3,), b*x**3*exp_polar(I*pi)/a
)/(3*a**(3/2)*x**2*gamma(1/3)) + B*x*gamma(1/3)*hyper((1/3, 3/2),
 (4/3,), b*x**3*exp_polar(I*pi)/a)/(3*a**(3/2)*gamma(4/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^3),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^3), x)
```

3.238 $\int \frac{A+Bx^3}{x^6(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=304

$$\frac{7\sqrt{a+bx^3}(13Ab-10aB)}{60a^3x^2}-\frac{13Ab-10aB}{15a^2x^2\sqrt{a+bx^3}}+\frac{7\sqrt{2+\sqrt{3}}\,b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{60\sqrt[4]{3}a^3\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A}{5ax^5\sqrt{a+bx^3}}$$

```
[Out] -A/(5*a*x^5*Sqrt[a + b*x^3]) - (13*A*b - 10*a*B)/(15*a^2*x^2*Sqrt
[a + b*x^3]) + (7*(13*A*b - 10*a*B)*Sqrt[a + b*x^3])/(60*a^3*x^2)
 + (7*Sqrt[2 + Sqrt[3]]*b^(2/3)*(13*A*b - 10*a*B)*(a^(1/3) + b^(1
/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sq
rt[3]])/(60*3^(1/4)*a^3*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1
+ Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.383128, antiderivative size = 304, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{7\sqrt{a+bx^3}(13Ab-10aB)}{60a^3x^2}-\frac{13Ab-10aB}{15a^2x^2\sqrt{a+bx^3}}+\frac{7\sqrt{2+\sqrt{3}}\,b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{60\sqrt[4]{3}a^3\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A}{5ax^5\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^6*(a + b*x^3)^(3/2)),x]
```


```
[Out] -A/(5*a*x^5*Sqrt[a + b*x^3]) - (13*A*b - 10*a*B)/(15*a^2*x^2*Sqrt
[a + b*x^3]) + (7*(13*A*b - 10*a*B)*Sqrt[a + b*x^3])/(60*a^3*x^2)
 + (7*Sqrt[2 + Sqrt[3]]*b^(2/3)*(13*A*b - 10*a*B)*(a^(1/3) + b^(1
/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sq
rt[3]])/(60*3^(1/4)*a^3*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1
+ Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 26.3821, size = 275, normalized size = 0.9

$$-\frac{A}{5ax^5\sqrt{a+bx^3}}-\frac{13Ab-10Ba}{15a^2x^2\sqrt{a+bx^3}}+\frac{7\cdot 3^{\frac{3}{4}}b^{\frac{2}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(13Ab-10Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{180a^3\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{7\sqrt{a+bx^3}\,(13Ab-10Ba)}{60a^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((B*x**3+A)/x**6/(b*x**3+a)**(3/2),x)
```

```
[Out] -A/(5*a*x**5*sqrt(a + b*x**3)) - (13*A*b - 10*B*a)/(15*a**2*x**2*
sqrt(a + b*x**3)) + 7*3**(3/4)*b**(2/3)*sqrt((a**(2/3) - a**(1/3)
*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x
)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(13*A*b - 10*B*a)
*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(180*a**3*sqrt(a*
*(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)
*x)**2)*sqrt(a + b*x**3)) + 7*sqrt(a + b*x**3)*(13*A*b - 10*B*a)/
(60*a**3*x**2)
```

Mathematica [C] time = 0.767826, size = 218, normalized size = 0.72

$$\sqrt{a+bx^3}\left(-\frac{2bx(aB-Ab)}{3a^3\left(a+bx^3\right)}+\frac{17Ab-10aB}{20a^3x^2}-\frac{A}{5a^2x^5}\right)-\frac{7ib\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(10aB-13Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{60\sqrt[4]{3}a^{8/3}\sqrt[3]{-b}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[(A + B*x^3)/(x^6*(a + b*x^3)^(3/2)),x]
```

```
[Out] Sqrt[a + b*x^3]*(-A/(5*a^2*x^5) + (17*A*b - 10*a*B)/(20*a^3*x^2)
- (2*b*(-(A*b) + a*B)*x)/(3*a^3*(a + b*x^3))) - (((7*I)/60)*b*(-1
3*A*b + 10*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sq
rt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*Ellipti
cF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)],
(-1)^(1/3)])/(3^(1/4)*a^(8/3)*(-b)^(1/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.013, size = 667, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((B*x^3+A)/x^6/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(2/3*b^2/a^3*x/((x^3+a/b)*b)^(1/2)-1/5/a^2*(b*x^3+a)^(1/2)/x^5+
17/20/a^3*b*(b*x^3+a)^(1/2)/x^2-91/180*I/a^3*b*3^(1/2)*(-a*b^2)^(
1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
```

```
^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)
^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(
-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^
(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))+B*(-2/3*b/a^2*x/((x^3+a/b
)*b)^(1/2)-1/2/a^2*(b*x^3+a)^(1/2)/x^2+7/18*I/a^2*3^(1/2)*(-a*b^2
)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b
*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2
/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b
^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/
b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^
2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3
)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} x^6}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^6),x, algorithm="maxima")

[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^6), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(bx^9 + ax^6)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^6),x, algorithm="fricas")

[Out] integral((B*x^3 + A)/((b*x^9 + a*x^6)*sqrt(b*x^3 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/x**6/(b*x**3+a)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} x^6}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^6),x, algorithm="giac")

[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^6), x)
```

3.239 $\int \frac{x^4(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=547

$$\frac{8\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{21\sqrt[4]{3}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{4\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-10aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7\ 3^{3/4}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{8\sqrt{a+bx^3}(7Ab-10aB)}{21b^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)} - \frac{2x^2(7Ab-10aB)}{21b^2\sqrt{a+bx^3}} + \frac{2Bx^5}{7b\sqrt{a+bx^3}}$$

```
[Out] (-2*(7*A*b - 10*a*B)*x^2)/(21*b^2*Sqrt[a + b*x^3]) + (2*B*x^5)/(7
*b*Sqrt[a + b*x^3]) + (8*(7*A*b - 10*a*B)*Sqrt[a + b*x^3])/(21*b^
(8/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (4*Sqrt[2 - Sqrt[3]]
*a^(1/3)*(7*A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*
x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 +
Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*3^(3/4)*b^(8/
3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) +
b^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (8*Sqrt[2]*a^(1/3)*(7*A*b - 10*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(21*3^(1/4)*b^(8/3)*Sqrt[(a^(1/3)*(a^(
1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a
+ b*x^3])
```

Rubi [A] time = 0.715726, antiderivative size = 547, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{8\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{21\sqrt[4]{3}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{4\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-10aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7\ 3^{3/4}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{8\sqrt{a+bx^3}(7Ab-10aB)}{21b^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)} - \frac{2x^2(7Ab-10aB)}{21b^2\sqrt{a+bx^3}} + \frac{2Bx^5}{7b\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (-2*(7*A*b - 10*a*B)*x^2)/(21*b^2*Sqrt[a + b*x^3]) + (2*B*x^5)/(7
*b*Sqrt[a + b*x^3]) + (8*(7*A*b - 10*a*B)*Sqrt[a + b*x^3])/(21*b^
```

```
(8/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (4*Sqrt[2 - Sqrt[3]]
*a^(1/3)*(7*A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*
x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 +
Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*3^(3/4)*b^(8/
3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) +
b^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (8*Sqrt[2]*a^(1/3)*(7*A*b - 10*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(21*3^(1/4)*b^(8/3)*Sqrt[(a^(1/3)*(a^(
1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a
+ b*x^3])
```

Rubi in Sympy [A] time = 48.7875, size = 493, normalized size = 0.9

$$\frac{2Bx^5}{7b\sqrt{a+bx^3}} - \frac{4\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(7Ab-10Ba)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{21b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{8\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(7Ab-10Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{63b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{2x^2(7Ab-10Ba)}{21b^2\sqrt{a+bx^3}} + \frac{8\sqrt{a+bx^3}(7Ab-10Ba)}{21b^{\frac{8}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*B*x**5/(7*b*sqrt(a + b*x**3)) - 4*3**(1/4)*a**(1/3)*sqrt((a**(2
/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)
) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(7
*A*b - 10*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/
3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(21
*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sq
rt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 8*sqrt(2)*3**(3/4)*a
**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a*
*(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(7
*A*b - 10*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/
3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(63
*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sq
rt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 2*x**2*(7*A*b - 10*B
*a)/(21*b**2*sqrt(a + b*x**3)) + 8*sqrt(a + b*x**3)*(7*A*b - 10*B
*a)/(21*b**(8/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x))
```

Mathematica [C] time = 0.632492, size = 236, normalized size = 0.43

$$-\frac{2\left(-3(-b)^{2/3}x^2\left(10aB-7Ab+3bBx^3\right)+4(-1)^{2/3}3^{3/4}a^{2/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(7Ab-10aB)\left((-\right.\right.}{63(-b)^{8/3}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (-2*(-3*(-b)^(2/3)*x^2*(-7*A*b + 10*a*B + 3*b*B*x^3) + 4*(-1)^(2/
3)*3^(3/4)*a^(2/3)*(7*A*b - 10*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(
1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x
^2)/a^(2/3)]*(Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)
^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(5/6)*EllipticF[A
rcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)
^(1/3)])))/(63*(-b)^(8/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.011, size = 937, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(-2/3/b*x^2/((x^3+a/b)*b)^(1/2)-8/9*I/b^2*3^(1/2)*(-a*b^2)^(1/3
)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1
/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)
,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/
2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(
1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(2/3/b
^2*a*x^2/((x^3+a/b)*b)^(1/2)+2/7/b^2*x^2*(b*x^3+a)^(1/2)+80/63*I*
a/b^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-
a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2
)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2
)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2
)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)x^4}{\left(bx^3 + a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{Bx^7 + Ax^4}{\left(bx^3 + a\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^7 + A*x^4)/(b*x^3 + a)^(3/2), x)
```

Sympy [A] time = 78.3121, size = 80, normalized size = 0.15

$$\frac{Ax^5\,\Gamma\left(\frac{5}{3}\right)\,{}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{5}{3}\\ \frac{8}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\,\Gamma\left(\frac{8}{3}\right)}+\frac{Bx^8\,\Gamma\left(\frac{8}{3}\right)\,{}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{8}{3}\\ \frac{11}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\,\Gamma\left(\frac{11}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] A*x**5*gamma(5/3)*hyper((3/2, 5/3), (8/3,), b*x**3*exp_polar(I*pi
)/a)/(3*a**(3/2)*gamma(8/3)) + B*x**8*gamma(8/3)*hyper((3/2, 8/3)
, (11/3,), b*x**3*exp_polar(I*pi)/a)/(3*a**(3/2)*gamma(11/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)x^4}{\left(bx^3+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(3/2), x)
```

3.240 $\int \frac{x(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=524

$$-\frac{2\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{3\sqrt[4]{3}a^{2/3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{3^{3/4}a^{2/3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{a+bx^3}(Ab-4aB)}{3ab^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2(Ab-aB)}{3ab\sqrt{a+bx^3}}$$

```
[Out] (2*(A*b - a*B)*x^2)/(3*a*b*Sqrt[a + b*x^3]) - (2*(A*b - 4*a*B)*Sq
rt[a + b*x^3])/(3*a*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x))
+ (Sqrt[2 - Sqrt[3]]*(A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^
(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*
x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(3/4
)*a^(2/3)*b^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt
[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (2*Sqrt[2]*(A*b -
 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3*3^(1/4)*a^(2/3)*b^(5/3)*Sqrt[(a
^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.566641, antiderivative size = 524, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$-\frac{2\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{3\sqrt[4]{3}a^{2/3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-4aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{3^{3/4}a^{2/3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{a+bx^3}(Ab-4aB)}{3ab^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2(Ab-aB)}{3ab\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(A*b - a*B)*x^2)/(3*a*b*Sqrt[a + b*x^3]) - (2*(A*b - 4*a*B)*Sq
rt[a + b*x^3])/(3*a*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x))
```

```
+ (Sqrt[2 - Sqrt[3]]*(A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^
(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*
x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(3/4
)*a^(2/3)*b^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt
[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (2*Sqrt[2]*(A*b -
 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3*3^(1/4)*a^(2/3)*b^(5/3)*Sqrt[(a
^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 40.6685, size = 464, normalized size = 0.89

$$\frac{2x^2(Ab-Ba)}{3ab\sqrt{a+bx^3}}-\frac{2\sqrt{a+bx^3}\,(Ab-4Ba)}{3ab^{\frac{5}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{\sqrt[4]{3}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab-4Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{3a^{\frac{2}{3}}b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(Ab-4Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{9a^{\frac{2}{3}}b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*x**2*(A*b - B*a)/(3*a*b*sqrt(a + b*x**3)) - 2*sqrt(a + b*x**3)*
(A*b - 4*B*a)/(3*a*b**(5/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)
) + 3**(1/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2
)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a
**(1/3) + b**(1/3)*x)*(A*b - 4*B*a)*elliptic_e(asin((-a**(1/3)*(-
1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x))
, -7 - 4*sqrt(3))/(3*a**(2/3)*b**(5/3)*sqrt(a**(1/3)*(a**(1/3) +
b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*
x**3)) - 2*sqrt(2)*3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x
+ b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1
/3) + b**(1/3)*x)*(A*b - 4*B*a)*elliptic_f(asin((-a**(1/3)*(-1 +
sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7
 - 4*sqrt(3))/(9*a**(2/3)*b**(5/3)*sqrt(a**(1/3)*(a**(1/3) + b**(
1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3
))
```

Mathematica [C] time = 0.644142, size = 235, normalized size = 0.45

$$\frac{2\left(3x^2(Ab-aB)+\frac{\sqrt[6]{-1}\,3^{3/4}a^{2/3}b\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\,(Ab-4aB)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\sin^{-1}\left(\cdots\right.\right.\right.}{(-b)^{5/3}}\right.}{9ab\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(3*(A*b - a*B)*x^2 + ((-1)^(1/6)*3^(3/4)*a^(2/3)*b*(A*b - 4*a*
B)*Sqrt[((-1)^(5/6)*(-a^(1/3) + (-b)^(1/3)*x))/a^(1/3)]*Sqrt[1 +
((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*
EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(
1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6)
 - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(-b)^(5/3)))
/(9*a*b*Sqrt[a + b*x^3])
```

Maple [B] time = 0.009, size = 921, normalized size = 1.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(2/3/a*x^2/((x^3+a/b)*b)^(1/2)+2/9*I/a*3^(1/2)/b*(-a*b^2)^(1/3)
*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/
2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)
-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),
(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2
)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-2/3/b
*x^2/((x^3+a/b)*b)^(1/2)-8/9*I/b^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1
/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a
*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)
+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/
3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2
)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/
2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+
1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)x}{\left(bx^3 + a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x/(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^4 + Ax}{\left(bx^3 + a\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^4 + A*x)/(b*x^3 + a)^(3/2), x)
```

Sympy [A] time = 35.4649, size = 80, normalized size = 0.15

$$\frac{Ax^2\Gamma\left(\frac{2}{3}\right){}_2F_1\left(\begin{matrix}\frac{2}{3},\frac{3}{2}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\Gamma\left(\frac{5}{3}\right)}+\frac{Bx^5\Gamma\left(\frac{5}{3}\right){}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{5}{3}\\ \frac{8}{3}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\Gamma\left(\frac{8}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] A*x**2*gamma(2/3)*hyper((2/3, 3/2), (5/3,), b*x**3*exp_polar(I*pi
)/a)/(3*a**(3/2)*gamma(5/3)) + B*x**5*gamma(5/3)*hyper((3/2, 5/3)
, (8/3,), b*x**3*exp_polar(I*pi)/a)/(3*a**(3/2)*gamma(8/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x/(b*x^3 + a)^(3/2), x)
```

3.241 $\int \frac{A+Bx^3}{x^2(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=548

$$\frac{\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{3\sqrt[4]{3}a^{5/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2\ 3^{3/4}a^{5/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(5Ab-2aB)}{3a^2b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{x^2(5Ab-2aB)}{3a^2\sqrt{a+bx^3}}-\frac{A}{ax\sqrt{a+bx^3}}$$

```
[Out] -(A/(a*x*Sqrt[a + b*x^3])) - ((5*A*b - 2*a*B)*x^2)/(3*a^2*Sqrt[a
+ b*x^3]) + ((5*A*b - 2*a*B)*Sqrt[a + b*x^3])/(3*a^2*b^(2/3)*((1
+ Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (Sqrt[2 - Sqrt[3]]*(5*A*b - 2*
a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSi
n[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)], -7 - 4*Sqrt[3]])/(2*3^(3/4)*a^(5/3)*b^(2/3)*Sqrt[(a^(1
/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*Sqrt[a + b*x^3]) + (Sqrt[2]*(5*A*b - 2*a*B)*(a^(1/3) + b^(1/3)*x
)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3)
+ b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]
])/(3*3^(1/4)*a^(5/3)*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x)
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.679535, antiderivative size = 548, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{3\sqrt[4]{3}a^{5/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-2aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2\ 3^{3/4}a^{5/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{a+bx^3}(5Ab-2aB)}{3a^2b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{x^2(5Ab-2aB)}{3a^2\sqrt{a+bx^3}}-\frac{A}{ax\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^2*(a + b*x^3)^(3/2)),x]
```

```
[Out] -(A/(a*x*Sqrt[a + b*x^3])) - ((5*A*b - 2*a*B)*x^2)/(3*a^2*Sqrt[a
+ b*x^3]) + ((5*A*b - 2*a*B)*Sqrt[a + b*x^3])/(3*a^2*b^(2/3)*((1
```

```
+ Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (Sqrt[2 - Sqrt[3]]*(5*A*b - 2*
a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSi
n[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)], -7 - 4*Sqrt[3]])/(2*3^(3/4)*a^(5/3)*b^(2/3)*Sqrt[(a^(1
/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*Sqrt[a + b*x^3]) + (Sqrt[2]*(5*A*b - 2*a*B)*(a^(1/3) + b^(1/3)*x
)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3)
+ b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]
])/(3*3^(1/4)*a^(5/3)*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x)
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 49.3733, size = 490, normalized size = 0.89

$$-\frac{A}{ax\sqrt{a+bx^3}}-\frac{2x^2\left(\frac{5Ab}{2}-Ba\right)}{3a^2\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}\left(\frac{5Ab}{2}-Ba\right)}{3a^2b^{\frac{2}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}-\frac{\sqrt[4]{3}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{5Ab}{2}-Ba\right)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{3a^{\frac{5}{3}}b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{5Ab}{2}-Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{9a^{\frac{5}{3}}b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**2/(b*x**3+a)**(3/2),x)
```

```
[Out] -A/(a*x*sqrt(a + b*x**3)) - 2*x**2*(5*A*b/2 - B*a)/(3*a**2*sqrt(a
 + b*x**3)) + 2*sqrt(a + b*x**3)*(5*A*b/2 - B*a)/(3*a**2*b**(2/3)
*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) - 3**(1/4)*sqrt((a**(2/3)
 - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) +
 b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(5*A*
b/2 - B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x
)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(3*a**(
5/3)*b**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1
+ sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 2*sqrt(2)*3**(3/
4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(5*A*b/
2 - B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(9*a**(5/
3)*b**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 +
sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.573606, size = 243, normalized size = 0.44

$$\frac{-3(-b)^{2/3}\left(3aA-2aBx^3+5Abx^3\right)-(-1)^{2/3}3^{3/4}a^{2/3}x\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(5Ab-2aB)\left((-1)^{5/6}F\right.}{9a^2(-b)^{2/3}x\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^2*(a + b*x^3)^(3/2)),x]
```

```
[Out] (-3*(-b)^(2/3)*(3*a*A + 5*A*b*x^3 - 2*a*B*x^3) - (-1)^(2/3)*3^(3/
4)*a^(2/3)*(5*A*b - 2*a*B)*x*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)
/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(
2/3)]*(Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*
x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(5/6)*EllipticF[ArcSin[S
qrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]
))/(9*a^2*(-b)^(2/3)*x*Sqrt[a + b*x^3])
```

Maple [B] time = 0.013, size = 939, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^2/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(-2/3*b/a^2*x^2/((x^3+a/b)*b)^(1/2)-1/a^2*(b*x^3+a)^(1/2)/x-5/9
*I/a^2*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(
-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/
2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(
1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^
2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/
2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3)))^(1/2))))+B*(2/3/a*x^2/((x^3+a/b)*b)^(1/2)+2/9*I/a*3^(1
/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(
1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/
2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^
(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(
1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+
1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*
EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*
b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
)^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(bx^5 + ax^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b*x^5 + a*x^2)*sqrt(b*x^3 + a)), x)
```

Sympy [A] time = 77.1642, size = 82, normalized size = 0.15

$$\frac{A\,\Gamma\left(-\frac{1}{3}\right)\,{}_{2}F_{1}\left(\begin{matrix}-\frac{1}{3},\frac{3}{2}\\ \frac{2}{3}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}x\,\Gamma\left(\frac{2}{3}\right)}+\frac{Bx^{2}\,\Gamma\left(\frac{2}{3}\right)\,{}_{2}F_{1}\left(\begin{matrix}\frac{2}{3},\frac{3}{2}\\ \frac{5}{3}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3a^{\frac{3}{2}}\,\Gamma\left(\frac{5}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**2/(b*x**3+a)**(3/2),x)
```

```
[Out] A*gamma(-1/3)*hyper((-1/3, 3/2), (2/3,), b*x**3*exp_polar(I*pi)/a
)/(3*a**(3/2)*x*gamma(2/3)) + B*x**2*gamma(2/3)*hyper((2/3, 3/2),
 (5/3,), b*x**3*exp_polar(I*pi)/a)/(3*a**(3/2)*gamma(5/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^{3}+A}{(bx^{3}+a)^{\frac{3}{2}}x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^2), x)
```

3.242 $\int \frac{A+Bx^3}{x^5(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=580

$$-\frac{5\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{12\sqrt{2}\sqrt[4]{3}a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{5\sqrt{2-\sqrt{3}}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-8aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{16\ 3^{3/4}a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{5\sqrt{a+bx^3}(11Ab-8aB)}{24a^3x}-\frac{5\sqrt[3]{b}\sqrt{a+bx^3}(11Ab-8aB)}{24a^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{11Ab-8aB}{12a^2x\sqrt{a+bx^3}}-\frac{A}{4ax^4\sqrt{a+bx^3}}$$

```
[Out] -A/(4*a*x^4*Sqrt[a + b*x^3]) - (11*A*b - 8*a*B)/(12*a^2*x*Sqrt[a
+ b*x^3]) + (5*(11*A*b - 8*a*B)*Sqrt[a + b*x^3])/(24*a^3*x) - (5*
b^(1/3)*(11*A*b - 8*a*B)*Sqrt[a + b*x^3])/(24*a^3*((1 + Sqrt[3])*
a^(1/3) + b^(1/3)*x)) + (5*Sqrt[2 - Sqrt[3]]*b^(1/3)*(11*A*b - 8*
a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSi
n[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)], -7 - 4*Sqrt[3]])/(16*3^(3/4)*a^(8/3)*Sqrt[(a^(1/3)*(a^
(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a
 + b*x^3]) - (5*b^(1/3)*(11*A*b - 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sq
rt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^
(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(
12*Sqrt[2]*3^(1/4)*a^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.808961, antiderivative size = 580, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{5\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{12\sqrt{2}\sqrt[4]{3}a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{5\sqrt{2-\sqrt{3}}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-8aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{16\ 3^{3/4}a^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{5\sqrt{a+bx^3}(11Ab-8aB)}{24a^3x}-\frac{5\sqrt[3]{b}\sqrt{a+bx^3}(11Ab-8aB)}{24a^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{11Ab-8aB}{12a^2x\sqrt{a+bx^3}}-\frac{A}{4ax^4\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^5*(a + b*x^3)^(3/2)),x]
```

```
[Out] -A/(4*a*x^4*Sqrt[a + b*x^3]) - (11*A*b - 8*a*B)/(12*a^2*x*Sqrt[a
+ b*x^3]) + (5*(11*A*b - 8*a*B)*Sqrt[a + b*x^3])/(24*a^3*x) - (5*
```

```
b^(1/3)*(11*A*b - 8*a*B)*Sqrt[a + b*x^3])/(24*a^3*((1 + Sqrt[3])*
a^(1/3) + b^(1/3)*x)) + (5*Sqrt[2 - Sqrt[3]]*b^(1/3)*(11*A*b - 8*
a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSi
n[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)], -7 - 4*Sqrt[3]])/(16*3^(3/4)*a^(8/3)*Sqrt[(a^(1/3)*(a^
(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a
 + b*x^3]) - (5*b^(1/3)*(11*A*b - 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sq
rt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^
(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(
12*Sqrt[2]*3^(1/4)*a^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 59.6332, size = 520, normalized size = 0.9

$$-\frac{A}{4ax^4\sqrt{a+bx^3}}-\frac{11Ab-8Ba}{12a^2x\sqrt{a+bx^3}}-\frac{5\sqrt[3]{b}\sqrt{a+bx^3}\,(11Ab-8Ba)}{24a^3\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{5\sqrt{a+bx^3}\,(11Ab-8Ba)}{24a^3x}$$
$$+\frac{5\sqrt[4]{3}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-8Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{48a^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{5\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(11Ab-8Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{72a^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((B*x**3+A)/x**5/(b*x**3+a)**(3/2),x)
```

```
[Out] -A/(4*a*x**4*sqrt(a + b*x**3)) - (11*A*b - 8*B*a)/(12*a**2*x*sqrt
(a + b*x**3)) - 5*b**(1/3)*sqrt(a + b*x**3)*(11*A*b - 8*B*a)/(24*
a**3*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) + 5*sqrt(a + b*x**3)*
(11*A*b - 8*B*a)/(24*a**3*x) + 5*3**(1/4)*b**(1/3)*sqrt((a**(2/3)
 - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) +
 b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(11*A
*b - 8*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*
x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(48*a*
*(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(
3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 5*sqrt(2)*3**(3/4)*b**(
1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1
/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(11*A
*b - 8*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*
x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(72*a*
*(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(
3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.632017, size = 266, normalized size = 0.46

$$\frac{3(-b)^{2/3}\left(-6a^2\left(A+4Bx^3\right)+abx^3\left(33A-40Bx^3\right)+55Ab^2x^6\right)+5(-1)^{2/3}3^{3/4}a^{2/3}bx^4\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\cdots}}{72a^3(-b)^{2/3}x^4\sqrt{a+\cdots}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^5*(a + b*x^3)^(3/2)),x]
```

```
[Out] (3*(-b)^(2/3)*(55*A*b^2*x^6 + a*b*x^3*(33*A - 40*B*x^3) - 6*a^2*(
A + 4*B*x^3)) + 5*(-1)^(2/3)*3^(3/4)*a^(2/3)*b*(11*A*b - 8*a*B)*x
^4*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^
(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(Sqrt[3]*EllipticE[A
rcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)
^(1/3)] + (-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^
(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(72*a^3*(-b)^(2/3)*x^4*
Sqrt[a + b*x^3])
```

Maple [B] time = 0.013, size = 975, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^5/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(-1/4/a^2*(b*x^3+a)^(1/2)/x^4+13/8/a^3*b*(b*x^3+a)^(1/2)/x+2/3*
b^2/a^3*x^2/((x^3+a/b)*b)^(1/2)+55/72*I/a^3*b*3^(1/2)*(-a*b^2)^(1
/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^
(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(
-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^
(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1
/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/
2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(
1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-2/
3*b/a^2*x^2/((x^3+a/b)*b)^(1/2)-1/a^2*(b*x^3+a)^(1/2)/x-5/9*I/a^2
*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2
)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^
(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*
(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b
/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/
3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(
-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} x^5} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^5),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(bx^8 + ax^5)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^5),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b*x^8 + a*x^5)*sqrt(b*x^3 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/x**5/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^5),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^5), x)
```

3.243 $\int \frac{A+Bx^3}{x^8(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=611

$$\frac{55b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{168\sqrt{2}\sqrt[4]{3}a^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{55\sqrt{2-\sqrt{3}}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-14aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224\ 3^{3/4}a^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{55b^{4/3}\sqrt{a+bx^3}(17Ab-14aB)}{336a^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{55b\sqrt{a+bx^3}(17Ab-14aB)}{336a^4x}+\frac{11\sqrt{a+bx^3}(17Ab-14aB)}{168a^3x^4}-\frac{17Ab-14aB}{21a^2x^4\sqrt{a+bx^3}}-\frac{A}{7ax^7\sqrt{a+bx^3}}$$

```
[Out] -A/(7*a*x^7*Sqrt[a + b*x^3]) - (17*A*b - 14*a*B)/(21*a^2*x^4*Sqrt
[a + b*x^3]) + (11*(17*A*b - 14*a*B)*Sqrt[a + b*x^3])/(168*a^3*x^
4) - (55*b*(17*A*b - 14*a*B)*Sqrt[a + b*x^3])/(336*a^4*x) + (55*b
^(4/3)*(17*A*b - 14*a*B)*Sqrt[a + b*x^3])/(336*a^4*((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)) - (55*Sqrt[2 - Sqrt[3]]*b^(4/3)*(17*A*b -
14*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*3^(3/4)*a^(11/3)*Sqrt[(a^(1/3
)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*S
qrt[a + b*x^3]) + (55*b^(4/3)*(17*A*b - 14*a*B)*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/
3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt
[3]])/(168*Sqrt[2]*3^(1/4)*a^(11/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1
/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.946827, antiderivative size = 611, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$\frac{55b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{168\sqrt{2}\sqrt[4]{3}a^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{55\sqrt{2-\sqrt{3}}b^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-14aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{224\ 3^{3/4}a^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{55b^{4/3}\sqrt{a+bx^3}(17Ab-14aB)}{336a^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{55b\sqrt{a+bx^3}(17Ab-14aB)}{336a^4x}+\frac{11\sqrt{a+bx^3}(17Ab-14aB)}{168a^3x^4}-\frac{17Ab-14aB}{21a^2x^4\sqrt{a+bx^3}}-\frac{A}{7ax^7\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^8*(a + b*x^3)^(3/2)),x]
```

```
[Out] -A/(7*a*x^7*Sqrt[a + b*x^3]) - (17*A*b - 14*a*B)/(21*a^2*x^4*Sqrt
[a + b*x^3]) + (11*(17*A*b - 14*a*B)*Sqrt[a + b*x^3])/(168*a^3*x^
4) - (55*b*(17*A*b - 14*a*B)*Sqrt[a + b*x^3])/(336*a^4*x) + (55*b
^(4/3)*(17*A*b - 14*a*B)*Sqrt[a + b*x^3])/(336*a^4*((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)) - (55*Sqrt[2 - Sqrt[3]]*b^(4/3)*(17*A*b -
14*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*3^(3/4)*a^(11/3)*Sqrt[(a^(1/3
)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*S
qrt[a + b*x^3]) + (55*b^(4/3)*(17*A*b - 14*a*B)*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/
3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt
[3]])/(168*Sqrt[2]*3^(1/4)*a^(11/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1
/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 71.6165, size = 554, normalized size = 0.91

$$-\frac{A}{7ax^7\sqrt{a+bx^3}} - \frac{17Ab-14Ba}{21a^2x^4\sqrt{a+bx^3}} + \frac{11\sqrt{a+bx^3}\,(17Ab-14Ba)}{168a^3x^4} + \frac{55b^{\frac{4}{3}}\sqrt{a+bx^3}\,(17Ab-14Ba)}{336a^4\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)} - \frac{55b\sqrt{a+bx^3}\,(17Ab-14Ba)}{336a^4x}$$

$$-\frac{55\sqrt[4]{3}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(17Ab-14Ba)\,E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{672a^{\frac{11}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$+\frac{55\sqrt{2}\cdot 3^{\frac{3}{4}}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(17Ab-14Ba)\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{1008a^{\frac{11}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**8/(b*x**3+a)**(3/2),x)
```

```
[Out] -A/(7*a*x**7*sqrt(a + b*x**3)) - (17*A*b - 14*B*a)/(21*a**2*x**4*
sqrt(a + b*x**3)) + 11*sqrt(a + b*x**3)*(17*A*b - 14*B*a)/(168*a*
*3*x**4) + 55*b**(4/3)*sqrt(a + b*x**3)*(17*A*b - 14*B*a)/(336*a*
*4*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) - 55*b*sqrt(a + b*x**3)
*(17*A*b - 14*B*a)/(336*a**4*x) - 55*3**(1/4)*b**(4/3)*sqrt((a**(
2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3
)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(
17*A*b - 14*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(
1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(
672*a**(11/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1
+ sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 55*sqrt(2)*3**(3
/4)*b**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2
)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*
x)*(17*A*b - 14*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) +
b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3
))/(1008*a**(11/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.69623, size = 292, normalized size = 0.48

$$\frac{-3(-b)^{2/3}\left(12a^3\left(4A+7Bx^3\right)-6a^2bx^3\left(17A+77Bx^3\right)+11ab^2x^6\left(51A-70Bx^3\right)+935Ab^3x^9\right)-55(-1)^{2/3}3^{3/4}a^{2/3}b^2x^7\sqrt{(-}}{100}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^8*(a + b*x^3)^(3/2)),x]
```

```
[Out] (-3*(-b)^(2/3)*(935*A*b^3*x^9 + 11*a*b^2*x^6*(51*A - 70*B*x^3) +
12*a^3*(4*A + 7*B*x^3) - 6*a^2*b*x^3*(17*A + 77*B*x^3)) - 55*(-1)
^(2/3)*3^(3/4)*a^(2/3)*b^2*(17*A*b - 14*a*B)*x^7*Sqrt[(-1)^(5/6)*
(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) +
((-b)^(2/3)*x^2)/a^(2/3)]*(Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5
/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(5/6
)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3
^(1/4)], (-1)^(1/3)]))/(1008*a^4*(-b)^(2/3)*x^7*Sqrt[a + b*x^3])
```

Maple [B] time = 0.047, size = 1018, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^8/(b*x^3+a)^(3/2),x)
```

```
[Out] A*(-1/7/a^2*(b*x^3+a)^(1/2)/x^7+25/56*b/a^3*(b*x^3+a)^(1/2)/x^4-2
37/112*b^2/a^4*(b*x^3+a)^(1/2)/x-2/3*b^3/a^4*x^2/((x^3+a/b)*b)^(1
/2)-935/1008*I*b^2/a^4*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2
)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))
^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^
(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*Ell
ipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2
)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(
1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^
2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-1/4/a^2*(b*x^3+a)^(1/2)/x
^4+13/8/a^3*b*(b*x^3+a)^(1/2)/x+2/3*b^2/a^3*x^2/((x^3+a/b)*b)^(1/
2)+55/72*I/a^3*b*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)
*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*
((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE
(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3
)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+
1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/
3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2
),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} x^8}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^8),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^8), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(bx^{11} + ax^8)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^8),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b*x^11 + a*x^8)*sqrt(b*x^3 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/x**8/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} x^8}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^8),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*x^8), x)
```

3.244 $\int \frac{x^8 (A+Bx^3)}{(a+bx^3)^{5/2}} \, dx$

Optimal. Leaf size=103

$$-\frac{2a^2(Ab-aB)}{9b^4\left(a+bx^3\right)^{3/2}}+\frac{2a(2Ab-3aB)}{3b^4\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}(Ab-3aB)}{3b^4}+\frac{2B\left(a+bx^3\right)^{3/2}}{9b^4}$$

```
[Out] (-2*a^2*(A*b - a*B))/(9*b^4*(a + b*x^3)^(3/2)) + (2*a*(2*A*b - 3*
a*B))/(3*b^4*Sqrt[a + b*x^3]) + (2*(A*b - 3*a*B)*Sqrt[a + b*x^3])
/(3*b^4) + (2*B*(a + b*x^3)^(3/2))/(9*b^4)
```

Rubi [A] time = 0.259859, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$-\frac{2a^2(Ab-aB)}{9b^4\left(a+bx^3\right)^{3/2}}+\frac{2a(2Ab-3aB)}{3b^4\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}(Ab-3aB)}{3b^4}+\frac{2B\left(a+bx^3\right)^{3/2}}{9b^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (-2*a^2*(A*b - a*B))/(9*b^4*(a + b*x^3)^(3/2)) + (2*a*(2*A*b - 3*
a*B))/(3*b^4*Sqrt[a + b*x^3]) + (2*(A*b - 3*a*B)*Sqrt[a + b*x^3])
/(3*b^4) + (2*B*(a + b*x^3)^(3/2))/(9*b^4)
```

Rubi in Sympy [A] time = 22.2459, size = 99, normalized size = 0.96

$$\frac{2B\left(a+bx^3\right)^{\frac{3}{2}}}{9b^4}-\frac{2a^2\left(Ab-Ba\right)}{9b^4\left(a+bx^3\right)^{\frac{3}{2}}}+\frac{2a\left(2Ab-3Ba\right)}{3b^4\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}\left(Ab-3Ba\right)}{3b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*B*(a + b*x**3)**(3/2)/(9*b**4) - 2*a**2*(A*b - B*a)/(9*b**4*(a
+ b*x**3)**(3/2)) + 2*a*(2*A*b - 3*B*a)/(3*b**4*sqrt(a + b*x**3))
 + 2*sqrt(a + b*x**3)*(A*b - 3*B*a)/(3*b**4)
```

Mathematica [A] time = 0.0989231, size = 73, normalized size = 0.71

$$\frac{2\left(-16a^3B+8a^2b\left(A-3Bx^3\right)-6ab^2x^3\left(Bx^3-2A\right)+b^3x^6\left(3A+Bx^3\right)\right)}{9b^4\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*(-16*a^3*B + 8*a^2*b*(A - 3*B*x^3) - 6*a*b^2*x^3*(-2*A + B*x^3
) + b^3*x^6*(3*A + B*x^3)))/(9*b^4*(a + b*x^3)^(3/2))
```

Maple [A] time = 0.01, size = 76, normalized size = 0.7

$$\frac{2\,Bx^9b^3+6\,Ab^3x^6-12\,Bab^2x^6+24\,Aab^2x^3-48\,Ba^2bx^3+16\,Aa^2b-32\,Ba^3}{9\,b^4}\left(bx^3+a\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] 2/9/(b*x^3+a)^(3/2)*(B*b^3*x^9+3*A*b^3*x^6-6*B*a*b^2*x^6+12*A*a*b
^2*x^3-24*B*a^2*b*x^3+8*A*a^2*b-16*B*a^3)/b^4
```

Maxima [A] time = 1.37989, size = 157, normalized size = 1.52

$$\frac{2}{9}B\left(\frac{(bx^3+a)^{\frac{3}{2}}}{b^4} - \frac{9\sqrt{bx^3+a}a}{b^4} - \frac{9a^2}{\sqrt{bx^3+a}b^4} + \frac{a^3}{(bx^3+a)^{\frac{3}{2}}b^4}\right) + \frac{2}{9}A\left(\frac{3\sqrt{bx^3+a}}{b^3} + \frac{6a}{\sqrt{bx^3+a}b^3} - \frac{a^2}{(bx^3+a)^{\frac{3}{2}}b^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] 2/9*B*((b*x^3 + a)^(3/2)/b^4 - 9*sqrt(b*x^3 + a)*a/b^4 - 9*a^2/(s
qrt(b*x^3 + a)*b^4) + a^3/((b*x^3 + a)^(3/2)*b^4)) + 2/9*A*(3*sqr
t(b*x^3 + a)/b^3 + 6*a/(sqrt(b*x^3 + a)*b^3) - a^2/((b*x^3 + a)^(
3/2)*b^3))
```

Fricas [A] time = 0.297201, size = 117, normalized size = 1.14

$$\frac{2\left(Bb^3x^9 - 3\left(2Bab^2 - Ab^3\right)x^6 - 16Ba^3 + 8Aa^2b - 12\left(2Ba^2b - Aab^2\right)x^3\right)}{9\left(b^5x^3 + ab^4\right)\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] 2/9*(B*b^3*x^9 - 3*(2*B*a*b^2 - A*b^3)*x^6 - 16*B*a^3 + 8*A*a^2*b
 - 12*(2*B*a^2*b - A*a*b^2)*x^3)/((b^5*x^3 + a*b^4)*sqrt(b*x^3 +
a))
```

Sympy [A] time = 14.4451, size = 338, normalized size = 3.28

$$\begin{cases} \frac{16Aa^2b}{9ab^4\sqrt{a+bx^3}+9b^5x^3\sqrt{a+bx^3}} + \frac{24Aab^2x^3}{9ab^4\sqrt{a+bx^3}+9b^5x^3\sqrt{a+bx^3}} + \frac{6Ab^3x^6}{9ab^4\sqrt{a+bx^3}+9b^5x^3\sqrt{a+bx^3}} - \frac{32Ba^3}{9ab^4\sqrt{a+bx^3}+9b^5x^3\sqrt{a+bx^3}} - \frac{48Ba^2bx^3}{9ab^4\sqrt{a+bx^3}+9b^5x^3\sqrt{a} \\ \frac{\frac{Ax^9}{9}+\frac{Bx^{12}}{12}}{a^{\frac{5}{2}}} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Piecewise((16*A*a**2*b/(9*a*b**4*sqrt(a + b*x**3) + 9*b**5*x**3*s
qrt(a + b*x**3)) + 24*A*a*b**2*x**3/(9*a*b**4*sqrt(a + b*x**3) +
9*b**5*x**3*sqrt(a + b*x**3)) + 6*A*b**3*x**6/(9*a*b**4*sqrt(a +
b*x**3) + 9*b**5*x**3*sqrt(a + b*x**3)) - 32*B*a**3/(9*a*b**4*sqr
t(a + b*x**3) + 9*b**5*x**3*sqrt(a + b*x**3)) - 48*B*a**2*b*x**3/
(9*a*b**4*sqrt(a + b*x**3) + 9*b**5*x**3*sqrt(a + b*x**3)) - 12*B
*a*b**2*x**6/(9*a*b**4*sqrt(a + b*x**3) + 9*b**5*x**3*sqrt(a + b*
x**3)) + 2*B*b**3*x**9/(9*a*b**4*sqrt(a + b*x**3) + 9*b**5*x**3*s
qrt(a + b*x**3)), Ne(b, 0)), ((A*x**9/9 + B*x**12/12)/a**(5/2), T
rue))
```

GIAC/XCAS [A] time = 0.215964, size = 124, normalized size = 1.2

$$\frac{2\left((bx^3+a)^{\frac{3}{2}}B-9\sqrt{bx^3+a}Ba+3\sqrt{bx^3+a}Ab-\frac{9\,(bx^3+a)\,Ba^2-Ba^3-6\,(bx^3+a)\,Aab+Aa^2b}{(bx^3+a)^{\frac{3}{2}}}\right)}{9\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^8/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] 2/9*((b*x^3 + a)^(3/2)*B - 9*sqrt(b*x^3 + a)*B*a + 3*sqrt(b*x^3 +
 a)*A*b - (9*(b*x^3 + a)*B*a^2 - B*a^3 - 6*(b*x^3 + a)*A*a*b + A*
a^2*b)/(b*x^3 + a)^(3/2))/b^4
```

3.245 $\int \frac{x^5(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=73

$$-\frac{2(Ab-2aB)}{3b^3\sqrt{a+bx^3}}+\frac{2a(Ab-aB)}{9b^3(a+bx^3)^{3/2}}+\frac{2B\sqrt{a+bx^3}}{3b^3}$$

```
[Out] (2*a*(A*b - a*B))/(9*b^3*(a + b*x^3)^(3/2)) - (2*(A*b - 2*a*B))/(
3*b^3*Sqrt[a + b*x^3]) + (2*B*Sqrt[a + b*x^3])/(3*b^3)
```

Rubi [A] time = 0.193813, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$-\frac{2(Ab-2aB)}{3b^3\sqrt{a+bx^3}}+\frac{2a(Ab-aB)}{9b^3(a+bx^3)^{3/2}}+\frac{2B\sqrt{a+bx^3}}{3b^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*a*(A*b - a*B))/(9*b^3*(a + b*x^3)^(3/2)) - (2*(A*b - 2*a*B))/(
3*b^3*Sqrt[a + b*x^3]) + (2*B*Sqrt[a + b*x^3])/(3*b^3)
```

Rubi in Sympy [A] time = 16.9223, size = 68, normalized size = 0.93

$$\frac{2B\sqrt{a+bx^3}}{3b^3}+\frac{2a(Ab-Ba)}{9b^3(a+bx^3)^{\frac{3}{2}}}-\frac{2(Ab-2Ba)}{3b^3\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*B*sqrt(a + b*x**3)/(3*b**3) + 2*a*(A*b - B*a)/(9*b**3*(a + b*x*
*3)**(3/2)) - 2*(A*b - 2*B*a)/(3*b**3*sqrt(a + b*x**3))
```

Mathematica [A] time = 0.071057, size = 54, normalized size = 0.74

$$\frac{16a^2B-4ab(A-6Bx^3)+6b^2x^3(Bx^3-A)}{9b^3(a+bx^3)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (16*a^2*B - 4*a*b*(A - 6*B*x^3) + 6*b^2*x^3*(-A + B*x^3))/(9*b^3*
(a + b*x^3)^(3/2))
```

Maple [A] time = 0.01, size = 53, normalized size = 0.7

$$-\frac{-6\,b^2Bx^6+6\,Ax^3b^2-24\,Bx^3ab+4\,abA-16\,a^2B}{9\,b^3}(bx^3+a)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] -2/9/(b*x^3+a)^(3/2)*(-3*B*b^2*x^6+3*A*b^2*x^3-12*B*a*b*x^3+2*A*a
*b-8*B*a^2)/b^3
```

Maxima [A] time = 1.37828, size = 113, normalized size = 1.55

$$\frac{2}{9}\,B\left(\frac{3\,\sqrt{bx^3+a}}{b^3}+\frac{6\,a}{\sqrt{bx^3+a}b^3}-\frac{a^2}{(bx^3+a)^{\frac{3}{2}}b^3}\right)-\frac{2}{9}\,A\left(\frac{3}{\sqrt{bx^3+a}b^2}-\frac{a}{(bx^3+a)^{\frac{3}{2}}b^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] 2/9*B*(3*sqrt(b*x^3 + a)/b^3 + 6*a/(sqrt(b*x^3 + a)*b^3) - a^2/((
b*x^3 + a)^(3/2)*b^3)) - 2/9*A*(3/(sqrt(b*x^3 + a)*b^2) - a/((b*x
^3 + a)^(3/2)*b^2))
```

Fricas [A] time = 0.278463, size = 86, normalized size = 1.18

$$\frac{2\,\left(3\,Bb^2x^6+3\,\left(4\,Bab-Ab^2\right)x^3+8\,Ba^2-2\,Aab\right)}{9\,\left(b^4x^3+ab^3\right)\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] 2/9*(3*B*b^2*x^6 + 3*(4*B*a*b - A*b^2)*x^3 + 8*B*a^2 - 2*A*a*b)/(
(b^4*x^3 + a*b^3)*sqrt(b*x^3 + a))
```

Sympy [A] time = 7.64609, size = 240, normalized size = 3.29

$$\begin{cases} -\frac{4Aab}{9ab^3\sqrt{a+bx^3}+9b^4x^3\sqrt{a+bx^3}}-\frac{6Ab^2x^3}{9ab^3\sqrt{a+bx^3}+9b^4x^3\sqrt{a+bx^3}}+\frac{16Ba^2}{9ab^3\sqrt{a+bx^3}+9b^4x^3\sqrt{a+bx^3}}+\frac{24Babx^3}{9ab^3\sqrt{a+bx^3}+9b^4x^3\sqrt{a+bx^3}}+\frac{6Bb^2x^6}{9ab^3\sqrt{a+bx^3}+9b^4x^3\sqrt{a+bx^3}} \\ \frac{\frac{Ax^6}{6}+\frac{Bx^9}{9}}{a^{\frac{5}{2}}} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Piecewise((-4*A*a*b/(9*a*b**3*sqrt(a + b*x**3) + 9*b**4*x**3*sqrt
(a + b*x**3)) - 6*A*b**2*x**3/(9*a*b**3*sqrt(a + b*x**3) + 9*b**4
*x**3*sqrt(a + b*x**3)) + 16*B*a**2/(9*a*b**3*sqrt(a + b*x**3) +
9*b**4*x**3*sqrt(a + b*x**3)) + 24*B*a*b*x**3/(9*a*b**3*sqrt(a +
b*x**3) + 9*b**4*x**3*sqrt(a + b*x**3)) + 6*B*b**2*x**6/(9*a*b**3
*sqrt(a + b*x**3) + 9*b**4*x**3*sqrt(a + b*x**3)), Ne(b, 0)), ((A
*x**6/6 + B*x**9/9)/a**(5/2), True))
```

GIAC/XCAS [A] time = 0.215931, size = 82, normalized size = 1.12

$$\frac{2\left(3\,\sqrt{bx^3+a}B+\frac{6\,(bx^3+a)\,Ba-Ba^2-3\,(bx^3+a)\,Ab+Aab}{(bx^3+a)^{\frac{3}{2}}}\right)}{9\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^5/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] 2/9*(3*sqrt(b*x^3 + a)*B + (6*(b*x^3 + a)*B*a - B*a^2 - 3*(b*x^3
+ a)*A*b + A*a*b)/(b*x^3 + a)^(3/2))/b^3
```

3.246 $\int \frac{x^2(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=46

$$-\frac{2(Ab-aB)}{9b^2(a+bx^3)^{3/2}}-\frac{2B}{3b^2\sqrt{a+bx^3}}$$

```
[Out] (-2*(A*b - a*B))/(9*b^2*(a + b*x^3)^(3/2)) - (2*B)/(3*b^2*Sqrt[a
+ b*x^3])
```

Rubi [A] time = 0.134879, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{2(Ab-aB)}{9b^2(a+bx^3)^{3/2}}-\frac{2B}{3b^2\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (-2*(A*b - a*B))/(9*b^2*(a + b*x^3)^(3/2)) - (2*B)/(3*b^2*Sqrt[a
+ b*x^3])
```

Rubi in Sympy [A] time = 12.2656, size = 44, normalized size = 0.96

$$-\frac{2B}{3b^2\sqrt{a+bx^3}}-\frac{2(Ab-Ba)}{9b^2(a+bx^3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] -2*B/(3*b**2*sqrt(a + b*x**3)) - 2*(A*b - B*a)/(9*b**2*(a + b*x**
3)**(3/2))
```

Mathematica [A] time = 0.0336187, size = 33, normalized size = 0.72

$$-\frac{2\left(2aB+Ab+3bBx^3\right)}{9b^2(a+bx^3)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (-2*(A*b + 2*a*B + 3*b*B*x^3))/(9*b^2*(a + b*x^3)^(3/2))
```

Maple [A] time = 0.009, size = 30, normalized size = 0.7

$$-\frac{6\,bBx^3+2\,Ab+4\,Ba}{9\,b^2}\left(bx^3+a\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] -2/9/(b*x^3+a)^(3/2)*(3*B*b*x^3+A*b+2*B*a)/b^2
```

Maxima [A] time = 1.39064, size = 66, normalized size = 1.43

$$-\frac{2}{9}\,B\left(\frac{3}{\sqrt{bx^3+a}\,b^2}-\frac{a}{\left(bx^3+a\right)^{\frac{3}{2}}b^2}\right)-\frac{2\,A}{9\left(bx^3+a\right)^{\frac{3}{2}}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x^2/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] -2/9*B*(3/(sqrt(b*x^3 + a)*b^2) - a/((b*x^3 + a)^(3/2)*b^2)) - 2/
9*A/((b*x^3 + a)^(3/2)*b)
```

Fricas [A] time = 0.324719, size = 55, normalized size = 1.2

$$-\frac{2\left(3\,Bbx^3+2\,Ba+Ab\right)}{9\left(b^3x^3+ab^2\right)\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x^2/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] -2/9*(3*B*b*x^3 + 2*B*a + A*b)/((b^3*x^3 + a*b^2)*sqrt(b*x^3 + a)
)
```

Sympy [A] time = 3.86405, size = 144, normalized size = 3.13

$$\begin{cases} -\frac{2Ab}{9ab^2\sqrt{a+bx^3}+9b^3x^3\sqrt{a+bx^3}}-\frac{4Ba}{9ab^2\sqrt{a+bx^3}+9b^3x^3\sqrt{a+bx^3}}-\frac{6Bbx^3}{9ab^2\sqrt{a+bx^3}+9b^3x^3\sqrt{a+bx^3}} & \text{for } b\neq 0\\ \frac{\frac{Ax^3}{3}+\frac{Bx^6}{6}}{a^{\frac{5}{2}}} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**2*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Piecewise((-2*A*b/(9*a*b**2*sqrt(a + b*x**3) + 9*b**3*x**3*sqrt(a
 + b*x**3)) - 4*B*a/(9*a*b**2*sqrt(a + b*x**3) + 9*b**3*x**3*sqrt
(a + b*x**3)) - 6*B*b*x**3/(9*a*b**2*sqrt(a + b*x**3) + 9*b**3*x*
*3*sqrt(a + b*x**3)), Ne(b, 0)), ((A*x**3/3 + B*x**6/6)/a**(5/2),
 True))
```

GIAC/XCAS [A] time = 0.215101, size = 43, normalized size = 0.93

$$-\frac{2\left(3\left(bx^3+a\right)B-Ba+Ab\right)}{9\left(bx^3+a\right)^{\frac{3}{2}}b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((B*x^3 + A)*x^2/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] -2/9*(3*(b*x^3 + a)*B - B*a + A*b)/((b*x^3 + a)^(3/2)*b^2)
```

3.247 $\int \frac{A+Bx^3}{x(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=77

$$-\frac{2A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{5/2}}+\frac{2A}{3a^2\sqrt{a+bx^3}}+\frac{2(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

```
[Out] (2*(A*b - a*B))/(9*a*b*(a + b*x^3)^(3/2)) + (2*A)/(3*a^2*Sqrt[a +
 b*x^3]) - (2*A*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(3*a^(5/2))
```

Rubi [A] time = 0.178925, antiderivative size = 77, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{2A\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{5/2}}+\frac{2A}{3a^2\sqrt{a+bx^3}}+\frac{2(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(A + B*x^3)/(x*(a + b*x^3)^(5/2)),x]
```

```
[Out] (2*(A*b - a*B))/(9*a*b*(a + b*x^3)^(3/2)) + (2*A)/(3*a^2*Sqrt[a +
 b*x^3]) - (2*A*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(3*a^(5/2))
```

Rubi in Sympy [A] time = 14.4026, size = 70, normalized size = 0.91

$$\frac{2A}{3a^2\sqrt{a+bx^3}}-\frac{2A\,\mathrm{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{\frac{5}{2}}}+\frac{2\left(Ab-Ba\right)}{9ab\left(a+bx^3\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((B*x**3+A)/x/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*A/(3*a**2*sqrt(a + b*x**3)) - 2*A*atanh(sqrt(a + b*x**3)/sqrt(a
))/(3*a**(5/2)) + 2*(A*b - B*a)/(9*a*b*(a + b*x**3)**(3/2))
```

Mathematica [A] time = 0.223342, size = 83, normalized size = 1.08

$$\frac{2\left(a\left(-\frac{a^2B}{b}+4aA+3Abx^3\right)-\frac{3A\left(a+bx^3\right)^2\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{\sqrt{\frac{bx^3}{a}+1}}\right)}{9a^3\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(A + B*x^3)/(x*(a + b*x^3)^(5/2)),x]
```

```
[Out] (2*(a*(4*a*A - (a^2*B)/b + 3*A*b*x^3) - (3*A*(a + b*x^3)^2*ArcTan
h[Sqrt[1 + (b*x^3)/a]])/Sqrt[1 + (b*x^3)/a]))/(9*a^3*(a + b*x^3)^
(3/2))
```

Maple [A] time = 0.042, size = 85, normalized size = 1.1

$$A\left(\frac{2}{9\,ab^{2}}\sqrt{bx^{3}+a}\left(x^{3}+\frac{a}{b}\right)^{-2}+\frac{2}{3\,a^{2}}\frac{1}{\sqrt{\left(x^{3}+\frac{a}{b}\right)b}}-\frac{2}{3}Artanh\left(1\sqrt{bx^{3}+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{5}{2}}\right)-\frac{2\,B}{9\,b}\left(bx^{3}+a\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(2/9/a/b^2*(b*x^3+a)^(1/2)/(x^3+a/b)^2+2/3/a^2/((x^3+a/b)*b)^(1
/2)-2/3/a^(5/2)*arctanh((b*x^3+a)^(1/2)/a^(1/2)))-2/9*B/b/(b*x^3+
a)^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.27424, size = 1, normalized size = 0.01

$$\left[\frac{3\left(Ab^{2}x^{3}+Aab\right)\sqrt{bx^{3}+a}\log\left(\frac{\left(bx^{3}+2\,a\right)\sqrt{a}-2\,\sqrt{bx^{3}+a}a}{x^{3}}\right)+2\left(3\,Ab^{2}x^{3}-Ba^{2}+4\,Aab\right)\sqrt{a}}{9\left(a^{2}b^{2}x^{3}+a^{3}b\right)\sqrt{bx^{3}+a}\sqrt{a}},\frac{2\left(3\left(Ab^{2}x^{3}+Aab\right)\sqrt{bx^{3}+a}\,\text{arctan}\right.}{9\left(a^{2}b^{2}x\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x),x, algorithm="fricas")
```

```
[Out] [1/9*(3*(A*b^2*x^3 + A*a*b)*sqrt(b*x^3 + a)*log(((b*x^3 + 2*a)*sq
rt(a) - 2*sqrt(b*x^3 + a)*a)/x^3) + 2*(3*A*b^2*x^3 - B*a^2 + 4*A*
a*b)*sqrt(a))/((a^2*b^2*x^3 + a^3*b)*sqrt(b*x^3 + a)*sqrt(a)), 2/
9*(3*(A*b^2*x^3 + A*a*b)*sqrt(b*x^3 + a)*arctan(a/(sqrt(b*x^3 + a
)*sqrt(-a))) + (3*A*b^2*x^3 - B*a^2 + 4*A*a*b)*sqrt(-a))/((a^2*b^
2*x^3 + a^3*b)*sqrt(b*x^3 + a)*sqrt(-a))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.218687, size = 90, normalized size = 1.17

$$\frac{2\,A\arctan\left(\frac{\sqrt{bx^{3}+a}}{\sqrt{-a}}\right)}{3\,\sqrt{-a}a^{2}}-\frac{2\left(Ba^{2}-3\left(bx^{3}+a\right)Ab-Aab\right)}{9\left(bx^{3}+a\right)^{\frac{3}{2}}a^{2}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x),x, algorithm="giac")
```

```
[Out] 2/3*A*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sqrt(-a)*a^2) - 2/9*(B*a^
2 - 3*(b*x^3 + a)*A*b - A*a*b)/((b*x^3 + a)^(3/2)*a^2*b)
```

3.248 $\int \frac{A+Bx^3}{x^4(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=113

$$\frac{(5Ab-2aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{7/2}}-\frac{5Ab-2aB}{3a^3\sqrt{a+bx^3}}-\frac{5Ab-2aB}{9a^2\left(a+bx^3\right)^{3/2}}-\frac{A}{3ax^3\left(a+bx^3\right)^{3/2}}$$

```
[Out] -(5*A*b - 2*a*B)/(9*a^2*(a + b*x^3)^(3/2)) - A/(3*a*x^3*(a + b*x^
3)^(3/2)) - (5*A*b - 2*a*B)/(3*a^3*Sqrt[a + b*x^3]) + ((5*A*b - 2
*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(3*a^(7/2))
```

Rubi [A] time = 0.274155, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{(5Ab-2aB)\tanh^{-1}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{7/2}}-\frac{5Ab-2aB}{3a^3\sqrt{a+bx^3}}-\frac{5Ab-2aB}{9a^2\left(a+bx^3\right)^{3/2}}-\frac{A}{3ax^3\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^4*(a + b*x^3)^(5/2)),x]
```

```
[Out] -(5*A*b - 2*a*B)/(9*a^2*(a + b*x^3)^(3/2)) - A/(3*a*x^3*(a + b*x^
3)^(3/2)) - (5*A*b - 2*a*B)/(3*a^3*Sqrt[a + b*x^3]) + ((5*A*b - 2
*a*B)*ArcTanh[Sqrt[a + b*x^3]/Sqrt[a]])/(3*a^(7/2))
```

Rubi in Sympy [A] time = 18.4813, size = 104, normalized size = 0.92

$$-\frac{A}{3ax^3\left(a+bx^3\right)^{\frac{3}{2}}}-\frac{2\left(\frac{5Ab}{2}-Ba\right)}{9a^2\left(a+bx^3\right)^{\frac{3}{2}}}-\frac{2\left(\frac{5Ab}{2}-Ba\right)}{3a^3\sqrt{a+bx^3}}+\frac{2\left(\frac{5Ab}{2}-Ba\right)\operatorname{atanh}\left(\frac{\sqrt{a+bx^3}}{\sqrt{a}}\right)}{3a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**4/(b*x**3+a)**(5/2),x)
```

```
[Out] -A/(3*a*x**3*(a + b*x**3)**(3/2)) - 2*(5*A*b/2 - B*a)/(9*a**2*(a
+ b*x**3)**(3/2)) - 2*(5*A*b/2 - B*a)/(3*a**3*sqrt(a + b*x**3)) +
 2*(5*A*b/2 - B*a)*atanh(sqrt(a + b*x**3)/sqrt(a))/(3*a**(7/2))
```

Mathematica [A] time = 0.309363, size = 108, normalized size = 0.96

$$\frac{\sqrt{a+bx^3}\left(\frac{2a^2(aB-Ab)}{(a+bx^3)^2}+\frac{6a(aB-2Ab)}{a+bx^3}+\frac{3(5Ab-2aB)\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{\sqrt{\frac{bx^3}{a}+1}}-\frac{3aA}{x^3}\right)}{9a^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/(x^4*(a + b*x^3)^(5/2)),x]
```

```
[Out] (Sqrt[a + b*x^3]*((-3*a*A)/x^3 + (2*a^2*(-(A*b) + a*B))/(a + b*x^
3)^2 + (6*a*(-2*A*b + a*B))/(a + b*x^3) + (3*(5*A*b - 2*a*B)*ArcT
anh[Sqrt[1 + (b*x^3)/a]])/Sqrt[1 + (b*x^3)/a]))/(9*a^4)
```

Maple [A] time = 0.047, size = 157, normalized size = 1.4

$$A\left(-\frac{1}{3\,a^3x^3}\sqrt{bx^3+a}-\frac{2}{9\,a^2b}\sqrt{bx^3+a}\left(x^3+\frac{a}{b}\right)^{-2}\right.$$
$$\left.-\frac{4\,b}{3\,a^3}\frac{1}{\sqrt{\left(x^3+\frac{a}{b}\right)b}}+\frac{5\,b}{3}Artanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{7}{2}}\right)$$
$$+B\left(\frac{2}{9\,ab^2}\sqrt{bx^3+a}\left(x^3+\frac{a}{b}\right)^{-2}+\frac{2}{3\,a^2}\frac{1}{\sqrt{\left(x^3+\frac{a}{b}\right)b}}-\frac{2}{3}Artanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)a^{-\frac{5}{2}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^4/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(-1/3/a^3*(b*x^3+a)^(1/2)/x^3-2/9/a^2/b*(b*x^3+a)^(1/2)/(x^3+a/
b)^2-4/3*b/a^3/((x^3+a/b)*b)^(1/2)+5/3*b/a^(7/2)*arctanh((b*x^3+a
)^(1/2)/a^(1/2)))+B*(2/9/a/b^2*(b*x^3+a)^(1/2)/(x^3+a/b)^2+2/3/a^
2/((x^3+a/b)*b)^(1/2)-2/3/a^(5/2)*arctanh((b*x^3+a)^(1/2)/a^(1/2)
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^4),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.296907, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(\left(2\,Bab-5\,Ab^2\right)x^6+\left(2\,Ba^2-5\,Aab\right)x^3\right)\sqrt{bx^3+a}\log\left(\frac{\left(bx^3+2\,a\right)\sqrt{a}+2\sqrt{bx^3+a}a}{x^3}\right)-2\left(3\left(2\,Bab-5\,Ab^2\right)x^6+4\left(2\,Ba^2-5\right.\right.}{18\left(a^3bx^6+a^4x^3\right)\sqrt{bx^3+a}\sqrt{a}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/18*(3*((2*B*a*b - 5*A*b^2)*x^6 + (2*B*a^2 - 5*A*a*b)*x^3)*sqr
t(b*x^3 + a)*log(((b*x^3 + 2*a)*sqrt(a) + 2*sqrt(b*x^3 + a)*a)/x^
3) - 2*(3*(2*B*a*b - 5*A*b^2)*x^6 + 4*(2*B*a^2 - 5*A*a*b)*x^3 - 3
*A*a^2)*sqrt(a))/((a^3*b*x^6 + a^4*x^3)*sqrt(b*x^3 + a)*sqrt(a)),
 1/9*(3*((2*B*a*b - 5*A*b^2)*x^6 + (2*B*a^2 - 5*A*a*b)*x^3)*sqrt(
b*x^3 + a)*arctan(a/(sqrt(b*x^3 + a)*sqrt(-a))) + (3*(2*B*a*b - 5
*A*b^2)*x^6 + 4*(2*B*a^2 - 5*A*a*b)*x^3 - 3*A*a^2)*sqrt(-a))/((a^
3*b*x^6 + a^4*x^3)*sqrt(b*x^3 + a)*sqrt(-a))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**4/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222165, size = 136, normalized size = 1.2

$$\frac{(2\,Ba - 5\,Ab)\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{3\,\sqrt{-a}a^3} + \frac{2\left(3\left(bx^3+a\right)Ba + Ba^2 - 6\left(bx^3+a\right)Ab - Aab\right)}{9\left(bx^3+a\right)^{\frac{3}{2}}a^3} - \frac{\sqrt{bx^3+a}A}{3\,a^3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*(2*B*a - 5*A*b)*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sqrt(-a)*a^
3) + 2/9*(3*(b*x^3 + a)*B*a + B*a^2 - 6*(b*x^3 + a)*A*b - A*a*b)/
((b*x^3 + a)^(3/2)*a^3) - 1/3*sqrt(b*x^3 + a)*A/(a^3*x^3)
```

3.249 $\int \frac{x^6(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=299

$$\frac{32\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{135\sqrt[4]{3}b^{10/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{16x(5Ab-14aB)}{135b^3\sqrt{a+bx^3}} - \frac{2x^4(5Ab-14aB)}{45b^2\left(a+bx^3\right)^{3/2}} + \frac{2Bx^7}{5b\left(a+bx^3\right)^{3/2}}$$

```
[Out] (-2*(5*A*b - 14*a*B)*x^4)/(45*b^2*(a + b*x^3)^(3/2)) + (2*B*x^7)/
(5*b*(a + b*x^3)^(3/2)) - (16*(5*A*b - 14*a*B)*x)/(135*b^3*Sqrt[a
 + b*x^3]) + (32*Sqrt[2 + Sqrt[3]]*(5*A*b - 14*a*B)*(a^(1/3) + b^
(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + S
qrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a
^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*
Sqrt[3]])/(135*3^(1/4)*b^(10/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*
x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.404543, antiderivative size = 299, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{32\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(5Ab-14aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{135\sqrt[4]{3}b^{10/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{16x(5Ab-14aB)}{135b^3\sqrt{a+bx^3}} - \frac{2x^4(5Ab-14aB)}{45b^2\left(a+bx^3\right)^{3/2}} + \frac{2Bx^7}{5b\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^6*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```


```
[Out] (-2*(5*A*b - 14*a*B)*x^4)/(45*b^2*(a + b*x^3)^(3/2)) + (2*B*x^7)/
(5*b*(a + b*x^3)^(3/2)) - (16*(5*A*b - 14*a*B)*x)/(135*b^3*Sqrt[a
 + b*x^3]) + (32*Sqrt[2 + Sqrt[3]]*(5*A*b - 14*a*B)*(a^(1/3) + b^
(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + S
qrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a
^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*
Sqrt[3]])/(135*3^(1/4)*b^(10/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*
x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 25.9625, size = 274, normalized size = 0.92

$$\frac{2Bx^7}{5b\left(a+bx^3\right)^{\frac{3}{2}}} - \frac{2x^4\left(5Ab-14Ba\right)}{45b^2\left(a+bx^3\right)^{\frac{3}{2}}} - \frac{16x\left(5Ab-14Ba\right)}{135b^3\sqrt{a+bx^3}} + \frac{32\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(5Ab-14Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{405b^{\frac{10}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*B*x**7/(5*b*(a + b*x**3)**(3/2)) - 2*x**4*(5*A*b - 14*B*a)/(45*
b**2*(a + b*x**3)**(3/2)) - 16*x*(5*A*b - 14*B*a)/(135*b**3*sqrt(
a + b*x**3)) + 32*3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x +
 b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(sq
rt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(5*A*b - 14*B*a)*elliptic_f(as
in((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)
) + b**(1/3)*x)), -7 - 4*sqrt(3))/(405*b**(10/3)*sqrt(a**(1/3)*(a
**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*s
qrt(a + b*x**3))
```

Mathematica [C] time = 0.568123, size = 205, normalized size = 0.69

$$-\frac{2\left(3\sqrt[3]{-b}x\left(112a^2B+a\left(154bBx^3-40Ab\right)+b^2x^3\left(27Bx^3-55A\right)\right)+16i3^{3/4}\sqrt[3]{a}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}}\right.}{405(-b)^{10/3}\left(a+bx^3\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^6*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (-2*(3*(-b)^(1/3)*x*(112*a^2*B + b^2*x^3*(-55*A + 27*B*x^3) + a*(
-40*A*b + 154*b*B*x^3)) + (16*I)*3^(3/4)*a^(1/3)*(5*A*b - 14*a*B)
*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1
/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(a + b*x^3)*EllipticF[
ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1
)^(1/3)]))/(405*(-b)^(10/3)*(a + b*x^3)^(3/2))
```

Maple [B] time = 0.057, size = 683, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(2/9*a*x/b^4*(b*x^3+a)^(1/2)/(x^3+a/b)^2-22/27/b^2*x/((x^3+a/b)
*b)^(1/2)-32/81*I/b^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)
^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^
(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(
1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b
*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3)))^(1/2)))+B*(-2/9*a^2*x/b^5*(b*x^3+a)^(1/2)/(x^3+a/b)^2+40/2
7/b^3*a*x/((x^3+a/b)*b)^(1/2)+2/5/b^3*x*(b*x^3+a)^(1/2)+448/405*I
/b^4*a*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(
-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)
/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^6}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^9 + Ax^6}{(b^2x^6 + 2\,abx^3 + a^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^9 + A*x^6)/((b^2*x^6 + 2*a*b*x^3 + a^2)*sqrt(b*x^3
+ a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^6}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^6/(b*x^3 + a)^(5/2), x)
```

3.250 $\int \frac{x^3(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=283

$$\frac{4\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}ab^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{2x(8aB+Ab)}{27ab^2\sqrt{a+bx^3}} + \frac{2x^4(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*x^4)/(9*a*b*(a + b*x^3)^(3/2)) - (2*(A*b + 8*a*B)*
x)/(27*a*b^2*Sqrt[a + b*x^3]) + (4*Sqrt[2 + Sqrt[3]]*(A*b + 8*a*B
)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[(
(1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*a*b^(7/3)*Sqrt[(a^(1/3)*(a^(
1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a
+ b*x^3])
```

Rubi [A] time = 0.324362, antiderivative size = 283, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{4\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(8aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}ab^{7/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{2x(8aB+Ab)}{27ab^2\sqrt{a+bx^3}} + \frac{2x^4(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```


```
[Out] (2*(A*b - a*B)*x^4)/(9*a*b*(a + b*x^3)^(3/2)) - (2*(A*b + 8*a*B)*
x)/(27*a*b^2*Sqrt[a + b*x^3]) + (4*Sqrt[2 + Sqrt[3]]*(A*b + 8*a*B
)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[(
(1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*a*b^(7/3)*Sqrt[(a^(1/3)*(a^(
1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a
+ b*x^3])
```

Rubi in Sympy [A] time = 23.3297, size = 250, normalized size = 0.88

$$\frac{2x^4\left(Ab-Ba\right)}{9ab\left(a+bx^3\right)^{\frac{3}{2}}} - \frac{2x\left(Ab+8Ba\right)}{27ab^2\sqrt{a+bx^3}} + \frac{4\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab+8Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{81ab^{\frac{7}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**3*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*x**4*(A*b - B*a)/(9*a*b*(a + b*x**3)**(3/2)) - 2*x*(A*b + 8*B*a
)/(27*a*b**2*sqrt(a + b*x**3)) + 4*3**(3/4)*sqrt((a**(2/3) - a**(
1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/
3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(A*b + 8*B*a)
*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(81*a*b**(7/3)*sq
rt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**
(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.550705, size = 199, normalized size = 0.7

$$\frac{2i\left(2\,3^{3/4}\sqrt[3]{a}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(a+bx^3\right)(8aB+Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-3i\sqrt[3]{-\cdots}\right.}{81a(-b)^{7/3}\left(a+bx^3\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[(x^3*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (((2*I)/81)*((-3*I)*(-b)^(1/3)*x*(-8*a^2*B + 2*A*b^2*x^3 - a*b*(A
 + 11*B*x^3)) + 2*3^(3/4)*a^(1/3)*(A*b + 8*a*B)*Sqrt[(-1)^(5/6)*(
-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + (
(-b)^(2/3)*x^2)/a^(2/3)]*(a + b*x^3)*EllipticF[ArcSin[Sqrt[-(-1)^
(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(a*(-b)
^(7/3)*(a + b*x^3)^(3/2))
```

Maple [B] time = 0.034, size = 669, normalized size = 2.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^3*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(-2/9*x/b^3*(b*x^3+a)^(1/2)/(x^3+a/b)^2+4/27/b/a*x/((x^3+a/b)*b
)^(1/2)-4/81*I/b^2/a*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^
(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(
1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1
/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*
(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3)))^(1/2)))+B*(2/9*a*x/b^4*(b*x^3+a)^(1/2)/(x^3+a/b)^2-22/27/b^
2*x/((x^3+a/b)*b)^(1/2)-32/81*I/b^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+
1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3
)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1
/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/
2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/
3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2
),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^3}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^6 + Ax^3}{(b^2x^6 + 2\,abx^3 + a^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^6 + A*x^3)/((b^2*x^6 + 2*a*b*x^3 + a^2)*sqrt(b*x^3
+ a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^3}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^3/(b*x^3 + a)^(5/2), x)
```

3.251 $\int \frac{A+Bx^3}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=283

$$\frac{2x(2aB+7Ab)}{27a^2b\sqrt{a+bx^3}}+\frac{2\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+7Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}a^2b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*x)/(9*a*b*(a + b*x^3)^(3/2)) + (2*(7*A*b + 2*a*B)*
x)/(27*a^2*b*Sqrt[a + b*x^3]) + (2*Sqrt[2 + Sqrt[3]]*(7*A*b + 2*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*a^2*b^(4/3)*Sqrt[(a^(1/3)*
(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqr
t[a + b*x^3])
```

Rubi [A] time = 0.278506, antiderivative size = 283, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$\frac{2x(2aB+7Ab)}{27a^2b\sqrt{a+bx^3}}+\frac{2\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(2aB+7Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}a^2b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2x(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(a + b*x^3)^(5/2),x]
```


```
[Out] (2*(A*b - a*B)*x)/(9*a*b*(a + b*x^3)^(3/2)) + (2*(7*A*b + 2*a*B)*
x)/(27*a^2*b*Sqrt[a + b*x^3]) + (2*Sqrt[2 + Sqrt[3]]*(7*A*b + 2*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*a^2*b^(4/3)*Sqrt[(a^(1/3)*
(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqr
t[a + b*x^3])
```

Rubi in Sympy [A] time = 19.3613, size = 253, normalized size = 0.89

$$\frac{2x\left(Ab-Ba\right)}{9ab\left(a+bx^3\right)^{\frac{3}{2}}}+\frac{4x\left(\frac{7Ab}{2}+Ba\right)}{27a^2b\sqrt{a+bx^3}}+\frac{4\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(\frac{7Ab}{2}+Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{81a^2b^{\frac{4}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*x*(A*b - B*a)/(9*a*b*(a + b*x**3)**(3/2)) + 4*x*(7*A*b/2 + B*a)
/(27*a**2*b*sqrt(a + b*x**3)) + 4*3**(3/4)*sqrt((a**(2/3) - a**(1
/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3
)*x)**2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(7*A*b/2 + B*a
)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/
3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(81*a**2*b**(4/3
)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) +
 b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.534226, size = 199, normalized size = 0.7

$$-\frac{2\left(3\sqrt[3]{-b}x\left(-a^2B+2ab\left(5A+Bx^3\right)+7Ab^2x^3\right)+i3^{3/4}\sqrt[3]{a}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(a+bx^3\right)(2aB+7\right.}{81a^2(-b)^{4/3}\left(a+bx^3\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(a + b*x^3)^(5/2),x]
```

```
[Out] (-2*(3*(-b)^(1/3)*x*(-(a^2*B) + 7*A*b^2*x^3 + 2*a*b*(5*A + B*x^3)
) + I*3^(3/4)*a^(1/3)*(7*A*b + 2*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)
^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)
*x^2)/a^(2/3)]*(a + b*x^3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I
*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(81*a^2*(-b)^(4/3
)*(a + b*x^3)^(3/2))
```

Maple [B] time = 0.029, size = 674, normalized size = 2.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(2/9/a*x/b^2*(b*x^3+a)^(1/2)/(x^3+a/b)^2+14/27/a^2*x/((x^3+a/b)
*b)^(1/2)-14/81*I/a^2*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^
2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)
^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)
```

```
/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3)))^(1/2)))+B*(-2/9*x/b^3*(b*x^3+a)^(1/2)/(x^3+a/b)^2+4/27/b
/a*x/((x^3+a/b)*b)^(1/2)-4/81*I/b^2/a*3^(1/2)*(-a*b^2)^(1/3)*(I*(
x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/
(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1
/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(
1/2)/(b*x^3+a)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(
1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1
/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(b^2x^6 + 2\,abx^3 + a^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b^2*x^6 + 2*a*b*x^3 + a^2)*sqrt(b*x^3 + a)
), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(b*x^3 + a)^(5/2), x)
```

3.252 $\int \frac{A+Bx^3}{x^3(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=300

$$-\frac{7x(13Ab-4aB)}{54a^3\sqrt{a+bx^3}}-\frac{x(13Ab-4aB)}{18a^2\left(a+bx^3\right)^{3/2}}-\frac{7\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{54\sqrt[4]{3}a^3\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A}{2ax^2\left(a+bx^3\right)^{3/2}}$$

```
[Out] -A/(2*a*x^2*(a + b*x^3)^(3/2)) - ((13*A*b - 4*a*B)*x)/(18*a^2*(a
+ b*x^3)^(3/2)) - (7*(13*A*b - 4*a*B)*x)/(54*a^3*Sqrt[a + b*x^3])
 - (7*Sqrt[2 + Sqrt[3]]*(13*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sq
rt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^
(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(
54*3^(1/4)*a^3*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 +
 Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.400873, antiderivative size = 300, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{7x(13Ab-4aB)}{54a^3\sqrt{a+bx^3}}-\frac{x(13Ab-4aB)}{18a^2\left(a+bx^3\right)^{3/2}}-\frac{7\sqrt{2+\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(13Ab-4aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{54\sqrt[4]{3}a^3\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A}{2ax^2\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^3*(a + b*x^3)^(5/2)),x]
```


```
[Out] -A/(2*a*x^2*(a + b*x^3)^(3/2)) - ((13*A*b - 4*a*B)*x)/(18*a^2*(a
+ b*x^3)^(3/2)) - (7*(13*A*b - 4*a*B)*x)/(54*a^3*Sqrt[a + b*x^3])
 - (7*Sqrt[2 + Sqrt[3]]*(13*A*b - 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sq
rt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^
(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(
54*3^(1/4)*a^3*b^(1/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 +
 Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 23.8875, size = 274, normalized size = 0.91

$$-\frac{A}{2ax^2(a+bx^3)^{\frac{3}{2}}}-\frac{x(13Ab-4Ba)}{18a^2(a+bx^3)^{\frac{3}{2}}}-\frac{7x(13Ab-4Ba)}{54a^3\sqrt{a+bx^3}}-\frac{7\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(13Ab-4Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{162a^3\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((B*x**3+A)/x**3/(b*x**3+a)**(5/2),x)
```

```
[Out] -A/(2*a*x**2*(a + b*x**3)**(3/2)) - x*(13*A*b - 4*B*a)/(18*a**2*(
a + b*x**3)**(3/2)) - 7*x*(13*A*b - 4*B*a)/(54*a**3*sqrt(a + b*x*
*3)) - 7*3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)
*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2
)*(a**(1/3) + b**(1/3)*x)*(13*A*b - 4*B*a)*elliptic_f(asin((-a**(
1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1
/3)*x)), -7 - 4*sqrt(3))/(162*a**3*b**(1/3)*sqrt(a**(1/3)*(a**(1/
3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a
 + b*x**3))
```

Mathematica [C] time = 0.661796, size = 210, normalized size = 0.7

$$\frac{a^2\left(40Bx^3-27A\right)+a\left(28bBx^6-130Abx^3\right)-91Ab^2x^6}{54a^3x^2\left(a+bx^3\right)^{3/2}}+\frac{7i\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}(4aB-13Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{54\sqrt[4]{3}a^{8/3}\sqrt[3]{-b}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[(A + B*x^3)/(x^3*(a + b*x^3)^(5/2)),x]
```

```
[Out] (-91*A*b^2*x^6 + a^2*(-27*A + 40*B*x^3) + a*(-130*A*b*x^3 + 28*b*
B*x^6))/(54*a^3*x^2*(a + b*x^3)^(3/2)) + (((7*I)/54)*(-13*A*b + 4
*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-
b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin[
Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)
])/(3^(1/4)*a^(8/3)*(-b)^(1/3)*Sqrt[a + b*x^3])
```

Maple [B] time = 0.045, size = 689, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((B*x^3+A)/x^3/(b*x^3+a)^(5/2),x)
```

```
[Out] B*(2/9/a*x/b^2*(b*x^3+a)^(1/2)/(x^3+a/b)^2+14/27/a^2*x/((x^3+a/b)
*b)^(1/2)-14/81*I/a^2*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^
2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^
```

```
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)
^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)
/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3)))^(1/2)))+A*(-2/9/a^2*x/b*(b*x^3+a)^(1/2)/(x^3+a/b)^2-32/2
7*b/a^3*x/((x^3+a/b)*b)^(1/2)-1/2/a^3*(b*x^3+a)^(1/2)/x^2+91/162*
I/a^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-
a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(1
/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/
(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^3),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(b^2x^9 + 2\,abx^6 + a^2x^3)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^3),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b^2*x^9 + 2*a*b*x^6 + a^2*x^3)*sqrt(b*x^3
+ a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/x**3/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^3),x, algorithm="giac")

[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^3), x)
```

3.253 $\int \frac{A+Bx^3}{x^6(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=334

$$\frac{91\sqrt{a+bx^3}(19Ab-10aB)}{540a^4x^2}-\frac{13(19Ab-10aB)}{135a^3x^2\sqrt{a+bx^3}}-\frac{19Ab-10aB}{45a^2x^2\left(a+bx^3\right)^{3/2}}+\frac{91\sqrt{2+\sqrt{3}}\,b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{540\sqrt[4]{3}a^4\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A}{5ax^5\left(a+bx^3\right)^{3/2}}$$

```
[Out] -A/(5*a*x^5*(a + b*x^3)^(3/2)) - (19*A*b - 10*a*B)/(45*a^2*x^2*(a
 + b*x^3)^(3/2)) - (13*(19*A*b - 10*a*B))/(135*a^3*x^2*Sqrt[a + b
*x^3]) + (91*(19*A*b - 10*a*B)*Sqrt[a + b*x^3])/(540*a^4*x^2) + (
91*Sqrt[2 + Sqrt[3]]*b^(2/3)*(19*A*b - 10*a*B)*(a^(1/3) + b^(1/3)
*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3
) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[
3]])/(540*3^(1/4)*a^4*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 +
Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.472302, antiderivative size = 334, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{91\sqrt{a+bx^3}(19Ab-10aB)}{540a^4x^2}-\frac{13(19Ab-10aB)}{135a^3x^2\sqrt{a+bx^3}}-\frac{19Ab-10aB}{45a^2x^2\left(a+bx^3\right)^{3/2}}+\frac{91\sqrt{2+\sqrt{3}}\,b^{2/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(19Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{540\sqrt[4]{3}a^4\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{A}{5ax^5\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^6*(a + b*x^3)^(5/2)),x]
```

```
[Out] -A/(5*a*x^5*(a + b*x^3)^(3/2)) - (19*A*b - 10*a*B)/(45*a^2*x^2*(a
 + b*x^3)^(3/2)) - (13*(19*A*b - 10*a*B))/(135*a^3*x^2*Sqrt[a + b
*x^3]) + (91*(19*A*b - 10*a*B)*Sqrt[a + b*x^3])/(540*a^4*x^2) + (
91*Sqrt[2 + Sqrt[3]]*b^(2/3)*(19*A*b - 10*a*B)*(a^(1/3) + b^(1/3)
*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3
])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3
) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[
3]])/(540*3^(1/4)*a^4*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 +
Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 33.1129, size = 304, normalized size = 0.91

$$-\frac{A}{5ax^5(a+bx^3)^{\frac{3}{2}}}-\frac{19Ab-10Ba}{45a^2x^2(a+bx^3)^{\frac{3}{2}}}-\frac{13(19Ab-10Ba)}{135a^3x^2\sqrt{a+bx^3}}+\frac{91\cdot 3^{\frac{3}{4}}b^{\frac{2}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(19Ab-10Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}(-1+\sqrt{3})+\sqrt[3]{b}x}{\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{1620a^4\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{91\sqrt{a+bx^3}(19Ab-10Ba)}{540a^4x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**6/(b*x**3+a)**(5/2),x)
```

```
[Out] -A/(5*a*x**5*(a + b*x**3)**(3/2)) - (19*A*b - 10*B*a)/(45*a**2*x*
*2*(a + b*x**3)**(3/2)) - 13*(19*A*b - 10*B*a)/(135*a**3*x**2*sqr
t(a + b*x**3)) + 91*3**(3/4)*b**(2/3)*sqrt((a**(2/3) - a**(1/3)*b
**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)*
*2)*sqrt(sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(19*A*b - 10*B*a)*e
lliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*
(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(1620*a**4*sqrt(a**
(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*
x)**2)*sqrt(a + b*x**3)) + 91*sqrt(a + b*x**3)*(19*A*b - 10*B*a)/
(540*a**4*x**2)
```

Mathematica [C] time = 0.844461, size = 228, normalized size = 0.68

$$\frac{-91i3^{3/4}\sqrt[3]{a}(-b)^{2/3}x^5\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(a+bx^3\right)(19Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\right.}{1620a^4x^5\left(a+bx^3\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^6*(a + b*x^3)^(5/2)),x]
```

```
[Out] (5187*A*b^3*x^9 + 3*a^2*b*x^3*(513*A - 1300*B*x^3) + 390*a*b^2*x^
6*(19*A - 7*B*x^3) - 162*a^3*(2*A + 5*B*x^3) - (91*I)*3^(3/4)*a^(
1/3)*(-b)^(2/3)*(19*A*b - 10*a*B)*x^5*Sqrt[(-1)^(5/6)*(-1 + ((-b)
^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)
*x^2)/a^(2/3)]*(a + b*x^3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I
*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/(1620*a^4*x^5*(a +
 b*x^3)^(3/2))
```

Maple [B] time = 0.049, size = 722, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^6/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(2/9/a^3*x*(b*x^3+a)^(1/2)/(x^3+a/b)^2+50/27*b^2/a^4*x/((x^3+a/
b)*b)^(1/2)-1/5/a^3*(b*x^3+a)^(1/2)/x^5+27/20/a^4*b*(b*x^3+a)^(1/
2)/x^2-1729/1620*I*b/a^4*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b
```

```
^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a
)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2
)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2)))+B*(-2/9/a^2*x/b*(b*x^3+a)^(1/2)/(x^3+a/b)^2-32/
27*b/a^3*x/((x^3+a/b)*b)^(1/2)-1/2/a^3*(b*x^3+a)^(1/2)/x^2+91/162
*I/a^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(
-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)
/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^6),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^6), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(b^2x^{12} + 2\,abx^9 + a^2x^6)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^6),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b^2*x^12 + 2*a*b*x^9 + a^2*x^6)*sqrt(b*x^3
 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/x**6/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^6),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^6), x)
```

3.254 $\int \frac{x^7(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=577

$$\frac{80\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-16aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{189\sqrt[4]{3}b^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{40\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-16aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{63\,3^{3/4}b^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{80\sqrt{a+bx^3}(7Ab-16aB)}{189b^{11/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)} - \frac{20x^2(7Ab-16aB)}{189b^3\sqrt{a+bx^3}} - \frac{2x^5(7Ab-16aB)}{63b^2\left(a+bx^3\right)^{3/2}} + \frac{2Bx^8}{7b\left(a+bx^3\right)^{3/2}}$$

```
[Out] (-2*(7*A*b - 16*a*B)*x^5)/(63*b^2*(a + b*x^3)^(3/2)) + (2*B*x^8)/
(7*b*(a + b*x^3)^(3/2)) - (20*(7*A*b - 16*a*B)*x^2)/(189*b^3*Sqrt
[a + b*x^3]) + (80*(7*A*b - 16*a*B)*Sqrt[a + b*x^3])/(189*b^(11/3
)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (40*Sqrt[2 - Sqrt[3]]*a^
(1/3)*(7*A*b - 16*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(63*3^(3/4)*b^(11/3
)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b
^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (80*Sqrt[2]*a^(1/3)*(7*A*b - 16*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(189*3^(1/4)*b^(11/3)*Sqrt[(a^(1/3)*(a
^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[
a + b*x^3])
```

Rubi [A] time = 0.852474, antiderivative size = 577, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{80\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-16aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{189\sqrt[4]{3}b^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{40\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(7Ab-16aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{63\,3^{3/4}b^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{80\sqrt{a+bx^3}(7Ab-16aB)}{189b^{11/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)} - \frac{20x^2(7Ab-16aB)}{189b^3\sqrt{a+bx^3}} - \frac{2x^5(7Ab-16aB)}{63b^2\left(a+bx^3\right)^{3/2}} + \frac{2Bx^8}{7b\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^7*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (-2*(7*A*b - 16*a*B)*x^5)/(63*b^2*(a + b*x^3)^(3/2)) + (2*B*x^8)/
(7*b*(a + b*x^3)^(3/2)) - (20*(7*A*b - 16*a*B)*x^2)/(189*b^3*Sqrt
[a + b*x^3]) + (80*(7*A*b - 16*a*B)*Sqrt[a + b*x^3])/(189*b^(11/3
)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) - (40*Sqrt[2 - Sqrt[3]]*a^
(1/3)*(7*A*b - 16*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(63*3^(3/4)*b^(11/3
)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b
^(1/3)*x)^2]*Sqrt[a + b*x^3]) + (80*Sqrt[2]*a^(1/3)*(7*A*b - 16*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(189*3^(1/4)*b^(11/3)*Sqrt[(a^(1/3)*(a
^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[
a + b*x^3])
```

Rubi in Sympy [A] time = 60.0314, size = 524, normalized size = 0.91

$$\frac{2Bx^8}{7b\left(a+bx^3\right)^{\frac{3}{2}}} - \frac{40\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(7Ab-16Ba\right)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{189b^{\frac{11}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{80\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(7Ab-16Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{567b^{\frac{11}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{2x^5\left(7Ab-16Ba\right)}{63b^2\left(a+bx^3\right)^{\frac{3}{2}}} - \frac{20x^2\left(7Ab-16Ba\right)}{189b^3\sqrt{a+bx^3}} + \frac{80\sqrt{a+bx^3}\left(7Ab-16Ba\right)}{189b^{\frac{11}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*B*x**8/(7*b*(a + b*x**3)**(3/2)) - 40*3**(1/4)*a**(1/3)*sqrt((a
**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqr
t(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x
)*(7*A*b - 16*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b*
*(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))
/(189*b**(11/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(
1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 80*sqrt(2)*3**
(3/4)*a**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x*
*2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3
)*x)*(7*A*b - 16*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) +
 b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(
3))/(567*b**(11/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3
)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 2*x**5*(7*A
*b - 16*B*a)/(63*b**2*(a + b*x**3)**(3/2)) - 20*x**2*(7*A*b - 16*
B*a)/(189*b**3*sqrt(a + b*x**3)) + 80*sqrt(a + b*x**3)*(7*A*b - 1
6*B*a)/(189*b**(11/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x))
```

Mathematica [C] time = 0.924499, size = 265, normalized size = 0.46

$$-\frac{2\left(3(-b)^{2/3}x^2\left(160a^2B+a\left(208bBx^3-70Ab\right)+b^2x^3\left(27Bx^3-91A\right)\right)-40(-1)^{2/3}3^{3/4}a^{2/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}}{a^{2/3}}}\right.}{567(-b)^{11}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^7*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (-2*(3*(-b)^(2/3)*x^2*(160*a^2*B + b^2*x^3*(-91*A + 27*B*x^3) + a
*(-70*A*b + 208*b*B*x^3)) - 40*(-1)^(2/3)*3^(3/4)*a^(2/3)*(7*A*b
- 16*a*B)*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 +
 ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(a + b*x^3)*(
Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1
/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-
1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])))/(56
7*(-b)^(11/3)*(a + b*x^3)^(3/2))
```

Maple [B] time = 0.056, size = 997, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(2/9*a*x^2/b^4*(b*x^3+a)^(1/2)/(x^3+a/b)^2-26/27/b^2*x^2/((x^3+
a/b)*b)^(1/2)-80/81*I/b^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+
a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*
EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*
b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
)^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a
*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1
/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2
*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-2/9*a^2*x^2/b^5*(b*x^3
+a)^(1/2)/(x^3+a/b)^2+44/27/b^3*a*x^2/((x^3+a/b)*b)^(1/2)+2/7/b^3
*x^2*(b*x^3+a)^(1/2)+1280/567*I/b^4*a*3^(1/2)*(-a*b^2)^(1/3)*(I*(
x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/
(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1
/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(
1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^
(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*
(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b
/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\,x^7}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^7/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^{10} + Ax^7}{(b^2x^6 + 2\,abx^3 + a^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^10 + A*x^7)/((b^2*x^6 + 2*a*b*x^3 + a^2)*sqrt(b*x^3
 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)x^7}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^7/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^7/(b*x^3 + a)^(5/2), x)
```

3.255 $\int \frac{x^4(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=559

$$-\frac{8\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}a^{2/3}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{4\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-10aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{9\ 3^{3/4}a^{2/3}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{8\sqrt{a+bx^3}(Ab-10aB)}{27ab^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2(Ab-10aB)}{27ab^2\sqrt{a+bx^3}}+\frac{2x^5(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*x^5)/(9*a*b*(a + b*x^3)^(3/2)) + (2*(A*b - 10*a*B)
*x^2)/(27*a*b^2*Sqrt[a + b*x^3]) - (8*(A*b - 10*a*B)*Sqrt[a + b*x
^3])/(27*a*b^(8/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (4*Sqrt
[2 - Sqrt[3]]*(A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3)
- a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1
 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(9*3^(3/4)*a^
(2/3)*b^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (8*Sqrt[2]*(A*b - 10*
a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSi
n[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*a^(2/3)*b^(8/3)*Sqrt[(a^(
1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2
]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.712494, antiderivative size = 559, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{8\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-10aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}a^{2/3}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{4\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(Ab-10aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{9\ 3^{3/4}a^{2/3}b^{8/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{8\sqrt{a+bx^3}(Ab-10aB)}{27ab^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2(Ab-10aB)}{27ab^2\sqrt{a+bx^3}}+\frac{2x^5(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```


```
[Out] (2*(A*b - a*B)*x^5)/(9*a*b*(a + b*x^3)^(3/2)) + (2*(A*b - 10*a*B)
*x^2)/(27*a*b^2*Sqrt[a + b*x^3]) - (8*(A*b - 10*a*B)*Sqrt[a + b*x
```

```
^3])/(27*a*b^(8/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (4*Sqrt
[2 - Sqrt[3]]*(A*b - 10*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3)
- a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1
 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(9*3^(3/4)*a^
(2/3)*b^(8/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (8*Sqrt[2]*(A*b - 10*
a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSi
n[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*a^(2/3)*b^(8/3)*Sqrt[(a^(
1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2
]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 51.8625, size = 496, normalized size = 0.89

$$\frac{2x^5\left(Ab-Ba\right)}{9ab\left(a+bx^3\right)^{\frac{3}{2}}}+\frac{2x^2\left(Ab-10Ba\right)}{27ab^2\sqrt{a+bx^3}}-\frac{8\sqrt{a+bx^3}\left(Ab-10Ba\right)}{27ab^{\frac{8}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{4\sqrt[4]{3}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab-10Ba\right)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{27a^{\frac{2}{3}}b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{8\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab-10Ba\right)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{81a^{\frac{2}{3}}b^{\frac{8}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**4*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*x**5*(A*b - B*a)/(9*a*b*(a + b*x**3)**(3/2)) + 2*x**2*(A*b - 10
*B*a)/(27*a*b**2*sqrt(a + b*x**3)) - 8*sqrt(a + b*x**3)*(A*b - 10
*B*a)/(27*a*b**(8/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) + 4*3
**(1/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a*
*(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/
3) + b**(1/3)*x)*(A*b - 10*B*a)*elliptic_e(asin((-a**(1/3)*(-1 +
sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7
 - 4*sqrt(3))/(27*a**(2/3)*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**
(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**
3)) - 8*sqrt(2)*3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b
**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3)
 + b**(1/3)*x)*(A*b - 10*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sq
rt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 -
 4*sqrt(3))/(81*a**(2/3)*b**(8/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1
/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)
)
```

Mathematica [C] time = 0.933408, size = 256, normalized size = 0.46

$$\frac{2\left(3(-b)^{2/3}x^2\left(-10a^2B+ab\left(A-13Bx^3\right)+4Ab^2x^3\right)+4(-1)^{2/3}3^{3/4}a^{2/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(a+\right.\right.}{81a(-b)^{8/3}\left(a+bx^3\right)^{3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*(3*(-b)^(2/3)*x^2*(-10*a^2*B + 4*A*b^2*x^3 + a*b*(A - 13*B*x^3
)) + 4*(-1)^(2/3)*3^(3/4)*a^(2/3)*(A*b - 10*a*B)*Sqrt[(-1)^(5/6)*
(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) +
((-b)^(2/3)*x^2)/a^(2/3)]*(a + b*x^3)*(Sqrt[3]*EllipticE[ArcSin[S
qrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]
 + (-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x
)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])))/(81*a*(-b)^(8/3)*(a + b*x^3)^
(3/2))
```

Maple [B] time = 0.034, size = 981, normalized size = 1.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(-2/9*x^2/b^3*(b*x^3+a)^(1/2)/(x^3+a/b)^2+8/27/b/a*x^2/((x^3+a/
b)*b)^(1/2)+8/81*I/b^2/a*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b
^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a
)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*E
llipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b
^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))
^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(2/9*a*x^2/b^4*(b*x^3+a)^
(1/2)/(x^3+a/b)^2-26/27/b^2*x^2/((x^3+a/b)*b)^(1/2)-80/81*I/b^3*3
^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^
(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1
/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x
+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(
-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)
*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a
*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)x^4}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^7 + Ax^4}{(b^2x^6 + 2\,abx^3 + a^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^7 + A*x^4)/((b^2*x^6 + 2*a*b*x^3 + a^2)*sqrt(b*x^3
+ a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\,x^4}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x^4/(b*x^3 + a)^(5/2), x)
```

3.256 $\int \frac{x(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=563

$$-\frac{2\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(4aB+5Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}a^{5/3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(4aB+5Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{9\,3^{3/4}a^{5/3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{a+bx^3}(4aB+5Ab)}{27a^2b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2(4aB+5Ab)}{27a^2b\sqrt{a+bx^3}}+\frac{2x^2(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*x^2)/(9*a*b*(a + b*x^3)^(3/2)) + (2*(5*A*b + 4*a*B
)*x^2)/(27*a^2*b*Sqrt[a + b*x^3]) - (2*(5*A*b + 4*a*B)*Sqrt[a + b
*x^3])/(27*a^2*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (Sq
rt[2 - Sqrt[3]]*(5*A*b + 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/
3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(9*3^(3/4)
*a^(5/3)*b^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (2*Sqrt[2]*(5*A*b
+ 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[A
rcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3)
+ b^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*a^(5/3)*b^(5/3)*Sqrt[
(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*
x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.685336, antiderivative size = 563, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$-\frac{2\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(4aB+5Ab)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}a^{5/3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(4aB+5Ab)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{9\,3^{3/4}a^{5/3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{a+bx^3}(4aB+5Ab)}{27a^2b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{2x^2(4aB+5Ab)}{27a^2b\sqrt{a+bx^3}}+\frac{2x^2(Ab-aB)}{9ab\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*(A*b - a*B)*x^2)/(9*a*b*(a + b*x^3)^(3/2)) + (2*(5*A*b + 4*a*B
)*x^2)/(27*a^2*b*Sqrt[a + b*x^3]) - (2*(5*A*b + 4*a*B)*Sqrt[a + b
```

```
*x^3])/(27*a^2*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)) + (Sq
rt[2 - Sqrt[3]]*(5*A*b + 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/
3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^
(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(9*3^(3/4)
*a^(5/3)*b^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (2*Sqrt[2]*(5*A*b
+ 4*a*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[A
rcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3)
+ b^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*a^(5/3)*b^(5/3)*Sqrt[
(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*
x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 51.0911, size = 503, normalized size = 0.89

$$\frac{2x^2(Ab-Ba)}{9ab(a+bx^3)^{\frac{3}{2}}}+\frac{2x^2(5Ab+4Ba)}{27a^2b\sqrt{a+bx^3}}-\frac{2\sqrt{a+bx^3}(5Ab+4Ba)}{27a^2b^{\frac{5}{3}}\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}+\frac{\sqrt[4]{3}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(5Ab+4Ba)E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}(-1+\sqrt{3})+\sqrt[3]{b}x}{\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{27a^{\frac{5}{3}}b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(5Ab+4Ba)F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}(-1+\sqrt{3})+\sqrt[3]{b}x}{\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{81a^{\frac{5}{3}}b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}(1+\sqrt{3})+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*x**2*(A*b - B*a)/(9*a*b*(a + b*x**3)**(3/2)) + 2*x**2*(5*A*b +
4*B*a)/(27*a**2*b*sqrt(a + b*x**3)) - 2*sqrt(a + b*x**3)*(5*A*b +
 4*B*a)/(27*a**2*b**(5/3)*(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x))
+ 3**(1/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**
(1/3) + b**(1/3)*x)*(5*A*b + 4*B*a)*elliptic_e(asin((-a**(1/3)*(-
1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x))
, -7 - 4*sqrt(3))/(27*a**(5/3)*b**(5/3)*sqrt(a**(1/3)*(a**(1/3) +
 b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b
*x**3)) - 2*sqrt(2)*3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x
 + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(
1/3) + b**(1/3)*x)*(5*A*b + 4*B*a)*elliptic_f(asin((-a**(1/3)*(-1
 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)),
 -7 - 4*sqrt(3))/(81*a**(5/3)*b**(5/3)*sqrt(a**(1/3)*(a**(1/3) +
b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*
x**3))
```

Mathematica [C] time = 0.857268, size = 257, normalized size = 0.46

$$-\frac{2\left(3(-b)^{2/3}x^2\left(a^2B+4ab\left(2A+Bx^3\right)+5Ab^2x^3\right)+(-1)^{2/3}3^{3/4}a^{2/3}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(a+bx^3\right.\right.}{81a^2(-b)^{5/3}\left(a+bx^3\right)^{3/}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (-2*(3*(-b)^(2/3)*x^2*(a^2*B + 5*A*b^2*x^3 + 4*a*b*(2*A + B*x^3))
 + (-1)^(2/3)*3^(3/4)*a^(2/3)*(5*A*b + 4*a*B)*Sqrt[(-1)^(5/6)*(-1
 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-
b)^(2/3)*x^2)/a^(2/3)]*(a + b*x^3)*(Sqrt[3]*EllipticE[ArcSin[Sqrt
[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] +
(-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a
^(1/3)]/3^(1/4)], (-1)^(1/3)])))/(81*a^2*(-b)^(5/3)*(a + b*x^3)^(
3/2))
```

Maple [B] time = 0.03, size = 986, normalized size = 1.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(2/9/a*x^2/b^2*(b*x^3+a)^(1/2)/(x^3+a/b)^2+10/27/a^2*x^2/((x^3+
a/b)*b)^(1/2)+10/81*I/a^2*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-
a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(
1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^
3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-
a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(
-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^
(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-2/9*x^2/b^3*(b*x^3+a
)^(1/2)/(x^3+a/b)^2+8/27/b/a*x^2/((x^3+a/b)*b)^(1/2)+8/81*I/b^2/a
*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2
)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^
(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*
(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b
/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/
3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(
-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)x}{\left(bx^3 + a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*x/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^4 + Ax}{(b^2x^6 + 2\,abx^3 + a^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^4 + A*x)/((b^2*x^6 + 2*a*b*x^3 + a^2)*sqrt(b*x^3 +
a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\,x}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*x/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*x/(b*x^3 + a)^(5/2), x)
```

3.257 $\int \frac{A+Bx^3}{x^2(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=578

$$\frac{5\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}a^{8/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{5\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-2aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{18\ 3^{3/4}a^{8/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{5\sqrt{a+bx^3}(11Ab-2aB)}{27a^3b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{5x^2(11Ab-2aB)}{27a^3\sqrt{a+bx^3}}-\frac{x^2(11Ab-2aB)}{9a^2\left(a+bx^3\right)^{3/2}}-\frac{A}{ax\left(a+bx^3\right)^{3/2}}$$

```
[Out] -(A/(a*x*(a + b*x^3)^(3/2))) - ((11*A*b - 2*a*B)*x^2)/(9*a^2*(a +
 b*x^3)^(3/2)) - (5*(11*A*b - 2*a*B)*x^2)/(27*a^3*Sqrt[a + b*x^3]
) + (5*(11*A*b - 2*a*B)*Sqrt[a + b*x^3])/(27*a^3*b^(2/3)*((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)) - (5*Sqrt[2 - Sqrt[3]]*(11*A*b - 2*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(18*3^(3/4)*a^(8/3)*b^(2/3)*Sqrt[(a^(1
/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*Sqrt[a + b*x^3]) + (5*Sqrt[2]*(11*A*b - 2*a*B)*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/
3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt
[3]])/(27*3^(1/4)*a^(8/3)*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3
)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.782729, antiderivative size = 578, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{5\sqrt{2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-2aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}a^{8/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{5\sqrt{2-\sqrt{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(11Ab-2aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{18\ 3^{3/4}a^{8/3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{5\sqrt{a+bx^3}(11Ab-2aB)}{27a^3b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{5x^2(11Ab-2aB)}{27a^3\sqrt{a+bx^3}}-\frac{x^2(11Ab-2aB)}{9a^2\left(a+bx^3\right)^{3/2}}-\frac{A}{ax\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^2*(a + b*x^3)^(5/2)),x]
```

```
[Out] -(A/(a*x*(a + b*x^3)^(3/2))) - ((11*A*b - 2*a*B)*x^2)/(9*a^2*(a +
 b*x^3)^(3/2)) - (5*(11*A*b - 2*a*B)*x^2)/(27*a^3*Sqrt[a + b*x^3]
```

```
) + (5*(11*A*b - 2*a*B)*Sqrt[a + b*x^3])/(27*a^3*b^(2/3)*((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)) - (5*Sqrt[2 - Sqrt[3]]*(11*A*b - 2*a
*B)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(
2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin
[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(
1/3)*x)], -7 - 4*Sqrt[3]])/(18*3^(3/4)*a^(8/3)*b^(2/3)*Sqrt[(a^(1
/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*Sqrt[a + b*x^3]) + (5*Sqrt[2]*(11*A*b - 2*a*B)*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[
3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/
3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt
[3]])/(27*3^(1/4)*a^(8/3)*b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3
)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 60.2721, size = 522, normalized size = 0.9

$$- \frac{A}{a x \left(a + b x^{3}\right)^{\frac{3}{2}}} - \frac{2 x^{2} \left(\frac{11 A b}{2} - B a\right)}{9 a^{2} \left(a + b x^{3}\right)^{\frac{3}{2}}} - \frac{10 x^{2} \left(\frac{11 A b}{2} - B a\right)}{27 a^{3} \sqrt{a + b x^{3}}} + \frac{10 \sqrt{a + b x^{3}} \left(\frac{11 A b}{2} - B a\right)}{27 a^{3} b^{\frac{2}{3}} \left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)} - \frac{5 \sqrt[4]{3} \sqrt{\frac{a^{\frac{2}{3}} - \sqrt[3]{a} \sqrt[3]{b} x + b^{\frac{2}{3}} x^{2}}{\left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)^{2}}} \sqrt{- \sqrt{3} + 2} \left(\sqrt[3]{a} + \sqrt[3]{b} x\right) \left(\frac{11 A b}{2} - B a\right) E\left(\operatorname{asin}{\left(\frac{- \sqrt[3]{a} \left(-1 + \sqrt{3}\right) + \sqrt[3]{b} x}{\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x} \right)}\middle| -7 - 4 \sqrt{3}\right)}{27 a^{\frac{8}{3}} b^{\frac{2}{3}} \sqrt{\frac{\sqrt[3]{a} \left(\sqrt[3]{a} + \sqrt[3]{b} x\right)}{\left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)^{2}}} \sqrt{a + b x^{3}}} + \frac{10 \sqrt{2} \cdot 3^{\frac{3}{4}} \sqrt{\frac{a^{\frac{2}{3}} - \sqrt[3]{a} \sqrt[3]{b} x + b^{\frac{2}{3}} x^{2}}{\left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)^{2}}} \left(\sqrt[3]{a} + \sqrt[3]{b} x\right) \left(\frac{11 A b}{2} - B a\right) F\left(\operatorname{asin}{\left(\frac{- \sqrt[3]{a} \left(-1 + \sqrt{3}\right) + \sqrt[3]{b} x}{\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x} \right)}\middle| -7 - 4 \sqrt{3}\right)}{81 a^{\frac{8}{3}} b^{\frac{2}{3}} \sqrt{\frac{\sqrt[3]{a} \left(\sqrt[3]{a} + \sqrt[3]{b} x\right)}{\left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)^{2}}} \sqrt{a + b x^{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**2/(b*x**3+a)**(5/2),x)
```

```
[Out] -A/(a*x*(a + b*x**3)**(3/2)) - 2*x**2*(11*A*b/2 - B*a)/(9*a**2*(a
 + b*x**3)**(3/2)) - 10*x**2*(11*A*b/2 - B*a)/(27*a**3*sqrt(a + b
*x**3)) + 10*sqrt(a + b*x**3)*(11*A*b/2 - B*a)/(27*a**3*b**(2/3)*
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) - 5*3**(1/4)*sqrt((a**(2/3
) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(11*
A*b/2 - B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)
*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(27*a
**(8/3)*b**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*
(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) + 10*sqrt(2)*3*
*(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**
(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(11
*A*b/2 - B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3
)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(81*
a**(8/3)*b**(2/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 1.01533, size = 273, normalized size = 0.47

$$\frac{-\frac{3\left(a^2\left(27A-16Bx^3\right)+2abx^3\left(44A-5Bx^3\right)+55Ab^2x^6\right)}{x}+\frac{5\sqrt[6]{-1}3^{3/4}a^{2/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(a+bx^3\right)(11Ab-2aB)\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\cdots\right.\right.\right.}{(-b)^{2/3}}}{81a^3\left(a+bx^3\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^2*(a + b*x^3)^(5/2)),x]
```

```
[Out] ((-3*(55*A*b^2*x^6 + a^2*(27*A - 16*B*x^3) + 2*a*b*x^3*(44*A - 5*
B*x^3)))/x + (5*(-1)^(1/6)*3^(3/4)*a^(2/3)*(11*A*b - 2*a*B)*Sqrt[
((-1)^(5/6)*(-a^(1/3) + (-b)^(1/3)*x))/a^(1/3)]*Sqrt[1 + ((-b)^(1
/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(a + b*x^3)*((-I)*Sqrt
[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]
/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(
5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(-b)^(2/
3))/(81*a^3*(a + b*x^3)^(3/2))
```

Maple [B] time = 0.043, size = 1001, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^2/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(-2/9/a^2*x^2/b*(b*x^3+a)^(1/2)/(x^3+a/b)^2-28/27*b/a^3*x^2/((x
^3+a/b)*b)^(1/2)-1/a^3*(b*x^3+a)^(1/2)/x-55/81*I/a^3*3^(1/2)*(-a*
b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1
/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+
1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-
a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)
/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
+B*(2/9/a*x^2/b^2*(b*x^3+a)^(1/2)/(x^3+a/b)^2+10/27/a^2*x^2/((x^3
+a/b)*b)^(1/2)+10/81*I/a^2*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(
-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^
(1/3))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2
*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x
^3+a)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(
-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*
(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)
^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(b^2x^8 + 2\,abx^5 + a^2x^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b^2*x^8 + 2*a*b*x^5 + a^2*x^2)*sqrt(b*x^3
+ a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**2/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^2), x)
```

3.258 $\int \frac{A+Bx^3}{x^5(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=610

$$-\frac{55\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{108\sqrt{2}\sqrt[4]{3}a^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{55\sqrt{2-\sqrt{3}}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-8aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{144\,3^{3/4}a^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{55\sqrt{a+bx^3}(17Ab-8aB)}{216a^4x}-\frac{55\sqrt[3]{b}\sqrt{a+bx^3}(17Ab-8aB)}{216a^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{11(17Ab-8aB)}{108a^3x\sqrt{a+bx^3}}-\frac{17Ab-8aB}{36a^2x\left(a+bx^3\right)^{3/2}}-\frac{A}{4ax^4\left(a+bx^3\right)^{3/2}}$$

```
[Out] -A/(4*a*x^4*(a + b*x^3)^(3/2)) - (17*A*b - 8*a*B)/(36*a^2*x*(a +
b*x^3)^(3/2)) - (11*(17*A*b - 8*a*B))/(108*a^3*x*Sqrt[a + b*x^3])
 + (55*(17*A*b - 8*a*B)*Sqrt[a + b*x^3])/(216*a^4*x) - (55*b^(1/3
)*(17*A*b - 8*a*B)*Sqrt[a + b*x^3])/(216*a^4*((1 + Sqrt[3])*a^(1/
3) + b^(1/3)*x)) + (55*Sqrt[2 - Sqrt[3]]*b^(1/3)*(17*A*b - 8*a*B)
*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin[((
1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3
)*x)], -7 - 4*Sqrt[3]])/(144*3^(3/4)*a^(11/3)*Sqrt[(a^(1/3)*(a^(1
/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a +
 b*x^3]) - (55*b^(1/3)*(17*A*b - 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sqr
t[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1
/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(
1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(1
08*Sqrt[2]*3^(1/4)*a^(11/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.931111, antiderivative size = 610, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$-\frac{55\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-8aB)F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{108\sqrt{2}\sqrt[4]{3}a^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{55\sqrt{2-\sqrt{3}}\sqrt[3]{b}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}(17Ab-8aB)E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{144\,3^{3/4}a^{11/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{55\sqrt{a+bx^3}(17Ab-8aB)}{216a^4x}-\frac{55\sqrt[3]{b}\sqrt{a+bx^3}(17Ab-8aB)}{216a^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{11(17Ab-8aB)}{108a^3x\sqrt{a+bx^3}}-\frac{17Ab-8aB}{36a^2x\left(a+bx^3\right)^{3/2}}-\frac{A}{4ax^4\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(x^5*(a + b*x^3)^(5/2)),x]
```

```
[Out] -A/(4*a*x^4*(a + b*x^3)^(3/2)) - (17*A*b - 8*a*B)/(36*a^2*x*(a +
b*x^3)^(3/2)) - (11*(17*A*b - 8*a*B))/(108*a^3*x*Sqrt[a + b*x^3])
 + (55*(17*A*b - 8*a*B)*Sqrt[a + b*x^3])/(216*a^4*x) - (55*b^(1/3
)*(17*A*b - 8*a*B)*Sqrt[a + b*x^3])/(216*a^4*((1 + Sqrt[3])*a^(1/
3) + b^(1/3)*x)) + (55*Sqrt[2 - Sqrt[3]]*b^(1/3)*(17*A*b - 8*a*B)
*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin[((
1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3
)*x)], -7 - 4*Sqrt[3]])/(144*3^(3/4)*a^(11/3)*Sqrt[(a^(1/3)*(a^(1
/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a +
 b*x^3]) - (55*b^(1/3)*(17*A*b - 8*a*B)*(a^(1/3) + b^(1/3)*x)*Sqr
t[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1
/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(
1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(1
08*Sqrt[2]*3^(1/4)*a^(11/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/
((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 71.5518, size = 547, normalized size = 0.9

$$- \frac{A}{4 a x^{4} \left(a + b x^{3}\right)^{\frac{3}{2}}} - \frac{17 A b - 8 B a}{36 a^{2} x \left(a + b x^{3}\right)^{\frac{3}{2}}} - \frac{11 \left(17 A b - 8 B a\right)}{108 a^{3} x \sqrt{a + b x^{3}}} - \frac{55 \sqrt[3]{b} \sqrt{a + b x^{3}} \left(17 A b - 8 B a\right)}{216 a^{4} \left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)} + \frac{55 \sqrt{a + b x^{3}} \left(17 A b - 8 B a\right)}{216 a^{4} x} + \frac{55 \sqrt[4]{3} \sqrt[3]{b} \sqrt{\frac{a^{\frac{2}{3}} - \sqrt[3]{a} \sqrt[3]{b} x + b^{\frac{2}{3}} x^{2}}{\left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)^{2}}} \sqrt{- \sqrt{3} + 2} \left(\sqrt[3]{a} + \sqrt[3]{b} x\right) \left(17 A b - 8 B a\right) E\left(\operatorname{asin}{\left(\frac{- \sqrt[3]{a} \left(-1 + \sqrt{3}\right) + \sqrt[3]{b} x}{\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x} \right)}\middle| -7 - 4 \sqrt{3}\right)}{432 a^{\frac{11}{3}} \sqrt{\frac{\sqrt[3]{a} \left(\sqrt[3]{a} + \sqrt[3]{b} x\right)}{\left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)^{2}}} \sqrt{a + b x^{3}}} - \frac{55 \sqrt{2} \cdot 3^{\frac{3}{4}} \sqrt[3]{b} \sqrt{\frac{a^{\frac{2}{3}} - \sqrt[3]{a} \sqrt[3]{b} x + b^{\frac{2}{3}} x^{2}}{\left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)^{2}}} \left(\sqrt[3]{a} + \sqrt[3]{b} x\right) \left(17 A b - 8 B a\right) F\left(\operatorname{asin}{\left(\frac{- \sqrt[3]{a} \left(-1 + \sqrt{3}\right) + \sqrt[3]{b} x}{\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x} \right)}\middle| -7 - 4 \sqrt{3}\right)}{648 a^{\frac{11}{3}} \sqrt{\frac{\sqrt[3]{a} \left(\sqrt[3]{a} + \sqrt[3]{b} x\right)}{\left(\sqrt[3]{a} \left(1 + \sqrt{3}\right) + \sqrt[3]{b} x\right)^{2}}} \sqrt{a + b x^{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/x**5/(b*x**3+a)**(5/2),x)
```

```
[Out] -A/(4*a*x**4*(a + b*x**3)**(3/2)) - (17*A*b - 8*B*a)/(36*a**2*x*(
a + b*x**3)**(3/2)) - 11*(17*A*b - 8*B*a)/(108*a**3*x*sqrt(a + b*
x**3)) - 55*b**(1/3)*sqrt(a + b*x**3)*(17*A*b - 8*B*a)/(216*a**4*
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)) + 55*sqrt(a + b*x**3)*(17*
A*b - 8*B*a)/(216*a**4*x) + 55*3**(1/4)*b**(1/3)*sqrt((a**(2/3) -
 a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b
**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1/3)*x)*(17*A*b
 - 8*B*a)*elliptic_e(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)
/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(432*a**
(11/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(
3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3)) - 55*sqrt(2)*3**(3/4)*b**
(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(
1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1/3)*x)*(17*
A*b - 8*B*a)*elliptic_f(asin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)
*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(648*
a**(11/3)*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sq
rt(3)) + b**(1/3)*x)**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 1.07071, size = 293, normalized size = 0.48

$$-\frac{\frac{3\left(54a^3\left(A+4Bx^3\right)+a^2\left(704bBx^6-459Abx^3\right)+88ab^2x^6\left(5Bx^3-17A\right)-935Ab^3x^9\right)}{x^4}+55\sqrt[6]{-1}3^{3/4}a^{2/3}\sqrt[3]{-b}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}}{\sqrt[3]{a}}}}{648a^4\left(a+bx\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(x^5*(a + b*x^3)^(5/2)),x]
```

```
[Out] ((-3*(-935*A*b^3*x^9 + 54*a^3*(A + 4*B*x^3) + 88*a*b^2*x^6*(-17*A
 + 5*B*x^3) + a^2*(-459*A*b*x^3 + 704*b*B*x^6)))/x^4 + 55*(-1)^(1
/6)*3^(3/4)*a^(2/3)*(-b)^(1/3)*(17*A*b - 8*a*B)*Sqrt[((-1)^(5/6)*
(-a^(1/3) + (-b)^(1/3)*x))/a^(1/3)]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/
3) + ((-b)^(2/3)*x^2)/a^(2/3)]*(a + b*x^3)*((-I)*Sqrt[3]*Elliptic
E[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (
-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-
b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(648*a^4*(a + b*x^3)
^(3/2))
```

Maple [B] time = 0.046, size = 1034, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/x^5/(b*x^3+a)^(5/2),x)
```

```
[Out] A*(2/9/a^3*x^2*(b*x^3+a)^(1/2)/(x^3+a/b)^2+46/27*b^2/a^4*x^2/((x^
3+a/b)*b)^(1/2)-1/4/a^3*(b*x^3+a)^(1/2)/x^4+21/8/a^4*b*(b*x^3+a)^
(1/2)/x+935/648*I*b/a^4*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^
2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3)
)^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)
^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*El
lipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^
2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^
(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b
^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))+B*(-2/9/a^2*x^2/b*(b*x^3+a)^
(1/2)/(x^3+a/b)^2-28/27*b/a^3*x^2/((x^3+a/b)*b)^(1/2)-1/a^3*(b*x^
3+a)^(1/2)/x-55/81*I/a^3*3^(1/2)*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b
^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3
))^(1/2)*((x-1/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a
)^(1/2)*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*E
llipticE(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b
^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))
^(1/2))+1/b*(-a*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/
3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^5),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(b^2x^{11} + 2\,abx^8 + a^2x^5)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^5),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b^2*x^11 + 2*a*b*x^8 + a^2*x^5)*sqrt(b*x^3
 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/x**5/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} x^5}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^5),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*x^5), x)
```

3.259 $\int \frac{x^8\sqrt{c+dx^3}}{4c+dx^3}\,dx$

Optimal. Leaf size=97

$$-\frac{32c^{5/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{\sqrt{3}d^3}+\frac{32c^2\sqrt{c+dx^3}}{3d^3}-\frac{10c\left(c+dx^3\right)^{3/2}}{9d^3}+\frac{2\left(c+dx^3\right)^{5/2}}{15d^3}$$

```
[Out] (32*c^2*Sqrt[c + d*x^3])/(3*d^3) - (10*c*(c + d*x^3)^(3/2))/(9*d^
3) + (2*(c + d*x^3)^(5/2))/(15*d^3) - (32*c^(5/2)*ArcTan[Sqrt[c +
 d*x^3]/(Sqrt[3]*Sqrt[c])])/(Sqrt[3]*d^3)
```

Rubi [A] time = 0.282701, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$-\frac{32c^{5/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{\sqrt{3}d^3}+\frac{32c^2\sqrt{c+dx^3}}{3d^3}-\frac{10c\left(c+dx^3\right)^{3/2}}{9d^3}+\frac{2\left(c+dx^3\right)^{5/2}}{15d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (32*c^2*Sqrt[c + d*x^3])/(3*d^3) - (10*c*(c + d*x^3)^(3/2))/(9*d^
3) + (2*(c + d*x^3)^(5/2))/(15*d^3) - (32*c^(5/2)*ArcTan[Sqrt[c +
 d*x^3]/(Sqrt[3]*Sqrt[c])])/(Sqrt[3]*d^3)
```

Rubi in Sympy [A] time = 27.3981, size = 95, normalized size = 0.98

$$-\frac{32\sqrt{3}c^{\frac{5}{2}}\operatorname{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{3d^3}+\frac{32c^2\sqrt{c+dx^3}}{3d^3}-\frac{10c\left(c+dx^3\right)^{\frac{3}{2}}}{9d^3}+\frac{2\left(c+dx^3\right)^{\frac{5}{2}}}{15d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] -32*sqrt(3)*c**(5/2)*atan(sqrt(3)*sqrt(c + d*x**3)/(3*sqrt(c)))/(
3*d**3) + 32*c**2*sqrt(c + d*x**3)/(3*d**3) - 10*c*(c + d*x**3)**
(3/2)/(9*d**3) + 2*(c + d*x**3)**(5/2)/(15*d**3)
```

Mathematica [A] time = 0.101277, size = 77, normalized size = 0.79

$$\frac{2\sqrt{c+dx^3}\left(218c^2-19cdx^3+3d^2x^6\right)-480\sqrt{3}c^{5/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{45d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3]*(218*c^2 - 19*c*d*x^3 + 3*d^2*x^6) - 480*Sqrt[
3]*c^(5/2)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(45*d^3)
```

Maple [C] time = 0.216, size = 506, normalized size = 5.2

$$\frac{1}{d^2}\left(d\left(\frac{2x^6}{15}\sqrt{dx^3+c}+\frac{2cx^3}{45d}\sqrt{dx^3+c}-\frac{4c^2}{45d^2}\sqrt{dx^3+c}\right)-\frac{8c}{9d}\left(dx^3+c\right)^{\frac{3}{2}}\right)$$
$$+16\frac{c^2}{d^2}\left(2/3\frac{\sqrt{dx^3+c}}{d}+\frac{i/3\sqrt{2}}{d^3}\sum_{\_alpha=RootOf\left(d\_Z^3+4c\right)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\_alpha^2d^2-i\sqrt{3}\left(-cd^2\right)^{2/3}-\sqrt[3]{-cd^2}\_c\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(1/2)/(d*x^3+4*c),x)
```

```
[Out] 1/d^2*(d*(2/15*x^6*(d*x^3+c)^(1/2)+2/45*c/d*x^3*(d*x^3+c)^(1/2)-4
/45*c^2*(d*x^3+c)^(1/2)/d^2)-8/9*c/d*(d*x^3+c)^(3/2))+16*c^2/d^2*
(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*
I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)
^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1
/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*
(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)
^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)
*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha
*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(
_Z^3*d+4*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(d*x^3 + 4*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.284489, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{3}\left(360\sqrt{-c}c^2\log\left(\frac{\sqrt{3}\left(dx^3-2c\right)-6\sqrt{dx^3+c}\sqrt{-c}}{dx^3+4c}\right)+\sqrt{3}\left(3d^2x^6-19cdx^3+218c^2\right)\sqrt{dx^3+c}\right)}{135d^3},\right.$$
$$\left.-\frac{2\sqrt{3}\left(720c^{\frac{5}{2}}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)-\sqrt{3}\left(3d^2x^6-19cdx^3+218c^2\right)\sqrt{dx^3+c}\right)}{135d^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(d*x^3 + 4*c),x, algorithm="fricas")
```

```
[Out] [2/135*sqrt(3)*(360*sqrt(-c)*c^2*log((sqrt(3)*(d*x^3 - 2*c) - 6*s
qrt(d*x^3 + c)*sqrt(-c))/(d*x^3 + 4*c)) + sqrt(3)*(3*d^2*x^6 - 19
*c*d*x^3 + 218*c^2)*sqrt(d*x^3 + c))/d^3, -2/135*sqrt(3)*(720*c^(
5/2)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c)) - sqrt(3)*(3*d^2
*x^6 - 19*c*d*x^3 + 218*c^2)*sqrt(d*x^3 + c))/d^3]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8\sqrt{c+dx^3}}{4c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**8*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] Integral(x**8*sqrt(c + d*x**3)/(4*c + d*x**3), x)
```

GIAC/XCAS [A] time = 0.214804, size = 111, normalized size = 1.14

$$-\frac{32\sqrt{3}c^{\frac{5}{2}}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)}{3\,d^3}+\frac{2\left(3\left(dx^3+c\right)^{\frac{5}{2}}d^{12}-25\left(dx^3+c\right)^{\frac{3}{2}}cd^{12}+240\sqrt{dx^3+c}c^2d^{12}\right)}{45\,d^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(d*x^3 + c)*x^8/(d*x^3 + 4*c),x, algorithm="giac")
```

```
[Out] -32/3*sqrt(3)*c^(5/2)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c))
/d^3 + 2/45*(3*(d*x^3 + c)^(5/2)*d^12 - 25*(d*x^3 + c)^(3/2)*c*d^
12 + 240*sqrt(d*x^3 + c)*c^2*d^12)/d^15
```

3.260 $\int \frac{x^5\sqrt{c+dx^3}}{4c+dx^3}\,dx$

Optimal. Leaf size=76

$$\frac{8c^{3/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{\sqrt{3}d^2}-\frac{8c\sqrt{c+dx^3}}{3d^2}+\frac{2\left(c+dx^3\right)^{3/2}}{9d^2}$$

```
[Out] (-8*c*Sqrt[c + d*x^3])/(3*d^2) + (2*(c + d*x^3)^(3/2))/(9*d^2) +
(8*c^(3/2)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(Sqrt[3]*d^
2)
```

Rubi [A] time = 0.208142, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$\frac{8c^{3/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{\sqrt{3}d^2}-\frac{8c\sqrt{c+dx^3}}{3d^2}+\frac{2\left(c+dx^3\right)^{3/2}}{9d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (-8*c*Sqrt[c + d*x^3])/(3*d^2) + (2*(c + d*x^3)^(3/2))/(9*d^2) +
(8*c^(3/2)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(Sqrt[3]*d^
2)
```

Rubi in Sympy [A] time = 19.6826, size = 75, normalized size = 0.99

$$\frac{8\sqrt{3}c^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{3d^2}-\frac{8c\sqrt{c+dx^3}}{3d^2}+\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] 8*sqrt(3)*c**(3/2)*atan(sqrt(3)*sqrt(c + d*x**3)/(3*sqrt(c)))/(3*
d**2) - 8*c*sqrt(c + d*x**3)/(3*d**2) + 2*(c + d*x**3)**(3/2)/(9*
d**2)
```

Mathematica [A] time = 0.0733734, size = 65, normalized size = 0.86

$$\frac{24\sqrt{3}c^{3/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)+2\left(dx^3-11c\right)\sqrt{c+dx^3}}{9d^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (2*(-11*c + d*x^3)*Sqrt[c + d*x^3] + 24*Sqrt[3]*c^(3/2)*ArcTan[Sq
rt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(9*d^2)
```

Maple [C] time = 0.013, size = 446, normalized size = 5.9

$$\frac{2}{9d^2}\left(dx^3+c\right)^{\frac{3}{2}} -4\frac{c}{d}\left(2/3\frac{\sqrt{dx^3+c}}{d}+\frac{i/3\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d+4c)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\_alpha^2d^2-i\sqrt{3}\left(-cd^2\right)^{2/3}-\sqrt[3]{-cd^2}\_al\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^5*(d*x^3+c)^(1/2)/(d*x^3+4*c),x)
```

```
[Out] 2/9*(d*x^3+c)^(3/2)/d^2-4*c/d*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^
(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1
/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*
d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_
alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*
d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(d*x^3 + c)*x^5/(d*x^3 + 4*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.357349, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{3}\left(18\sqrt{-c}c\log\left(\frac{\sqrt{3}(dx^3-2c)+6\sqrt{dx^3+c}\sqrt{-c}}{dx^3+4c}\right)+\sqrt{3}\sqrt{dx^3+c}\left(dx^3-11c\right)\right)}{27d^2}, \frac{2\sqrt{3}\left(36c^{\frac{3}{2}}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)+\sqrt{3}\sqrt{dx^3+c}(dx\right.}{27d^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(d*x^3 + c)*x^5/(d*x^3 + 4*c),x, algorithm="fricas")
```

```
[Out] [2/27*sqrt(3)*(18*sqrt(-c)*c*log((sqrt(3)*(d*x^3 - 2*c) + 6*sqrt(
d*x^3 + c)*sqrt(-c))/(d*x^3 + 4*c)) + sqrt(3)*sqrt(d*x^3 + c)*(d*
x^3 - 11*c))/d^2, 2/27*sqrt(3)*(36*c^(3/2)*arctan(1/3*sqrt(3)*sqr
t(d*x^3 + c)/sqrt(c)) + sqrt(3)*sqrt(d*x^3 + c)*(d*x^3 - 11*c))/d
^2]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^5\sqrt{c+dx^3}}{4c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] Integral(x**5*sqrt(c + d*x**3)/(4*c + d*x**3), x)
```

GIAC/XCAS [A] time = 0.215406, size = 92, normalized size = 1.21

$$\frac{2\left(\frac{12\,\sqrt{3}c^{\frac{3}{2}}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\,\sqrt{c}}\right)}{d}+\frac{\left(dx^3+c\right)^{\frac{3}{2}}d^2-12\,\sqrt{dx^3+c}cd^2}{d^3}\right)}{9\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(d*x^3 + 4*c),x, algorithm="giac")
```

```
[Out] 2/9*(12*sqrt(3)*c^(3/2)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c
))/d + ((d*x^3 + c)^(3/2)*d^2 - 12*sqrt(d*x^3 + c)*c*d^2)/d^3)/d
```

3.261 $\int \frac{x^2\sqrt{c+dx^3}}{4c+dx^3}\,dx$

Optimal. Leaf size=57

$$\frac{2\sqrt{c+dx^3}}{3d}-\frac{2\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{\sqrt{3}d}$$

```
[Out] (2*Sqrt[c + d*x^3])/(3*d) - (2*Sqrt[c]*ArcTan[Sqrt[c + d*x^3]/(Sq
rt[3]*Sqrt[c])])/(Sqrt[3]*d)
```

Rubi [A] time = 0.150913, antiderivative size = 57, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{2\sqrt{c+dx^3}}{3d}-\frac{2\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{\sqrt{3}d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(3*d) - (2*Sqrt[c]*ArcTan[Sqrt[c + d*x^3]/(Sq
rt[3]*Sqrt[c])])/(Sqrt[3]*d)
```

Rubi in Sympy [A] time = 16.2657, size = 53, normalized size = 0.93

$$-\frac{2\sqrt{3}\sqrt{c}\,\operatorname{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{3d}+\frac{2\sqrt{c+dx^3}}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] -2*sqrt(3)*sqrt(c)*atan(sqrt(3)*sqrt(c + d*x**3)/(3*sqrt(c)))/(3*
d) + 2*sqrt(c + d*x**3)/(3*d)
```

Mathematica [A] time = 0.0378873, size = 54, normalized size = 0.95

$$\frac{2\left(\sqrt{c+dx^3}-\sqrt{3}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)\right)}{3d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (2*(Sqrt[c + d*x^3] - Sqrt[3]*Sqrt[c]*ArcTan[Sqrt[c + d*x^3]/(Sqr
t[3]*Sqrt[c])]))/(3*d)
```

Maple [C] time = 0.01, size = 425, normalized size = 7.5

$$\frac{2}{3\,d}\sqrt{dx^3+c}$$

$$+\frac{\frac{i}{3}\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d+4c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\sqrt[3]{}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(d*x^3+c)^(1/2)/(d*x^3+4*c),x)
```

```
[Out] 2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I
*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^
(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/
2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^
(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(
-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^
(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*
3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*
(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_
Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(d*x^3 + 4*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.287768, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{3}\left(3\sqrt{-c}\log\left(\frac{\sqrt{3}(dx^3-2c)-6\sqrt{dx^3+c}\sqrt{-c}}{dx^3+4c}\right)+2\sqrt{3}\sqrt{dx^3+c}\right)}{9d}, -\frac{2\sqrt{3}\left(3\sqrt{c}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)-\sqrt{3}\sqrt{dx^3+c}\right)}{9d}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(d*x^3 + 4*c),x, algorithm="fricas")
```

```
[Out] [1/9*sqrt(3)*(3*sqrt(-c)*log((sqrt(3)*(d*x^3 - 2*c) - 6*sqrt(d*x^
3 + c)*sqrt(-c))/(d*x^3 + 4*c)) + 2*sqrt(3)*sqrt(d*x^3 + c))/d, -
2/9*sqrt(3)*(3*sqrt(c)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c)
) - sqrt(3)*sqrt(d*x^3 + c))/d]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2\sqrt{c+dx^3}}{4c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] Integral(x**2*sqrt(c + d*x**3)/(4*c + d*x**3), x)
```

GIAC/XCAS [A] time = 0.214213, size = 59, normalized size = 1.04

$$-\frac{2\sqrt{3}\sqrt{c}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)}{3d}+\frac{2\sqrt{dx^3+c}}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(d*x^3 + 4*c),x, algorithm="giac")
```

```
[Out] -2/3*sqrt(3)*sqrt(c)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c))/
d + 2/3*sqrt(d*x^3 + c)/d
```

3.262 $\int \frac{\sqrt{c+dx^3}}{x(4c+dx^3)}\,dx$

Optimal. Leaf size=65

$$\frac{\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{2\sqrt{3}\sqrt{c}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6\sqrt{c}}$$

```
[Out] ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])]/(2*Sqrt[3]*Sqrt[c]) - A
rcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(6*Sqrt[c])
```

Rubi [A] time = 0.185134, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$\frac{\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{2\sqrt{3}\sqrt{c}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x*(4*c + d*x^3)),x]
```

```
[Out] ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])]/(2*Sqrt[3]*Sqrt[c]) - A
rcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(6*Sqrt[c])
```

Rubi in Sympy [A] time = 17.7859, size = 58, normalized size = 0.89

$$\frac{\sqrt{3}\,\mathrm{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{6\sqrt{c}}-\frac{\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x/(d*x**3+4*c),x)
```

```
[Out] sqrt(3)*atan(sqrt(3)*sqrt(c + d*x**3)/(3*sqrt(c)))/(6*sqrt(c)) -
atanh(sqrt(c + d*x**3)/sqrt(c))/(6*sqrt(c))
```

Mathematica [C] time = 0.30233, size = 158, normalized size = 2.43

$$-\frac{2dx^3\sqrt{c+dx^3}F_1\left(\frac{1}{2};-\frac{1}{2},1;\frac{3}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)}{(4c+dx^3)\left(3dx^3F_1\left(\frac{1}{2};-\frac{1}{2},1;\frac{3}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)+c\left(F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)-8F_1\left(\frac{3}{2};-\frac{1}{2},2;\frac{5}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x*(4*c + d*x^3)),x]
```

```
[Out] (-2*d*x^3*Sqrt[c + d*x^3]*AppellF1[1/2, -1/2, 1, 3/2, -(c/(d*x^3)
), (-4*c)/(d*x^3)])/((4*c + d*x^3)*(3*d*x^3*AppellF1[1/2, -1/2, 1
, 3/2, -(c/(d*x^3)), (-4*c)/(d*x^3)] + c*(-8*AppellF1[3/2, -1/2,
2, 5/2, -(c/(d*x^3)), (-4*c)/(d*x^3)] + AppellF1[3/2, 1/2, 1, 5/2
, -(c/(d*x^3)), (-4*c)/(d*x^3)])))
```

Maple [C] time = 0.029, size = 468, normalized size = 7.2

$$\frac{1}{4c}\left(\frac{2}{3}\sqrt{dx^3+c}-\frac{2}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\sqrt{c}\right)$$
$$-\frac{d}{4c}\left(\frac{2}{3d}\sqrt{dx^3+c}+\frac{\frac{i}{3}\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(d\_Z^3+4c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x/(d*x^3+4*c),x)
```

```
[Out] 1/4/c*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))*c
^(1/2))-1/4*d/c*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*
d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^
(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d
^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*
3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*
3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*El
lipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^
2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1
/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
),_alpha=RootOf(_Z^3*d+4*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{dx^3+c}}{(dx^3+4c)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x), x)
```

Fricas [A] time = 0.319425, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{3}\left(\sqrt{3}\sqrt{c}\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)-6\sqrt{c}\arctan\left(\frac{\sqrt{3}\sqrt{c}}{\sqrt{dx^3+c}}\right)\right)}{36c},\right.$$
$$\left.-\frac{\sqrt{3}\left(2\sqrt{3}\sqrt{-c}\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+3\sqrt{-c}\log\left(\frac{\sqrt{3}(dx^3-2c)\sqrt{-c}+6\sqrt{dx^3+c}c}{dx^3+4c}\right)\right)}{36c}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x),x, algorithm="fricas")
```

```
[Out] [1/36*sqrt(3)*(sqrt(3)*sqrt(c)*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqr
t(d*x^3 + c)*c)/x^3) - 6*sqrt(c)*arctan(sqrt(3)*sqrt(c)/sqrt(d*x^
3 + c)))/c, -1/36*sqrt(3)*(2*sqrt(3)*sqrt(-c)*arctan(c/(sqrt(d*x^
3 + c)*sqrt(-c))) + 3*sqrt(-c)*log((sqrt(3)*(d*x^3 - 2*c)*sqrt(-c
) + 6*sqrt(d*x^3 + c)*c)/(d*x^3 + 4*c)))/c]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{x\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x/(d*x**3+4*c),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(x*(4*c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.21569, size = 68, normalized size = 1.05

$$\frac{\sqrt{3}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)}{6\sqrt{c}}+\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{6\sqrt{-c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(3)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c))/sqrt(c) +
 1/6*arctan(sqrt(d*x^3 + c)/sqrt(-c))/sqrt(-c)
```

3.263 $\int \frac{\sqrt{c+dx^3}}{x^4(4c+dx^3)}\,dx$

Optimal. Leaf size=88

$$-\frac{d\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{8\sqrt{3}c^{3/2}}-\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{24c^{3/2}}-\frac{\sqrt{c+dx^3}}{12cx^3}$$

```
[Out] -Sqrt[c + d*x^3]/(12*c*x^3) - (d*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*
Sqrt[c])])/(8*Sqrt[3]*c^(3/2)) - (d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[
c]])/(24*c^(3/2))
```

Rubi [A] time = 0.294534, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{d\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{8\sqrt{3}c^{3/2}}-\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{24c^{3/2}}-\frac{\sqrt{c+dx^3}}{12cx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^4*(4*c + d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(12*c*x^3) - (d*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*
Sqrt[c])])/(8*Sqrt[3]*c^(3/2)) - (d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[
c]])/(24*c^(3/2))
```

Rubi in Sympy [A] time = 29.3211, size = 80, normalized size = 0.91

$$-\frac{\sqrt{c+dx^3}}{12cx^3}-\frac{\sqrt{3}d\,\mathrm{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{24c^{\frac{3}{2}}}-\frac{d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{24c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**4/(d*x**3+4*c),x)
```

```
[Out] -sqrt(c + d*x**3)/(12*c*x**3) - sqrt(3)*d*atan(sqrt(3)*sqrt(c + d
*x**3)/(3*sqrt(c)))/(24*c**(3/2)) - d*atanh(sqrt(c + d*x**3)/sqrt
(c))/(24*c**(3/2))
```

Mathematica [C] time = 0.78221, size = 319, normalized size = 3.62

$$\frac{\frac{12d^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{(4c+dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)-8cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)}+\frac{10d^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\cdots\right.}{(4c+dx^3)\left(c\left(8F_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)+F_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\cdots\right.\right.\right.}}{36x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^4*(4*c + d*x^3)),x]
```

```
[Out] (-3 - (3*d*x^3)/c + (12*d^2*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/
c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(-8*c*AppellF1[1, 1/2, 1, 2,
-((d*x^3)/c), -(d*x^3)/(4*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((
d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c
), -(d*x^3)/(4*c)]))) + (10*d^2*x^6*AppellF1[3/2, 1/2, 1, 5/2, -(
c/(d*x^3)), (-4*c)/(d*x^3)])/((4*c + d*x^3)*(-5*d*x^3*AppellF1[3/
```

```
2, 1/2, 1, 5/2, -(c/(d*x^3)), (-4*c)/(d*x^3)] + c*(8*AppellF1[5/2
, 1/2, 2, 7/2, -(c/(d*x^3)), (-4*c)/(d*x^3)] + AppellF1[5/2, 3/2,
 1, 7/2, -(c/(d*x^3)), (-4*c)/(d*x^3)]))))/(36*x^3*Sqrt[c + d*x^3
])
```

Maple [C] time = 0.034, size = 511, normalized size = 5.8

$$\frac{1}{4c}\left(-\frac{1}{3x^3}\sqrt{dx^3+c}-\frac{d}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\frac{1}{\sqrt{c}}\right)$$
$$-\frac{d}{16c^2}\left(\frac{2}{3}\sqrt{dx^3+c}-\frac{2}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\sqrt{c}\right)$$
$$+\frac{d^2}{16c^2}\left(\frac{2}{3d}\sqrt{dx^3+c}+\frac{\frac{i}{3}\sqrt{2}}{d^3}\sum_{\_alpha=RootOf\left(d\_Z^3+4c\right)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^4/(d*x^3+4*c),x)
```

```
[Out] 1/4/c*(-1/3*(d*x^3+c)^(1/2)/x^3-1/3*d*arctanh((d*x^3+c)^(1/2)/c^(
1/2))/c^(1/2))-1/16*d/c^2*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3
+c)^(1/2)/c^(1/2))*c^(1/2))+1/16*d^2/c^2*(2/3*(d*x^3+c)^(1/2)/d+1
/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*
d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c
,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{dx^3+c}}{(dx^3+4c)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^4), x)
```

Fricas [A] time = 0.284966, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{3}\left(\sqrt{3}\sqrt{c}dx^3\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)+6\sqrt{c}dx^3\arctan\left(\frac{\sqrt{3}\sqrt{c}}{\sqrt{dx^3+c}}\right)-4\sqrt{3}\sqrt{dx^3+c}c\right)}{144c^2x^3},\right.$$
$$\left.-\frac{\sqrt{3}\left(2\sqrt{3}\sqrt{-c}dx^3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+3\sqrt{-c}dx^3\log\left(\frac{\sqrt{3}(dx^3-2c)\sqrt{-c}-6\sqrt{dx^3+c}c}{dx^3+4c}\right)+4\sqrt{3}\sqrt{dx^3+c}c\right)}{144c^2x^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/144*sqrt(3)*(sqrt(3)*sqrt(c)*d*x^3*log(((d*x^3 + 2*c)*sqrt(c)
- 2*sqrt(d*x^3 + c)*c)/x^3) + 6*sqrt(c)*d*x^3*arctan(sqrt(3)*sqrt
(c)/sqrt(d*x^3 + c)) - 4*sqrt(3)*sqrt(d*x^3 + c)*c)/(c^2*x^3), -1
/144*sqrt(3)*(2*sqrt(3)*sqrt(-c)*d*x^3*arctan(c/(sqrt(d*x^3 + c)*
sqrt(-c))) + 3*sqrt(-c)*d*x^3*log((sqrt(3)*(d*x^3 - 2*c)*sqrt(-c)
 - 6*sqrt(d*x^3 + c)*c)/(d*x^3 + 4*c)) + 4*sqrt(3)*sqrt(d*x^3 + c
)*c)/(c^2*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{x^4\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(1/2)/x**4/(d*x**3+4*c),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(x**4*(4*c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.219369, size = 101, normalized size = 1.15

$$-\frac{1}{24}\,d\left(\frac{\sqrt{3}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)}{c^{\frac{3}{2}}}-\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c}+\frac{2\sqrt{dx^3+c}}{cdx^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^4),x, algorithm="giac")
```

```
[Out] -1/24*d*(sqrt(3)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c))/c^(3
/2) - arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) + 2*sqrt(d*x^
3 + c)/(c*d*x^3))
```

3.264 $\int \frac{x^4\sqrt{c+dx^3}}{4c+dx^3}\,dx$

Optimal. Leaf size=689

$$-\frac{2\sqrt[3]{2}c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{\sqrt{3}d^{5/3}}+\frac{2\sqrt[3]{2}c^{7/6}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{\sqrt{3}d^{5/3}}-\frac{2\sqrt[3]{2}c^{7/6}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{5/3}}+\frac{2\sqrt[3]{2}c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3d^{5/3}}-\frac{50\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{25\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{50c\sqrt{c+dx^3}}{7d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{2x^2\sqrt{c+dx^3}}{7d}$$

```
[Out] (2*x^2*Sqrt[c + d*x^3])/(7*d) - (50*c*Sqrt[c + d*x^3])/(7*d^(5/3)
*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (2*2^(1/3)*c^(7/6)*ArcTan
[(Sqrt[3]*c^(1/6)*(c^(1/3) + 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]]
)/(Sqrt[3]*d^(5/3)) + (2*2^(1/3)*c^(7/6)*ArcTan[Sqrt[c + d*x^3]/(
Sqrt[3]*Sqrt[c])])/(Sqrt[3]*d^(5/3)) - (2*2^(1/3)*c^(7/6)*ArcTanh
[(c^(1/6)*(c^(1/3) - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(5/3
) + (2*2^(1/3)*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*d^(5/
3)) + (25*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(4/3)*(c^(1/3) + d^(1/3)*x)
*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*
c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) +
 d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]]
)/(7*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*
c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (50*Sqrt[2]*c^(4/3)*(c
^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x
^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 -
 Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x
)], -7 - 4*Sqrt[3]])/(7*3^(1/4)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) +
d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3
])
```

Rubi [A] time = 1.1301, antiderivative size = 689, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{2\sqrt[3]{2}c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{\sqrt{3}d^{5/3}}+\frac{2\sqrt[3]{2}c^{7/6}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{\sqrt{3}d^{5/3}}-\frac{2\sqrt[3]{2}c^{7/6}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{5/3}}+\frac{2\sqrt[3]{2}c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3d^{5/3}}-\frac{50\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{25\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{50c\sqrt{c+dx^3}}{7d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{2x^2\sqrt{c+dx^3}}{7d}$$

Warning: Unable to verify antiderivative.

```
[In]   Int[(x^4*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (2*x^2*Sqrt[c + d*x^3])/(7*d) - (50*c*Sqrt[c + d*x^3])/(7*d^(5/3)
*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (2*2^(1/3)*c^(7/6)*ArcTan
[(Sqrt[3]*c^(1/6)*(c^(1/3) + 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]]
)/(Sqrt[3]*d^(5/3)) + (2*2^(1/3)*c^(7/6)*ArcTan[Sqrt[c + d*x^3]/(
Sqrt[3]*Sqrt[c])])/(Sqrt[3]*d^(5/3)) - (2*2^(1/3)*c^(7/6)*ArcTanh
[(c^(1/6)*(c^(1/3) - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(5/3
) + (2*2^(1/3)*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*d^(5/
3)) + (25*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(4/3)*(c^(1/3) + d^(1/3)*x)
*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*
c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) +
 d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]]
)/(7*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*
c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (50*Sqrt[2]*c^(4/3)*(c
^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x
^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 -
 Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x
)], -7 - 4*Sqrt[3]])/(7*3^(1/4)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) +
d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3
])
```

Rubi in Sympy [A] time = 81.5944, size = 712, normalized size = 1.03

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**4*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] 2**(1/3)*c**(7/6)*log(1 - sqrt(c + d*x**3)/sqrt(c) - 2**(1/3)*d**
(1/3)*x/c**(1/3))/d**(5/3) - 2**(1/3)*c**(7/6)*log(1 + sqrt(c + d
*x**3)/sqrt(c) - 2**(1/3)*d**(1/3)*x/c**(1/3))/d**(5/3) - 2*2**(1
/3)*sqrt(3)*c**(7/6)*atan(sqrt(3)/3 + 2**(2/3)*sqrt(3)*(sqrt(c) -
 sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(3*d**(5/3)) + 2*2**(
```

```
1/3)*sqrt(3)*c**(7/6)*atan(sqrt(3)/3 + 2**(2/3)*sqrt(3)*(sqrt(c)
+ sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(3*d**(5/3)) + 2*2**
(1/3)*c**(7/6)*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*d**(5/3)) + 25*
3**(1/4)*c**(4/3)*sqrt((c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)
*x**2)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*sqrt(-sqrt(3) +
2)*(c**(1/3) + d**(1/3)*x)*elliptic_e(asin((-c**(1/3)*(-1 + sqrt(
3)) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)), -7 - 4*
sqrt(3))/(7*d**(5/3)*sqrt(c**(1/3)*(c**(1/3) + d**(1/3)*x)/(c**(1
/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*sqrt(c + d*x**3)) - 50*sqrt(2
)*3**(3/4)*c**(4/3)*sqrt((c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/
3)*x**2)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*(c**(1/3) + d*
*(1/3)*x)*elliptic_f(asin((-c**(1/3)*(-1 + sqrt(3)) + d**(1/3)*x)
/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)), -7 - 4*sqrt(3))/(21*d**(
5/3)*sqrt(c**(1/3)*(c**(1/3) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)
) + d**(1/3)*x)**2)*sqrt(c + d*x**3)) - 50*c*sqrt(c + d*x**3)/(7*
d**(5/3)*(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)) + 2*x**2*sqrt(c +
 d*x**3)/(7*d)
```

Mathematica [C] time = 0.727383, size = 343, normalized size = 0.5

$$\frac{2x^2\left(\frac{80c^3F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{d(4c+dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)-20cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)}-\frac{80c^2x}{(4c+dx^3)\left(32cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3\right.}\right.}{7\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (2*x^2*(c/d + x^3 + (80*c^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/
c), -(d*x^3)/(4*c)])/(d*(4*c + d*x^3)*(-20*c*AppellF1[2/3, 1/2, 1
, 5/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 3*d*x^3*(AppellF1[5/3, 1/2
, 2, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[5/3, 3/2, 1,
 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)]))) - (80*c^2*x^3*AppellF1[5/3
, 1/2, 1, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(32*
c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*
x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -(d*x^3)/(4*c)] +
2*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -(d*x^3)/(4*c)])))))/
(7*Sqrt[c + d*x^3])
```

Maple [C] time = 0.056, size = 1309, normalized size = 1.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(d*x^3+c)^(1/2)/(d*x^3+4*c),x)
```

```
[Out] 1/d*(2/7*x^2*(d*x^3+c)^(1/2)-2/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-4*c/d*(-2/3*I
*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d
^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
```

```
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(
I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(
1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2
*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(
1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2
)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I
*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2
)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3
)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alph
a*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf
(_Z^3*d+4*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x^4}{dx^3 + 4\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 + 4*c),x, algorithm="maxima")

[Out] integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 + 4*c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx^3 + c}x^4}{dx^3 + 4\,c}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 + 4*c),x, algorithm="fricas")

[Out] integral(sqrt(d*x^3 + c)*x^4/(d*x^3 + 4*c), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4\sqrt{c + dx^3}}{4c + dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)

[Out] Integral(x**4*sqrt(c + d*x**3)/(4*c + d*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x^4}{dx^3 + 4\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 + 4*c),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 + 4*c), x)
```

3.265 $\int \frac{x\sqrt{c+dx^3}}{4c+dx^3}\,dx$

Optimal. Leaf size=659

$$\frac{2\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{\sqrt[4]{3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{2\sqrt{c+dx^3}}{d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{2^{2/3}\sqrt{3}d^{2/3}}$$
$$-\frac{\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{2^{2/3}\sqrt{3}d^{2/3}}+\frac{\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{2^{2/3}d^{2/3}}-\frac{\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3\,2^{2/3}d^{2/3}}$$

```
[Out] (2*Sqrt[c + d*x^3])/(d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x))
 + (c^(1/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + 2^(1/3)*d^(1/3)*x)
)/Sqrt[c + d*x^3]])/(2^(2/3)*Sqrt[3]*d^(2/3)) - (c^(1/6)*ArcTan[S
qrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(2^(2/3)*Sqrt[3]*d^(2/3)) + (c
^(1/6)*ArcTanh[(c^(1/6)*(c^(1/3) - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d
*x^3]])/(2^(2/3)*d^(2/3)) - (c^(1/6)*ArcTanh[Sqrt[c + d*x^3]/Sqrt
[c]])/(3*2^(2/3)*d^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(1/3)*(c
^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x
^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 -
 Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x
)], -7 - 4*Sqrt[3]])/(d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x)
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (2*Sq
rt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/
3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellipt
icF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*d^(2/3)*Sqrt[(c^(1/
3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*
Sqrt[c + d*x^3])
```

Rubi [A] time = 0.544433, antiderivative size = 659, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{2\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{2\sqrt{c+dx^3}}{d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{2^{2/3}\sqrt{3}d^{2/3}}$$
$$-\frac{\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{2^{2/3}\sqrt{3}d^{2/3}}+\frac{\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{2^{2/3}d^{2/3}}-\frac{\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3\ 2^{2/3}d^{2/3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(x*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x))
 + (c^(1/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + 2^(1/3)*d^(1/3)*x)
)/Sqrt[c + d*x^3]])/(2^(2/3)*Sqrt[3]*d^(2/3)) - (c^(1/6)*ArcTan[S
qrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(2^(2/3)*Sqrt[3]*d^(2/3)) + (c
^(1/6)*ArcTanh[(c^(1/6)*(c^(1/3) - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d
*x^3]])/(2^(2/3)*d^(2/3)) - (c^(1/6)*ArcTanh[Sqrt[c + d*x^3]/Sqrt
[c]])/(3*2^(2/3)*d^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(1/3)*(c
^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x
^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 -
 Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x
)], -7 - 4*Sqrt[3]])/(d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x)
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (2*Sq
rt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/
3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellipt
icF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*d^(2/3)*Sqrt[(c^(1/
3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*
Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 44.3916, size = 685, normalized size = 1.04

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] -2**(1/3)*c**(1/6)*log(1 - sqrt(c + d*x**3)/sqrt(c) - 2**(1/3)*d*
*(1/3)*x/c**(1/3))/(4*d**(2/3)) + 2**(1/3)*c**(1/6)*log(1 + sqrt(
c + d*x**3)/sqrt(c) - 2**(1/3)*d**(1/3)*x/c**(1/3))/(4*d**(2/3))
+ 2**(1/3)*sqrt(3)*c**(1/6)*atan(sqrt(3)/3 + 2**(2/3)*sqrt(3)*(sq
rt(c) - sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(6*d**(2/3)) -
 2**(1/3)*sqrt(3)*c**(1/6)*atan(sqrt(3)/3 + 2**(2/3)*sqrt(3)*(sqr
t(c) + sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(6*d**(2/3)) -
2**(1/3)*c**(1/6)*atanh(sqrt(c + d*x**3)/sqrt(c))/(6*d**(2/3)) -
```

```
3**(1/4)*c**(1/3)*sqrt((c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)
*x**2)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*sqrt(-sqrt(3) +
2)*(c**(1/3) + d**(1/3)*x)*elliptic_e(asin((-c**(1/3)*(-1 + sqrt(
3)) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)), -7 - 4*
sqrt(3))/(d**(2/3)*sqrt(c**(1/3)*(c**(1/3) + d**(1/3)*x)/(c**(1/3
)*(1 + sqrt(3)) + d**(1/3)*x)**2)*sqrt(c + d*x**3)) + 2*sqrt(2)*3
**(3/4)*c**(1/3)*sqrt((c**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*
x**2)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*(c**(1/3) + d**(1
/3)*x)*elliptic_f(asin((-c**(1/3)*(-1 + sqrt(3)) + d**(1/3)*x)/(c
**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)), -7 - 4*sqrt(3))/(3*d**(2/3)
*sqrt(c**(1/3)*(c**(1/3) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) +
d**(1/3)*x)**2)*sqrt(c + d*x**3)) + 2*sqrt(c + d*x**3)/(d**(2/3)*
(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x))
```

Mathematica [C] time = 0.254699, size = 167, normalized size = 0.25

$$\frac{10cx^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{(4c+dx^3)\left(20cF_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-2F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (10*c*x^2*Sqrt[c + d*x^3]*AppellF1[2/3, -1/2, 1, 5/3, -((d*x^3)/c
), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(20*c*AppellF1[2/3, -1/2, 1, 5
/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[5/3, -1/2,
2, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 2*AppellF1[5/3, 1/2, 1, 8
/3, -((d*x^3)/c), -(d*x^3)/(4*c)])))
```

Maple [C] time = 0.009, size = 848, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(1/2)/(d*x^3+4*c),x)
```

```
[Out] -2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d
*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*
d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3
)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)
+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(
-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1
/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(
-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2
)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3
*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=
RootOf(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+cx}}{dx^3+4\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(d*x^3 + 4*c),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x/(d*x^3 + 4*c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx^3+cx}}{dx^3+4\,c},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(d*x^3 + 4*c),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x^3 + c)*x/(d*x^3 + 4*c), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\sqrt{c+dx^3}}{4c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] Integral(x*sqrt(c + d*x**3)/(4*c + d*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+cx}}{dx^3+4\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(d*x^3 + 4*c),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x/(d*x^3 + 4*c), x)
```

3.266 $\int \frac{\sqrt{c+dx^3}}{x^2(4c+dx^3)}\,dx$

Optimal. Leaf size=697

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2\sqrt{2}\sqrt[4]{3}c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{4\,2^{2/3}\sqrt{3}c^{5/6}}+\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{4\,2^{2/3}\sqrt{3}c^{5/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{4\,2^{2/3}c^{5/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12\,2^{2/3}c^{5/6}}-\frac{\sqrt{c+dx^3}}{4cx}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{4c\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$

```
[Out] -Sqrt[c + d*x^3]/(4*c*x) + (d^(1/3)*Sqrt[c + d*x^3])/(4*c*((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*
(c^(1/3) + 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/(4*2^(2/3)*Sqrt[
3]*c^(5/6)) + (d^(1/3)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])
/(4*2^(2/3)*Sqrt[3]*c^(5/6)) - (d^(1/3)*ArcTanh[(c^(1/6)*(c^(1/3)
 - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/(4*2^(2/3)*c^(5/6)) + (d
^(1/3)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(12*2^(2/3)*c^(5/6)) - (
3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(
2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) +
d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(8*c^(2/
3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) +
d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(1/3) + d^(1/3)*x)*S
qrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d
^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/
(2*Sqrt[2]*3^(1/4)*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.994196, antiderivative size = 697, normalized size of antiderivative = 1., number

of steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2\sqrt{2}\sqrt[4]{3}c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{4\,2^{2/3}\sqrt{3}c^{5/6}}+\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{4\,2^{2/3}\sqrt{3}c^{5/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{4\,2^{2/3}c^{5/6}}$$
$$+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12\,2^{2/3}c^{5/6}}-\frac{\sqrt{c+dx^3}}{4cx}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{4c\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[Sqrt[c + d*x^3]/(x^2*(4*c + d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(4*c*x) + (d^(1/3)*Sqrt[c + d*x^3])/(4*c*((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*
(c^(1/3) + 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/(4*2^(2/3)*Sqrt[
3]*c^(5/6)) + (d^(1/3)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])
/(4*2^(2/3)*Sqrt[3]*c^(5/6)) - (d^(1/3)*ArcTanh[(c^(1/6)*(c^(1/3)
 - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/(4*2^(2/3)*c^(5/6)) + (d
^(1/3)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(12*2^(2/3)*c^(5/6)) - (
3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(
2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) +
d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(8*c^(2/
3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) +
d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(1/3) + d^(1/3)*x)*S
qrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d
^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/
(2*Sqrt[2]*3^(1/4)*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 83.2263, size = 702, normalized size = 1.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**2/(d*x**3+4*c),x)
```

```
[Out] d**(1/3)*sqrt(c + d*x**3)/(4*c*(c**(1/3)*(1 + sqrt(3)) + d**(1/3)
*x)) - sqrt(c + d*x**3)/(4*c*x) - 3**(1/4)*d**(1/3)*sqrt((c**(2/3
) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(c**(1/3)*(1 + sqrt(3))
+ d**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(c**(1/3) + d**(1/3)*x)*elli
ptic_e(asin((-c**(1/3)*(-1 + sqrt(3)) + d**(1/3)*x)/(c**(1/3)*(1
+ sqrt(3)) + d**(1/3)*x)), -7 - 4*sqrt(3))/(8*c**(2/3)*sqrt(c**(1
/3)*(c**(1/3) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)
**2)*sqrt(c + d*x**3)) + sqrt(2)*3**(3/4)*d**(1/3)*sqrt((c**(2/3)
 - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(c**(1/3)*(1 + sqrt(3)) +
 d**(1/3)*x)**2)*(c**(1/3) + d**(1/3)*x)*elliptic_f(asin((-c**(1/
```

```
3)*(-1 + sqrt(3)) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3
)*x)), -7 - 4*sqrt(3))/(12*c**(2/3)*sqrt(c**(1/3)*(c**(1/3) + d**
(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*sqrt(c + d*x**
3)) + 2**(1/3)*d**(1/3)*log(1 - sqrt(c + d*x**3)/sqrt(c) - 2**(1/
3)*d**(1/3)*x/c**(1/3))/(16*c**(5/6)) - 2**(1/3)*d**(1/3)*log(1 +
 sqrt(c + d*x**3)/sqrt(c) - 2**(1/3)*d**(1/3)*x/c**(1/3))/(16*c**
(5/6)) - 2**(1/3)*sqrt(3)*d**(1/3)*atan(sqrt(3)/3 + 2**(2/3)*sqrt
(3)*(sqrt(c) - sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(24*c**
(5/6)) + 2**(1/3)*sqrt(3)*d**(1/3)*atan(sqrt(3)/3 + 2**(2/3)*sqrt
(3)*(sqrt(c) + sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(24*c**
(5/6)) + 2**(1/3)*d**(1/3)*atanh(sqrt(c + d*x**3)/sqrt(c))/(24*c*
*(5/6))
```

Mathematica [C] time = 0.40053, size = 344, normalized size = 0.49

$$\frac{\frac{16d^2x^6F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{(4c+dx^3)\left(32cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}+\frac{250cdx^3F_1\left(\frac{2}{3};\cdots\right.}{(4c+dx^3)\left(20cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F\cdots\right.\right.}}{20x\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^2*(4*c + d*x^3)),x]
```

```
[Out] (-5 - (5*d*x^3)/c + (250*c*d*x^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*
x^3)/c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(20*c*AppellF1[2/3, 1/2,
 1, 5/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[5/3, 1
/2, 2, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[5/3, 3/2,
1, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)])) + (16*d^2*x^6*AppellF1[5
/3, 1/2, 1, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(3
2*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*
d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -(d*x^3)/(4*c)]
+ 2*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -(d*x^3)/(4*c)]))))
/(20*x*Sqrt[c + d*x^3])
```

Maple [C] time = 0.031, size = 1306, normalized size = 1.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^2/(d*x^3+4*c),x)
```

```
[Out] 1/4/c*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^
3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-1/4*d/c*(-2/3*I*3^(1/2)/
d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3)
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(
-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/
d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^
2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Elli
```

```
pticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)
*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2
)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4
*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{(dx^3+4\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx^3+c}}{dx^5+4\,cx^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x^3 + c)/(d*x^5 + 4*c*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{x^2\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(1/2)/x**2/(d*x**3+4*c),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(x**2*(4*c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{(dx^3+4\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^2),x, algorithm="giac")

[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^2), x)
```

3.267 $\int \frac{x^3\sqrt{c+dx^3}}{4c+dx^3}\,dx$

Optimal. Leaf size=66

$$\frac{x^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};1,-\frac{1}{2};\frac{7}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{16c\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 1, -1/2, 7/3, -(d*x^3)/(4*c),
-((d*x^3)/c)])/(16*c*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.200824, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{x^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};1,-\frac{1}{2};\frac{7}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{16c\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 1, -1/2, 7/3, -(d*x^3)/(4*c),
-((d*x^3)/c)])/(16*c*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 28.0432, size = 53, normalized size = 0.8

$$\frac{x^4\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{4}{3},-\frac{1}{2},1,\frac{7}{3},-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{16c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, -1/2, 1, 7/3, -d*x**3/c, -d*x
**3/(4*c))/(16*c*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.77796, size = 344, normalized size = 5.21

$$\frac{x\left(\frac{128c^3F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{d(4c+dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)-16cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)}-\frac{119c^2x^3F}{(4c+dx^3)\left(28cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx\right.}\right.}{5\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^3*Sqrt[c + d*x^3])/(4*c + d*x^3),x]
```

```
[Out] (x*(2*(c/d + x^3) + (128*c^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)
/c), -(d*x^3)/(4*c)])/(d*(4*c + d*x^3)*(-16*c*AppellF1[1/3, 1/2,
1, 4/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 3*d*x^3*(AppellF1[4/3, 1/
2, 2, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[4/3, 3/2, 1
, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)]))) - (119*c^2*x^3*AppellF1[4
/3, 1/2, 1, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(2
8*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*
```

```
d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -(d*x^3)/(4*c)]
+ 2*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -(d*x^3)/(4*c)]))))
)/(5*Sqrt[c + d*x^3])
```

Maple [C] time = 0.055, size = 1003, normalized size = 15.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(d*x^3+c)^(1/2)/(d*x^3+4*c),x)
```

```
[Out] 1/d*(2/5*x*(d*x^3+c)^(1/2)-2/5*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2))-4*c/d*(-2/3*I*3^(1/2)/d*(-c*d^2)^(1
/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/d^3*2^(1/2)*sum(1/_al
pha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)
+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))
/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2
*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alph
a^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)
^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2
*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1
/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(
-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x^3}{dx^3 + 4\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(d*x^3 + 4*c),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^3/(d*x^3 + 4*c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx^3 + c}x^3}{dx^3 + 4\,c}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(d*x^3 + 4*c),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x^3 + c)*x^3/(d*x^3 + 4*c), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3\sqrt{c+dx^3}}{4c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] Integral(x**3*sqrt(c + d*x**3)/(4*c + d*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}\,x^3}{dx^3+4\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(d*x^3 + 4*c),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^3/(d*x^3 + 4*c), x)
```

3.268 $\int \frac{\sqrt{c+dx^3}}{4c+dx^3}\,dx$

Optimal. Leaf size=64

$$\frac{x\sqrt{c+dx^3}F_1\left(\frac{1}{3};1,-\frac{1}{2};\frac{4}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{4c\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (x*Sqrt[c + d*x^3]*AppellF1[1/3, 1, -1/2, 4/3, -(d*x^3)/(4*c), -(
(d*x^3)/c)])/(4*c*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.100552, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087

$$\frac{x\sqrt{c+dx^3}F_1\left(\frac{1}{3};1,-\frac{1}{2};\frac{4}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{4c\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(4*c + d*x^3),x]
```

```
[Out] (x*Sqrt[c + d*x^3]*AppellF1[1/3, 1, -1/2, 4/3, -(d*x^3)/(4*c), -(
(d*x^3)/c)])/(4*c*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 26.1712, size = 51, normalized size = 0.8

$$\frac{x\sqrt{c+dx^3}\,\mathrm{appellf_1}\left(\frac{1}{3},-\frac{1}{2},1,\frac{4}{3},-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{4c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, -1/2, 1, 4/3, -d*x**3/c, -d*x**3
/(4*c))/(4*c*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.257715, size = 165, normalized size = 2.58

$$\frac{16cx\sqrt{c+dx^3}F_1\left(\frac{1}{3};-\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{(4c+dx^3)\left(16cF_1\left(\frac{1}{3};-\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{4}{3};-\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-2F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(4*c + d*x^3),x]
```

```
[Out] (16*c*x*Sqrt[c + d*x^3]*AppellF1[1/3, -1/2, 1, 4/3, -((d*x^3)/c),
 -(d*x^3)/(4*c)])/((4*c + d*x^3)*(16*c*AppellF1[1/3, -1/2, 1, 4/3
, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[4/3, -1/2, 2,
 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 2*AppellF1[4/3, 1/2, 1, 7/3
, -((d*x^3)/c), -(d*x^3)/(4*c)])))
```

Maple [C] time = 0.008, size = 696, normalized size = 10.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/(d*x^3+4*c),x)
```

```
[Out] -2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d
*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Elliptic
F(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/
3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))
+1/3*I/d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/
d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2
)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1
/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*
d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c)
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{dx^3+4\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(d*x^3 + 4*c),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/(d*x^3 + 4*c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{dx^3+c}}{dx^3+4\,c},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(d*x^3 + 4*c),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x^3 + c)/(d*x^3 + 4*c), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{4c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/(d*x**3+4*c),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(4*c + d*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{dx^3 + 4\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(d*x^3 + 4*c),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/(d*x^3 + 4*c), x)
```

3.269 $\int \frac{\sqrt{c+dx^3}}{x^3(4c+dx^3)}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{c+dx^3}F_1\left(-\frac{2}{3};1,-\frac{1}{2};\frac{1}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{8cx^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -(Sqrt[c + d*x^3]*AppellF1[-2/3, 1, -1/2, 1/3, -(d*x^3)/(4*c), -(
(d*x^3)/c)])/(8*c*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.205045, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$-\frac{\sqrt{c+dx^3}F_1\left(-\frac{2}{3};1,-\frac{1}{2};\frac{1}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{8cx^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^3*(4*c + d*x^3)),x]
```

```
[Out] -(Sqrt[c + d*x^3]*AppellF1[-2/3, 1, -1/2, 1/3, -(d*x^3)/(4*c), -(
(d*x^3)/c)])/(8*c*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 25.3777, size = 56, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{2}{3},-\frac{1}{2},1,\frac{1}{3},-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{8cx^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**3/(d*x**3+4*c),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, -1/2, 1, 1/3, -d*x**3/c, -d*x**3
/(4*c))/(8*c*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.452843, size = 344, normalized size = 5.21

$$\frac{\frac{7d^2x^6F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{(4c+dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)-28cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)}+\frac{128cdx^3F_1\left(\frac{1}{3};\right.}{(4c+dx^3)\left(16cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F\right.\right.}}{16x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^3*(4*c + d*x^3)),x]
```

```
[Out] (-2 - (2*d*x^3)/c + (128*c*d*x^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*
x^3)/c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(16*c*AppellF1[1/3, 1/2,
 1, 4/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[4/3, 1
/2, 2, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[4/3, 3/2,
1, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)]))) + (7*d^2*x^6*AppellF1[4/
3, 1/2, 1, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(-2
8*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 3*
```

```
d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -(d*x^3)/(4*c)]
+ 2*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -(d*x^3)/(4*c)])))
/(16*x^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.033, size = 1002, normalized size = 15.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^3/(d*x^3+4*c),x)
```

```
[Out] 1/4/c*(-1/2/x^2*(d*x^3+c)^(1/2)-1/2*I*3^(1/2)*(-c*d^2)^(1/3)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)))-1/4*d/c*(-2/3*I*3^(1/2)/d*(-c*d^2)
^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/d^3*2^(1/2)*sum(1/
_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/
3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d
*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_a
lpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d
^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d
*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3
^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(dx^3 + 4\,c)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx^3 + c}}{dx^6 + 4\,cx^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^3),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x^3 + c)/(d*x^6 + 4*c*x^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{x^3\left(4c+dx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**3/(d*x**3+4*c),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(x**3*(4*c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{\left(dx^3+4\,c\right)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 + 4*c)*x^3), x)
```

3.270 $\int \frac{x^8}{\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=78

$$\frac{32c^{3/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}d^3}-\frac{10c\sqrt{c+dx^3}}{3d^3}+\frac{2\left(c+dx^3\right)^{3/2}}{9d^3}$$

```
[Out] (-10*c*Sqrt[c + d*x^3])/(3*d^3) + (2*(c + d*x^3)^(3/2))/(9*d^3) +
 (32*c^(3/2)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(3*Sqrt[3
]*d^3)
```

Rubi [A] time = 0.241893, antiderivative size = 78, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{32c^{3/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}d^3}-\frac{10c\sqrt{c+dx^3}}{3d^3}+\frac{2\left(c+dx^3\right)^{3/2}}{9d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (-10*c*Sqrt[c + d*x^3])/(3*d^3) + (2*(c + d*x^3)^(3/2))/(9*d^3) +
 (32*c^(3/2)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(3*Sqrt[3
]*d^3)
```

Rubi in Sympy [A] time = 21.8923, size = 75, normalized size = 0.96

$$\frac{32\sqrt{3}c^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^3}-\frac{10c\sqrt{c+dx^3}}{3d^3}+\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] 32*sqrt(3)*c**(3/2)*atan(sqrt(3)*sqrt(c + d*x**3)/(3*sqrt(c)))/(9
*d**3) - 10*c*sqrt(c + d*x**3)/(3*d**3) + 2*(c + d*x**3)**(3/2)/(
9*d**3)
```

Mathematica [A] time = 0.0894404, size = 65, normalized size = 0.83

$$\frac{32\sqrt{3}c^{3/2}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)+2\left(dx^3-14c\right)\sqrt{c+dx^3}}{9d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (2*(-14*c + d*x^3)*Sqrt[c + d*x^3] + 32*Sqrt[3]*c^(3/2)*ArcTan[Sq
rt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(9*d^3)
```

Maple [C] time = 0.055, size = 467, normalized size = 6.

$$\frac{1}{d^2}\left(d\left(\frac{2x^3}{9d}\sqrt{dx^3+c}-\frac{4c}{9d^2}\sqrt{dx^3+c}\right)-\frac{8c}{3d}\sqrt{dx^3+c}\right)$$

$$-\frac{\frac{16i}{9}c\sqrt{2}}{d^5}\sum_{\_alpha=RootOf(d\_Z^3+4c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/d^2*(d*(2/9/d*x^3*(d*x^3+c)^(1/2)-4/9*c*(d*x^3+c)^(1/2)/d^2)-8/
3*c*(d*x^3+c)^(1/2)/d)-16/9*I*c/d^5*2^(1/2)*sum((-c*d^2)^(1/3)*(1
/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d
^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3
^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*
(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d
^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1
/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_al
pha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Root
Of(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.246175, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{3}\left(24\sqrt{-c}c\log\left(\frac{\sqrt{3}(dx^3-2c)+6\sqrt{dx^3+c}\sqrt{-c}}{dx^3+4c}\right)+\sqrt{3}\sqrt{dx^3+c}\left(dx^3-14c\right)\right)}{27d^3}, \frac{2\sqrt{3}\left(48c^{\frac{3}{2}}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)+\sqrt{3}\sqrt{dx^3+c}(dx\right.}{27d^3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [2/27*sqrt(3)*(24*sqrt(-c)*c*log((sqrt(3)*(d*x^3 - 2*c) + 6*sqrt(
d*x^3 + c)*sqrt(-c))/(d*x^3 + 4*c)) + sqrt(3)*sqrt(d*x^3 + c)*(d*
x^3 - 14*c))/d^3, 2/27*sqrt(3)*(48*c^(3/2)*arctan(1/3*sqrt(3)*sqr
t(d*x^3 + c)/sqrt(c)) + sqrt(3)*sqrt(d*x^3 + c)*(d*x^3 - 14*c))/d
^3]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^8}{\sqrt{c+dx^3}\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**8/(sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.214226, size = 86, normalized size = 1.1

$$\frac{32\sqrt{3}c^{\frac{3}{2}}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)}{9\,d^3}+\frac{2\left(\left(dx^3+c\right)^{\frac{3}{2}}d^6-15\sqrt{dx^3+c}\,cd^6\right)}{9\,d^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 32/9*sqrt(3)*c^(3/2)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c))/
d^3 + 2/9*((d*x^3 + c)^(3/2)*d^6 - 15*sqrt(d*x^3 + c)*c*d^6)/d^9
```

3.271 $\int \frac{x^5}{\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=59

$$\frac{2\sqrt{c+dx^3}}{3d^2}-\frac{8\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}d^2}$$

```
[Out] (2*Sqrt[c + d*x^3])/(3*d^2) - (8*Sqrt[c]*ArcTan[Sqrt[c + d*x^3]/(
Sqrt[3]*Sqrt[c])])/(3*Sqrt[3]*d^2)
```

Rubi [A] time = 0.178205, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{2\sqrt{c+dx^3}}{3d^2}-\frac{8\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(3*d^2) - (8*Sqrt[c]*ArcTan[Sqrt[c + d*x^3]/(
Sqrt[3]*Sqrt[c])])/(3*Sqrt[3]*d^2)
```

Rubi in Sympy [A] time = 15.5219, size = 56, normalized size = 0.95

$$-\frac{8\sqrt{3}\sqrt{c}\,\mathrm{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^2}+\frac{2\sqrt{c+dx^3}}{3d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -8*sqrt(3)*sqrt(c)*atan(sqrt(3)*sqrt(c + d*x**3)/(3*sqrt(c)))/(9*
d**2) + 2*sqrt(c + d*x**3)/(3*d**2)
```

Mathematica [A] time = 0.0509765, size = 56, normalized size = 0.95

$$\frac{6\sqrt{c+dx^3}-8\sqrt{3}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{9d^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (6*Sqrt[c + d*x^3] - 8*Sqrt[3]*Sqrt[c]*ArcTan[Sqrt[c + d*x^3]/(Sq
rt[3]*Sqrt[c])])/(9*d^2)
```

Maple [C] time = 0.012, size = 425, normalized size = 7.2

$$\frac{2}{3\,d^2}\sqrt{dx^3+c}$$

$$+\frac{\frac{4i}{9}\sqrt{2}}{d^4}\sum_{\_alpha=RootOf(\_Z^3d+4c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 2/3*(d*x^3+c)^(1/2)/d^2+4/9*I/d^4*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2
*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(
1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2
)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I
*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2
)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3
)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alph
a*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf
(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.244879, size = 1, normalized size = 0.02

$$\left[\frac{2\,\sqrt{3}\left(2\,\sqrt{-c}\log\left(\frac{\sqrt{3}\left(dx^3-2\,c\right)-6\,\sqrt{dx^3+c}\sqrt{-c}}{dx^3+4\,c}\right)+\sqrt{3}\sqrt{dx^3+c}\right)}{9\,d^2},\,-\frac{2\,\sqrt{3}\left(4\,\sqrt{c}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\,\sqrt{c}}\right)-\sqrt{3}\sqrt{dx^3+c}\right)}{9\,d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [2/9*sqrt(3)*(2*sqrt(-c)*log((sqrt(3)*(d*x^3 - 2*c) - 6*sqrt(d*x^
3 + c)*sqrt(-c))/(d*x^3 + 4*c)) + sqrt(3)*sqrt(d*x^3 + c))/d^2, -
2/9*sqrt(3)*(4*sqrt(c)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c)
) - sqrt(3)*sqrt(d*x^3 + c))/d^2]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\sqrt{c+dx^3}\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**5/(sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.21453, size = 66, normalized size = 1.12

$$-\frac{2\left(\frac{4\sqrt{3}\sqrt{c}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)}{d}-\frac{3\sqrt{dx^3+c}}{d}\right)}{9d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] -2/9*(4*sqrt(3)*sqrt(c)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c
))/d - 3*sqrt(d*x^3 + c)/d)/d
```

3.272 $\int \frac{x^2}{\sqrt{c+dx^3}(4c+dx^3)} dx$

Optimal. Leaf size=40

$$\frac{2\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}\sqrt{c}d}$$

```
[Out] (2*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(3*Sqrt[3]*Sqrt[c]*
d)
```

Rubi [A] time = 0.129408, antiderivative size = 40, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$\frac{2\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}\sqrt{c}d}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]

[Out] (2*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(3*Sqrt[3]*Sqrt[c]*
d)
```

Rubi in Sympy [A] time = 12.6562, size = 37, normalized size = 0.92

$$\frac{2\sqrt{3}\,\mathrm{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)

[Out] 2*sqrt(3)*atan(sqrt(3)*sqrt(c + d*x**3)/(3*sqrt(c)))/(9*sqrt(c)*d
)
```

Mathematica [A] time = 0.0308774, size = 40, normalized size = 1.

$$\frac{2\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}\sqrt{c}d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]

[Out] (2*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(3*Sqrt[3]*Sqrt[c]*
d)
```

Maple [C] time = 0.011, size = 413, normalized size = 10.3

$$\frac{-\frac{i}{9}\sqrt{2}}{d^3c}\sum_{\_alpha=RootOf(\_Z^3d+4c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\sqrt[3]{\ldots}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/9*I/d^3/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(
1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-
1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))
^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alph
a*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3
)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*
(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*
d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.244076, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{3}\log\left(\frac{\sqrt{3}\left(dx^3-2\,c\right)\sqrt{-c}+6\,\sqrt{dx^3+c}c}{dx^3+4\,c}\right)}{9\,\sqrt{-c}d}, -\frac{2\,\sqrt{3}\arctan\left(\frac{\sqrt{3}\sqrt{c}}{\sqrt{dx^3+c}}\right)}{9\,\sqrt{c}d}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [1/9*sqrt(3)*log((sqrt(3)*(d*x^3 - 2*c)*sqrt(-c) + 6*sqrt(d*x^3 +
 c)*c)/(d*x^3 + 4*c))/(sqrt(-c)*d), -2/9*sqrt(3)*arctan(sqrt(3)*s
qrt(c)/sqrt(d*x^3 + c))/(sqrt(c)*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{c+dx^3}\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**2/(sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.21402, size = 39, normalized size = 0.98

$$\frac{2\,\sqrt{3}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\,\sqrt{c}}\right)}{9\,\sqrt{c}d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 2/9*sqrt(3)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c))/(sqrt(c)*
d)
```

3.273 $\int \frac{1}{x\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=65

$$-\frac{\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{6\sqrt{3}c^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6c^{3/2}}$$

```
[Out] -ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])]/(6*Sqrt[3]*c^(3/2)) -
ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(6*c^(3/2))
```

Rubi [A] time = 0.200438, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$-\frac{\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{6\sqrt{3}c^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6c^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] -ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])]/(6*Sqrt[3]*c^(3/2)) -
ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(6*c^(3/2))
```

Rubi in Sympy [A] time = 17.704, size = 60, normalized size = 0.92

$$-\frac{\sqrt{3}\,\mathrm{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{18c^{\frac{3}{2}}}-\frac{\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(3)*atan(sqrt(3)*sqrt(c + d*x**3)/(3*sqrt(c)))/(18*c**(3/2))
 - atanh(sqrt(c + d*x**3)/sqrt(c))/(6*c**(3/2))
```

Mathematica [C] time = 0.0959696, size = 160, normalized size = 2.46

$$\frac{10dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)}{9\sqrt{c+dx^3}\,(4c+dx^3)\left(c\left(8F_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)+F_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)\right)-5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (10*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (-4*c)/(d*x^3)
])/(9*Sqrt[c + d*x^3]*(4*c + d*x^3)*(-5*d*x^3*AppellF1[3/2, 1/2,
1, 5/2, -(c/(d*x^3)), (-4*c)/(d*x^3)] + c*(8*AppellF1[5/2, 1/2, 2
, 7/2, -(c/(d*x^3)), (-4*c)/(d*x^3)] + AppellF1[5/2, 3/2, 1, 7/2,
 -(c/(d*x^3)), (-4*c)/(d*x^3)])))
```

Maple [C] time = 0.029, size = 433, normalized size = 6.7

$$-\frac{1}{6}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{3}{2}} + \frac{\frac{i}{36}\sqrt{2}}{c^2d^2}\sum_{\_alpha=RootOf(d\_Z^3+4c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/6*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2)+1/36*I/d^2/c^2*2^(1
/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*
(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^
(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+4c)\sqrt{dx^3+cx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x), x)
```

Fricas [A] time = 0.253692, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{3}\left(\sqrt{3}\sqrt{c}\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)+2\sqrt{c}\arctan\left(\frac{\sqrt{3}\sqrt{c}}{\sqrt{dx^3+c}}\right)\right)}{36c^2}, -\frac{\sqrt{3}\left(2\sqrt{3}\sqrt{-c}\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+\sqrt{-c}\log\left(\frac{\sqrt{3}(dx^3-2c)\sqrt{-c}-6\sqrt{dx^3+c}c}{dx^3+4c}\right)\right)}{36c^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/36*sqrt(3)*(sqrt(3)*sqrt(c)*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqr
t(d*x^3 + c)*c)/x^3) + 2*sqrt(c)*arctan(sqrt(3)*sqrt(c)/sqrt(d*x^
3 + c)))/c^2, -1/36*sqrt(3)*(2*sqrt(3)*sqrt(-c)*arctan(c/(sqrt(d*
x^3 + c)*sqrt(-c))) + sqrt(-c)*log((sqrt(3)*(d*x^3 - 2*c)*sqrt(-c
) - 6*sqrt(d*x^3 + c)*c)/(d*x^3 + 4*c)))/c^2]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{c+dx^3}\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.214003, size = 72, normalized size = 1.11

$$-\frac{\sqrt{3}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)}{18\,c^{\frac{3}{2}}}+\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{6\sqrt{-c}c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x),x, algorithm="giac")
```

```
[Out] -1/18*sqrt(3)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c))/c^(3/2)
 + 1/6*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c)
```

3.274 $\int \frac{1}{x^4\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=88

$$\frac{d\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{24\sqrt{3}c^{5/2}}+\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{8c^{5/2}}-\frac{\sqrt{c+dx^3}}{12c^2x^3}$$

```
[Out] -Sqrt[c + d*x^3]/(12*c^2*x^3) + (d*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3
]*Sqrt[c])])/(24*Sqrt[3]*c^(5/2)) + (d*ArcTanh[Sqrt[c + d*x^3]/Sq
rt[c]])/(8*c^(5/2))
```

Rubi [A] time = 0.321398, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.231$

$$\frac{d\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{24\sqrt{3}c^{5/2}}+\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{8c^{5/2}}-\frac{\sqrt{c+dx^3}}{12c^2x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(12*c^2*x^3) + (d*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3
]*Sqrt[c])])/(24*Sqrt[3]*c^(5/2)) + (d*ArcTanh[Sqrt[c + d*x^3]/Sq
rt[c]])/(8*c^(5/2))
```

Rubi in Sympy [A] time = 30.3218, size = 80, normalized size = 0.91

$$-\frac{\sqrt{c+dx^3}}{12c^2x^3}+\frac{\sqrt{3}d\,\mathrm{atan}\left(\frac{\sqrt{3}\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{72c^{\frac{5}{2}}}+\frac{d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)/(12*c**2*x**3) + sqrt(3)*d*atan(sqrt(3)*sqrt(c
+ d*x**3)/(3*sqrt(c)))/(72*c**(5/2)) + d*atanh(sqrt(c + d*x**3)/s
qrt(c))/(8*c**(5/2))
```

Mathematica [C] time = 0.381572, size = 324, normalized size = 3.68

$$\frac{-\frac{4cd^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{(4c+dx^3)\left(8cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}-\frac{10cd^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2}\cdots}{(4c+dx^3)\left(-5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{4c}{dx^3}\right)+8cF_1\left(\frac{5}{2};\frac{1}{2}\cdots\right.\right.}\cdots}{12c^2x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (-c - d*x^3 - (4*c*d^2*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -
(d*x^3)/(4*c)])/((4*c + d*x^3)*(8*c*AppellF1[1, 1/2, 1, 2, -((d*x
^3)/c), -(d*x^3)/(4*c)] - d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)
/c), -(d*x^3)/(4*c)] + 2*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -(d
*x^3)/(4*c)]))) - (10*c*d^2*x^6*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d
*x^3)), (-4*c)/(d*x^3)])/((4*c + d*x^3)*(-5*d*x^3*AppellF1[3/2, 1
```

```
/2, 1, 5/2, -(c/(d*x^3)), (-4*c)/(d*x^3)] + 8*c*AppellF1[5/2, 1/2
, 2, 7/2, -(c/(d*x^3)), (-4*c)/(d*x^3)] + c*AppellF1[5/2, 3/2, 1,
 7/2, -(c/(d*x^3)), (-4*c)/(d*x^3)])))/(12*c^2*x^3*Sqrt[c + d*x^3
])
```

Maple [C] time = 0.033, size = 477, normalized size = 5.4

$$\frac{1}{4c}\left(-\frac{1}{3cx^3}\sqrt{dx^3+c}+\frac{d}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{3}{2}}\right)+\frac{d}{24}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{5}{2}}$$
$$-\frac{\frac{i}{144}\sqrt{2}}{dc^3}\sum_{\_alpha=RootOf(d\_Z^3+4c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/4/c*(-1/3*(d*x^3+c)^(1/2)/c/x^3+1/3*d*arctanh((d*x^3+c)^(1/2)/c
^(1/2))/c^(3/2))+1/24*d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2)-
1/144*I/d/c^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^
(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x
-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3))
)^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/
3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alp
ha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/
3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha
*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c
*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+4c)\sqrt{dx^3+c}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^4), x)
```

Fricas [A] time = 0.265511, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{3}\left(3\sqrt{3}\sqrt{c}dx^3\log\left(\frac{(dx^3+2c)\sqrt{c}+2\sqrt{dx^3+c}c}{x^3}\right)-2\sqrt{c}dx^3\arctan\left(\frac{\sqrt{3}\sqrt{c}}{\sqrt{dx^3+c}}\right)-4\sqrt{3}\sqrt{dx^3+c}c\right)}{144c^3x^3},\frac{\sqrt{3}\left(6\sqrt{3}\sqrt{-c}dx^3\arctan\left(\frac{c}{\sqrt{dx^3+}}\right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/144*sqrt(3)*(3*sqrt(3)*sqrt(c)*d*x^3*log(((d*x^3 + 2*c)*sqrt(c
) + 2*sqrt(d*x^3 + c)*c)/x^3) - 2*sqrt(c)*d*x^3*arctan(sqrt(3)*sq
rt(c)/sqrt(d*x^3 + c)) - 4*sqrt(3)*sqrt(d*x^3 + c)*c)/(c^3*x^3),
1/144*sqrt(3)*(6*sqrt(3)*sqrt(-c)*d*x^3*arctan(c/(sqrt(d*x^3 + c)
```

```
*sqrt(-c))) - sqrt(-c)*d*x^3*log((sqrt(3)*(d*x^3 - 2*c)*sqrt(-c)
+ 6*sqrt(d*x^3 + c)*c)/(d*x^3 + 4*c)) - 4*sqrt(3)*sqrt(d*x^3 + c)
*c)/(c^3*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^4\sqrt{c+dx^3}\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**4*sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.216284, size = 101, normalized size = 1.15

$$\frac{1}{72}\,d\left(\frac{\sqrt{3}\arctan\left(\frac{\sqrt{3}\sqrt{dx^3+c}}{3\sqrt{c}}\right)}{c^{\frac{5}{2}}}-\frac{9\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^2}-\frac{6\sqrt{dx^3+c}}{c^2dx^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^4),x, algorithm="giac")
```

```
[Out] 1/72*d*(sqrt(3)*arctan(1/3*sqrt(3)*sqrt(d*x^3 + c)/sqrt(c))/c^(5/
2) - 9*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) - 6*sqrt(d
*x^3 + c)/(c^2*d*x^3))
```

3.275 $\int \frac{x^4}{\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=667

$$\frac{2\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} + \frac{2\sqrt{c+dx^3}}{d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)} + \frac{2\sqrt[3]{2}\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{5/3}} - \frac{2\sqrt[3]{2}\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}d^{5/3}} + \frac{2\sqrt[3]{2}\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3d^{5/3}} - \frac{2\sqrt[3]{2}\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{9d^{5/3}}$$

```
[Out] (2*Sqrt[c + d*x^3])/(d^(5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x))
 + (2*2^(1/3)*c^(1/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + 2^(1/3)*
d^(1/3)*x))/Sqrt[c + d*x^3]])/(3*Sqrt[3]*d^(5/3)) - (2*2^(1/3)*c^
(1/6)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(3*Sqrt[3]*d^(5/
3)) + (2*2^(1/3)*c^(1/6)*ArcTanh[(c^(1/6)*(c^(1/3) - 2^(1/3)*d^(1
/3)*x))/Sqrt[c + d*x^3]])/(3*d^(5/3)) - (2*2^(1/3)*c^(1/6)*ArcTan
h[Sqrt[c + d*x^3]/Sqrt[c]])/(9*d^(5/3)) - (3^(1/4)*Sqrt[2 - Sqrt[
3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)
*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Elliptic
E[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3
) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d
*x^3]) + (2*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
 c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*d^(5/
3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) +
d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.678431, antiderivative size = 667, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$\frac{2\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} + \frac{2\sqrt{c+dx^3}}{d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)} + \frac{2\sqrt[3]{2}\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{5/3}} - \frac{2\sqrt[3]{2}\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\sqrt{3}d^{5/3}} + \frac{2\sqrt[3]{2}\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3d^{5/3}} - \frac{2\sqrt[3]{2}\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{9d^{5/3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^4/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(d^(5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x))
 + (2*2^(1/3)*c^(1/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + 2^(1/3)*
d^(1/3)*x))/Sqrt[c + d*x^3]])/(3*Sqrt[3]*d^(5/3)) - (2*2^(1/3)*c^
(1/6)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt[c])])/(3*Sqrt[3]*d^(5/
3)) + (2*2^(1/3)*c^(1/6)*ArcTanh[(c^(1/6)*(c^(1/3) - 2^(1/3)*d^(1
/3)*x))/Sqrt[c + d*x^3]])/(3*d^(5/3)) - (2*2^(1/3)*c^(1/6)*ArcTan
h[Sqrt[c + d*x^3]/Sqrt[c]])/(9*d^(5/3)) - (3^(1/4)*Sqrt[2 - Sqrt[
3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)
*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Elliptic
E[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3
) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d
*x^3]) + (2*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
 c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*d^(5/
3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) +
d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 53.1504, size = 690, normalized size = 1.03

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -2**(1/3)*c**(1/6)*log(1 - sqrt(c + d*x**3)/sqrt(c) - 2**(1/3)*d*
*(1/3)*x/c**(1/3))/(3*d**(5/3)) + 2**(1/3)*c**(1/6)*log(1 + sqrt(
c + d*x**3)/sqrt(c) - 2**(1/3)*d**(1/3)*x/c**(1/3))/(3*d**(5/3))
+ 2*2**(1/3)*sqrt(3)*c**(1/6)*atan(sqrt(3)/3 + 2**(2/3)*sqrt(3)*(
sqrt(c) - sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(9*d**(5/3))
 - 2*2**(1/3)*sqrt(3)*c**(1/6)*atan(sqrt(3)/3 + 2**(2/3)*sqrt(3)*
(sqrt(c) + sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(9*d**(5/3)
) - 2*2**(1/3)*c**(1/6)*atanh(sqrt(c + d*x**3)/sqrt(c))/(9*d**(5/
```

```
3)) - 3**(1/4)*c**(1/3)*sqrt((c**(2/3) - c**(1/3)*d**(1/3)*x + d*
*(2/3)*x**2)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*sqrt(-sqrt
(3) + 2)*(c**(1/3) + d**(1/3)*x)*elliptic_e(asin((-c**(1/3)*(-1 +
 sqrt(3)) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)), -
7 - 4*sqrt(3))/(d**(5/3)*sqrt(c**(1/3)*(c**(1/3) + d**(1/3)*x)/(c
**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*sqrt(c + d*x**3)) + 2*sqr
t(2)*3**(3/4)*c**(1/3)*sqrt((c**(2/3) - c**(1/3)*d**(1/3)*x + d**
(2/3)*x**2)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*(c**(1/3) +
 d**(1/3)*x)*elliptic_f(asin((-c**(1/3)*(-1 + sqrt(3)) + d**(1/3)
*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)), -7 - 4*sqrt(3))/(3*d*
*(5/3)*sqrt(c**(1/3)*(c**(1/3) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(
3)) + d**(1/3)*x)**2)*sqrt(c + d*x**3)) + 2*sqrt(c + d*x**3)/(d**
(5/3)*(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x))
```

Mathematica [C] time = 0.0880097, size = 169, normalized size = 0.25

$$\frac{32cx^5F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{5\sqrt{c+dx^3}\left(4c+dx^3\right)\left(32cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (32*c*x^5*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)
])/(5*Sqrt[c + d*x^3]*(4*c + d*x^3)*(32*c*AppellF1[5/3, 1/2, 1, 8
/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[8/3, 1/2, 2
, 11/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[8/3, 3/2, 1, 1
1/3, -((d*x^3)/c), -(d*x^3)/(4*c)])))
```

Maple [C] time = 0.051, size = 848, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -2/3*I/d^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-
c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)))+4/9*I/d^4*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1
/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/
3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)
*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticP
i(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d
^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d
-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alph
a=RootOf(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(dx^3 + 4c)\sqrt{dx^3 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{(dx^3 + 4c)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] integral(x^4/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{c + dx^3}\,(4c + dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**4/(sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(dx^3 + 4c)\sqrt{dx^3 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

3.276 $\int \frac{x}{\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=206

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\ 2^{2/3}\sqrt{3}c^{5/6}d^{2/3}}+\frac{\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\ 2^{2/3}\sqrt{3}c^{5/6}d^{2/3}}-\frac{\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\ 2^{2/3}c^{5/6}d^{2/3}}+\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{9\ 2^{2/3}c^{5/6}d^{2/3}}$$

```
[Out] -ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + 2^(1/3)*d^(1/3)*x))/Sqrt[c +
d*x^3]]/(3*2^(2/3)*Sqrt[3]*c^(5/6)*d^(2/3)) + ArcTan[Sqrt[c + d*x
^3]/(Sqrt[3]*Sqrt[c])]/(3*2^(2/3)*Sqrt[3]*c^(5/6)*d^(2/3)) - ArcT
anh[(c^(1/6)*(c^(1/3) - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]]/(3*2
^(2/3)*c^(5/6)*d^(2/3)) + ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(9*2^(
2/3)*c^(5/6)*d^(2/3))
```

Rubi [A] time = 0.146796, antiderivative size = 206, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.042

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\ 2^{2/3}\sqrt{3}c^{5/6}d^{2/3}}+\frac{\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{3\ 2^{2/3}\sqrt{3}c^{5/6}d^{2/3}}-\frac{\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\ 2^{2/3}c^{5/6}d^{2/3}}+\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{9\ 2^{2/3}c^{5/6}d^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] -ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + 2^(1/3)*d^(1/3)*x))/Sqrt[c +
d*x^3]]/(3*2^(2/3)*Sqrt[3]*c^(5/6)*d^(2/3)) + ArcTan[Sqrt[c + d*x
^3]/(Sqrt[3]*Sqrt[c])]/(3*2^(2/3)*Sqrt[3]*c^(5/6)*d^(2/3)) - ArcT
anh[(c^(1/6)*(c^(1/3) - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]]/(3*2
^(2/3)*c^(5/6)*d^(2/3)) + ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(9*2^(
2/3)*c^(5/6)*d^(2/3))
```

Rubi in Sympy [A] time = 11.6196, size = 277, normalized size = 1.34

$$\frac{\sqrt[3]{2}\log\left(1-\frac{\sqrt{c+dx^3}}{\sqrt{c}}-\frac{\sqrt[3]{2}\sqrt[3]{d}x}{\sqrt[3]{c}}\right)}{12c^{\frac{5}{6}}d^{\frac{2}{3}}}-\frac{\sqrt[3]{2}\log\left(1+\frac{\sqrt{c+dx^3}}{\sqrt{c}}-\frac{\sqrt[3]{2}\sqrt[3]{d}x}{\sqrt[3]{c}}\right)}{12c^{\frac{5}{6}}d^{\frac{2}{3}}}-\frac{\sqrt[3]{2}\sqrt{3}\operatorname{atan}\left(\frac{\sqrt{3}}{3}+\frac{2^{\frac{2}{3}}\sqrt{3}\left(\sqrt{c}-\sqrt{c+dx^3}\right)}{3\sqrt[6]{c}\sqrt[3]{d}x}\right)}{18c^{\frac{5}{6}}d^{\frac{2}{3}}}+\frac{\sqrt[3]{2}\sqrt{3}\operatorname{atan}\left(\frac{\sqrt{3}}{3}+\frac{2^{\frac{2}{3}}\sqrt{3}\left(\sqrt{c}+\sqrt{c+dx^3}\right)}{3\sqrt[6]{c}\sqrt[3]{d}x}\right)}{18c^{\frac{5}{6}}d^{\frac{2}{3}}}+\frac{\sqrt[3]{2}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{18c^{\frac{5}{6}}d^{\frac{2}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] 2**(1/3)*log(1 - sqrt(c + d*x**3)/sqrt(c) - 2**(1/3)*d**(1/3)*x/c
**(1/3))/(12*c**(5/6)*d**(2/3)) - 2**(1/3)*log(1 + sqrt(c + d*x**
3)/sqrt(c) - 2**(1/3)*d**(1/3)*x/c**(1/3))/(12*c**(5/6)*d**(2/3))
 - 2**(1/3)*sqrt(3)*atan(sqrt(3)/3 + 2**(2/3)*sqrt(3)*(sqrt(c) -
sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(18*c**(5/6)*d**(2/3))
 + 2**(1/3)*sqrt(3)*atan(sqrt(3)/3 + 2**(2/3)*sqrt(3)*(sqrt(c) +
sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))/(18*c**(5/6)*d**(2/3))
 + 2**(1/3)*atanh(sqrt(c + d*x**3)/sqrt(c))/(18*c**(5/6)*d**(2/3)
)
```

Mathematica [C] time = 0.078473, size = 167, normalized size = 0.81

$$\frac{10cx^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{\sqrt{c+dx^3}\,(4c+dx^3)\left(20cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (10*c*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -(d*x^3)/(4*c)
])/(Sqrt[c + d*x^3]*(4*c + d*x^3)*(20*c*AppellF1[2/3, 1/2, 1, 5/3
, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[5/3, 1/2, 2,
8/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[5/3, 3/2, 1, 8/3,
 -((d*x^3)/c), -(d*x^3)/(4*c)])))
```

Maple [C] time = 0.008, size = 416, normalized size = 2.

$$\frac{-\frac{i}{9}\sqrt{2}}{d^3c}\sum_{\_alpha=RootOf(\_Z^3d+4c)}\frac{1}{\_alpha}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/9*I/d^3/c*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/
d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2
)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1
/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*
d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c)
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{(dx^3+4c)\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

Fricas [A] time = 0.805948, size = 3645, normalized size = 17.69

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] 1/9*sqrt(3)*(1/432)^(1/6)*(-1/(c^5*d^4))^(1/6)*arctan(6*(4*sqrt(3
)*(1/2)^(2/3)*(c^4*d^5*x^7 - c^5*d^4*x^4 - 2*c^6*d^3*x)*(-1/(c^5*
d^4))^(2/3) - sqrt(3)*(1/2)^(1/3)*(c^2*d^4*x^8 - 7*c^3*d^3*x^5 -
8*c^4*d^2*x^2)*(-1/(c^5*d^4))^(1/3) + (648*sqrt(3)*(1/432)^(5/6)*
c^5*d^5*x^5*(-1/(c^5*d^4))^(5/6) - sqrt(3)*(1/432)^(1/6)*(c*d^3*x
^7 - 16*c^2*d^2*x^4 - 8*c^3*d*x)*(-1/(c^5*d^4))^(1/6))*sqrt(d*x^3
 + c))/(d^3*x^9 - 66*c*d^2*x^6 - 72*c^2*d*x^3 - 32*c^3 - 24*(1/2)
^(2/3)*(c^4*d^5*x^7 - c^5*d^4*x^4 - 2*c^6*d^3*x)*(-1/(c^5*d^4))^(
2/3) - 6*(1/2)^(1/3)*(c^2*d^4*x^8 - 7*c^3*d^3*x^5 - 8*c^4*d^2*x^2
)*(-1/(c^5*d^4))^(1/3) + 6*(648*(1/432)^(5/6)*c^5*d^5*x^5*(-1/(c^
5*d^4))^(5/6) - sqrt(1/3)*(5*c^3*d^4*x^6 - 20*c^4*d^3*x^3 - 16*c^
5*d^2)*sqrt(-1/(c^5*d^4)) + (1/432)^(1/6)*(c*d^3*x^7 - 16*c^2*d^2
*x^4 - 8*c^3*d*x)*(-1/(c^5*d^4))^(1/6))*sqrt(d*x^3 + c) + (d^3*x^
9 + 12*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)*sqrt((d^3*x^9 + 60*c*d^
2*x^6 - 32*c^3 - 24*(1/2)^(2/3)*(c^4*d^5*x^7 + 5*c^5*d^4*x^4 + 4*
c^6*d^3*x)*(-1/(c^5*d^4))^(2/3) + 12*(1/2)^(1/3)*(c^2*d^4*x^8 - 7
*c^3*d^3*x^5 - 8*c^4*d^2*x^2)*(-1/(c^5*d^4))^(1/3) - 12*(648*(1/4
32)^(5/6)*c^5*d^5*x^5*(-1/(c^5*d^4))^(5/6) - sqrt(1/3)*(c^3*d^4*x
^6 - 16*c^4*d^3*x^3 - 8*c^5*d^2)*sqrt(-1/(c^5*d^4)) - (1/432)^(1/
6)*(c*d^3*x^7 + 2*c^2*d^2*x^4 - 8*c^3*d*x)*(-1/(c^5*d^4))^(1/6))*
sqrt(d*x^3 + c))/(d^3*x^9 + 12*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)
))) + 1/9*sqrt(3)*(1/432)^(1/6)*(-1/(c^5*d^4))^(1/6)*arctan(-6*(4
*sqrt(3)*(1/2)^(2/3)*(c^4*d^5*x^7 - c^5*d^4*x^4 - 2*c^6*d^3*x)*(-
1/(c^5*d^4))^(2/3) - sqrt(3)*(1/2)^(1/3)*(c^2*d^4*x^8 - 7*c^3*d^3
*x^5 - 8*c^4*d^2*x^2)*(-1/(c^5*d^4))^(1/3) - (648*sqrt(3)*(1/432)
^(5/6)*c^5*d^5*x^5*(-1/(c^5*d^4))^(5/6) - sqrt(3)*(1/432)^(1/6)*(
c*d^3*x^7 - 16*c^2*d^2*x^4 - 8*c^3*d*x)*(-1/(c^5*d^4))^(1/6))*sqr
t(d*x^3 + c))/(d^3*x^9 - 66*c*d^2*x^6 - 72*c^2*d*x^3 - 32*c^3 - 2
4*(1/2)^(2/3)*(c^4*d^5*x^7 - c^5*d^4*x^4 - 2*c^6*d^3*x)*(-1/(c^5*
d^4))^(2/3) - 6*(1/2)^(1/3)*(c^2*d^4*x^8 - 7*c^3*d^3*x^5 - 8*c^4*
d^2*x^2)*(-1/(c^5*d^4))^(1/3) - 6*(648*(1/432)^(5/6)*c^5*d^5*x^5*
(-1/(c^5*d^4))^(5/6) - sqrt(1/3)*(5*c^3*d^4*x^6 - 20*c^4*d^3*x^3
- 16*c^5*d^2)*sqrt(-1/(c^5*d^4)) + (1/432)^(1/6)*(c*d^3*x^7 - 16*
c^2*d^2*x^4 - 8*c^3*d*x)*(-1/(c^5*d^4))^(1/6))*sqrt(d*x^3 + c) +
(d^3*x^9 + 12*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)*sqrt((d^3*x^9 +
60*c*d^2*x^6 - 32*c^3 - 24*(1/2)^(2/3)*(c^4*d^5*x^7 + 5*c^5*d^4*x
^4 + 4*c^6*d^3*x)*(-1/(c^5*d^4))^(2/3) + 12*(1/2)^(1/3)*(c^2*d^4*
x^8 - 7*c^3*d^3*x^5 - 8*c^4*d^2*x^2)*(-1/(c^5*d^4))^(1/3) + 12*(6
48*(1/432)^(5/6)*c^5*d^5*x^5*(-1/(c^5*d^4))^(5/6) - sqrt(1/3)*(c^
3*d^4*x^6 - 16*c^4*d^3*x^3 - 8*c^5*d^2)*sqrt(-1/(c^5*d^4)) - (1/4
32)^(1/6)*(c*d^3*x^7 + 2*c^2*d^2*x^4 - 8*c^3*d*x)*(-1/(c^5*d^4))^
(1/6))*sqrt(d*x^3 + c))/(d^3*x^9 + 12*c*d^2*x^6 + 48*c^2*d*x^3 +
64*c^3)))) - 1/36*(1/432)^(1/6)*(-1/(c^5*d^4))^(1/6)*log((d^3*x^9
 + 60*c*d^2*x^6 - 32*c^3 - 24*(1/2)^(2/3)*(c^4*d^5*x^7 + 5*c^5*d^
4*x^4 + 4*c^6*d^3*x)*(-1/(c^5*d^4))^(2/3) + 12*(1/2)^(1/3)*(c^2*d
^4*x^8 - 7*c^3*d^3*x^5 - 8*c^4*d^2*x^2)*(-1/(c^5*d^4))^(1/3) + 12
*(648*(1/432)^(5/6)*c^5*d^5*x^5*(-1/(c^5*d^4))^(5/6) - sqrt(1/3)*
(c^3*d^4*x^6 - 16*c^4*d^3*x^3 - 8*c^5*d^2)*sqrt(-1/(c^5*d^4)) - (
1/432)^(1/6)*(c*d^3*x^7 + 2*c^2*d^2*x^4 - 8*c^3*d*x)*(-1/(c^5*d^4
))^(1/6))*sqrt(d*x^3 + c))/(d^3*x^9 + 12*c*d^2*x^6 + 48*c^2*d*x^3
 + 64*c^3)) + 1/36*(1/432)^(1/6)*(-1/(c^5*d^4))^(1/6)*log((d^3*x^
9 + 60*c*d^2*x^6 - 32*c^3 - 24*(1/2)^(2/3)*(c^4*d^5*x^7 + 5*c^5*d
^4*x^4 + 4*c^6*d^3*x)*(-1/(c^5*d^4))^(2/3) + 12*(1/2)^(1/3)*(c^2*
d^4*x^8 - 7*c^3*d^3*x^5 - 8*c^4*d^2*x^2)*(-1/(c^5*d^4))^(1/3) - 1
2*(648*(1/432)^(5/6)*c^5*d^5*x^5*(-1/(c^5*d^4))^(5/6) - sqrt(1/3)
*(c^3*d^4*x^6 - 16*c^4*d^3*x^3 - 8*c^5*d^2)*sqrt(-1/(c^5*d^4)) -
(1/432)^(1/6)*(c*d^3*x^7 + 2*c^2*d^2*x^4 - 8*c^3*d*x)*(-1/(c^5*d^
4))^(1/6))*sqrt(d*x^3 + c))/(d^3*x^9 + 12*c*d^2*x^6 + 48*c^2*d*x^
3 + 64*c^3)) + 1/18*(1/432)^(1/6)*(-1/(c^5*d^4))^(1/6)*log((d^3*x
^9 - 66*c*d^2*x^6 - 72*c^2*d*x^3 - 32*c^3 + 48*(1/2)^(2/3)*(c^4*d
^5*x^7 - c^5*d^4*x^4 - 2*c^6*d^3*x)*(-1/(c^5*d^4))^(2/3) + 12*(1/
2)^(1/3)*(c^2*d^4*x^8 - 7*c^3*d^3*x^5 - 8*c^4*d^2*x^2)*(-1/(c^5*d
^4))^(1/3) + 6*(1296*(1/432)^(5/6)*c^5*d^5*x^5*(-1/(c^5*d^4))^(5/
6) + sqrt(1/3)*(5*c^3*d^4*x^6 - 20*c^4*d^3*x^3 - 16*c^5*d^2)*sqrt
(-1/(c^5*d^4)) + 2*(1/432)^(1/6)*(c*d^3*x^7 - 16*c^2*d^2*x^4 - 8*
c^3*d*x)*(-1/(c^5*d^4))^(1/6))*sqrt(d*x^3 + c))/(d^3*x^9 + 12*c*d
^2*x^6 + 48*c^2*d*x^3 + 64*c^3)) - 1/18*(1/432)^(1/6)*(-1/(c^5*d^
4))^(1/6)*log((d^3*x^9 - 66*c*d^2*x^6 - 72*c^2*d*x^3 - 32*c^3 + 4
8*(1/2)^(2/3)*(c^4*d^5*x^7 - c^5*d^4*x^4 - 2*c^6*d^3*x)*(-1/(c^5*
d^4))^(2/3) + 12*(1/2)^(1/3)*(c^2*d^4*x^8 - 7*c^3*d^3*x^5 - 8*c^4
*d^2*x^2)*(-1/(c^5*d^4))^(1/3) - 6*(1296*(1/432)^(5/6)*c^5*d^5*x^
```

```
5*(-1/(c^5*d^4))^(5/6) + sqrt(1/3)*(5*c^3*d^4*x^6 - 20*c^4*d^3*x^
3 - 16*c^5*d^2)*sqrt(-1/(c^5*d^4)) + 2*(1/432)^(1/6)*(c*d^3*x^7 -
 16*c^2*d^2*x^4 - 8*c^3*d*x)*(-1/(c^5*d^4))^(1/6))*sqrt(d*x^3 + c
))/(d^3*x^9 + 12*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{c+dx^3}\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x/(sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(dx^3+4\,c)\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

3.277 $\int \frac{1}{x^2\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=697

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{12\,2^{2/3}\sqrt{3}c^{11/6}}-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{12\,2^{2/3}\sqrt{3}c^{11/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{12\,2^{2/3}c^{11/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{36\,2^{2/3}c^{11/6}}-\frac{\sqrt{c+dx^3}}{4c^2x}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{4c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$

```
[Out] -Sqrt[c + d*x^3]/(4*c^2*x) + (d^(1/3)*Sqrt[c + d*x^3])/(4*c^2*((1
 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (d^(1/3)*ArcTan[(Sqrt[3]*c^(1
/6)*(c^(1/3) + 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/(12*2^(2/3)*
Sqrt[3]*c^(11/6)) - (d^(1/3)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt
[c])])/(12*2^(2/3)*Sqrt[3]*c^(11/6)) + (d^(1/3)*ArcTanh[(c^(1/6)*
(c^(1/3) - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/(12*2^(2/3)*c^(1
1/6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(36*2^(2/3)*c^
(11/6)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x
)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3)
+ d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]
])/(8*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(1/3) + d
^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*
c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4
*Sqrt[3]])/(2*Sqrt[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^
(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.02005, antiderivative size = 697, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.231$

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{12\ 2^{2/3}\sqrt{3}c^{11/6}}-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{3}\sqrt{c}}\right)}{12\ 2^{2/3}\sqrt{3}c^{11/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt[6]{c}\left(\sqrt[3]{c}-\sqrt[3]{2}\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{12\ 2^{2/3}c^{11/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{36\ 2^{2/3}c^{11/6}}-\frac{\sqrt{c+dx^3}}{4c^2x}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{4c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/(x^2*Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(4*c^2*x) + (d^(1/3)*Sqrt[c + d*x^3])/(4*c^2*((1
 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (d^(1/3)*ArcTan[(Sqrt[3]*c^(1
/6)*(c^(1/3) + 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/(12*2^(2/3)*
Sqrt[3]*c^(11/6)) - (d^(1/3)*ArcTan[Sqrt[c + d*x^3]/(Sqrt[3]*Sqrt
[c])])/(12*2^(2/3)*Sqrt[3]*c^(11/6)) + (d^(1/3)*ArcTanh[(c^(1/6)*
(c^(1/3) - 2^(1/3)*d^(1/3)*x))/Sqrt[c + d*x^3]])/(12*2^(2/3)*c^(1
1/6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(36*2^(2/3)*c^
(11/6)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x
)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3)
+ d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]
])/(8*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(1/3) + d
^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*
c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4
*Sqrt[3]])/(2*Sqrt[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^
(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 63.6819, size = 706, normalized size = 1.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] d**(1/3)*sqrt(c + d*x**3)/(4*c**2*(c**(1/3)*(1 + sqrt(3)) + d**(1
/3)*x)) - sqrt(c + d*x**3)/(4*c**2*x) - 3**(1/4)*d**(1/3)*sqrt((c
**(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(c**(1/3)*(1 + sqr
t(3)) + d**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(c**(1/3) + d**(1/3)*x
)*elliptic_e(asin((-c**(1/3)*(-1 + sqrt(3)) + d**(1/3)*x)/(c**(1/
3)*(1 + sqrt(3)) + d**(1/3)*x)), -7 - 4*sqrt(3))/(8*c**(5/3)*sqrt
(c**(1/3)*(c**(1/3) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1
/3)*x)**2)*sqrt(c + d*x**3)) + sqrt(2)*3**(3/4)*d**(1/3)*sqrt((c*
*(2/3) - c**(1/3)*d**(1/3)*x + d**(2/3)*x**2)/(c**(1/3)*(1 + sqrt
(3)) + d**(1/3)*x)**2)*(c**(1/3) + d**(1/3)*x)*elliptic_f(asin((-
```

```
c**(1/3)*(-1 + sqrt(3)) + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d
**(1/3)*x)), -7 - 4*sqrt(3))/(12*c**(5/3)*sqrt(c**(1/3)*(c**(1/3)
 + d**(1/3)*x)/(c**(1/3)*(1 + sqrt(3)) + d**(1/3)*x)**2)*sqrt(c +
 d*x**3)) - 2**(1/3)*d**(1/3)*log(1 - sqrt(c + d*x**3)/sqrt(c) -
2**(1/3)*d**(1/3)*x/c**(1/3))/(48*c**(11/6)) + 2**(1/3)*d**(1/3)*
log(1 + sqrt(c + d*x**3)/sqrt(c) - 2**(1/3)*d**(1/3)*x/c**(1/3))/
(48*c**(11/6)) + 2**(1/3)*sqrt(3)*d**(1/3)*atan(sqrt(3)/3 + 2**(2
/3)*sqrt(3)*(sqrt(c) - sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x))
/(72*c**(11/6)) - 2**(1/3)*sqrt(3)*d**(1/3)*atan(sqrt(3)/3 + 2**(
2/3)*sqrt(3)*(sqrt(c) + sqrt(c + d*x**3))/(3*c**(1/6)*d**(1/3)*x)
)/(72*c**(11/6)) - 2**(1/3)*d**(1/3)*atanh(sqrt(c + d*x**3)/sqrt(
c))/(72*c**(11/6))
```

Mathematica [C] time = 0.420196, size = 348, normalized size = 0.5

$$\frac{\frac{\frac{16cd^2x^6F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{(4c+dx^3)\left(32cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}-5(c+dx^3)}{c^2}+\frac{50dx^3F_1\left(\frac{2}{3};\ldots\right.}{(4c+dx^3)\left(20cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(\ldots\right.\right.}}{20x\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] ((50*d*x^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -(d*x^3)/(4*c
)])/((4*c + d*x^3)*(20*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c),
 -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/
c), -(d*x^3)/(4*c)] + 2*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c),
-(d*x^3)/(4*c)]))) + (-5*(c + d*x^3) + (16*c*d^2*x^6*AppellF1[5/3
, 1/2, 1, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(32*
c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*
x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -(d*x^3)/(4*c)] +
2*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -(d*x^3)/(4*c)]))))/c
^2)/(20*x*Sqrt[c + d*x^3])
```

Maple [C] time = 0.032, size = 874, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/4/c*(-(d*x^3+c)^(1/2)/c/x-1/3*I/c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/36*I/d^2/c^2*2
^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*
(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(
-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2
)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(
1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_al
pha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
```

```
(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d
^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3 + 4\,c)\sqrt{dx^3 + c}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(dx^5 + 4\,cx^2)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/((d*x^5 + 4*c*x^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{c + dx^3}\,(4c + dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3 + 4\,c)\sqrt{dx^3 + c}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^2), x)
```

3.278 $\int \frac{x^3}{\sqrt{c+dx^3}(4c+dx^3)} \, dx$

Optimal. Leaf size=66

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{1}{2};\frac{7}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{16c\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 1/2, 7/3, -(d*x^3)/(4*c
), -((d*x^3)/c)])/(16*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.205822, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{1}{2};\frac{7}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{16c\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 1/2, 7/3, -(d*x^3)/(4*c
), -((d*x^3)/c)])/(16*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 28.4695, size = 53, normalized size = 0.8

$$\frac{x^4\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{4}{3},\frac{1}{2},1,\frac{7}{3},-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{16c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 1/2, 1, 7/3, -d*x**3/c, -d*x*
*3/(4*c))/(16*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.0908576, size = 167, normalized size = 2.53

$$\frac{7cx^4F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{\sqrt{c+dx^3}\left(4c+dx^3\right)\left(28cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (7*c*x^4*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)]
)/(Sqrt[c + d*x^3]*(4*c + d*x^3)*(28*c*AppellF1[4/3, 1/2, 1, 7/3,
 -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[7/3, 1/2, 2, 1
0/3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[7/3, 3/2, 1, 10/3
, -((d*x^3)/c), -(d*x^3)/(4*c)])))
```

Maple [C] time = 0.05, size = 696, normalized size = 10.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -2/3*I/d^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
))+4/9*I/d^4*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+
1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d
^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^
(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-
c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*
d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)
^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*
c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(dx^3 + 4c)\sqrt{dx^3 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{(dx^3 + 4c)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] integral(x^3/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{c + dx^3}\,(4c + dx^3)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**3/(sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(dx^3 + 4\,c)\sqrt{dx^3 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^3/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

3.279 $\int \frac{1}{\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=64

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{1}{2};\frac{4}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{4c\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 1/2, 4/3, -(d*x^3)/(4*c),
 -((d*x^3)/c)])/(4*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.10081, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{1}{2};\frac{4}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{4c\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 1/2, 4/3, -(d*x^3)/(4*c),
 -((d*x^3)/c)])/(4*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.1706, size = 51, normalized size = 0.8

$$\frac{x\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{1}{3},\frac{1}{2},1,\frac{4}{3},-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{4c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 1/2, 1, 4/3, -d*x**3/c, -d*x**3/
(4*c))/(4*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.0695813, size = 165, normalized size = 2.58

$$\frac{16cxF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{\sqrt{c+dx^3}\,(4c+dx^3)\left(16cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] (16*c*x*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -(d*x^3)/(4*c)])
/(Sqrt[c + d*x^3]*(4*c + d*x^3)*(16*c*AppellF1[1/3, 1/2, 1, 4/3,
-((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/
3, -((d*x^3)/c), -(d*x^3)/(4*c)] + 2*AppellF1[4/3, 3/2, 1, 7/3, -
((d*x^3)/c), -(d*x^3)/(4*c)])))
```

Maple [C] time = 0.008, size = 416, normalized size = 6.5

$$\frac{-\frac{i}{9}\sqrt{2}}{d^3c}\sum_{\_alpha=RootOf\left(\_Z^3d+4c\right)}\frac{1}{\_alpha^2}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/9*I/d^3/c*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+
1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d
^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^
(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-
c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),1/6/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*
d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)
^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*
c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+4c)\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(dx^3+4c)\sqrt{dx^3+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] integral(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{c+dx^3}\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3 + 4c)\sqrt{dx^3 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)), x)
```

3.280 $\int \frac{1}{x^3\sqrt{c+dx^3}(4c+dx^3)}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{1}{2};\frac{1}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{8cx^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 1/2, 1/3, -(d*x^3)/(4*c),
 -((d*x^3)/c)])/(8*c*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.203719, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{1}{2};\frac{1}{3};-\frac{dx^3}{4c},-\frac{dx^3}{c}\right)}{8cx^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 1/2, 1/3, -(d*x^3)/(4*c),
 -((d*x^3)/c)])/(8*c*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.2291, size = 56, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{2}{3},\frac{1}{2},1,\frac{1}{3},-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{8c^2x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 1/2, 1, 1/3, -d*x**3/c, -d*x**3/
(4*c))/(8*c**2*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.480912, size = 348, normalized size = 5.27

$$\frac{\frac{-\frac{7cd^2x^6F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)}{\left(4c+dx^3\right)\left(28cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)-3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)\right)\right)}-2\left(c+dx^3\right)}{c^2}+\frac{128dx^3F_1(\cdots}{(4c+dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{dx^3}{4c}\right)+2F\cdots\right.\right.}}{16x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*Sqrt[c + d*x^3]*(4*c + d*x^3)),x]
```

```
[Out] ((128*d*x^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -(d*x^3)/(4*
c)])/((4*c + d*x^3)*(-16*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c
), -(d*x^3)/(4*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3
)/c), -(d*x^3)/(4*c)] + 2*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c)
, -(d*x^3)/(4*c)]))) + (-2*(c + d*x^3) - (7*c*d^2*x^6*AppellF1[4/
3, 1/2, 1, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)])/((4*c + d*x^3)*(28
*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -(d*x^3)/(4*c)] - 3*d
```

```
*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -(d*x^3)/(4*c)] +
 2*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -(d*x^3)/(4*c)]))))/
c^2)/(16*x^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.031, size = 722, normalized size = 10.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(d*x^3+4*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/4/c*(-1/2/c/x^2*(d*x^3+c)^(1/2)+1/6*I/c*3^(1/2)*(-c*d^2)^(1/3)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/36*I/d^2/c^2*2^(1/2)*sum(1/_
alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/6/d*
(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^
(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2)),_alpha=RootOf(_Z^3*d+4*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3 + 4\,c)\sqrt{dx^3 + c}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(dx^6 + 4\,cx^3)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/((d*x^6 + 4*c*x^3)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\sqrt{c+dx^3}\,(4c+dx^3)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(d*x**3+4*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(c + d*x**3)*(4*c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+4\,c)\sqrt{dx^3+c}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + 4*c)*sqrt(d*x^3 + c)*x^3), x)
```

3.281 $\int \frac{x}{\sqrt{1-x^3}(4-x^3)}\,dx$

Optimal. Leaf size=127

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\left(1-\sqrt[3]{2}x\right)}{\sqrt{1-x^3}}\right)}{3\ 2^{2/3}\sqrt{3}}+\frac{\tan^{-1}\left(\frac{\sqrt{1-x^3}}{\sqrt{3}}\right)}{3\ 2^{2/3}\sqrt{3}}-\frac{\tanh^{-1}\left(\frac{\sqrt[3]{2}x+1}{\sqrt{1-x^3}}\right)}{3\ 2^{2/3}}+\frac{\tanh^{-1}\left(\sqrt{1-x^3}\right)}{9\ 2^{2/3}}$$

```
[Out] -ArcTan[(Sqrt[3]*(1 - 2^(1/3)*x))/Sqrt[1 - x^3]]/(3*2^(2/3)*Sqrt[
3]) + ArcTan[Sqrt[1 - x^3]/Sqrt[3]]/(3*2^(2/3)*Sqrt[3]) - ArcTanh
[(1 + 2^(1/3)*x)/Sqrt[1 - x^3]]/(3*2^(2/3)) + ArcTanh[Sqrt[1 - x^
3]]/(9*2^(2/3))
```

Rubi [A] time = 0.0800063, antiderivative size = 127, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\left(1-\sqrt[3]{2}x\right)}{\sqrt{1-x^3}}\right)}{3\ 2^{2/3}\sqrt{3}}+\frac{\tan^{-1}\left(\frac{\sqrt{1-x^3}}{\sqrt{3}}\right)}{3\ 2^{2/3}\sqrt{3}}-\frac{\tanh^{-1}\left(\frac{\sqrt[3]{2}x+1}{\sqrt{1-x^3}}\right)}{3\ 2^{2/3}}+\frac{\tanh^{-1}\left(\sqrt{1-x^3}\right)}{9\ 2^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[1 - x^3]*(4 - x^3)),x]
```

```
[Out] -ArcTan[(Sqrt[3]*(1 - 2^(1/3)*x))/Sqrt[1 - x^3]]/(3*2^(2/3)*Sqrt[
3]) + ArcTan[Sqrt[1 - x^3]/Sqrt[3]]/(3*2^(2/3)*Sqrt[3]) - ArcTanh
[(1 + 2^(1/3)*x)/Sqrt[1 - x^3]]/(3*2^(2/3)) + ArcTanh[Sqrt[1 - x^
3]]/(9*2^(2/3))
```

Rubi in Sympy [A] time = 6.11785, size = 155, normalized size = 1.22

$$\frac{\sqrt[3]{2}\log\left(\sqrt[3]{2}x-\sqrt{-x^3+1}+1\right)}{12}-\frac{\sqrt[3]{2}\log\left(\sqrt[3]{2}x+\sqrt{-x^3+1}+1\right)}{12}-\frac{\sqrt[3]{2}\sqrt{3}\operatorname{atan}\left(\frac{\sqrt{3}}{3}-\frac{2^{\frac{2}{3}}\sqrt{3}\left(-\sqrt{-x^3+1}+1\right)}{3x}\right)}{18}+\frac{\sqrt[3]{2}\sqrt{3}\operatorname{atan}\left(\frac{\sqrt{3}}{3}-\frac{2^{\frac{2}{3}}\sqrt{3}\left(\sqrt{-x^3+1}+1\right)}{3x}\right)}{18}+\frac{\sqrt[3]{2}\operatorname{atanh}\left(\sqrt{-x^3+1}\right)}{18}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-x**3+4)/(-x**3+1)**(1/2),x)
```

```
[Out] 2**(1/3)*log(2**(1/3)*x - sqrt(-x**3 + 1) + 1)/12 - 2**(1/3)*log(
2**(1/3)*x + sqrt(-x**3 + 1) + 1)/12 - 2**(1/3)*sqrt(3)*atan(sqrt
(3)/3 - 2**(2/3)*sqrt(3)*(-sqrt(-x**3 + 1) + 1)/(3*x))/18 + 2**(1
/3)*sqrt(3)*atan(sqrt(3)/3 - 2**(2/3)*sqrt(3)*(sqrt(-x**3 + 1) +
1)/(3*x))/18 + 2**(1/3)*atanh(sqrt(-x**3 + 1))/18
```

Mathematica [C] time = 0.188216, size = 120, normalized size = 0.94

$$-\frac{10x^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};x^3,\frac{x^3}{4}\right)}{\sqrt{1-x^3}\left(x^3-4\right)\left(3x^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};x^3,\frac{x^3}{4}\right)+2F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};x^3,\frac{x^3}{4}\right)\right)+20F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};x^3,\frac{x^3}{4}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[1 - x^3]*(4 - x^3)),x]
```

```
[Out] (-10*x^2*AppellF1[2/3, 1/2, 1, 5/3, x^3, x^3/4])/(Sqrt[1 - x^3]*(
-4 + x^3)*(20*AppellF1[2/3, 1/2, 1, 5/3, x^3, x^3/4] + 3*x^3*(App
ellF1[5/3, 1/2, 2, 8/3, x^3, x^3/4] + 2*AppellF1[5/3, 3/2, 1, 8/3
, x^3, x^3/4])))
```

Maple [C] time = 0.628, size = 164, normalized size = 1.3

$$\frac{i}{36}\sqrt{2}\sum_{\_alpha=RootOf(\_Z^3-4)}\_alpha^2\left(-2\,\_alpha^2+\_alpha+1+i\sqrt{3}\,(1-\_alpha)\right)\sqrt{\frac{i}{2}\left(2\,x+1-i\sqrt{3}\right)}\sqrt{\frac{-1+x}{i\sqrt{3}-3}}\sqrt{-\frac{i}{2}\left(2\,x\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-x^3+4)/(-x^3+1)^(1/2),x)
```

```
[Out] 1/36*I*2^(1/2)*sum(_alpha^2*(1/2*I*(2*x+1-I*3^(1/2)))^(1/2)*((-1+
x)/(I*3^(1/2)-3))^(1/2)*(-1/2*I*(2*x+1+I*3^(1/2)))^(1/2)/(-x^3+1)
^(1/2)*(-2*_alpha^2+_alpha+1+I*3^(1/2)*(1-_alpha))*EllipticPi(1/3
*3^(1/2)*(I*(x+1/2-1/2*I*3^(1/2))*3^(1/2))^(1/2),1/2*_alpha-1/3*I
*_alpha^2*3^(1/2)-1/2+1/6*I*_alpha*3^(1/2)+1/6*I*3^(1/2),(I*3^(1/
2)/(-3/2+1/2*I*3^(1/2)))^(1/2)),_alpha=RootOf(_Z^3-4))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x}{(x^3-4)\sqrt{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/((x^3 - 4)*sqrt(-x^3 + 1)),x, algorithm="maxima")
```

```
[Out] -integrate(x/((x^3 - 4)*sqrt(-x^3 + 1)), x)
```

Fricas [A] time = 0.365465, size = 1451, normalized size = 11.43

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/((x^3 - 4)*sqrt(-x^3 + 1)),x, algorithm="fricas")
```

```
[Out] 1/15552*432^(5/6)*(sqrt(3)*log(2592*(1296*x^7 - 1296*x^4 + 6*2^(2
/3)*(x^9 - 228*x^6 + 264*x^3 - 64) + (72*x^7 - 1872*x^4 + 432^(5/
6)*sqrt(3)*(7*x^5 - 4*x^2) - 144*432^(1/6)*sqrt(3)*(x^6 - x^3) +
1152*x)*sqrt(-x^3 + 1) - 216*2^(1/3)*(x^8 - 5*x^5 + 4*x^2))/(x^9
- 12*x^6 + 48*x^3 - 64)) - sqrt(3)*log(2592*(1296*x^7 - 1296*x^4
+ 6*2^(2/3)*(x^9 - 228*x^6 + 264*x^3 - 64) - (72*x^7 - 1872*x^4 +
 432^(5/6)*sqrt(3)*(7*x^5 - 4*x^2) - 144*432^(1/6)*sqrt(3)*(x^6 -
 x^3) + 1152*x)*sqrt(-x^3 + 1) - 216*2^(1/3)*(x^8 - 5*x^5 + 4*x^2
))/(x^9 - 12*x^6 + 48*x^3 - 64)) + 8*arctan(-432*(18*x^5 + 2^(2/3
)*(x^7 + 16*x^4 - 8*x) + 2^(1/3)*(5*x^6 + 20*x^3 - 16))*sqrt(-x^3
 + 1)/(432^(5/6)*(x^9 + 66*x^6 - 72*x^3 + 32) - 72*sqrt(3)*2^(1/3
)*(x^9 - 12*x^6 + 48*x^3 - 64) + 864*sqrt(3)*(x^8 + 7*x^5 - 8*x^2
) + 1728*432^(1/6)*(x^7 + x^4 - 2*x))) + 4*arctan(-216*(6*x^8 + 4
2*x^5 - 48*x^2 - 4*432^(1/6)*sqrt(3)*(x^7 + x^4 - 2*x) - (18*x^5
+ 2^(2/3)*(x^7 + 16*x^4 - 8*x) - 2*2^(1/3)*(5*x^6 + 20*x^3 - 16))
*sqrt(-x^3 + 1))/(36*sqrt(2)*(x^9 - 12*x^6 + 48*x^3 - 64)*sqrt((1
```

```
296*x^7 - 1296*x^4 + 6*2^(2/3)*(x^9 - 228*x^6 + 264*x^3 - 64) + (
72*x^7 - 1872*x^4 + 432^(5/6)*sqrt(3)*(7*x^5 - 4*x^2) - 144*432^(
1/6)*sqrt(3)*(x^6 - x^3) + 1152*x)*sqrt(-x^3 + 1) - 216*2^(1/3)*(
x^8 - 5*x^5 + 4*x^2))/(x^9 - 12*x^6 + 48*x^3 - 64)) - 432^(5/6)*(
x^9 + 66*x^6 - 72*x^3 + 32) + 432*sqrt(3)*(x^8 + 7*x^5 - 8*x^2) +
 216*(18*sqrt(3)*x^5 - sqrt(3)*2^(2/3)*(x^7 + 16*x^4 - 8*x))*sqrt
(-x^3 + 1) + 864*432^(1/6)*(x^7 + x^4 - 2*x))) + 4*arctan(216*(6*
x^8 + 42*x^5 - 48*x^2 - 4*432^(1/6)*sqrt(3)*(x^7 + x^4 - 2*x) + (
18*x^5 + 2^(2/3)*(x^7 + 16*x^4 - 8*x) - 2*2^(1/3)*(5*x^6 + 20*x^3
 - 16))*sqrt(-x^3 + 1))/(36*sqrt(2)*(x^9 - 12*x^6 + 48*x^3 - 64)*
sqrt((1296*x^7 - 1296*x^4 + 6*2^(2/3)*(x^9 - 228*x^6 + 264*x^3 -
64) - (72*x^7 - 1872*x^4 + 432^(5/6)*sqrt(3)*(7*x^5 - 4*x^2) - 14
4*432^(1/6)*sqrt(3)*(x^6 - x^3) + 1152*x)*sqrt(-x^3 + 1) - 216*2^
(1/3)*(x^8 - 5*x^5 + 4*x^2))/(x^9 - 12*x^6 + 48*x^3 - 64)) - 432^
(5/6)*(x^9 + 66*x^6 - 72*x^3 + 32) + 432*sqrt(3)*(x^8 + 7*x^5 - 8
*x^2) - 216*(18*sqrt(3)*x^5 - sqrt(3)*2^(2/3)*(x^7 + 16*x^4 - 8*x
))*sqrt(-x^3 + 1) + 864*432^(1/6)*(x^7 + x^4 - 2*x))))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x}{x^3\sqrt{-x^3+1} - 4\sqrt{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-x**3+4)/(-x**3+1)**(1/2),x)
```

```
[Out] -Integral(x/(x**3*sqrt(-x**3 + 1) - 4*sqrt(-x**3 + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x}{(x^3-4)\sqrt{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/((x^3 - 4)*sqrt(-x^3 + 1)),x, algorithm="giac")
```

```
[Out] integrate(-x/((x^3 - 4)*sqrt(-x^3 + 1)), x)
```

3.282 $\int \frac{x^{11}\sqrt{c+dx^3}}{8c-dx^3}\,dx$

Optimal. Leaf size=111

$$\frac{1024c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}-\frac{1024c^3\sqrt{c+dx^3}}{3d^4}-\frac{38c^2\left(c+dx^3\right)^{3/2}}{3d^4}-\frac{4c\left(c+dx^3\right)^{5/2}}{5d^4}-\frac{2\left(c+dx^3\right)^{7/2}}{21d^4}$$

```
[Out] (-1024*c^3*Sqrt[c + d*x^3])/(3*d^4) - (38*c^2*(c + d*x^3)^(3/2))/
(3*d^4) - (4*c*(c + d*x^3)^(5/2))/(5*d^4) - (2*(c + d*x^3)^(7/2))
/(21*d^4) + (1024*c^(7/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d
^4
```

Rubi [A] time = 0.291983, antiderivative size = 111, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{1024c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}-\frac{1024c^3\sqrt{c+dx^3}}{3d^4}-\frac{38c^2\left(c+dx^3\right)^{3/2}}{3d^4}-\frac{4c\left(c+dx^3\right)^{5/2}}{5d^4}-\frac{2\left(c+dx^3\right)^{7/2}}{21d^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^11*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-1024*c^3*Sqrt[c + d*x^3])/(3*d^4) - (38*c^2*(c + d*x^3)^(3/2))/
(3*d^4) - (4*c*(c + d*x^3)^(5/2))/(5*d^4) - (2*(c + d*x^3)^(7/2))
/(21*d^4) + (1024*c^(7/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d
^4
```

Rubi in Sympy [A] time = 31.3084, size = 104, normalized size = 0.94

$$\frac{1024c^{\frac{7}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}-\frac{1024c^3\sqrt{c+dx^3}}{3d^4}-\frac{38c^2\left(c+dx^3\right)^{\frac{3}{2}}}{3d^4}-\frac{4c\left(c+dx^3\right)^{\frac{5}{2}}}{5d^4}-\frac{2\left(c+dx^3\right)^{\frac{7}{2}}}{21d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] 1024*c**(7/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**4 - 1024*c**
3*sqrt(c + d*x**3)/(3*d**4) - 38*c**2*(c + d*x**3)**(3/2)/(3*d**4
) - 4*c*(c + d*x**3)**(5/2)/(5*d**4) - 2*(c + d*x**3)**(7/2)/(21*
d**4)
```

Mathematica [A] time = 0.118387, size = 81, normalized size = 0.73

$$\frac{107520c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-2\sqrt{c+dx^3}\left(18632c^3+764c^2dx^3+57cd^2x^6+5d^3x^9\right)}{105d^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^11*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3]*(18632*c^3 + 764*c^2*d*x^3 + 57*c*d^2*x^6 + 5
*d^3*x^9) + 107520*c^(7/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/
(105*d^4)
```

Maple [C] time = 0.089, size = 582, normalized size = 5.2

$$-\frac{1}{d}\left(\frac{2x^9}{21}\sqrt{dx^3+c}+\frac{2cx^6}{105d}\sqrt{dx^3+c}-\frac{8c^2x^3}{315d^2}\sqrt{dx^3+c}+\frac{16c^3}{315d^3}\sqrt{dx^3+c}\right) - 8\frac{c}{d^2}\left(2/15x^6\sqrt{dx^3+c}+\frac{2cx^3\sqrt{dx^3+c}}{45d}-\frac{4c^2\sqrt{dx^3+c}}{45d^2}\right)-\frac{128c^2}{9d^4}\left(dx^3+c\right)^{\frac{3}{2}} - 512\frac{c^3}{d^3}\left(2/3\frac{\sqrt{dx^3+c}}{d}+\frac{i/3\sqrt{2}}{d^3}\sum_{\_alpha=RootOf\left(d\_Z^3-8c\right)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\_alpha^2d^2-i\sqrt{3}\left(-cd^2\right)^{2/3}-\sqrt[3]{-cd^2}\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11*(d*x^3+c)^(1/2)/(-d*x^3+8*c),x)
```

```
[Out] -1/d*(2/21*x^9*(d*x^3+c)^(1/2)+2/105*c/d*x^6*(d*x^3+c)^(1/2)-8/31
5*c^2/d^2*x^3*(d*x^3+c)^(1/2)+16/315*c^3*(d*x^3+c)^(1/2)/d^3)-8*c
/d^2*(2/15*x^6*(d*x^3+c)^(1/2)+2/45*c/d*x^3*(d*x^3+c)^(1/2)-4/45*
c^2*(d*x^3+c)^(1/2)/d^2)-128/9*c^2*(d*x^3+c)^(3/2)/d^4-512*c^3/d^
3*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
tOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^11/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.243944, size = 1, normalized size = 0.01

$$\left[\frac{2\left(26880c^{\frac{7}{2}}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)-\left(5d^3x^9+57cd^2x^6+764c^2dx^3+18632c^3\right)\sqrt{dx^3+c}\right)}{105d^4}, \frac{2\left(53760\sqrt{-c}c^3\arctan\left(\frac{\sqrt{d}}{3\sqrt{}}\right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^11/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] [2/105*(26880*c^(7/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10
*c)/(d*x^3 - 8*c)) - (5*d^3*x^9 + 57*c*d^2*x^6 + 764*c^2*d*x^3 +
18632*c^3)*sqrt(d*x^3 + c))/d^4, 2/105*(53760*sqrt(-c)*c^3*arctan
(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (5*d^3*x^9 + 57*c*d^2*x^6 + 764*
c^2*d*x^3 + 18632*c^3)*sqrt(d*x^3 + c))/d^4]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.214813, size = 135, normalized size = 1.22

$$-\frac{1024\,c^4\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}d^4} - \frac{2\left(5\left(dx^3+c\right)^{\frac{7}{2}}d^{24} + 42\left(dx^3+c\right)^{\frac{5}{2}}cd^{24} + 665\left(dx^3+c\right)^{\frac{3}{2}}c^2d^{24} + 17920\sqrt{dx^3+c}c^3d^{24}\right)}{105\,d^{28}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^11/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] -1024*c^4*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^4) - 2
/105*(5*(d*x^3 + c)^(7/2)*d^24 + 42*(d*x^3 + c)^(5/2)*c*d^24 + 66
5*(d*x^3 + c)^(3/2)*c^2*d^24 + 17920*sqrt(d*x^3 + c)*c^3*d^24)/d^
28
```

3.283 $\int \frac{x^8\sqrt{c+dx^3}}{8c-dx^3}\,dx$

Optimal. Leaf size=90

$$\frac{128c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}-\frac{128c^2\sqrt{c+dx^3}}{3d^3}-\frac{14c\left(c+dx^3\right)^{3/2}}{9d^3}-\frac{2\left(c+dx^3\right)^{5/2}}{15d^3}$$

```
[Out] (-128*c^2*Sqrt[c + d*x^3])/(3*d^3) - (14*c*(c + d*x^3)^(3/2))/(9*
d^3) - (2*(c + d*x^3)^(5/2))/(15*d^3) + (128*c^(5/2)*ArcTanh[Sqrt
[c + d*x^3]/(3*Sqrt[c])])/d^3
```

Rubi [A] time = 0.257817, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{128c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}-\frac{128c^2\sqrt{c+dx^3}}{3d^3}-\frac{14c\left(c+dx^3\right)^{3/2}}{9d^3}-\frac{2\left(c+dx^3\right)^{5/2}}{15d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-128*c^2*Sqrt[c + d*x^3])/(3*d^3) - (14*c*(c + d*x^3)^(3/2))/(9*
d^3) - (2*(c + d*x^3)^(5/2))/(15*d^3) + (128*c^(5/2)*ArcTanh[Sqrt
[c + d*x^3]/(3*Sqrt[c])])/d^3
```

Rubi in Sympy [A] time = 27.7941, size = 83, normalized size = 0.92

$$\frac{128c^{\frac{5}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}-\frac{128c^2\sqrt{c+dx^3}}{3d^3}-\frac{14c\left(c+dx^3\right)^{\frac{3}{2}}}{9d^3}-\frac{2\left(c+dx^3\right)^{\frac{5}{2}}}{15d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] 128*c**(5/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**3 - 128*c**2*
sqrt(c + d*x**3)/(3*d**3) - 14*c*(c + d*x**3)**(3/2)/(9*d**3) - 2
*(c + d*x**3)**(5/2)/(15*d**3)
```

Mathematica [A] time = 0.0975081, size = 70, normalized size = 0.78

$$\frac{5760c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-2\sqrt{c+dx^3}\left(998c^2+41cdx^3+3d^2x^6\right)}{45d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3]*(998*c^2 + 41*c*d*x^3 + 3*d^2*x^6) + 5760*c^(
5/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(45*d^3)
```

Maple [C] time = 0.016, size = 507, normalized size = 5.6

$$-\frac{1}{d^2}\left(d\left(\frac{2x^6}{15}\sqrt{dx^3+c}+\frac{2cx^3}{45d}\sqrt{dx^3+c}-\frac{4c^2}{45d^2}\sqrt{dx^3+c}\right)+\frac{16c}{9d}\left(dx^3+c\right)^{\frac{3}{2}}\right)$$
$$-64\frac{c^2}{d^2}\left(2/3\frac{\sqrt{dx^3+c}}{d}+\frac{i/3\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d-8c)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\_alpha^2d^2-i\sqrt{3}\left(-cd^2\right)^{2/3}-\sqrt[3]{-cd^2}\_\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(1/2)/(-d*x^3+8*c),x)
```

```
[Out] -1/d^2*(d*(2/15*x^6*(d*x^3+c)^(1/2)+2/45*c/d*x^3*(d*x^3+c)^(1/2)-
4/45*c^2*(d*x^3+c)^(1/2)/d^2)+16/9*c/d*(d*x^3+c)^(3/2))-64*c^2/d^
2*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
tOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^8/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.252609, size = 1, normalized size = 0.01

$$\left[\frac{2\left(1440c^{\frac{5}{2}}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)-\left(3d^2x^6+41cdx^3+998c^2\right)\sqrt{dx^3+c}\right)}{45d^3},\frac{2\left(2880\sqrt{-c}c^2\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-\left(3d^2x^6+\right.\right.}{45d^3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^8/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] [2/45*(1440*c^(5/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c
)/(d*x^3 - 8*c)) - (3*d^2*x^6 + 41*c*d*x^3 + 998*c^2)*sqrt(d*x^3
+ c))/d^3, 2/45*(2880*sqrt(-c)*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqr
t(-c)) - (3*d^2*x^6 + 41*c*d*x^3 + 998*c^2)*sqrt(d*x^3 + c))/d^3]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.218015, size = 112, normalized size = 1.24

$$-\frac{128\,c^3\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}d^3}-\frac{2\left(3\left(dx^3+c\right)^{\frac{5}{2}}d^{12}+35\left(dx^3+c\right)^{\frac{3}{2}}cd^{12}+960\sqrt{dx^3+c}c^2d^{12}\right)}{45\,d^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^8/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] -128*c^3*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^3) - 2/
45*(3*(d*x^3 + c)^(5/2)*d^12 + 35*(d*x^3 + c)^(3/2)*c*d^12 + 960*
sqrt(d*x^3 + c)*c^2*d^12)/d^15
```

3.284 $\int \frac{x^5\sqrt{c+dx^3}}{8c-dx^3}\,dx$

Optimal. Leaf size=69

$$\frac{16c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}-\frac{16c\sqrt{c+dx^3}}{3d^2}-\frac{2\left(c+dx^3\right)^{3/2}}{9d^2}$$

```
[Out] (-16*c*Sqrt[c + d*x^3])/(3*d^2) - (2*(c + d*x^3)^(3/2))/(9*d^2) +
 (16*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^2
```

Rubi [A] time = 0.193912, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{16c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}-\frac{16c\sqrt{c+dx^3}}{3d^2}-\frac{2\left(c+dx^3\right)^{3/2}}{9d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-16*c*Sqrt[c + d*x^3])/(3*d^2) - (2*(c + d*x^3)^(3/2))/(9*d^2) +
 (16*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^2
```

Rubi in Sympy [A] time = 19.5435, size = 63, normalized size = 0.91

$$\frac{16c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}-\frac{16c\sqrt{c+dx^3}}{3d^2}-\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] 16*c**(3/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**2 - 16*c*sqrt(
c + d*x**3)/(3*d**2) - 2*(c + d*x**3)**(3/2)/(9*d**2)
```

Mathematica [A] time = 0.0721411, size = 58, normalized size = 0.84

$$\frac{144c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-2\sqrt{c+dx^3}\left(25c+dx^3\right)}{9d^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3]*(25*c + d*x^3) + 144*c^(3/2)*ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])])/(9*d^2)
```

Maple [C] time = 0.015, size = 446, normalized size = 6.5

$$-\frac{2}{9\,d^2}\left(dx^3+c\right)^{\frac{3}{2}}$$
$$-8\,\frac{c}{d}\left(2/3\,\frac{\sqrt{dx^3+c}}{d}+\frac{i/3\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d-8\,c)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\,\_alpha^2d^2-i\sqrt{3}\left(-cd^2\right)^{2/3}-\sqrt[3]{-cd^2}\_al\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^3+c)^(1/2)/(-d*x^3+8*c),x)
```

```
[Out] -2/9*(d*x^3+c)^(3/2)/d^2-8*c/d*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2
^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^
(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(
1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I
*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(
1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*
_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c
*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/
18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/
3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^5/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.239096, size = 1, normalized size = 0.01

$$\left[\frac{2\left(36\,c^{\frac{3}{2}}\log\left(\frac{dx^3+6\,\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)-\left(dx^3+25\,c\right)\sqrt{dx^3+c}\right)}{9\,d^2},\ \frac{2\left(72\,\sqrt{-c}c\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)-\left(dx^3+25\,c\right)\sqrt{dx^3+c}\right)}{9\,d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^5/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] [2/9*(36*c^(3/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c)/(
d*x^3 - 8*c)) - (d*x^3 + 25*c)*sqrt(d*x^3 + c))/d^2, 2/9*(72*sqrt
(-c)*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (d*x^3 + 25*c)*sqrt
(d*x^3 + c))/d^2]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{x^5\sqrt{c+dx^3}}{-8c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] -Integral(x**5*sqrt(c + d*x**3)/(-8*c + d*x**3), x)
```

GIAC/XCAS [A] time = 0.213697, size = 93, normalized size = 1.35

$$-\frac{2\left(\frac{72\,c^{2}\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}d}+\frac{\left(dx^{3}+c\right)^{\frac{3}{2}}d^{2}+24\,\sqrt{dx^{3}+c}cd^{2}}{d^{3}}\right)}{9\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^5/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] -2/9*(72*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) +
((d*x^3 + c)^(3/2)*d^2 + 24*sqrt(d*x^3 + c)*c*d^2)/d^3)/d
```

3.285 $\int \frac{x^2\sqrt{c+dx^3}}{8c-dx^3}\,dx$

Optimal. Leaf size=50

$$\frac{2\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}-\frac{2\sqrt{c+dx^3}}{3d}$$

```
[Out] (-2*Sqrt[c + d*x^3])/(3*d) + (2*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(
3*Sqrt[c])])/d
```

Rubi [A] time = 0.147602, antiderivative size = 50, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{2\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}-\frac{2\sqrt{c+dx^3}}{3d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3])/(3*d) + (2*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(
3*Sqrt[c])])/d
```

Rubi in Sympy [A] time = 16.2959, size = 41, normalized size = 0.82

$$\frac{2\sqrt{c}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}-\frac{2\sqrt{c+dx^3}}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] 2*sqrt(c)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d - 2*sqrt(c + d*x*
*3)/(3*d)
```

Mathematica [A] time = 0.0399521, size = 47, normalized size = 0.94

$$-\frac{2\left(\sqrt{c+dx^3}-3\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{3d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-2*(Sqrt[c + d*x^3] - 3*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])]))/(3*d)
```

Maple [C] time = 0.011, size = 425, normalized size = 8.5

$$-\frac{2}{3\,d}\sqrt{dx^3+c}$$

$$-\frac{\frac{i}{3}\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d-8c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(d*x^3+c)^(1/2)/(-d*x^3+8*c),x)
```

```
[Out] -2/3*(d*x^3+c)^(1/2)/d-1/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*
I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)
^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1
/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*
(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)
^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/
3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alp
ha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootO
f(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^2/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.244359, size = 1, normalized size = 0.02

$$\left[\frac{3\sqrt{c}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)-2\sqrt{dx^3+c}}{3\,d}, \frac{2\left(3\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-\sqrt{dx^3+c}\right)}{3\,d}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^2/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] [1/3*(3*sqrt(c)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c)/(d
*x^3 - 8*c)) - 2*sqrt(d*x^3 + c))/d, 2/3*(3*sqrt(-c)*arctan(1/3*s
qrt(d*x^3 + c)/sqrt(-c)) - sqrt(d*x^3 + c))/d]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^2\sqrt{c+dx^3}}{-8c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] -Integral(x**2*sqrt(c + d*x**3)/(-8*c + d*x**3), x)
```

GIAC/XCAS [A] time = 0.213088, size = 58, normalized size = 1.16

$$-\frac{2\,c\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}d}-\frac{2\sqrt{dx^3+c}}{3\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^2/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] -2*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) - 2/3*sqrt
(d*x^3 + c)/d
```

3.286 $\int \frac{\sqrt{c+dx^3}}{x(8c-dx^3)}\,dx$

Optimal. Leaf size=58

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{4\sqrt{c}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12\sqrt{c}}$$

```
[Out] ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]/(4*Sqrt[c]) - ArcTanh[Sqrt[c
 + d*x^3]/Sqrt[c]]/(12*Sqrt[c])
```

Rubi [A] time = 0.178895, antiderivative size = 58, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{4\sqrt{c}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x*(8*c - d*x^3)),x]
```

```
[Out] ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]/(4*Sqrt[c]) - ArcTanh[Sqrt[c
 + d*x^3]/Sqrt[c]]/(12*Sqrt[c])
```

Rubi in Sympy [A] time = 18.1555, size = 48, normalized size = 0.83

$$\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{4\sqrt{c}}-\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x/(-d*x**3+8*c),x)
```

```
[Out] atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(4*sqrt(c)) - atanh(sqrt(c +
d*x**3)/sqrt(c))/(12*sqrt(c))
```

Mathematica [C] time = 0.314318, size = 158, normalized size = 2.72

$$\frac{2dx^3\sqrt{c+dx^3}F_1\left(\frac{1}{2};-\frac{1}{2},1;\frac{3}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{(dx^3-8c)\left(3dx^3F_1\left(\frac{1}{2};-\frac{1}{2},1;\frac{3}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+c\left(16F_1\left(\frac{3}{2};-\frac{1}{2},2;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x*(8*c - d*x^3)),x]
```

```
[Out] (2*d*x^3*Sqrt[c + d*x^3]*AppellF1[1/2, -1/2, 1, 3/2, -(c/(d*x^3))
, (8*c)/(d*x^3)])/((-8*c + d*x^3)*(3*d*x^3*AppellF1[1/2, -1/2, 1,
 3/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + c*(16*AppellF1[3/2, -1/2, 2,
 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + AppellF1[3/2, 1/2, 1, 5/2, -
(c/(d*x^3)), (8*c)/(d*x^3)])))
```

Maple [C] time = 0.016, size = 468, normalized size = 8.1

$$\frac{1}{8c}\left(\frac{2}{3}\sqrt{dx^3+c}-\frac{2}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\sqrt{c}\right)$$
$$-\frac{d}{8c}\left(\frac{2}{3d}\sqrt{dx^3+c}+\frac{\frac{i}{3}\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d-8c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((d*x^3+c)^(1/2)/x/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))*c
^(1/2))-1/8*d/c*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*
d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^
(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d
^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*
3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*
3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*El
lipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alph
a^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^
(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^
(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{\sqrt{dx^3+c}}{(dx^3-8c)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x), x)
```

Fricas [A] time = 0.262771, size = 1, normalized size = 0.02

$$\left[\frac{3\log\left(\frac{(dx^3+10c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8c}\right)+\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)}{24\sqrt{c}},-\frac{3\arctan\left(\frac{3c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)}{12\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x),x, algorithm="fricas")
```

```
[Out] [1/24*(3*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c)/(d*x^
3 - 8*c)) + log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3
))/sqrt(c), -1/12*(3*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - arc
tan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/sqrt(-c)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{\sqrt{c+dx^3}}{-8cx+dx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x/(-d*x**3+8*c),x)
```

```
[Out] -Integral(sqrt(c + d*x**3)/(-8*c*x + d*x**4), x)
```

GIAC/XCAS [A] time = 0.215631, size = 65, normalized size = 1.12

$$\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{12\sqrt{-c}} - \frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{4\sqrt{-c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x),x, algorithm="giac")
```

```
[Out] 1/12*arctan(sqrt(d*x^3 + c)/sqrt(-c))/sqrt(-c) - 1/4*arctan(1/3*s
qrt(d*x^3 + c)/sqrt(-c))/sqrt(-c)
```

3.287 $\int \frac{\sqrt{c+dx^3}}{x^4(8c-dx^3)}\,dx$

Optimal. Leaf size=81

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32c^{3/2}}-\frac{5d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{3/2}}-\frac{\sqrt{c+dx^3}}{24cx^3}$$

```
[Out] -Sqrt[c + d*x^3]/(24*c*x^3) + (d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])])/(32*c^(3/2)) - (5*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(96*c
^(3/2))
```

Rubi [A] time = 0.285048, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32c^{3/2}}-\frac{5d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{3/2}}-\frac{\sqrt{c+dx^3}}{24cx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^4*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(24*c*x^3) + (d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])])/(32*c^(3/2)) - (5*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(96*c
^(3/2))
```

Rubi in Sympy [A] time = 32.3305, size = 70, normalized size = 0.86

$$-\frac{\sqrt{c+dx^3}}{24cx^3}+\frac{d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32c^{\frac{3}{2}}}-\frac{5d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**4/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)/(24*c*x**3) + d*atanh(sqrt(c + d*x**3)/(3*sqrt(
c)))/(32*c**(3/2)) - 5*d*atanh(sqrt(c + d*x**3)/sqrt(c))/(96*c**(
3/2))
```

Mathematica [C] time = 0.827386, size = 321, normalized size = 3.96

$$\frac{\frac{24d^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{50d^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\right.}{(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\right.\right.}}{72x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^4*(8*c - d*x^3)),x]
```

```
[Out] (-3 - (3*d*x^3)/c + (24*d^2*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/
c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -
((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*
x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c),
(d*x^3)/(8*c)]))) + (50*d^2*x^6*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d
*x^3)), (8*c)/(d*x^3)])/((-8*c + d*x^3)*(5*d*x^3*AppellF1[3/2, 1/
```

```
2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2,
 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7
/2, -(c/(d*x^3)), (8*c)/(d*x^3)])))/(72*x^3*Sqrt[c + d*x^3])
```

Maple [C] time = 0.015, size = 511, normalized size = 6.3

$$\frac{1}{8c}\left(-\frac{1}{3x^3}\sqrt{dx^3+c}-\frac{d}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\frac{1}{\sqrt{c}}\right)$$
$$+\frac{d}{64c^2}\left(\frac{2}{3}\sqrt{dx^3+c}-\frac{2}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\sqrt{c}\right)$$
$$-\frac{d^2}{64c^2}\left(\frac{2}{3d}\sqrt{dx^3+c}+\frac{\frac{i}{3}\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d-8c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd\right.}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^4/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-1/3*(d*x^3+c)^(1/2)/x^3-1/3*d*arctanh((d*x^3+c)^(1/2)/c^(
1/2))/c^(1/2))+1/64*d/c^2*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3
+c)^(1/2)/c^(1/2))*c^(1/2))-1/64*d^2/c^2*(2/3*(d*x^3+c)^(1/2)/d+1
/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{\sqrt{dx^3+c}}{(dx^3-8c)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^4),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^4), x)
```

Fricas [A] time = 0.25766, size = 1, normalized size = 0.01

$$\left[\frac{3\,dx^3\log\left(\frac{(dx^3+10c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8c}\right)+5\,dx^3\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)-8\sqrt{dx^3+c}\sqrt{c}}{192\,c^{\frac{3}{2}}x^3},\right.$$
$$\left.-\frac{3\,dx^3\arctan\left(\frac{3c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-5\,dx^3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+4\sqrt{dx^3+c}\sqrt{-c}}{96\sqrt{-c}cx^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/192*(3*d*x^3*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c
)/(d*x^3 - 8*c)) + 5*d*x^3*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*
x^3 + c)*c)/x^3) - 8*sqrt(d*x^3 + c)*sqrt(c))/(c^(3/2)*x^3), -1/9
6*(3*d*x^3*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 5*d*x^3*arcta
n(c/(sqrt(d*x^3 + c)*sqrt(-c))) + 4*sqrt(d*x^3 + c)*sqrt(-c))/(sq
rt(-c)*c*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{c + dx^3}}{-8cx^4 + dx^7}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(1/2)/x**4/(-d*x**3+8*c),x)
```

```
[Out] -Integral(sqrt(c + d*x**3)/(-8*c*x**4 + d*x**7), x)
```

GIAC/XCAS [A] time = 0.217993, size = 104, normalized size = 1.28

$$\frac{1}{96}\, d\left(\frac{5 \arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c} - \frac{3 \arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}c} - \frac{4\sqrt{dx^3 + c}}{cdx^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^4),x, algorithm="giac")
```

```
[Out] 1/96*d*(5*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 3*arcta
n(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 4*sqrt(d*x^3 + c)/
(c*d*x^3))
```

3.288 $\int \frac{\sqrt{c+dx^3}}{x^7(8c-dx^3)}\,dx$

Optimal. Leaf size=107

$$\frac{d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{256c^{5/2}}+\frac{d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{256c^{5/2}}-\frac{d\sqrt{c+dx^3}}{64c^2x^3}-\frac{\sqrt{c+dx^3}}{48cx^6}$$

```
[Out] -Sqrt[c + d*x^3]/(48*c*x^6) - (d*Sqrt[c + d*x^3])/(64*c^2*x^3) +
(d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(256*c^(5/2)) + (d^2*A
rcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(256*c^(5/2))
```

Rubi [A] time = 0.402872, antiderivative size = 107, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{256c^{5/2}}+\frac{d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{256c^{5/2}}-\frac{d\sqrt{c+dx^3}}{64c^2x^3}-\frac{\sqrt{c+dx^3}}{48cx^6}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^7*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(48*c*x^6) - (d*Sqrt[c + d*x^3])/(64*c^2*x^3) +
(d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(256*c^(5/2)) + (d^2*A
rcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(256*c^(5/2))
```

Rubi in Sympy [A] time = 50.7096, size = 92, normalized size = 0.86

$$-\frac{\sqrt{c+dx^3}}{48cx^6}-\frac{d\sqrt{c+dx^3}}{64c^2x^3}+\frac{d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{256c^{\frac{5}{2}}}+\frac{d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{256c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**7/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)/(48*c*x**6) - d*sqrt(c + d*x**3)/(64*c**2*x**3)
 + d**2*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(256*c**(5/2)) + d**2
*atanh(sqrt(c + d*x**3)/sqrt(c))/(256*c**(5/2))
```

Mathematica [C] time = 0.366423, size = 341, normalized size = 3.19

$$\frac{\frac{12d^3x^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{c(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{5d^3x^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3}\right.}{c(8c-dx^3)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};\right.\right.}}{96\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^7*(8*c - d*x^3)),x]
```

```
[Out] ((-3*d^2)/(2*c^2) - 2/x^6 - (7*d)/(2*c*x^3) + (12*d^3*x^3*AppellF
1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])/(c*(8*c - d*x^3)*(1
6*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(
AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[
2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (5*d^3*x^3*Appell
F1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/(c*(8*c - d*x^
```

```
3)*(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3
)] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]
 - c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)])))/(
96*Sqrt[c + d*x^3])
```

Maple [C] time = 0.037, size = 574, normalized size = 5.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^7/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-1/6*(d*x^3+c)^(1/2)/x^6-1/12*d*(d*x^3+c)^(1/2)/c/x^3+1/12
*d^2*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2))+1/64*d/c^2*(-1/3*(
d*x^3+c)^(1/2)/x^3-1/3*d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(1/2)
)+1/512*d^2/c^3*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/
c^(1/2))*c^(1/2))-1/512*d^3/c^3*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*
2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^
(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*
I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^
(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2
*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-
c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1
/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2
/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{dx^3+c}}{(dx^3-8\,c)x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^7),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^7), x)
```

Fricas [A] time = 0.252486, size = 1, normalized size = 0.01

$$\left[\frac{3\,d^2x^6\log\left(\frac{8\,(cdx^3+4\,c^2)\sqrt{dx^3+c}+(d^2x^6+24\,cdx^3+32\,c^2)\sqrt{c}}{dx^6-8\,cx^3}\right)-8\,\left(3\,dx^3+4\,c\right)\sqrt{dx^3+c}\sqrt{c}}{1536\,c^{\frac{5}{2}}x^6}, \frac{3\,d^2x^6\arctan\left(\frac{(dx^3+4\,c)\sqrt{-c}}{4\sqrt{dx^3+c}c}\right)-4\,\left(3\,dx^3\right.}{768\sqrt{-c}c^2x^6}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^7),x, algorithm="fricas")
```

```
[Out] [1/1536*(3*d^2*x^6*log((8*(c*d*x^3 + 4*c^2)*sqrt(d*x^3 + c) + (d^
2*x^6 + 24*c*d*x^3 + 32*c^2)*sqrt(c))/(d*x^6 - 8*c*x^3)) - 8*(3*d
*x^3 + 4*c)*sqrt(d*x^3 + c)*sqrt(c))/(c^(5/2)*x^6), 1/768*(3*d^2*
x^6*arctan(1/4*(d*x^3 + 4*c)*sqrt(-c)/(sqrt(d*x^3 + c)*c)) - 4*(3
*d*x^3 + 4*c)*sqrt(d*x^3 + c)*sqrt(-c))/(sqrt(-c)*c^2*x^6)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**7/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220168, size = 126, normalized size = 1.18

$$-\frac{1}{768}\,d^2\left(\frac{3\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^2}+\frac{3\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}c^2}+\frac{4\left(3\left(dx^3+c\right)^{\frac{3}{2}}+\sqrt{dx^3+c}c\right)}{c^2d^2x^6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^7),x, algorithm="giac")
```

```
[Out] -1/768*d^2*(3*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) + 3
*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) + 4*(3*(d*x^
3 + c)^(3/2) + sqrt(d*x^3 + c)*c)/(c^2*d^2*x^6))
```

3.289 $\int \frac{x^7\sqrt{c+dx^3}}{8c-dx^3}\,dx$

Optimal. Leaf size=648

$$-\frac{32\sqrt{3}c^{13/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{8/3}}+\frac{32c^{13/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{8/3}}-\frac{32c^{13/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{8/3}}-\frac{12248\sqrt{2}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{91\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{6124\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{91d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{12248c^2\sqrt{c+dx^3}}{91d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{214cx^2\sqrt{c+dx^3}}{91d^2}-\frac{2x^5\sqrt{c+dx^3}}{13d}$$

```
[Out] (-214*c*x^2*Sqrt[c + d*x^3])/(91*d^2) - (2*x^5*Sqrt[c + d*x^3])/(
13*d) - (12248*c^2*Sqrt[c + d*x^3])/(91*d^(8/3)*((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)) - (32*Sqrt[3]*c^(13/6)*ArcTan[(Sqrt[3]*c^(1/6
)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(8/3) + (32*c^(13/6)
*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])]])/d^
(8/3) - (32*c^(13/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(8/3
) + (6124*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(7/3)*(c^(1/3) + d^(1/3)*x)
*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*
c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) +
 d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]]
)/(91*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (12248*Sqrt[2]*c^(7/3
)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/
3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[(
(1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/
3)*x)], -7 - 4*Sqrt[3]])/(91*3^(1/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/
3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c +
d*x^3])
```

Rubi [A] time = 1.98137, antiderivative size = 648, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{32\sqrt{3}c^{13/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{8/3}}+\frac{32c^{13/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{8/3}}-\frac{32c^{13/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{8/3}}-\frac{12248\sqrt{2}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{91\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{6124\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{91d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{12248c^2\sqrt{c+dx^3}}{91d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{214cx^2\sqrt{c+dx^3}}{91d^2}-\frac{2x^5\sqrt{c+dx^3}}{13d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^7*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-214*c*x^2*Sqrt[c + d*x^3])/(91*d^2) - (2*x^5*Sqrt[c + d*x^3])/(
13*d) - (12248*c^2*Sqrt[c + d*x^3])/(91*d^(8/3)*((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)) - (32*Sqrt[3]*c^(13/6)*ArcTan[(Sqrt[3]*c^(1/6
)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(8/3) + (32*c^(13/6)
*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])]])/d^
(8/3) - (32*c^(13/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(8/3
) + (6124*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(7/3)*(c^(1/3) + d^(1/3)*x)
*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*
c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) +
 d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]]
)/(91*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (12248*Sqrt[2]*c^(7/3
)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/
3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[(
(1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/
3)*x)], -7 - 4*Sqrt[3]])/(91*3^(1/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/
3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c +
d*x^3])
```

Rubi in Sympy [A] time = 24.8586, size = 51, normalized size = 0.08

$$\frac{x^8\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{8}{3},-\frac{1}{2},1,\frac{11}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] x**8*sqrt(c + d*x**3)*appellf1(8/3, -1/2, 1, 11/3, -d*x**3/c, d*x
**3/(8*c))/(64*c*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.97503, size = 361, normalized size = 0.56

$$\frac{2x^2\left(\frac{171200c^4F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{195968c^3dx^3F_1(}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1(\right.\right.}\right.}{455d^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^7*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (2*x^2*(-5*(107*c^2 + 114*c*d*x^3 + 7*d^2*x^6) + (171200*c^4*Appe
llF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^
3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)]
+ 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)
] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])))
+ (195968*c^3*d*x^3*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x
^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*
x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -(
(d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x
^3)/c), (d*x^3)/(8*c)])))))/(455*d^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.059, size = 1788, normalized size = 2.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(d*x^3+c)^(1/2)/(-d*x^3+8*c),x)
```

```
[Out] -1/d^2*(d*(2/13*x^5*(d*x^3+c)^(1/2)+6/91*c*x^2*(d*x^3+c)^(1/2)/d+
8/91*I*c^2/d^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*(
(x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/
d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2))))+8*c*(2/7*x^2*(d*x^3+c)^(1/2)-2/7*I*c*
3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^
2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1
/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)))))-64*c^2/d^2*(-2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2
```

```
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/d^3*2^(1/2
)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^
2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1
/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*
d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d
-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)
^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{dx^3 + c}x^7}{dx^3 - 8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\sqrt{dx^3 + c}x^7}{dx^3 - 8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] integrate(-sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c), x)
```

3.290 $\int \frac{x^4\sqrt{c+dx^3}}{8c-dx^3}\,dx$

Optimal. Leaf size=624

$$-\frac{4\sqrt{3}c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{5/3}}+\frac{4c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{5/3}}-\frac{4c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{5/3}}-\frac{118\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{59\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{118c\sqrt{c+dx^3}}{7d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2x^2\sqrt{c+dx^3}}{7d}$$

```
[Out] (-2*x^2*Sqrt[c + d*x^3])/(7*d) - (118*c*Sqrt[c + d*x^3])/(7*d^(5/
3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (4*Sqrt[3]*c^(7/6)*ArcT
an[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(5
/3) + (4*c^(7/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[
c + d*x^3])])/d^(5/3) - (4*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])])/d^(5/3) + (59*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(4/3)*(c^(1/3)
+ d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1
 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3
])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7
- 4*Sqrt[3]])/(7*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (118*Sqrt[
2]*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*
x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF
[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3
) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*3^(1/4)*d^(5/3)*Sqrt[(c^(1/3
)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*S
qrt[c + d*x^3])
```

Rubi [A] time = 1.71991, antiderivative size = 624, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$-\frac{4\sqrt{3}c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{5/3}}+\frac{4c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{5/3}}-\frac{4c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{5/3}}$$
$$-\frac{118\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{59\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{118c\sqrt{c+dx^3}}{7d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2x^2\sqrt{c+dx^3}}{7d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-2*x^2*Sqrt[c + d*x^3])/(7*d) - (118*c*Sqrt[c + d*x^3])/(7*d^(5/
3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (4*Sqrt[3]*c^(7/6)*ArcT
an[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(5
/3) + (4*c^(7/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[
c + d*x^3])])/d^(5/3) - (4*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])])/d^(5/3) + (59*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(4/3)*(c^(1/3)
+ d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1
 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3
])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7
- 4*Sqrt[3]])/(7*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (118*Sqrt[
2]*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*
x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF
[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3
) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*3^(1/4)*d^(5/3)*Sqrt[(c^(1/3
)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*S
qrt[c + d*x^3])
```

Rubi in Sympy [A] time = 24.9903, size = 51, normalized size = 0.08

$$\frac{x^5\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{5}{3},-\frac{1}{2},1,\frac{8}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{40c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] x**5*sqrt(c + d*x**3)*appellf1(5/3, -1/2, 1, 8/3, -d*x**3/c, d*x*
*3/(8*c))/(40*c*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.304819, size = 349, normalized size = 0.56

$$\frac{2x^2\left(\frac{1600c^3F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{d(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{1888c^2x^3F_1\left(\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\right.\right.}\right.}{35\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (2*x^2*((-5*(c + d*x^3))/d + (1600*c^3*AppellF1[2/3, 1/2, 1, 5/3,
 -((d*x^3)/c), (d*x^3)/(8*c)])/(d*(8*c - d*x^3)*(40*c*AppellF1[2/
3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[
5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3,
3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (1888*c^2*x^3*Appe
llF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^
3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]
+ 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c
)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))
)))/(35*Sqrt[c + d*x^3])
```

Maple [C] time = 0.013, size = 1310, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(d*x^3+c)^(1/2)/(-d*x^3+8*c),x)
```

```
[Out] -1/d*(2/7*x^2*(d*x^3+c)^(1/2)-2/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(
I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-8*c/d*(-2/3*
I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*
d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^
(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
```

```
tOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{dx^3 + c}x^4}{dx^3 - 8c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{\sqrt{dx^3 + c}x^4}{dx^3 - 8c}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] integral(-sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^4\sqrt{c + dx^3}}{-8c + dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] -Integral(x**4*sqrt(c + d*x**3)/(-8*c + d*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\sqrt{dx^3 + c}x^4}{dx^3 - 8c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] integrate(-sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c), x)
```

3.291 $\int \frac{x\sqrt{c+dx^3}}{8c-dx^3}\,dx$

Optimal. Leaf size=601

$$-\frac{2\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{\sqrt{3}\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{2d^{2/3}}+\frac{\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{2d^{2/3}}-\frac{\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2d^{2/3}}$$

```
[Out] (-2*Sqrt[c + d*x^3])/(d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) - (Sqrt[3]*c^(1/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x
))/Sqrt[c + d*x^3]])/(2*d^(2/3)) + (c^(1/6)*ArcTanh[(c^(1/3) + d^
(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(2*d^(2/3)) - (c^(1/6)*A
rcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(2*d^(2/3)) + (3^(1/4)*Sqrt[
2 - Sqrt[3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3
)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(d^(2/3)*Sqrt[(c^(1/3
)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*S
qrt[c + d*x^3]) - (2*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(
c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3
)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1
/4)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.20331, antiderivative size = 601, normalized size of antiderivative = 1., number of

steps used = 12, number of rules used = 12, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.48$

$$-\frac{2\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{\sqrt{3}\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{2d^{2/3}}+\frac{\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{2d^{2/3}}-\frac{\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2d^{2/3}}$$

Antiderivative was successfully verified.

```
[In]   Int[(x*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3])/(d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) - (Sqrt[3]*c^(1/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x
))/Sqrt[c + d*x^3]])/(2*d^(2/3)) + (c^(1/6)*ArcTanh[(c^(1/3) + d^
(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(2*d^(2/3)) - (c^(1/6)*A
rcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(2*d^(2/3)) + (3^(1/4)*Sqrt[
2 - Sqrt[3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3
)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(d^(2/3)*Sqrt[(c^(1/3
)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*S
qrt[c + d*x^3]) - (2*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(
c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3
)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1
/4)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 20.4555, size = 51, normalized size = 0.08

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{16c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, -1/2, 1, 5/3, -d*x**3/c, d*x*
*3/(8*c))/(16*c*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.313982, size = 168, normalized size = 0.28

$$\frac{20cx^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)+4F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[c + d*x^3])/(8*c - d*x^3),x]
```

```
[Out] (20*c*x^2*Sqrt[c + d*x^3]*AppellF1[2/3, -1/2, 1, 5/3, -((d*x^3)/c
), (d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, -1/2, 1, 5/
3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, -1/2, 2,
 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 4*AppellF1[5/3, 1/2, 1, 8/3,
 -((d*x^3)/c), (d*x^3)/(8*c)])))
```

Maple [C] time = 0.01, size = 848, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(1/2)/(-d*x^3+8*c),x)
```

```
[Out] 2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*
(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d
^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)))-1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha
=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{dx^3+cx}}{dx^3-8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)*x/(d*x^3 - 8*c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{\sqrt{dx^3+c}x}{dx^3-8\,c},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x/(d*x^3 - 8*c),x, algorithm="fricas")

[Out] integral(-sqrt(d*x^3 + c)*x/(d*x^3 - 8*c), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x\sqrt{c+dx^3}}{-8c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**3+c)**(1/2)/(-d*x**3+8*c),x)

[Out] -Integral(x*sqrt(c + d*x**3)/(-8*c + d*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\sqrt{dx^3+c}x}{dx^3-8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)*x/(d*x^3 - 8*c),x, algorithm="giac")

[Out] integrate(-sqrt(d*x^3 + c)*x/(d*x^3 - 8*c), x)
```

3.292 $\int \frac{\sqrt{c+dx^3}}{x^2(8c-dx^3)}\,dx$

Optimal. Leaf size=632

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt[4]{3}c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{3}\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{16c^{5/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{16c^{5/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{16c^{5/6}}-\frac{\sqrt{c+dx^3}}{8cx}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{8c\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$

```
[Out] -Sqrt[c + d*x^3]/(8*c*x) + (d^(1/3)*Sqrt[c + d*x^3])/(8*c*((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)) - (Sqrt[3]*d^(1/3)*ArcTan[(Sqrt[3]*
c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(16*c^(5/6)) + (
d^(1/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3
])]])/(16*c^(5/6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
)/(16*c^(5/6)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^
(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c
^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*
Sqrt[3]])/(16*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(
1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - S
qrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)]
, -7 - 4*Sqrt[3]])/(4*Sqrt[2]*3^(1/4)*c^(2/3)*Sqrt[(c^(1/3)*(c^(1
/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c +
 d*x^3])
```

Rubi [A] time = 1.65909, antiderivative size = 632, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt[4]{3}c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt{3}\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{16c^{5/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{16c^{5/6}}$$
$$-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{16c^{5/6}}-\frac{\sqrt{c+dx^3}}{8cx}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{8c\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^2*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(8*c*x) + (d^(1/3)*Sqrt[c + d*x^3])/(8*c*((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)) - (Sqrt[3]*d^(1/3)*ArcTan[(Sqrt[3]*
c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(16*c^(5/6)) + (
d^(1/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3
])])/(16*c^(5/6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
)/(16*c^(5/6)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^
(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c
^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*
Sqrt[3]])/(16*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(
1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - S
qrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)]
, -7 - 4*Sqrt[3]])/(4*Sqrt[2]*3^(1/4)*c^(2/3)*Sqrt[(c^(1/3)*(c^(1
/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c +
 d*x^3])
```

Rubi in Sympy [A] time = 25.927, size = 53, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{1}{3},-\frac{1}{2},1,\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{8cx\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**2/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, -1/2, 1, 2/3, -d*x**3/c, d*x**3/
(8*c))/(8*c*x*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.747499, size = 345, normalized size = 0.55

$$\frac{\frac{32d^2x^6F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{1300cdx^3F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\right.\right.\right.}}{40x\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^2*(8*c - d*x^3)),x]
```

```
[Out] (-5 - (5*d*x^3)/c + (1300*c*d*x^3*AppellF1[2/3, 1/2, 1, 5/3, -((d
*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2,
 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/
2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1,
 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (32*d^2*x^6*AppellF1[5/3,
 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((-8*c + d*x^3)*(64*c
*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^
3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*A
ppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(40*x
*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 1306, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^2/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^
3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-1/8*d/c*(-2/3*I*3^(1/2)/
d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3)
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(
-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/
d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^
2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Elli
pticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d
```

```
-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{dx^3+c}}{(dx^3-8\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^2),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{\sqrt{dx^3+c}}{dx^5-8\,cx^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(-sqrt(d*x^3 + c)/(d*x^5 - 8*c*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{c+dx^3}}{-8cx^2+dx^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(1/2)/x**2/(-d*x**3+8*c),x)
```

```
[Out] -Integral(sqrt(c + d*x**3)/(-8*c*x**2 + d*x**5), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\sqrt{dx^3+c}}{(dx^3-8\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^2), x)
```

3.293 $\int \frac{\sqrt{c+dx^3}}{x^5(8c-dx^3)}\,dx$

Optimal. Leaf size=654

$$-\frac{\sqrt{3}d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{128c^{11/6}}+\frac{d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{128c^{11/6}}-\frac{d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{128c^{11/6}}+\frac{d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{d^{4/3}\sqrt{c+dx^3}}{16c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{d\sqrt{c+dx^3}}{16c^2x}-\frac{\sqrt{c+dx^3}}{32cx^4}$$

```
[Out] -Sqrt[c + d*x^3]/(32*c*x^4) - (d*Sqrt[c + d*x^3])/(16*c^2*x) + (d
^(4/3)*Sqrt[c + d*x^3])/(16*c^2*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)) - (Sqrt[3]*d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)
*x))/Sqrt[c + d*x^3]])/(128*c^(11/6)) + (d^(4/3)*ArcTanh[(c^(1/3)
 + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(128*c^(11/6)) - (d
^(4/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(128*c^(11/6)) - (3^
(1/4)*Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/
3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/
((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32*c^(5/3
)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sq
rt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^
(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(
8*Sqrt[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.97413, antiderivative size = 654, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{\sqrt{3}d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{128c^{11/6}}+\frac{d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{128c^{11/6}}-\frac{d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{128c^{11/6}}+\frac{d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{d^{4/3}\sqrt{c+dx^3}}{16c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{d\sqrt{c+dx^3}}{16c^2x}-\frac{\sqrt{c+dx^3}}{32cx^4}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^5*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(32*c*x^4) - (d*Sqrt[c + d*x^3])/(16*c^2*x) + (d
^(4/3)*Sqrt[c + d*x^3])/(16*c^2*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)) - (Sqrt[3]*d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)
*x))/Sqrt[c + d*x^3]])/(128*c^(11/6)) + (d^(4/3)*ArcTanh[(c^(1/3)
 + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(128*c^(11/6)) - (d
^(4/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(128*c^(11/6)) - (3^
(1/4)*Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/
3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/
((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32*c^(5/3
)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sq
rt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^
(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(
8*Sqrt[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.87, size = 56, normalized size = 0.09

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{4}{3},-\frac{1}{2},1,-\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{32cx^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**5/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-4/3, -1/2, 1, -1/3, -d*x**3/c, d*x**3
/(8*c))/(32*c*x**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.464265, size = 367, normalized size = 0.56

$$\frac{\frac{625d^2x^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{\frac{64cd^3x^9F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-d\right.\right.\right.}}{2}}{80\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^5*(8*c - d*x^3)),x]
```

```
[Out] ((625*d^2*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8
*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c
), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)
/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c),
(d*x^3)/(8*c)]))) - (5*(c^2 + 3*c*d*x^3 + 2*d^2*x^6) + (64*c*d^3*
x^9*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*
c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)
/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x
^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/
(8*c)]))))/(2*c^2*x^4))/(80*Sqrt[c + d*x^3])
```

Maple [C] time = 0.036, size = 1782, normalized size = 2.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^5/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-1/4*(d*x^3+c)^(1/2)/x^4-3/8*d*(d*x^3+c)^(1/2)/c/x-1/8*I*d
/c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d
^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(
I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(
1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2))))+1/64*d/c^2*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*d^2)
^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-1/6
4*d^2/c^2*(-2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Ellipt
icE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^
```

```
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-
c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2
)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c
*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(
I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(
d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-
I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*
EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_al
pha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*
3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{dx^3+c}}{(dx^3-8\,c)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^5),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{\sqrt{dx^3+c}}{dx^8-8\,cx^5}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^5),x, algorithm="fricas")
```

```
[Out] integral(-sqrt(d*x^3 + c)/(d*x^8 - 8*c*x^5), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**5/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\sqrt{dx^3+c}}{(dx^3-8\,c)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^5),x, algorithm="giac")
```

```
[Out] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^5), x)
```

3.294 $\int \frac{\sqrt{c+dx^3}}{x^8(8c-dx^3)}\,dx$

Optimal. Leaf size=678

$$-\frac{\sqrt{3}d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1024c^{17/6}}+\frac{d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1024c^{17/6}}-\frac{d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1024c^{17/6}}-\frac{d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{56\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{224c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{d^{7/3}\sqrt{c+dx^3}}{112c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{d^2\sqrt{c+dx^3}}{112c^3x}-\frac{19d\sqrt{c+dx^3}}{1792c^2x^4}-\frac{\sqrt{c+dx^3}}{56cx^7}$$

```
[Out] -Sqrt[c + d*x^3]/(56*c*x^7) - (19*d*Sqrt[c + d*x^3])/(1792*c^2*x^
4) + (d^2*Sqrt[c + d*x^3])/(112*c^3*x) - (d^(7/3)*Sqrt[c + d*x^3]
)/(112*c^3*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (Sqrt[3]*d^(7/3
)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]
)/(1024*c^(17/6)) + (d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c
^(1/6)*Sqrt[c + d*x^3])])/(1024*c^(17/6)) - (d^(7/3)*ArcTanh[Sqrt
[c + d*x^3]/(3*Sqrt[c])])/(1024*c^(17/6)) + (3^(1/4)*Sqrt[2 - Sqr
t[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/
3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellipt
icE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*c^(8/3)*Sqrt[(c^(1/3)*(
c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt
[c + d*x^3]) - (d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(
1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sq
rt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(56*Sqrt[2]*3^(1/4
)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.28795, antiderivative size = 678, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{\sqrt{3}d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1024c^{17/6}}+\frac{d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1024c^{17/6}}-\frac{d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1024c^{17/6}}$$
$$-\frac{d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{56\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{224c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{d^{7/3}\sqrt{c+dx^3}}{112c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{d^2\sqrt{c+dx^3}}{112c^3x}-\frac{19d\sqrt{c+dx^3}}{1792c^2x^4}-\frac{\sqrt{c+dx^3}}{56cx^7}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^8*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(56*c*x^7) - (19*d*Sqrt[c + d*x^3])/(1792*c^2*x^
4) + (d^2*Sqrt[c + d*x^3])/(112*c^3*x) - (d^(7/3)*Sqrt[c + d*x^3]
)/(112*c^3*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (Sqrt[3]*d^(7/3
)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]
)/(1024*c^(17/6)) + (d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c
^(1/6)*Sqrt[c + d*x^3])])/(1024*c^(17/6)) - (d^(7/3)*ArcTanh[Sqrt
[c + d*x^3]/(3*Sqrt[c])])/(1024*c^(17/6)) + (3^(1/4)*Sqrt[2 - Sqr
t[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/
3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellipt
icE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(224*c^(8/3)*Sqrt[(c^(1/3)*(
c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt
[c + d*x^3]) - (d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(
1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sq
rt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(56*Sqrt[2]*3^(1/4
)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.0826, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{7}{3},-\frac{1}{2},1,-\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{56cx^7\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**8/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-7/3, -1/2, 1, -4/3, -d*x**3/c, d*x**3
/(8*c))/(56*c*x**7*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.534775, size = 378, normalized size = 0.56

$$\frac{-\frac{3250c^2d^3x^9F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{512cd^4x^{12}F_1\left(\frac{5}{3};\frac{1}{2},1\cdots\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},\cdots\right.\right.\right.}\cdots}{8960c^3x^7\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^8*(8*c - d*x^3)),x]
```

```
[Out] (-5*(32*c^3 + 51*c^2*d*x^3 + 3*c*d^2*x^6 - 16*d^3*x^9) - (3250*c^
2*d^3*x^9*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)]
)/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (
d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c),
 (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x
^3)/(8*c)]))) + (512*c*d^4*x^12*AppellF1[5/3, 1/2, 1, 8/3, -((d*x
^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1
, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2,
 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1,
11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(8960*c^3*x^7*Sqrt[c + d*x
^3])
```

Maple [C] time = 0.038, size = 2280, normalized size = 3.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^8/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-1/7*(d*x^3+c)^(1/2)/x^7-3/56*d*(d*x^3+c)^(1/2)/c/x^4+15/1
12*d^2*(d*x^3+c)^(1/2)/c^2/x+5/112*I*d^2/c^2*3^(1/2)*(-c*d^2)^(1/
3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/64*d/
c^2*(-1/4*(d*x^3+c)^(1/2)/x^4-3/8*d*(d*x^3+c)^(1/2)/c/x-1/8*I*d/c
*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2
)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/
3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(
-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3)))^(1/2))))+1/512*d^2/c^3*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*d^2
)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3
```

```
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-1/
512*d^3/c^3*(-2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(
1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Elli
pticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*
(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(
-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d
*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^
2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3)
)*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_
alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+
I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{dx^3 + c}}{(dx^3 - 8\,c)x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^8),x, algorithm="maxima")
```

```
[Out] -integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^8), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(-\frac{\sqrt{dx^3 + c}}{dx^{11} - 8\,cx^8}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^8),x, algorithm="fricas")
```

```
[Out] integral(-sqrt(d*x^3 + c)/(d*x^11 - 8*c*x^8), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**8/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\sqrt{dx^3 + c}}{(dx^3 - 8\,c)x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^8),x, algorithm="giac")
```

```
[Out] integrate(-sqrt(d*x^3 + c)/((d*x^3 - 8*c)*x^8), x)
```

3.295 $\int \frac{x^{11}(c+dx^3)^{3/2}}{8c-dx^3}\,dx$

Optimal. Leaf size=130

$$\frac{9216c^{9/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}-\frac{3072c^4\sqrt{c+dx^3}}{d^4}-\frac{1024c^3\left(c+dx^3\right)^{3/2}}{9d^4}-\frac{38c^2\left(c+dx^3\right)^{5/2}}{5d^4}-\frac{4c\left(c+dx^3\right)^{7/2}}{7d^4}-\frac{2\left(c+dx^3\right)^{9/2}}{27d^4}$$

```
[Out] (-3072*c^4*Sqrt[c + d*x^3])/d^4 - (1024*c^3*(c + d*x^3)^(3/2))/(9
*d^4) - (38*c^2*(c + d*x^3)^(5/2))/(5*d^4) - (4*c*(c + d*x^3)^(7/
2))/(7*d^4) - (2*(c + d*x^3)^(9/2))/(27*d^4) + (9216*c^(9/2)*ArcT
anh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^4
```

Rubi [A] time = 0.342433, antiderivative size = 130, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{9216c^{9/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}-\frac{3072c^4\sqrt{c+dx^3}}{d^4}-\frac{1024c^3\left(c+dx^3\right)^{3/2}}{9d^4}-\frac{38c^2\left(c+dx^3\right)^{5/2}}{5d^4}-\frac{4c\left(c+dx^3\right)^{7/2}}{7d^4}-\frac{2\left(c+dx^3\right)^{9/2}}{27d^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^11*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-3072*c^4*Sqrt[c + d*x^3])/d^4 - (1024*c^3*(c + d*x^3)^(3/2))/(9
*d^4) - (38*c^2*(c + d*x^3)^(5/2))/(5*d^4) - (4*c*(c + d*x^3)^(7/
2))/(7*d^4) - (2*(c + d*x^3)^(9/2))/(27*d^4) + (9216*c^(9/2)*ArcT
anh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^4
```

Rubi in Sympy [A] time = 36.6091, size = 122, normalized size = 0.94

$$\frac{9216c^{\frac{9}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}-\frac{3072c^4\sqrt{c+dx^3}}{d^4}-\frac{1024c^3\left(c+dx^3\right)^{\frac{3}{2}}}{9d^4}-\frac{38c^2\left(c+dx^3\right)^{\frac{5}{2}}}{5d^4}-\frac{4c\left(c+dx^3\right)^{\frac{7}{2}}}{7d^4}-\frac{2\left(c+dx^3\right)^{\frac{9}{2}}}{27d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] 9216*c**(9/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**4 - 3072*c**
4*sqrt(c + d*x**3)/d**4 - 1024*c**3*(c + d*x**3)**(3/2)/(9*d**4)
- 38*c**2*(c + d*x**3)**(5/2)/(5*d**4) - 4*c*(c + d*x**3)**(7/2)/
(7*d**4) - 2*(c + d*x**3)**(9/2)/(27*d**4)
```

Mathematica [A] time = 0.161684, size = 93, normalized size = 0.72

$$\frac{9216c^{9/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}-\frac{2\sqrt{c+dx^3}\left(1509176c^4+61892c^3dx^3+4611c^2d^2x^6+410cd^3x^9+35d^4x^{12}\right)}{945d^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^11*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3]*(1509176*c^4 + 61892*c^3*d*x^3 + 4611*c^2*d^2
*x^6 + 410*c*d^3*x^9 + 35*d^4*x^12))/(945*d^4) + (9216*c^(9/2)*Ar
cTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^4
```

Maple [C]   time = 0.07, size = 634, normalized size = 4.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11*(d*x^3+c)^(3/2)/(-d*x^3+8*c),x)
```

```
[Out] -1/d*(2/27*d*x^12*(d*x^3+c)^(1/2)+20/189*c*x^9*(d*x^3+c)^(1/2)+2/
315*c^2/d*x^6*(d*x^3+c)^(1/2)-8/945*c^3/d^2*x^3*(d*x^3+c)^(1/2)+1
6/945*c^4/d^3*(d*x^3+c)^(1/2))-8*c/d^2*(2/21*d*x^9*(d*x^3+c)^(1/2
)+16/105*c*x^6*(d*x^3+c)^(1/2)+2/105*c^2/d*x^3*(d*x^3+c)^(1/2)-4/
105*c^3/d^2*(d*x^3+c)^(1/2))-128/15*c^2*(d*x^3+c)^(5/2)/d^4-512*c
^3/d^3*(2/9*x^3*(d*x^3+c)^(1/2)+56/9*c*(d*x^3+c)^(1/2)/d+3*I*c/d^
3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2
)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/
2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d
+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-
(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^
(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^11/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A]   time = 0.253619, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2177280\,c^{\frac{9}{2}}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)-\left(35\,d^4x^{12}+410\,cd^3x^9+4611\,c^2d^2x^6+61892\,c^3dx^3+1509176\,c^4\right)\sqrt{dx^3+c}\right)}{945\,d^4},\ 2\left(\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^11/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] [2/945*(2177280*c^(9/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) +
10*c)/(d*x^3 - 8*c)) - (35*d^4*x^12 + 410*c*d^3*x^9 + 4611*c^2*d^
2*x^6 + 61892*c^3*d*x^3 + 1509176*c^4)*sqrt(d*x^3 + c))/d^4, 2/94
5*(4354560*sqrt(-c)*c^4*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (3
5*d^4*x^12 + 410*c*d^3*x^9 + 4611*c^2*d^2*x^6 + 61892*c^3*d*x^3 +
```

```
1509176*c^4)*sqrt(d*x^3 + c))/d^4]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217599, size = 158, normalized size = 1.22

$$-\frac{9216\,c^{5}\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}d^{4}}-\frac{2\left(35\left(dx^{3}+c\right)^{\frac{9}{2}}d^{32}+270\left(dx^{3}+c\right)^{\frac{7}{2}}cd^{32}+3591\left(dx^{3}+c\right)^{\frac{5}{2}}c^{2}d^{32}+53760\left(dx^{3}+c\right)^{\frac{3}{2}}c^{3}d^{32}+1451520\sqrt{dx^{3}+c}c^{4}d^{32}\right)}{945\,d^{36}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^11/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] -9216*c^5*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^4) - 2
/945*(35*(d*x^3 + c)^(9/2)*d^32 + 270*(d*x^3 + c)^(7/2)*c*d^32 +
3591*(d*x^3 + c)^(5/2)*c^2*d^32 + 53760*(d*x^3 + c)^(3/2)*c^3*d^3
2 + 1451520*sqrt(d*x^3 + c)*c^4*d^32)/d^36
```

3.296 $\int \frac{x^8(c+dx^3)^{3/2}}{8c-dx^3}\,dx$

Optimal. Leaf size=109

$$\frac{1152c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}-\frac{384c^3\sqrt{c+dx^3}}{d^3}-\frac{128c^2\left(c+dx^3\right)^{3/2}}{9d^3}-\frac{14c\left(c+dx^3\right)^{5/2}}{15d^3}-\frac{2\left(c+dx^3\right)^{7/2}}{21d^3}$$

```
[Out] (-384*c^3*Sqrt[c + d*x^3])/d^3 - (128*c^2*(c + d*x^3)^(3/2))/(9*d
^3) - (14*c*(c + d*x^3)^(5/2))/(15*d^3) - (2*(c + d*x^3)^(7/2))/(
21*d^3) + (1152*c^(7/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^3
```

Rubi [A] time = 0.322432, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{1152c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}-\frac{384c^3\sqrt{c+dx^3}}{d^3}-\frac{128c^2\left(c+dx^3\right)^{3/2}}{9d^3}-\frac{14c\left(c+dx^3\right)^{5/2}}{15d^3}-\frac{2\left(c+dx^3\right)^{7/2}}{21d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-384*c^3*Sqrt[c + d*x^3])/d^3 - (128*c^2*(c + d*x^3)^(3/2))/(9*d
^3) - (14*c*(c + d*x^3)^(5/2))/(15*d^3) - (2*(c + d*x^3)^(7/2))/(
21*d^3) + (1152*c^(7/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^3
```

Rubi in Sympy [A] time = 33.2412, size = 102, normalized size = 0.94

$$\frac{1152c^{\frac{7}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}-\frac{384c^3\sqrt{c+dx^3}}{d^3}-\frac{128c^2\left(c+dx^3\right)^{\frac{3}{2}}}{9d^3}-\frac{14c\left(c+dx^3\right)^{\frac{5}{2}}}{15d^3}-\frac{2\left(c+dx^3\right)^{\frac{7}{2}}}{21d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] 1152*c**(7/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**3 - 384*c**3
*sqrt(c + d*x**3)/d**3 - 128*c**2*(c + d*x**3)**(3/2)/(9*d**3) -
14*c*(c + d*x**3)**(5/2)/(15*d**3) - 2*(c + d*x**3)**(7/2)/(21*d*
*3)
```

Mathematica [A] time = 0.125944, size = 81, normalized size = 0.74

$$\frac{362880c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-2\sqrt{c+dx^3}\left(62882c^3+2579c^2dx^3+192cd^2x^6+15d^3x^9\right)}{315d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3]*(62882*c^3 + 2579*c^2*d*x^3 + 192*c*d^2*x^6 +
 15*d^3*x^9) + 362880*c^(7/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])
])/(315*d^3)
```

Maple [C] time = 0.016, size = 541, normalized size = 5.

$$-\frac{1}{d^2}\left(d\left(\frac{2\,dx^9}{21}\sqrt{dx^3+c}+\frac{16\,cx^6}{105}\sqrt{dx^3+c}+\frac{2\,c^2x^3}{105\,d}\sqrt{dx^3+c}-\frac{4\,c^3}{105\,d^2}\sqrt{dx^3+c}\right)+\frac{16\,c}{15\,d}\left(dx^3+c\right)^{\frac{5}{2}}\right)$$
$$-64\,\frac{c^2}{d^2}\left(2/9\,x^3\sqrt{dx^3+c}+\frac{56\,c\sqrt{dx^3+c}}{9\,d}+\frac{3\,ic\sqrt{2}}{d^3}\sum_{\_alpha=RootOf\left(\_Z^3d-8\,c\right)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\,\_alpha^2d^2-i\sqrt{3}\left(-\right.\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(3/2)/(-d*x^3+8*c),x)
```

```
[Out] -1/d^2*(d*(2/21*d*x^9*(d*x^3+c)^(1/2)+16/105*c*x^6*(d*x^3+c)^(1/2
)+2/105*c^2/d*x^3*(d*x^3+c)^(1/2)-4/105*c^3/d^2*(d*x^3+c)^(1/2))+
16/15*c/d*(d*x^3+c)^(5/2))-64*c^2/d^2*(2/9*x^3*(d*x^3+c)^(1/2)+56
/9*c*(d*x^3+c)^(1/2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*
I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)
^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1
/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*
(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)
^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/
3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alp
ha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootO
f(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^8/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.24195, size = 1, normalized size = 0.01

$$\left[\frac{2\left(90720\,c^{\frac{7}{2}}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)-\left(15\,d^3x^9+192\,cd^2x^6+2579\,c^2dx^3+62882\,c^3\right)\sqrt{dx^3+c}\right)}{315\,d^3},\ \frac{2\left(181440\,\sqrt{-c}c^3\arctan\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^8/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] [2/315*(90720*c^(7/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10
*c)/(d*x^3 - 8*c)) - (15*d^3*x^9 + 192*c*d^2*x^6 + 2579*c^2*d*x^3
 + 62882*c^3)*sqrt(d*x^3 + c))/d^3, 2/315*(181440*sqrt(-c)*c^3*ar
ctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (15*d^3*x^9 + 192*c*d^2*x^6
+ 2579*c^2*d*x^3 + 62882*c^3)*sqrt(d*x^3 + c))/d^3]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.215404, size = 135, normalized size = 1.24

$$-\frac{1152\,c^4\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}d^3}-\frac{2\left(15\,\left(dx^3+c\right)^{\frac{7}{2}}d^{18}+147\,\left(dx^3+c\right)^{\frac{5}{2}}cd^{18}+2240\,\left(dx^3+c\right)^{\frac{3}{2}}c^2d^{18}+60480\,\sqrt{dx^3+c}c^3d^{18}\right)}{315\,d^{21}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^8/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] -1152*c^4*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^3) - 2
/315*(15*(d*x^3 + c)^(7/2)*d^18 + 147*(d*x^3 + c)^(5/2)*c*d^18 +
2240*(d*x^3 + c)^(3/2)*c^2*d^18 + 60480*sqrt(d*x^3 + c)*c^3*d^18)
/d^21
```

3.297 $\int \frac{x^5(c+dx^3)^{3/2}}{8c-dx^3}\,dx$

Optimal. Leaf size=88

$$\frac{144c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}-\frac{48c^2\sqrt{c+dx^3}}{d^2}-\frac{16c\left(c+dx^3\right)^{3/2}}{9d^2}-\frac{2\left(c+dx^3\right)^{5/2}}{15d^2}$$

```
[Out] (-48*c^2*Sqrt[c + d*x^3])/d^2 - (16*c*(c + d*x^3)^(3/2))/(9*d^2)
- (2*(c + d*x^3)^(5/2))/(15*d^2) + (144*c^(5/2)*ArcTanh[Sqrt[c +
d*x^3]/(3*Sqrt[c])])/d^2
```

Rubi [A] time = 0.238437, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{144c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}-\frac{48c^2\sqrt{c+dx^3}}{d^2}-\frac{16c\left(c+dx^3\right)^{3/2}}{9d^2}-\frac{2\left(c+dx^3\right)^{5/2}}{15d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-48*c^2*Sqrt[c + d*x^3])/d^2 - (16*c*(c + d*x^3)^(3/2))/(9*d^2)
- (2*(c + d*x^3)^(5/2))/(15*d^2) + (144*c^(5/2)*ArcTanh[Sqrt[c +
d*x^3]/(3*Sqrt[c])])/d^2
```

Rubi in Sympy [A] time = 23.9017, size = 82, normalized size = 0.93

$$\frac{144c^{\frac{5}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}-\frac{48c^2\sqrt{c+dx^3}}{d^2}-\frac{16c\left(c+dx^3\right)^{\frac{3}{2}}}{9d^2}-\frac{2\left(c+dx^3\right)^{\frac{5}{2}}}{15d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] 144*c**(5/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**2 - 48*c**2*s
qrt(c + d*x**3)/d**2 - 16*c*(c + d*x**3)**(3/2)/(9*d**2) - 2*(c +
 d*x**3)**(5/2)/(15*d**2)
```

Mathematica [A] time = 0.0918991, size = 70, normalized size = 0.8

$$\frac{6480c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-2\sqrt{c+dx^3}\left(1123c^2+46cdx^3+3d^2x^6\right)}{45d^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3]*(1123*c^2 + 46*c*d*x^3 + 3*d^2*x^6) + 6480*c^
(5/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(45*d^2)
```

Maple [C] time = 0.012, size = 462, normalized size = 5.3

$$-\frac{2}{15 d^2}\left(dx^3+c\right)^{\frac{5}{2}}$$
$$-8\frac{c}{d}\left(2/9\,x^3\sqrt{dx^3+c}+\frac{56\,c\sqrt{dx^3+c}}{9\,d}+\frac{3\,ic\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d-8\,c)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\_alpha^2d^2-i\sqrt{3}\left(-ca\right.\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^3+c)^(3/2)/(-d*x^3+8*c),x)
```

```
[Out] -2/15*(d*x^3+c)^(5/2)/d^2-8*c/d*(2/9*x^3*(d*x^3+c)^(1/2)+56/9*c*(
d*x^3+c)^(1/2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2
*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3)
)^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-
c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)
+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^
2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)
-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(
I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(
1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c
*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3
*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^5/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.249533, size = 1, normalized size = 0.01

$$\left[\frac{2\left(1620\,c^{\frac{5}{2}}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)-\left(3\,d^2x^6+46\,cdx^3+1123\,c^2\right)\sqrt{dx^3+c}\right)}{45\,d^2},\frac{2\left(3240\sqrt{-c}c^2\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-\left(3\,d^2x^6+\right.\right.}{45\,d^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^5/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] [2/45*(1620*c^(5/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c
)/(d*x^3 - 8*c)) - (3*d^2*x^6 + 46*c*d*x^3 + 1123*c^2)*sqrt(d*x^3
 + c))/d^2, 2/45*(3240*sqrt(-c)*c^2*arctan(1/3*sqrt(d*x^3 + c)/sq
rt(-c)) - (3*d^2*x^6 + 46*c*d*x^3 + 1123*c^2)*sqrt(d*x^3 + c))/d^
2]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.213601, size = 112, normalized size = 1.27

$$-\frac{144\,c^3\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}d^2}-\frac{2\left(3\left(dx^3+c\right)^{\frac{5}{2}}d^8+40\left(dx^3+c\right)^{\frac{3}{2}}cd^8+1080\,\sqrt{dx^3+c}c^2d^8\right)}{45\,d^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^5/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] -144*c^3*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^2) - 2/
45*(3*(d*x^3 + c)^(5/2)*d^8 + 40*(d*x^3 + c)^(3/2)*c*d^8 + 1080*s
qrt(d*x^3 + c)*c^2*d^8)/d^10
```

3.298 $\int \frac{x^2(c+dx^3)^{3/2}}{8c-dx^3}\,dx$

Optimal. Leaf size=67

$$\frac{18c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}-\frac{6c\sqrt{c+dx^3}}{d}-\frac{2\left(c+dx^3\right)^{3/2}}{9d}$$

```
[Out] (-6*c*Sqrt[c + d*x^3])/d - (2*(c + d*x^3)^(3/2))/(9*d) + (18*c^(3
/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d
```

Rubi [A] time = 0.181104, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{18c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}-\frac{6c\sqrt{c+dx^3}}{d}-\frac{2\left(c+dx^3\right)^{3/2}}{9d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-6*c*Sqrt[c + d*x^3])/d - (2*(c + d*x^3)^(3/2))/(9*d) + (18*c^(3
/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d
```

Rubi in Sympy [A] time = 19.901, size = 56, normalized size = 0.84

$$\frac{18c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}-\frac{6c\sqrt{c+dx^3}}{d}-\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] 18*c**(3/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d - 6*c*sqrt(c +
d*x**3)/d - 2*(c + d*x**3)**(3/2)/(9*d)
```

Mathematica [A] time = 0.0787161, size = 58, normalized size = 0.87

$$\frac{162c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-2\sqrt{c+dx^3}\left(28c+dx^3\right)}{9d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-2*Sqrt[c + d*x^3]*(28*c + d*x^3) + 162*c^(3/2)*ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])])/(9*d)
```

Maple [C] time = 0.011, size = 441, normalized size = 6.6

$$-\frac{2x^3}{9}\sqrt{dx^3+c}-\frac{56c}{9d}\sqrt{dx^3+c}$$

$$-\frac{3ic\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d-8c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{\ldots}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(d*x^3+c)^(3/2)/(-d*x^3+8*c),x)
```

```
[Out] -2/9*x^3*(d*x^3+c)^(1/2)-56/9*c*(d*x^3+c)^(1/2)/d-3*I*c/d^3*2^(1/
2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3
)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3)
)/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(
2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3)
)^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alp
ha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2
)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d
*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3
^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)*x^2/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.245254, size = 1, normalized size = 0.01

$$\left[\frac{81\,c^{\frac{3}{2}}\log\left(\frac{dx^3+6\,\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)-2\,\left(dx^3+28\,c\right)\sqrt{dx^3+c}}{9\,d},\ \frac{2\,\left(81\,\sqrt{-c}c\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)-\left(dx^3+28\,c\right)\sqrt{dx^3+c}\right)}{9\,d}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)*x^2/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] [1/9*(81*c^(3/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c)/(
d*x^3 - 8*c)) - 2*(d*x^3 + 28*c)*sqrt(d*x^3 + c))/d, 2/9*(81*sqrt
(-c)*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (d*x^3 + 28*c)*sqrt
(d*x^3 + c))/d]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{cx^2\sqrt{c+dx^3}}{-8c+dx^3}\,dx-\int\frac{dx^5\sqrt{c+dx^3}}{-8c+dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] -Integral(c*x**2*sqrt(c + d*x**3)/(-8*c + d*x**3), x) - Integral(
d*x**5*sqrt(c + d*x**3)/(-8*c + d*x**3), x)
```

GIAC/XCAS [A] time = 0.217737, size = 88, normalized size = 1.31

$$-\frac{18\,c^2\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}d}-\frac{2\left(\left(dx^3+c\right)^{\frac{3}{2}}d^2+27\,\sqrt{dx^3+c}cd^2\right)}{9\,d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x^2/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] -18*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) - 2/9*(
(d*x^3 + c)^(3/2)*d^2 + 27*sqrt(d*x^3 + c)*c*d^2)/d^3
```

3.299 $\int \frac{(c+dx^3)^{3/2}}{x(8c-dx^3)}\,dx$

Optimal. Leaf size=73

$$-\frac{2}{3}\sqrt{c+dx^3}+\frac{9}{4}\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-\frac{1}{12}\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)$$

```
[Out] (-2*Sqrt[c + d*x^3])/3 + (9*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sq
rt[c])])/4 - (Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/12
```

Rubi [A] time = 0.274042, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$-\frac{2}{3}\sqrt{c+dx^3}+\frac{9}{4}\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-\frac{1}{12}\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(c + d*x^3)^(3/2)/(x*(8*c - d*x^3)),x]
```

```
[Out] (-2*Sqrt[c + d*x^3])/3 + (9*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sq
rt[c])])/4 - (Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/12
```

Rubi in Sympy [A] time = 35.6595, size = 63, normalized size = 0.86

$$\frac{9\sqrt{c}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{4}-\frac{\sqrt{c}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12}-\frac{2\sqrt{c+dx^3}}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((d*x**3+c)**(3/2)/x/(-d*x**3+8*c),x)
```

```
[Out] 9*sqrt(c)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/4 - sqrt(c)*atanh(s
qrt(c + d*x**3)/sqrt(c))/12 - 2*sqrt(c + d*x**3)/3
```

Mathematica [C] time = 0.292338, size = 319, normalized size = 4.37

$$\frac{2\left(\frac{240c^2dx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{5c^2dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\ldots\right)}{(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\ldots\right)\right)}\ldots\right)}{9\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(c + d*x^3)^(3/2)/(x*(8*c - d*x^3)),x]
```

```
[Out] (2*(-3*(c + d*x^3) + (240*c^2*d*x^3*AppellF1[1, 1/2, 1, 2, -((d*x
^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1,
2, -((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -
((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/
c), (d*x^3)/(8*c)]))) + (5*c^2*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -
(c/(d*x^3)), (8*c)/(d*x^3)])/((-8*c + d*x^3)*(5*d*x^3*AppellF1[3/
2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2,
 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2,
 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]))))/(9*Sqrt[c + d*x^3])
```

Maple [C] time = 0.03, size = 500, normalized size = 6.9

$$\frac{1}{8c}\left(\frac{2dx^3}{9}\sqrt{dx^3+c}+\frac{8c}{9}\sqrt{dx^3+c}-\frac{2}{3}c^{\frac{3}{2}}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\right)$$
$$-\frac{d}{8c}\left(\frac{2x^3}{9}\sqrt{dx^3+c}+\frac{56c}{9d}\sqrt{dx^3+c}+\frac{3ic\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(d\_Z^3-8c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(2/9*d*x^3*(d*x^3+c)^(1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(3/2
)*arctanh((d*x^3+c)^(1/2)/c^(1/2)))-1/8*d/c*(2/9*x^3*(d*x^3+c)^(1
/2)+56/9*c*(d*x^3+c)^(1/2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha
=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{\left(dx^3+c\right)^{\frac{3}{2}}}{(dx^3-8c)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x), x)
```

Fricas [A] time = 0.26347, size = 1, normalized size = 0.01

$$\left[\frac{9}{8}\sqrt{c}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)+\frac{1}{24}\sqrt{c}\log\left(\frac{dx^3-2\sqrt{dx^3+c}\sqrt{c}+2c}{x^3}\right)-\frac{2}{3}\sqrt{dx^3+c},-\frac{1}{12}\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)+\frac{9}{4}\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-\frac{2}{3}\sqrt{dx^3+c}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x),x, algorithm="fricas")
```

```
[Out] [9/8*sqrt(c)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c)/(d*x^
3 - 8*c)) + 1/24*sqrt(c)*log((d*x^3 - 2*sqrt(d*x^3 + c)*sqrt(c) +
 2*c)/x^3) - 2/3*sqrt(d*x^3 + c), -1/12*sqrt(-c)*arctan(sqrt(d*x^
3 + c)/sqrt(-c)) + 9/4*sqrt(-c)*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-
c)) - 2/3*sqrt(d*x^3 + c)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{c\sqrt{c+dx^3}}{-8cx+dx^4}\,dx - \int \frac{dx^3\sqrt{c+dx^3}}{-8cx+dx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x/(-d*x**3+8*c),x)
```

```
[Out] -Integral(c*sqrt(c + d*x**3)/(-8*c*x + d*x**4), x) - Integral(d*x
**3*sqrt(c + d*x**3)/(-8*c*x + d*x**4), x)
```

GIAC/XCAS [A] time = 0.221476, size = 82, normalized size = 1.12

$$\frac{c\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{12\sqrt{-c}} - \frac{9\,c\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{4\sqrt{-c}} - \frac{2}{3}\sqrt{dx^3+c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x),x, algorithm="giac")
```

```
[Out] 1/12*c*arctan(sqrt(d*x^3 + c)/sqrt(-c))/sqrt(-c) - 9/4*c*arctan(1
/3*sqrt(d*x^3 + c)/sqrt(-c))/sqrt(-c) - 2/3*sqrt(d*x^3 + c)
```

3.300 $\int \frac{(c+dx^3)^{3/2}}{x^4(8c-dx^3)}\,dx$

Optimal. Leaf size=78

$$-\frac{\sqrt{c+dx^3}}{24x^3}+\frac{9d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32\sqrt{c}}-\frac{13d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96\sqrt{c}}$$

```
[Out] -Sqrt[c + d*x^3]/(24*x^3) + (9*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])])/(32*Sqrt[c]) - (13*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(96*
Sqrt[c])
```

Rubi [A] time = 0.289311, antiderivative size = 78, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$-\frac{\sqrt{c+dx^3}}{24x^3}+\frac{9d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32\sqrt{c}}-\frac{13d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^4*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(24*x^3) + (9*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])])/(32*Sqrt[c]) - (13*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(96*
Sqrt[c])
```

Rubi in Sympy [A] time = 36.2769, size = 70, normalized size = 0.9

$$-\frac{\sqrt{c+dx^3}}{24x^3}+\frac{9d\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32\sqrt{c}}-\frac{13d\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**4/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)/(24*x**3) + 9*d*atanh(sqrt(c + d*x**3)/(3*sqrt(
c)))/(32*sqrt(c)) - 13*d*atanh(sqrt(c + d*x**3)/sqrt(c))/(96*sqrt
(c))
```

Mathematica [C] time = 0.278364, size = 322, normalized size = 4.13

$$\frac{\frac{408cd^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{130cd^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3}\right.}{(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\right.\right.}}{72x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^4*(8*c - d*x^3)),x]
```

```
[Out] (-3*(c + d*x^3) + (408*c*d^2*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)
/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2,
-((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d
*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c),
 (d*x^3)/(8*c)]))) + (130*c*d^2*x^6*AppellF1[3/2, 1/2, 1, 5/2, -(
c/(d*x^3)), (8*c)/(d*x^3)])/((-8*c + d*x^3)*(5*d*x^3*AppellF1[3/2
```

```
, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2,
1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2,
1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)])))/(72*x^3*Sqrt[c + d*x^3])
```

Maple [C] time = 0.037, size = 556, normalized size = 7.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^4/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-1/3*c*(d*x^3+c)^(1/2)/x^3+2/3*d*(d*x^3+c)^(1/2)-c^(1/2)*d
*arctanh((d*x^3+c)^(1/2)/c^(1/2)))+1/64*d/c^2*(2/9*d*x^3*(d*x^3+c
)^(1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(3/2)*arctanh((d*x^3+c)^(1/2)
/c^(1/2)))-1/64*d^2/c^2*(2/9*x^3*(d*x^3+c)^(1/2)+56/9*c*(d*x^3+c)
^(1/2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(
-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*
(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(
1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2
)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)
*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2
)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I
*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2
/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{\left(dx^3 - 8\,c\right)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^4),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^4), x)
```

Fricas [A] time = 0.254185, size = 1, normalized size = 0.01

$$\left[\frac{27\,dx^3\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right) + 13\,dx^3\log\left(\frac{\left(dx^3+2\,c\right)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right) - 8\,\sqrt{dx^3+c}\sqrt{c}}{192\,\sqrt{c}x^3},\right.$$
$$\left.-\frac{27\,dx^3\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right) - 13\,dx^3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right) + 4\,\sqrt{dx^3+c}\sqrt{-c}}{96\,\sqrt{-c}x^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/192*(27*d*x^3*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*
c)/(d*x^3 - 8*c)) + 13*d*x^3*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(
d*x^3 + c)*c)/x^3) - 8*sqrt(d*x^3 + c)*sqrt(c))/(sqrt(c)*x^3), -1
```

```
/96*(27*d*x^3*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 13*d*x^3*a
rctan(c/(sqrt(d*x^3 + c)*sqrt(-c))) + 4*sqrt(d*x^3 + c)*sqrt(-c))
/(sqrt(-c)*x^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x**4/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221783, size = 92, normalized size = 1.18

$$\frac{1}{96}\, d\left(\frac{13\, \arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}} - \frac{27\, \arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}} - \frac{4\sqrt{dx^3+c}}{dx^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^4),x, algorithm="giac")
```

```
[Out] 1/96*d*(13*arctan(sqrt(d*x^3 + c)/sqrt(-c))/sqrt(-c) - 27*arctan(
1/3*sqrt(d*x^3 + c)/sqrt(-c))/sqrt(-c) - 4*sqrt(d*x^3 + c)/(d*x^3
))
```

3.301 $\int \frac{(c+dx^3)^{3/2}}{x^7(8c-dx^3)}\,dx$

Optimal. Leaf size=104

$$\frac{9d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{256c^{3/2}}-\frac{37d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{768c^{3/2}}-\frac{11d\sqrt{c+dx^3}}{192cx^3}-\frac{\sqrt{c+dx^3}}{48x^6}$$

```
[Out] -Sqrt[c + d*x^3]/(48*x^6) - (11*d*Sqrt[c + d*x^3])/(192*c*x^3) +
(9*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(256*c^(3/2)) - (37*
d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(768*c^(3/2))
```

Rubi [A] time = 0.419337, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{9d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{256c^{3/2}}-\frac{37d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{768c^{3/2}}-\frac{11d\sqrt{c+dx^3}}{192cx^3}-\frac{\sqrt{c+dx^3}}{48x^6}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^7*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(48*x^6) - (11*d*Sqrt[c + d*x^3])/(192*c*x^3) +
(9*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(256*c^(3/2)) - (37*
d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(768*c^(3/2))
```

Rubi in Sympy [A] time = 54.5681, size = 94, normalized size = 0.9

$$-\frac{\sqrt{c+dx^3}}{48x^6}-\frac{11d\sqrt{c+dx^3}}{192cx^3}+\frac{9d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{256c^{\frac{3}{2}}}-\frac{37d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{768c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**7/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)/(48*x**6) - 11*d*sqrt(c + d*x**3)/(192*c*x**3)
+ 9*d**2*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(256*c**(3/2)) - 37*
d**2*atanh(sqrt(c + d*x**3)/sqrt(c))/(768*c**(3/2))
```

Mathematica [C] time = 0.327822, size = 332, normalized size = 3.19

$$\frac{\frac{132d^3x^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{185d^3x^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\ldots\right.}{(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\ldots\right.\right.}}{288\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^7*(8*c - d*x^3)),x]
```

```
[Out] ((-33*d^2)/(2*c) - (6*c)/x^6 - (45*d)/(2*x^3) + (132*d^3*x^3*Appe
llF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(
16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*
(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1
[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (185*d^3*x^3*App
ellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/((-8*c + d*
```

```
x^3)*(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x
^3)] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3
)] - c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]))
/(288*Sqrt[c + d*x^3])
```

Maple [C] time = 0.038, size = 617, normalized size = 5.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x^3+c)^(3/2)/x^7/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-1/6*c*(d*x^3+c)^(1/2)/x^6-5/12*d*(d*x^3+c)^(1/2)/x^3-1/4*
d^2*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(1/2))+1/64*d/c^2*(-1/3*c*
(d*x^3+c)^(1/2)/x^3+2/3*d*(d*x^3+c)^(1/2)-c^(1/2)*d*arctanh((d*x^
3+c)^(1/2)/c^(1/2)))+1/512*d^2/c^3*(2/9*d*x^3*(d*x^3+c)^(1/2)+8/9
*c*(d*x^3+c)^(1/2)-2/3*c^(3/2)*arctanh((d*x^3+c)^(1/2)/c^(1/2)))-
1/512*d^3/c^3*(2/9*x^3*(d*x^3+c)^(1/2)+56/9*c*(d*x^3+c)^(1/2)/d+3
*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{\left(dx^3 - 8\,c\right)x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^7),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^7), x)
```

Fricas [A] time = 0.254815, size = 1, normalized size = 0.01

$$\left[\frac{27\,d^2x^6\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right) + 37\,d^2x^6\log\left(\frac{(dx^3+2\,c)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right) - 8\left(11\,dx^3+4\,c\right)\sqrt{dx^3+c}\sqrt{c}}{1536\,c^{\frac{3}{2}}x^6}, -\frac{27\,d^2x^6\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right) - 37\,d^2x^6\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right) + 4\left(11\,dx^3+4\,c\right)\sqrt{dx^3+c}\sqrt{-c}}{768\,\sqrt{-c}cx^6}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^7),x, algorithm="fricas")
```

```
[Out] [1/1536*(27*d^2*x^6*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 +
c)*c)/(d*x^3 - 8*c)) + 37*d^2*x^6*log(((d*x^3 + 2*c)*sqrt(c) - 2*
```

```
sqrt(d*x^3 + c)*c)/x^3) - 8*(11*d*x^3 + 4*c)*sqrt(d*x^3 + c)*sqrt
(c))/(c^(3/2)*x^6), -1/768*(27*d^2*x^6*arctan(3*c/(sqrt(d*x^3 + c
)*sqrt(-c))) - 37*d^2*x^6*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))) +
4*(11*d*x^3 + 4*c)*sqrt(d*x^3 + c)*sqrt(-c))/(sqrt(-c)*c*x^6)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x**7/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221336, size = 127, normalized size = 1.22

$$\frac{1}{768}\,d^2\left(\frac{37\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c}-\frac{27\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c}-\frac{4\left(11\left(dx^3+c\right)^{\frac{3}{2}}-7\,\sqrt{dx^3+c}c\right)}{cd^2x^6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^7),x, algorithm="giac")
```

```
[Out] 1/768*d^2*(37*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 27*
arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 4*(11*(d*x^3
+ c)^(3/2) - 7*sqrt(d*x^3 + c)*c)/(c*d^2*x^6))
```

3.302 $\int \frac{x^7 (c+dx^3)^{3/2}}{8c-dx^3} \, dx$

Optimal. Leaf size=669

$$-\frac{288\sqrt{3}c^{19/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{8/3}}+\frac{288c^{19/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{8/3}}-\frac{288c^{19/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{8/3}}-\frac{698216\sqrt{2}3^{3/4}c^{10/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1729d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{1047324\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{10/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1729d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2094648c^3\sqrt{c+dx^3}}{1729d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{36534c^2x^2\sqrt{c+dx^3}}{1729d^2}-\frac{2}{19}x^8\sqrt{c+dx^3}-\frac{348cx^5\sqrt{c+dx^3}}{247d}$$

```
[Out] (-36534*c^2*x^2*Sqrt[c + d*x^3])/(1729*d^2) - (348*c*x^5*Sqrt[c +
 d*x^3])/(247*d) - (2*x^8*Sqrt[c + d*x^3])/19 - (2094648*c^3*Sqrt
[c + d*x^3])/(1729*d^(8/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) -
 (288*Sqrt[3]*c^(19/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)
*x))/Sqrt[c + d*x^3]])/d^(8/3) + (288*c^(19/6)*ArcTanh[(c^(1/3) +
 d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/d^(8/3) - (288*c^(19/
6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(8/3) + (1047324*3^(1/
4)*Sqrt[2 - Sqrt[3]]*c^(10/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3)
 - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(1729*d^(8/3
)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (698216*Sqrt[2]*3^(3/4)*c^(10/3)*
(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)
*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1
 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)], -7 - 4*Sqrt[3]])/(1729*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(
1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.29478, antiderivative size = 669, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{288\sqrt{3}c^{19/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{8/3}}+\frac{288c^{19/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{8/3}}-\frac{288c^{19/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{8/3}}-\frac{698216\sqrt{2}3^{3/4}c^{10/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1729d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{1047324\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{10/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1729d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2094648c^3\sqrt{c+dx^3}}{1729d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{36534c^2x^2\sqrt{c+dx^3}}{1729d^2}-\frac{2}{19}x^8\sqrt{c+dx^3}-\frac{348cx^5\sqrt{c+dx^3}}{247d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^7*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-36534*c^2*x^2*Sqrt[c + d*x^3])/(1729*d^2) - (348*c*x^5*Sqrt[c +
 d*x^3])/(247*d) - (2*x^8*Sqrt[c + d*x^3])/19 - (2094648*c^3*Sqrt
[c + d*x^3])/(1729*d^(8/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) -
 (288*Sqrt[3]*c^(19/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)
*x))/Sqrt[c + d*x^3]])/d^(8/3) + (288*c^(19/6)*ArcTanh[(c^(1/3) +
 d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/d^(8/3) - (288*c^(19/
6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(8/3) + (1047324*3^(1/
4)*Sqrt[2 - Sqrt[3]]*c^(10/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3)
 - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(1729*d^(8/3
)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (698216*Sqrt[2]*3^(3/4)*c^(10/3)*
(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)
*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1
 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)], -7 - 4*Sqrt[3]])/(1729*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(
1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 24.6962, size = 49, normalized size = 0.07

$$\frac{x^8\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{8}{3},-\frac{3}{2},1,\frac{11}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] x**8*sqrt(c + d*x**3)*appellf1(8/3, -3/2, 1, 11/3, -d*x**3/c, d*x
**3/(8*c))/(64*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.364807, size = 371, normalized size = 0.55

$$\frac{2x^2\left(\frac{29227200c^5F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{d^2(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{33514368c^4x^3\cdots}{d(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4\cdots\right.\right.}\right.}{8645\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^7*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (2*x^2*((-91335*c^3)/d^2 - (97425*c^2*x^3)/d - 6545*c*x^6 - 455*d
*x^9 + (29227200*c^5*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*
x^3)/(8*c)])/(d^2*(8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3,
-((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3
, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((
d*x^3)/c), (d*x^3)/(8*c)]))) + (33514368*c^4*x^3*AppellF1[5/3, 1/
2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(d*(8*c - d*x^3)*(64*c*A
ppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*
(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*App
ellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])))))/(8645*
Sqrt[c + d*x^3])
```

Maple [C] time = 0.068, size = 1840, normalized size = 2.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(d*x^3+c)^(3/2)/(-d*x^3+8*c),x)
```

```
[Out] -1/d^2*(d*(2/19*d*x^8*(d*x^3+c)^(1/2)+44/247*c*x^5*(d*x^3+c)^(1/2
)+54/1729*c^2/d*x^2*(d*x^3+c)^(1/2)+72/1729*I*c^3/d^2*3^(1/2)*(-c
*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x
+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF
(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))
)+8*c*(2/13*x^5*d*(d*x^3+c)^(1/2)+32/91*c*x^2*(d*x^3+c)^(1/2)-18/
91*I*c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-
c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)))))-64*c^2/d^2*(2/7*x^2*(d*x^3+c)^(1/2)-44/7
*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(
-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/
2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^
```

```
2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/
2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)))+3*I*c/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*
(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c
*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I
*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c
*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2
)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c
*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2
)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3
*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=
RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x^7}{dx^3-8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**7*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\left(dx^3+c\right)^{\frac{3}{2}}x^7}{dx^3-8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] integrate(-(d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c), x)
```

3.303 $\int \frac{x^4\left(c+dx^3\right)^{3/2}}{8c-dx^3}\,dx$

Optimal. Leaf size=645

$$-\frac{36\sqrt{3}c^{13/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{5/3}}+\frac{36c^{13/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{5/3}}-\frac{36c^{13/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{5/3}}-\frac{4594\sqrt{2}3^{3/4}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{91d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{6891\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{91d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{13782c^2\sqrt{c+dx^3}}{91d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2}{13}x^5\sqrt{c+dx^3}-\frac{240cx^2\sqrt{c+dx^3}}{91d}$$

```
[Out] (-240*c*x^2*Sqrt[c + d*x^3])/(91*d) - (2*x^5*Sqrt[c + d*x^3])/13
- (13782*c^2*Sqrt[c + d*x^3])/(91*d^(5/3)*((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)) - (36*Sqrt[3]*c^(13/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(
1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(5/3) + (36*c^(13/6)*ArcTa
nh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/d^(5/3)
- (36*c^(13/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(5/3) + (6
891*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[
(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3
) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/
3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(91*
d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (4594*Sqrt[2]*3^(3/4)*c^(7/
3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2
/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[
((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)], -7 - 4*Sqrt[3]])/(91*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^
(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.98098, antiderivative size = 645, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{36\sqrt{3}c^{13/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{5/3}}+\frac{36c^{13/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{5/3}}-\frac{36c^{13/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{5/3}}-\frac{4594\sqrt{2}3^{3/4}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{91d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{6891\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{91d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{13782c^2\sqrt{c+dx^3}}{91d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2}{13}x^5\sqrt{c+dx^3}-\frac{240cx^2\sqrt{c+dx^3}}{91d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-240*c*x^2*Sqrt[c + d*x^3])/(91*d) - (2*x^5*Sqrt[c + d*x^3])/13
- (13782*c^2*Sqrt[c + d*x^3])/(91*d^(5/3)*((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)) - (36*Sqrt[3]*c^(13/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(
1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(5/3) + (36*c^(13/6)*ArcTa
nh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/d^(5/3)
- (36*c^(13/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(5/3) + (6
891*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[
(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3
) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/
3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(91*
d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (4594*Sqrt[2]*3^(3/4)*c^(7/
3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2
/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[
((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)], -7 - 4*Sqrt[3]])/(91*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^
(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 24.699, size = 49, normalized size = 0.08

$$\frac{x^5\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{5}{3},-\frac{3}{2},1,\frac{8}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{40\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] x**5*sqrt(c + d*x**3)*appellf1(5/3, -3/2, 1, 8/3, -d*x**3/c, d*x*
*3/(8*c))/(40*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.328991, size = 357, normalized size = 0.55

$$\frac{2x^2\left(\frac{192000c^4F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{d(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{220512c^3x^3F_1}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\right.\right.}\right.}{455\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (2*x^2*((-600*c^2)/d - 635*c*x^3 - 35*d*x^6 + (192000*c^4*AppellF
1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(d*(8*c - d*x^3
)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] +
 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]
 - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) +
 (220512*c^3*x^3*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)
/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3
)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*
x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)
/c), (d*x^3)/(8*c)])))))/(455*Sqrt[c + d*x^3])
```

Maple [C] time = 0.013, size = 1344, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(d*x^3+c)^(3/2)/(-d*x^3+8*c),x)
```

```
[Out] -1/d*(2/13*x^5*d*(d*x^3+c)^(1/2)+32/91*c*x^2*(d*x^3+c)^(1/2)-18/9
1*I*c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/
d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c
*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2))))-8*c/d*(2/7*x^2*(d*x^3+c)^(1/2)-44/7*I*c*3^
(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)
^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3
)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)))+3*I*c/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*
d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(
1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2
)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-
c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(
2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/
2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)
*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha
*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(
```

```
_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{(dx^3+c)^{\frac{3}{2}}x^4}{dx^3-8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{(dx^7+cx^4)\sqrt{dx^3+c}}{dx^3-8\,c},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] integral(-(d*x^7 + c*x^4)*sqrt(d*x^3 + c)/(d*x^3 - 8*c), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{(dx^3+c)^{\frac{3}{2}}x^4}{dx^3-8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] integrate(-(d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c), x)
```

3.304 $\int \frac{x(c+dx^3)^{3/2}}{8c-dx^3}\,dx$

Optimal. Leaf size=627

$$-\frac{9\sqrt{3}c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{2d^{2/3}}+\frac{9c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{2d^{2/3}}-\frac{9c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2d^{2/3}}-\frac{44\sqrt{2}3^{3/4}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{66\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{132c\sqrt{c+dx^3}}{7d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2}{7}x^2\sqrt{c+dx^3}$$

```
[Out] (-2*x^2*Sqrt[c + d*x^3])/7 - (132*c*Sqrt[c + d*x^3])/(7*d^(2/3)*(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (9*Sqrt[3]*c^(7/6)*ArcTan[(
Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(2*d^(2/
3)) + (9*c^(7/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[
c + d*x^3])])/(2*d^(2/3)) - (9*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/(3
*Sqrt[c])])/(2*d^(2/3)) + (66*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(4/3)*(
c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*
x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1
- Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)], -7 - 4*Sqrt[3]])/(7*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)
*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (4
4*Sqrt[2]*3^(3/4)*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*d^(2/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.66212, antiderivative size = 627, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.52$

$$-\frac{9\sqrt{3}c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{2d^{2/3}}+\frac{9c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{2d^{2/3}}-\frac{9c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2d^{2/3}}-\frac{44\sqrt{2}3^{3/4}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{66\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{132c\sqrt{c+dx^3}}{7d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2}{7}x^2\sqrt{c+dx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (-2*x^2*Sqrt[c + d*x^3])/7 - (132*c*Sqrt[c + d*x^3])/(7*d^(2/3)*(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (9*Sqrt[3]*c^(7/6)*ArcTan[(
Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(2*d^(2/
3)) + (9*c^(7/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[
c + d*x^3])])/(2*d^(2/3)) - (9*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/(3
*Sqrt[c])])/(2*d^(2/3)) + (66*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(4/3)*(
c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*
x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1
- Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)], -7 - 4*Sqrt[3]])/(7*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)
*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (4
4*Sqrt[2]*3^(3/4)*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*d^(2/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 20.2749, size = 49, normalized size = 0.08

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},-\frac{3}{2},1,\frac{5}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{16\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, -3/2, 1, 5/3, -d*x**3/c, d*x*
*3/(8*c))/(16*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.289757, size = 344, normalized size = 0.55

$$\frac{2x^2\left(\frac{1950c^3F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{2112c^2dx^3F_1\left(\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\right.\right.\right.}\right.}{35\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*(c + d*x^3)^(3/2))/(8*c - d*x^3),x]
```

```
[Out] (2*x^2*(-5*(c + d*x^3) + (1950*c^3*AppellF1[2/3, 1/2, 1, 5/3, -((
d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2
, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1
/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1
, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (2112*c^2*d*x^3*AppellF1
[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(
64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*
d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] -
 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])))))/
(35*Sqrt[c + d*x^3])
```

Maple [C] time = 0.011, size = 864, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(3/2)/(-d*x^3+8*c),x)
```

```
[Out] -2/7*x^2*(d*x^3+c)^(1/2)+44/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-3*I*c/d^3*2^(1/2)
*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2
)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/
2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d
+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-
(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^
(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x}{dx^3-8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{\left(dx^4 + cx\right)\sqrt{dx^3 + c}}{dx^3 - 8\,c}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c),x, algorithm="fricas")
```

```
[Out] integral(-(d*x^4 + c*x)*sqrt(d*x^3 + c)/(d*x^3 - 8*c), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{cx\sqrt{c + dx^3}}{-8c + dx^3}\,dx - \int \frac{dx^4\sqrt{c + dx^3}}{-8c + dx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**3+c)**(3/2)/(-d*x**3+8*c),x)
```

```
[Out] -Integral(c*x*sqrt(c + d*x**3)/(-8*c + d*x**3), x) - Integral(d*x
**4*sqrt(c + d*x**3)/(-8*c + d*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\left(dx^3 + c\right)^{\frac{3}{2}}x}{dx^3 - 8\,c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c),x, algorithm="giac")
```

```
[Out] integrate(-(d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c), x)
```

3.305 $\int \frac{(c+dx^3)^{3/2}}{x^2(8c-dx^3)}\,dx$

Optimal. Leaf size=626

$$-\frac{5\,3^{3/4}\sqrt[3]{c}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{15\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt{c+dx^3}}{8x}-\frac{15\sqrt[3]{d}\sqrt{c+dx^3}}{8\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$
$$-\frac{9}{16}\sqrt{3}\sqrt[6]{c}\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)+\frac{9}{16}\sqrt[6]{c}\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)-\frac{9}{16}\sqrt[6]{c}\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)$$

```
[Out] -Sqrt[c + d*x^3]/(8*x) - (15*d^(1/3)*Sqrt[c + d*x^3])/(8*((1 + Sq
rt[3])*c^(1/3) + d^(1/3)*x)) - (9*Sqrt[3]*c^(1/6)*d^(1/3)*ArcTan[
(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/16 + (9
*c^(1/6)*d^(1/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[
c + d*x^3])])/16 - (9*c^(1/6)*d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*
Sqrt[c])])/16 + (15*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(1/3)*d^(1/3)*(c^
(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^
2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 -
Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
], -7 - 4*Sqrt[3]])/(16*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (5*3^(3/4)*
c^(1/3)*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(
1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Elli
pticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(4*Sqrt[2]*Sqrt[(c^(1/3)*(
c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt
[c + d*x^3])
```

Rubi [A] time = 1.67728, antiderivative size = 626, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$-\frac{5\, 3^{3/4} \sqrt[3]{c} \sqrt[3]{d} \left(\sqrt[3]{c}+\sqrt[3]{d} x\right) \sqrt{\frac{c^{2/3}-\sqrt[3]{c} \sqrt[3]{d} x+d^{2/3} x^2}{\left(\left(1+\sqrt{3}\right) \sqrt[3]{c}+\sqrt[3]{d} x\right)^2}} F\left(\sin^{-1}\left(\frac{\sqrt[3]{d} x+\left(1-\sqrt{3}\right) \sqrt[3]{c}}{\sqrt[3]{d} x+\left(1+\sqrt{3}\right) \sqrt[3]{c}}\right)|-7-4 \sqrt{3}\right)}{4 \sqrt{2} \sqrt{\frac{\sqrt[3]{c} \left(\sqrt[3]{c}+\sqrt[3]{d} x\right)}{\left(\left(1+\sqrt{3}\right) \sqrt[3]{c}+\sqrt[3]{d} x\right)^2}} \sqrt{c+d x^3}}$$
$$+\frac{15 \sqrt[4]{3} \sqrt{2-\sqrt{3}} \sqrt[3]{c} \sqrt[3]{d} \left(\sqrt[3]{c}+\sqrt[3]{d} x\right) \sqrt{\frac{c^{2/3}-\sqrt[3]{c} \sqrt[3]{d} x+d^{2/3} x^2}{\left(\left(1+\sqrt{3}\right) \sqrt[3]{c}+\sqrt[3]{d} x\right)^2}} E\left(\sin^{-1}\left(\frac{\sqrt[3]{d} x+\left(1-\sqrt{3}\right) \sqrt[3]{c}}{\sqrt[3]{d} x+\left(1+\sqrt{3}\right) \sqrt[3]{c}}\right)|-7-4 \sqrt{3}\right)}{16 \sqrt{\frac{\sqrt[3]{c} \left(\sqrt[3]{c}+\sqrt[3]{d} x\right)}{\left(\left(1+\sqrt{3}\right) \sqrt[3]{c}+\sqrt[3]{d} x\right)^2}} \sqrt{c+d x^3}}$$
$$-\frac{\sqrt{c+d x^3}}{8 x}-\frac{15 \sqrt[3]{d} \sqrt{c+d x^3}}{8 \left(\left(1+\sqrt{3}\right) \sqrt[3]{c}+\sqrt[3]{d} x\right)}$$
$$-\frac{9}{16} \sqrt{3} \sqrt[6]{c} \sqrt[3]{d} \tan^{-1}\left(\frac{\sqrt{3} \sqrt[6]{c} \left(\sqrt[3]{c}+\sqrt[3]{d} x\right)}{\sqrt{c+d x^3}}\right)+\frac{9}{16} \sqrt[6]{c} \sqrt[3]{d} \tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d} x\right)^2}{3 \sqrt[6]{c} \sqrt{c+d x^3}}\right)-\frac{9}{16} \sqrt[6]{c} \sqrt[3]{d} \tanh^{-1}\left(\frac{\sqrt{c+d x^3}}{3 \sqrt{c}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^2*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(8*x) - (15*d^(1/3)*Sqrt[c + d*x^3])/(8*((1 + Sq
rt[3])*c^(1/3) + d^(1/3)*x)) - (9*Sqrt[3]*c^(1/6)*d^(1/3)*ArcTan[
(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/16 + (9
*c^(1/6)*d^(1/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[
c + d*x^3])])/16 - (9*c^(1/6)*d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*
Sqrt[c])])/16 + (15*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(1/3)*d^(1/3)*(c^
(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^
2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 -
Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
], -7 - 4*Sqrt[3]])/(16*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (5*3^(3/4)*
c^(1/3)*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(
1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Elli
pticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(4*Sqrt[2]*Sqrt[(c^(1/3)*(
c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt
[c + d*x^3])
```

Rubi in Sympy [A] time = 26.0302, size = 51, normalized size = 0.08

$$-\frac{\sqrt{c+d x^3}\, \operatorname{appellf_1}\left(-\frac{1}{3},-\frac{3}{2},1,\frac{2}{3},-\frac{d x^3}{c},\frac{d x^3}{8 c}\right)}{8 x \sqrt{1+\frac{d x^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**2/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, -3/2, 1, 2/3, -d*x**3/c, d*x**3/
(8*c))/(8*x*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.276136, size = 348, normalized size = 0.56

$$\frac{\frac{420 c^2 d x^3 F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{d x^3}{c},\frac{d x^3}{8 c}\right)}{\left(8 c-d x^3\right) \left(3 d x^3 \left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{d x^3}{c},\frac{d x^3}{8 c}\right)-4 F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{d x^3}{c},\frac{d x^3}{8 c}\right)\right)+40 c F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{d x^3}{c},\frac{d x^3}{8 c}\right)\right)}+\frac{96 c d^2 x^6 F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};\ldots\right.}{\left(8 c-d x^3\right) \left(3 d x^3 \left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{d x^3}{c},\frac{d x^3}{8 c}\right)-4 F_1\left(\frac{8}{3};\frac{3}{2},1;\ldots\right.\right.\right.}}{8 x \sqrt{c+d x^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^2*(8*c - d*x^3)),x]
```

```
[Out] (-c - d*x^3 + (420*c^2*d*x^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)
/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5
/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2,
 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3,
 -((d*x^3)/c), (d*x^3)/(8*c)]))) + (96*c*d^2*x^6*AppellF1[5/3, 1/
2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*App
ellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(A
ppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*Appel
lF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(8*x*Sqrt
[c + d*x^3])
```

Maple [C] time = 0.035, size = 1339, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^2/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-c*(d*x^3+c)^(1/2)/x+2/7*d*x^2*(d*x^3+c)^(1/2)-9/7*I*c*3^(
1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1
/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*E
llipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2))))-1/8*d/c*(2/7*x^2*(d*x^3+c)^(1/2)-44/7*I*c*3^(1/2)/d*(-c
*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x
+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF
(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))
+3*I*c/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*
(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^
(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3
)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^
2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{(dx^3 - 8\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^2),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{c\sqrt{c + dx^3}}{-8cx^2 + dx^5}\,dx - \int \frac{dx^3\sqrt{c + dx^3}}{-8cx^2 + dx^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x**2/(-d*x**3+8*c),x)
```

```
[Out] -Integral(c*sqrt(c + d*x**3)/(-8*c*x**2 + d*x**5), x) - Integral(
d*x**3*sqrt(c + d*x**3)/(-8*c*x**2 + d*x**5), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{(dx^3 - 8\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^2), x)
```

3.306 $\int \frac{(c+dx^3)^{3/2}}{x^5(8c-dx^3)}\,dx$

Optimal. Leaf size=651

$$-\frac{9\sqrt{3}d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{128c^{5/6}}+\frac{9d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{128c^{5/6}}-\frac{9d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{128c^{5/6}}$$
$$+\frac{3^{3/4}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{8\sqrt{2}c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{32c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{3d^{4/3}\sqrt{c+dx^3}}{16c\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{3d\sqrt{c+dx^3}}{16cx}-\frac{\sqrt{c+dx^3}}{32x^4}$$

```
[Out] -Sqrt[c + d*x^3]/(32*x^4) - (3*d*Sqrt[c + d*x^3])/(16*c*x) + (3*d
^(4/3)*Sqrt[c + d*x^3])/(16*c*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) - (9*Sqrt[3]*d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)
*x))/Sqrt[c + d*x^3]])/(128*c^(5/6)) + (9*d^(4/3)*ArcTanh[(c^(1/3
) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(128*c^(5/6)) - (9
*d^(4/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(128*c^(5/6)) - (3
*3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^
(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*
x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32*c^(
2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (3^(3/4)*d^(4/3)*(c^(1/3) + d^
(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c
^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*
Sqrt[3]])/(8*Sqrt[2]*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))
/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.9875, antiderivative size = 651, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{9\sqrt{3}d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{128c^{5/6}}+\frac{9d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{128c^{5/6}}-\frac{9d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{128c^{5/6}}+\frac{3^{3/4}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8\sqrt{2}c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{3d^{4/3}\sqrt{c+dx^3}}{16c\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{3d\sqrt{c+dx^3}}{16cx}-\frac{\sqrt{c+dx^3}}{32x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^5*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(32*x^4) - (3*d*Sqrt[c + d*x^3])/(16*c*x) + (3*d
^(4/3)*Sqrt[c + d*x^3])/(16*c*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) - (9*Sqrt[3]*d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)
*x))/Sqrt[c + d*x^3]])/(128*c^(5/6)) + (9*d^(4/3)*ArcTanh[(c^(1/3
) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(128*c^(5/6)) - (9
*d^(4/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(128*c^(5/6)) - (3
*3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^
(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*
x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32*c^(
2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (3^(3/4)*d^(4/3)*(c^(1/3) + d^
(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c
^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*
Sqrt[3]])/(8*Sqrt[2]*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))
/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.2599, size = 54, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{4}{3},-\frac{3}{2},1,-\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{32x^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**5/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-4/3, -3/2, 1, -1/3, -d*x**3/c, d*x**3
/(8*c))/(32*x**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.403511, size = 363, normalized size = 0.56

$$\frac{\frac{96d^3x^5F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{3225cd^2x^2F_1\left(\frac{2}{3};\frac{1}{2},1;\cdots\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\cdots\right.\right.\right.}}{80\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^5*(8*c - d*x^3)),x]
```

```
[Out] ((-5*(c^2 + 7*c*d*x^3 + 6*d^2*x^6))/(2*c*x^4) + (3225*c*d^2*x^2*A
ppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d
*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c
)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8
*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])
)) + (96*d^3*x^5*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)
/(8*c)])/((-8*c + d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^
3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d
*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3
)/c), (d*x^3)/(8*c)]))))/(80*Sqrt[c + d*x^3])
```

Maple [C] time = 0.038, size = 1810, normalized size = 2.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^5/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-1/4*c*(d*x^3+c)^(1/2)/x^4-11/8*d*(d*x^3+c)^(1/2)/x-9/8*I*
d*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^
2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1
/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2))))+1/64*d/c^2*(-c*(d*x^3+c)^(1/2)/x+2/7*d*x^2*(d*x^3+
c)^(1/2)-9/7*I*c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*
((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE
(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+
1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2))))-1/64*d^2/c^2*(2/7*x^2*(d*x^3+c)^(1/
2)-44/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((
x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d
*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(
```

```
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3)))^(1/2))+3*I*c/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)
^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^
(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1
/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+
c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1
/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipt
icPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*
(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2
)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),
_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(dx^3-8\,c\right)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^5),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{\left(dx^3+c\right)^{\frac{3}{2}}}{dx^8-8\,cx^5},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^5),x, algorithm="fricas")
```

```
[Out] integral(-(d*x^3 + c)^(3/2)/(d*x^8 - 8*c*x^5), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x**5/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(dx^3-8\,c\right)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^5),x, algorithm="giac")
```

```
[Out] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^5), x)
```

3.307 $\int \frac{(c+dx^3)^{3/2}}{x^8(8c-dx^3)}\,dx$

Optimal. Leaf size=675

$$-\frac{9\sqrt{3}d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1024c^{11/6}}+\frac{9d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1024c^{11/6}}-\frac{9d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1024c^{11/6}}$$
$$+\frac{3^{3/4}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{28\sqrt{2}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{112c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{3d^{7/3}\sqrt{c+dx^3}}{56c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{3d^2\sqrt{c+dx^3}}{56c^2x}-\frac{\sqrt{c+dx^3}}{56x^7}-\frac{75d\sqrt{c+dx^3}}{1792cx^4}$$

```
[Out] -Sqrt[c + d*x^3]/(56*x^7) - (75*d*Sqrt[c + d*x^3])/(1792*c*x^4) -
 (3*d^2*Sqrt[c + d*x^3])/(56*c^2*x) + (3*d^(7/3)*Sqrt[c + d*x^3])
/(56*c^2*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (9*Sqrt[3]*d^(7/3
)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]
)/(1024*c^(11/6)) + (9*d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3
*c^(1/6)*Sqrt[c + d*x^3])])/(1024*c^(11/6)) - (9*d^(7/3)*ArcTanh[
Sqrt[c + d*x^3]/(3*Sqrt[c])])/(1024*c^(11/6)) - (3*3^(1/4)*Sqrt[2
 - Sqrt[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)
*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*
EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(112*c^(5/3)*Sqrt[(c^(
1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2
]*Sqrt[c + d*x^3]) + (3^(3/4)*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[
(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3
) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/
3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(28*
Sqrt[2]*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.0668, antiderivative size = 675, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{9\sqrt{3}d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1024c^{11/6}}+\frac{9d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1024c^{11/6}}-\frac{9d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1024c^{11/6}}+\frac{3^{3/4}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{28\sqrt{2}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{112c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{3d^{7/3}\sqrt{c+dx^3}}{56c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{3d^2\sqrt{c+dx^3}}{56c^2x}-\frac{\sqrt{c+dx^3}}{56x^7}-\frac{75d\sqrt{c+dx^3}}{1792cx^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^8*(8*c - d*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(56*x^7) - (75*d*Sqrt[c + d*x^3])/(1792*c*x^4) -
 (3*d^2*Sqrt[c + d*x^3])/(56*c^2*x) + (3*d^(7/3)*Sqrt[c + d*x^3])
/(56*c^2*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (9*Sqrt[3]*d^(7/3
)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]
)/(1024*c^(11/6)) + (9*d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3
*c^(1/6)*Sqrt[c + d*x^3])])/(1024*c^(11/6)) - (9*d^(7/3)*ArcTanh[
Sqrt[c + d*x^3]/(3*Sqrt[c])])/(1024*c^(11/6)) - (3*3^(1/4)*Sqrt[2
 - Sqrt[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)
*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*
EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(112*c^(5/3)*Sqrt[(c^(
1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2
]*Sqrt[c + d*x^3]) + (3^(3/4)*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[
(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3
) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/
3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(28*
Sqrt[2]*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.0494, size = 54, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{7}{3},-\frac{3}{2},1,-\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{56x^7\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**8/(-d*x**3+8*c),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-7/3, -3/2, 1, -4/3, -d*x**3/c, d*x**3
/(8*c))/(56*x**7*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.415043, size = 379, normalized size = 0.56

$$-\frac{\frac{1536 d^4 x^5 F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{c(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{33375d^3x^2F_1\left(\frac{2}{3};\frac{1}{2}\cdots\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\cdots\right.\right.\right.}}{4480\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^8*(8*c - d*x^3)),x]
```

```
[Out] ((-5*(32*c^3 + 107*c^2*d*x^3 + 171*c*d^2*x^6 + 96*d^3*x^9))/(2*c^
2*x^7) + (33375*d^3*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c),
(d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -
((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3,
 -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d
*x^3)/c), (d*x^3)/(8*c)]))) - (1536*d^4*x^5*AppellF1[5/3, 1/2, 1,
 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(c*(8*c - d*x^3)*(64*c*Appell
F1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(Appe
llF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1
[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(4480*Sqrt[c
 + d*x^3])
```

Maple [C] time = 0.039, size = 2306, normalized size = 3.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^8/(-d*x^3+8*c),x)
```

```
[Out] 1/8/c*(-1/7*c*(d*x^3+c)^(1/2)/x^7-17/56*d*(d*x^3+c)^(1/2)/x^4-27/
112*d^2/c*(d*x^3+c)^(1/2)/x-9/112*I/c*d^2*3^(1/2)*(-c*d^2)^(1/3)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/64*d/c^2
*(-1/4*c*(d*x^3+c)^(1/2)/x^4-11/8*d*(d*x^3+c)^(1/2)/x-9/8*I*d*3^(
1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1
/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*E
llipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2))))+1/512*d^2/c^3*(-c*(d*x^3+c)^(1/2)/x+2/7*d*x^2*(d*x^3+c)
^(1/2)-9/7*I*c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*(
(x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/
```

```
d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2))))-1/512*d^3/c^3*(2/7*x^2*(d*x^3+c)^(1/2
)-44/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x
-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*
(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)))+3*I*c/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^
(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)
))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(
1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/
2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c
)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/
2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipti
cPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(
-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)
*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_
alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{(dx^3-8\,c)x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^8),x, algorithm="maxima")
```

```
[Out] -integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^8), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{\left(dx^3+c\right)^{\frac{3}{2}}}{dx^{11}-8\,cx^8},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^8),x, algorithm="fricas")
```

```
[Out] integral(-(d*x^3 + c)^(3/2)/(d*x^11 - 8*c*x^8), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x**8/(-d*x**3+8*c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{\left(dx^3+c\right)^{\frac{3}{2}}}{(dx^3-8\,c)x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^8),x, algorithm="giac")
```

```
[Out] integrate(-(d*x^3 + c)^(3/2)/((d*x^3 - 8*c)*x^8), x)
```

3.308 $\int \frac{x^{11}}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=90

$$\frac{1024c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^4}-\frac{38c^2\sqrt{c+dx^3}}{d^4}-\frac{4c\left(c+dx^3\right)^{3/2}}{3d^4}-\frac{2\left(c+dx^3\right)^{5/2}}{15d^4}$$

```
[Out] (-38*c^2*Sqrt[c + d*x^3])/d^4 - (4*c*(c + d*x^3)^(3/2))/(3*d^4) -
 (2*(c + d*x^3)^(5/2))/(15*d^4) + (1024*c^(5/2)*ArcTanh[Sqrt[c +
d*x^3]/(3*Sqrt[c])])/(9*d^4)
```

Rubi [A] time = 0.228862, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{1024c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^4}-\frac{38c^2\sqrt{c+dx^3}}{d^4}-\frac{4c\left(c+dx^3\right)^{3/2}}{3d^4}-\frac{2\left(c+dx^3\right)^{5/2}}{15d^4}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-38*c^2*Sqrt[c + d*x^3])/d^4 - (4*c*(c + d*x^3)^(3/2))/(3*d^4) -
 (2*(c + d*x^3)^(5/2))/(15*d^4) + (1024*c^(5/2)*ArcTanh[Sqrt[c +
d*x^3]/(3*Sqrt[c])])/(9*d^4)
```

Rubi in Sympy [A] time = 26.2305, size = 83, normalized size = 0.92

$$\frac{1024c^{\frac{5}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^4}-\frac{38c^2\sqrt{c+dx^3}}{d^4}-\frac{4c\left(c+dx^3\right)^{\frac{3}{2}}}{3d^4}-\frac{2\left(c+dx^3\right)^{\frac{5}{2}}}{15d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] 1024*c**(5/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(9*d**4) - 38*c
**2*sqrt(c + d*x**3)/d**4 - 4*c*(c + d*x**3)**(3/2)/(3*d**4) - 2*
(c + d*x**3)**(5/2)/(15*d**4)
```

Mathematica [A] time = 0.109898, size = 69, normalized size = 0.77

$$\frac{5120c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-6\sqrt{c+dx^3}\left(296c^2+12cdx^3+d^2x^6\right)}{45d^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-6*Sqrt[c + d*x^3]*(296*c^2 + 12*c*d*x^3 + d^2*x^6) + 5120*c^(5/
2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(45*d^4)
```

Maple [C] time = 0.064, size = 528, normalized size = 5.9

$$-\frac{1}{d}\left(\frac{2x^6}{15d}\sqrt{dx^3+c}-\frac{8cx^3}{45d^2}\sqrt{dx^3+c}+\frac{16c^2}{45d^3}\sqrt{dx^3+c}\right)$$
$$-8\frac{c}{d^2}\left(2/9\frac{x^3\sqrt{dx^3+c}}{d}-4/9\frac{c\sqrt{dx^3+c}}{d^2}\right)-\frac{128c^2}{3d^4}\sqrt{dx^3+c}$$
$$-\frac{\frac{512i}{27}c^2\sqrt{2}}{d^6}\sum_{\_alpha=RootOf(d\_Z^3-8c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/d*(2/15/d*x^6*(d*x^3+c)^(1/2)-8/45*c/d^2*x^3*(d*x^3+c)^(1/2)+1
6/45*c^2*(d*x^3+c)^(1/2)/d^3)-8*c/d^2*(2/9/d*x^3*(d*x^3+c)^(1/2)-
4/9*c*(d*x^3+c)^(1/2)/d^2)-128/3*c^2*(d*x^3+c)^(1/2)/d^4-512/27*I
*c^2/d^6*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^11/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.241403, size = 1, normalized size = 0.01

$$\left[\frac{2\left(1280c^{\frac{5}{2}}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)-3\left(d^2x^6+12cdx^3+296c^2\right)\sqrt{dx^3+c}\right)}{45d^4},\frac{2\left(2560\sqrt{-c}c^2\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-3\left(d^2x^6+\right.\right.}{45d^4}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^11/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] [2/45*(1280*c^(5/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c
)/(d*x^3 - 8*c)) - 3*(d^2*x^6 + 12*c*d*x^3 + 296*c^2)*sqrt(d*x^3
+ c))/d^4, 2/45*(2560*sqrt(-c)*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqr
t(-c)) - 3*(d^2*x^6 + 12*c*d*x^3 + 296*c^2)*sqrt(d*x^3 + c))/d^4]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.218956, size = 111, normalized size = 1.23

$$-\frac{1024\,c^{3}\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\,\sqrt{-c}}\right)}{9\,\sqrt{-c}d^{4}}-\frac{2\,\left(\left(dx^{3}+c\right)^{\frac{5}{2}}d^{16}+10\,\left(dx^{3}+c\right)^{\frac{3}{2}}cd^{16}+285\,\sqrt{dx^{3}+c}c^{2}d^{16}\right)}{15\,d^{20}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^11/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] -1024/9*c^3*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^4) -
 2/15*((d*x^3 + c)^(5/2)*d^16 + 10*(d*x^3 + c)^(3/2)*c*d^16 + 285
*sqrt(d*x^3 + c)*c^2*d^16)/d^20
```

3.309 $\int \frac{x^8}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=71

$$\frac{128c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^3}-\frac{14c\sqrt{c+dx^3}}{3d^3}-\frac{2\left(c+dx^3\right)^{3/2}}{9d^3}$$

```
[Out] (-14*c*Sqrt[c + d*x^3])/(3*d^3) - (2*(c + d*x^3)^(3/2))/(9*d^3) +
 (128*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^3)
```

Rubi [A] time = 0.204991, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{128c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^3}-\frac{14c\sqrt{c+dx^3}}{3d^3}-\frac{2\left(c+dx^3\right)^{3/2}}{9d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-14*c*Sqrt[c + d*x^3])/(3*d^3) - (2*(c + d*x^3)^(3/2))/(9*d^3) +
 (128*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^3)
```

Rubi in Sympy [A] time = 22.5711, size = 65, normalized size = 0.92

$$\frac{128c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^3}-\frac{14c\sqrt{c+dx^3}}{3d^3}-\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] 128*c**(3/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(9*d**3) - 14*c*
sqrt(c + d*x**3)/(3*d**3) - 2*(c + d*x**3)**(3/2)/(9*d**3)
```

Mathematica [A] time = 0.0839834, size = 58, normalized size = 0.82

$$\frac{128c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-2\sqrt{c+dx^3}\left(22c+dx^3\right)}{9d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*Sqrt[c + d*x^3]*(22*c + d*x^3) + 128*c^(3/2)*ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])])/(9*d^3)
```

Maple [C] time = 0.016, size = 468, normalized size = 6.6

$$-\frac{1}{d^2}\left(d\left(\frac{2x^3}{9d}\sqrt{dx^3+c}-\frac{4c}{9d^2}\sqrt{dx^3+c}\right)+\frac{16c}{3d}\sqrt{dx^3+c}\right)$$

$$-\frac{\frac{64i}{27}c\sqrt{2}}{d^5}\sum_{\_alpha=RootOf\left(\_Z^3d-8c\right)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{\ldots}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/d^2*(d*(2/9/d*x^3*(d*x^3+c)^(1/2)-4/9*c*(d*x^3+c)^(1/2)/d^2)+1
6/3*c*(d*x^3+c)^(1/2)/d)-64/27*I*c/d^5*2^(1/2)*sum((-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha
=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^8/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.239342, size = 1, normalized size = 0.01

$$\left[\frac{2\left(32\,c^{\frac{3}{2}}\log\left(\frac{dx^3+6\,\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)-\left(dx^3+22\,c\right)\sqrt{dx^3+c}\right)}{9\,d^3},\ \frac{2\left(64\,\sqrt{-c}c\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)-\left(dx^3+22\,c\right)\sqrt{dx^3+c}\right)}{9\,d^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^8/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] [2/9*(32*c^(3/2)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c)/(
d*x^3 - 8*c)) - (d*x^3 + 22*c)*sqrt(d*x^3 + c))/d^3, 2/9*(64*sqrt
(-c)*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (d*x^3 + 22*c)*sqrt
(d*x^3 + c))/d^3]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.224066, size = 88, normalized size = 1.24

$$-\frac{128\,c^{2}\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\,\sqrt{-c}}\right)}{9\,\sqrt{-c}d^{3}}-\frac{2\,\left(\left(dx^{3}+c\right)^{\frac{3}{2}}d^{6}+21\,\sqrt{dx^{3}+c}cd^{6}\right)}{9\,d^{9}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^8/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] -128/9*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^3) -
2/9*((d*x^3 + c)^(3/2)*d^6 + 21*sqrt(d*x^3 + c)*c*d^6)/d^9
```

3.310 $\int \frac{x^5}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=52

$$\frac{16\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^2}-\frac{2\sqrt{c+dx^3}}{3d^2}$$

```
[Out] (-2*Sqrt[c + d*x^3])/(3*d^2) + (16*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3
]/(3*Sqrt[c])])/(9*d^2)
```

Rubi [A] time = 0.148255, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{16\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^2}-\frac{2\sqrt{c+dx^3}}{3d^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^5/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*Sqrt[c + d*x^3])/(3*d^2) + (16*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3
]/(3*Sqrt[c])])/(9*d^2)
```

Rubi in Sympy [A] time = 15.723, size = 46, normalized size = 0.88

$$\frac{16\sqrt{c}\,\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^2}-\frac{2\sqrt{c+dx^3}}{3d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**5/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] 16*sqrt(c)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(9*d**2) - 2*sqrt(
c + d*x**3)/(3*d**2)
```

Mathematica [A] time = 0.0456392, size = 49, normalized size = 0.94

$$-\frac{2\left(3\sqrt{c+dx^3}-8\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{9d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*(3*Sqrt[c + d*x^3] - 8*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])]))/(9*d^2)
```

Maple [C] time = 0.013, size = 425, normalized size = 8.2

$$-\frac{2}{3\,d^2}\sqrt{dx^3+c}$$
$$-\frac{\frac{8\,i}{27}\sqrt{2}}{d^4}\sum_{\_alpha=RootOf(\_Z^3d-8\,c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -2/3*(d*x^3+c)^(1/2)/d^2-8/27*I/d^4*2^(1/2)*sum((-c*d^2)^(1/3)*(1
/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d
^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3
^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*
(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d
^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^
(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_
alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Ro
otOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^5/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.24144, size = 1, normalized size = 0.02

$$\left[\frac{2\left(4\sqrt{c}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)-3\sqrt{dx^3+c}\right)}{9\,d^2},\ \frac{2\left(8\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-3\sqrt{dx^3+c}\right)}{9\,d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^5/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] [2/9*(4*sqrt(c)*log((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c)/(d
*x^3 - 8*c)) - 3*sqrt(d*x^3 + c))/d^2, 2/9*(8*sqrt(-c)*arctan(1/3
*sqrt(d*x^3 + c)/sqrt(-c)) - 3*sqrt(d*x^3 + c))/d^2]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{x^5}{-8c\sqrt{c+dx^3}+dx^3\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(x**5/(-8*c*sqrt(c + d*x**3) + d*x**3*sqrt(c + d*x**3)),
 x)
```

GIAC/XCAS [A] time = 0.220591, size = 65, normalized size = 1.25

$$-\frac{2\left(\frac{8\,c\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}d}+\frac{3\sqrt{dx^3+c}}{d}\right)}{9\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^5/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] -2/9*(8*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) + 3*s
qrt(d*x^3 + c)/d)/d
```

3.311 $\int \frac{x^2}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=33

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}d}$$

[Out] (2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*Sqrt[c]*d)

Rubi [A] time = 0.107492, antiderivative size = 33, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}d}$$

Antiderivative was successfully verified.

[In] Int[x^2/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]

[Out] (2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*Sqrt[c]*d)

Rubi in Sympy [A] time = 13.1484, size = 27, normalized size = 0.82

$$\frac{2\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}d}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] rubi_integrate(x**2/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)

[Out] 2*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(9*sqrt(c)*d)

Mathematica [A] time = 0.0283191, size = 33, normalized size = 1.

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}d}$$

Antiderivative was successfully verified.

[In] Integrate[x^2/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]

[Out] (2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*Sqrt[c]*d)

Maple [C] time = 0.012, size = 413, normalized size = 12.5

$$\frac{-\frac{i}{27}\sqrt{2}}{d^3c}\sum_{\_alpha=RootOf(\_Z^3d-8\,c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/27*I/d^3/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^
(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x
-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3))
)^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/
3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alp
ha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/
3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alp
ha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3
*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^2/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.239663, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)}{9\,\sqrt{c}d}, -\frac{2\,\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)}{9\,\sqrt{-c}d}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^2/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] [1/9*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c)/(d*x^3 -
8*c))/(sqrt(c)*d), -2/9*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c)))/(s
qrt(-c)*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^2}{-8c\sqrt{c+dx^3}+dx^3\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(x**2/(-8*c*sqrt(c + d*x**3) + d*x**3*sqrt(c + d*x**3)),
 x)
```

GIAC/XCAS [A] time = 0.217678, size = 36, normalized size = 1.09

$$-\frac{2\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{9\,\sqrt{-c}d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^2/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] -2/9*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d)
```

3.312 $\int \frac{1}{x(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=58

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{36c^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12c^{3/2}}$$

```
[Out] ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]/(36*c^(3/2)) - ArcTanh[Sqrt[
c + d*x^3]/Sqrt[c]]/(12*c^(3/2))
```

Rubi [A] time = 0.1725, antiderivative size = 58, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{36c^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12c^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]/(36*c^(3/2)) - ArcTanh[Sqrt[
c + d*x^3]/Sqrt[c]]/(12*c^(3/2))
```

Rubi in Sympy [A] time = 18.1933, size = 48, normalized size = 0.83

$$\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{36c^{\frac{3}{2}}}-\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(36*c**(3/2)) - atanh(sqrt(c
+ d*x**3)/sqrt(c))/(12*c**(3/2))
```

Mathematica [C] time = 0.0801071, size = 161, normalized size = 2.78

$$\frac{10dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{9\left(dx^3-8c\right)\sqrt{c+dx^3}\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (10*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)]
)/(9*(-8*c + d*x^3)*Sqrt[c + d*x^3]*(5*d*x^3*AppellF1[3/2, 1/2, 1
, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2, 2,
7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7/2,
-(c/(d*x^3)), (8*c)/(d*x^3)]))
```

Maple [C] time = 0.013, size = 433, normalized size = 7.5

$$-\frac{1}{12}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{3}{2}}$$

$$-\frac{\frac{i}{216}\sqrt{2}}{c^2d^2}\sum_{\_alpha=RootOf(\_Z^3d-8c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/12*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2)-1/216*I/d^2/c^2*2^
(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1
/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*
d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_
alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*
d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/1
8/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3
)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/
2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{1}{\sqrt{dx^3+c}(dx^3-8c)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x), x)
```

Fricas [A] time = 0.252032, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(\frac{(dx^3+10c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8c}\right)+3\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)}{72c^{\frac{3}{2}}},-\frac{\arctan\left(\frac{3c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)}{36\sqrt{-c}c}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x),x, algorithm="fricas")
```

```
[Out] [1/72*(log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c)/(d*x^3
- 8*c)) + 3*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3
))/c^(3/2), -1/36*(arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 3*arc
tan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/(sqrt(-c)*c)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{1}{-8cx\sqrt{c+dx^3}+dx^4\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(1/(-8*c*x*sqrt(c + d*x**3) + d*x**4*sqrt(c + d*x**3)),
x)
```

GIAC/XCAS [A] time = 0.218373, size = 73, normalized size = 1.26

$$\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{12\sqrt{-c}c} - \frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{36\sqrt{-c}c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x),x, algorithm="giac")
```

```
[Out] 1/12*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 1/36*arctan(
1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c)
```

3.313 $\int \frac{1}{x^4(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=81

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{288c^{5/2}}+\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{32c^{5/2}}-\frac{\sqrt{c+dx^3}}{24c^2x^3}$$

```
[Out] -Sqrt[c + d*x^3]/(24*c^2*x^3) + (d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])])/(288*c^(5/2)) + (d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(32*
c^(5/2))
```

Rubi [A] time = 0.268044, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{288c^{5/2}}+\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{32c^{5/2}}-\frac{\sqrt{c+dx^3}}{24c^2x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -Sqrt[c + d*x^3]/(24*c^2*x^3) + (d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])])/(288*c^(5/2)) + (d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(32*
c^(5/2))
```

Rubi in Sympy [A] time = 32.6038, size = 70, normalized size = 0.86

$$-\frac{\sqrt{c+dx^3}}{24c^2x^3}+\frac{d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{288c^{\frac{5}{2}}}+\frac{d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{32c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)/(24*c**2*x**3) + d*atanh(sqrt(c + d*x**3)/(3*sq
rt(c)))/(288*c**(5/2)) + d*atanh(sqrt(c + d*x**3)/sqrt(c))/(32*c*
*(5/2))
```

Mathematica [C] time = 0.341684, size = 326, normalized size = 4.02

$$\frac{\frac{8cd^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{10cd^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3}\ldots\right.}{(8c-dx^3)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\ldots\right.\right.}}{24c^2x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-c - d*x^3 + (8*c*d^2*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (
d*x^3)/(8*c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x
^3)/c), (d*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/
c), (d*x^3)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^
3)/(8*c)]))) + (10*c*d^2*x^6*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^
3)), (8*c)/(d*x^3)])/((8*c - d*x^3)*(5*d*x^3*AppellF1[3/2, 1/2, 1
```

```
, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2, 2,
7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7/2,
-(c/(d*x^3)), (8*c)/(d*x^3)])))/(24*c^2*x^3*Sqrt[c + d*x^3])
```

Maple [C] time = 0.015, size = 477, normalized size = 5.9

$$\frac{1}{8c}\left(-\frac{1}{3cx^3}\sqrt{dx^3+c}+\frac{d}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{3}{2}}\right)-\frac{d}{96}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{5}{2}}$$
$$-\frac{\frac{i}{1728}\sqrt{2}}{dc^3}\sum_{\_alpha=RootOf(\_Z^3d-8c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/8/c*(-1/3*(d*x^3+c)^(1/2)/c/x^3+1/3*d*arctanh((d*x^3+c)^(1/2)/c
^(1/2))/c^(3/2))-1/96*d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2)-
1/1728*I/d/c^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{1}{\sqrt{dx^3+c}(dx^3-8c)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^4),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^4), x)
```

Fricas [A] time = 0.253168, size = 1, normalized size = 0.01

$$\left[\frac{dx^3\log\left(\frac{(dx^3+10c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8c}\right)+9dx^3\log\left(\frac{(dx^3+2c)\sqrt{c}+2\sqrt{dx^3+c}c}{x^3}\right)-24\sqrt{dx^3+c}\sqrt{c}}{576c^{\frac{5}{2}}x^3},\right.$$
$$\left.-\frac{dx^3\arctan\left(\frac{3c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+9dx^3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+12\sqrt{dx^3+c}\sqrt{-c}}{288\sqrt{-c}c^2x^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/576*(d*x^3*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c)/
(d*x^3 - 8*c)) + 9*d*x^3*log(((d*x^3 + 2*c)*sqrt(c) + 2*sqrt(d*x^
3 + c)*c)/x^3) - 24*sqrt(d*x^3 + c)*sqrt(c))/(c^(5/2)*x^3), -1/28
8*(d*x^3*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) + 9*d*x^3*arctan(
c/(sqrt(d*x^3 + c)*sqrt(-c))) + 12*sqrt(d*x^3 + c)*sqrt(-c))/(sqr
t(-c)*c^2*x^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221023, size = 103, normalized size = 1.27

$$-\frac{1}{288}\,d\left(\frac{9\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^2}+\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c^2}+\frac{12\,\sqrt{dx^3+c}}{c^2dx^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^4),x, algorithm="giac")
```

```
[Out] -1/288*d*(9*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) + arc
tan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) + 12*sqrt(d*x^3
+ c)/(c^2*d*x^3))
```

3.314 $\int \frac{1}{x^7(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=107

$$\frac{d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2304c^{7/2}}-\frac{7d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{256c^{7/2}}+\frac{5d\sqrt{c+dx^3}}{192c^3x^3}-\frac{\sqrt{c+dx^3}}{48c^2x^6}$$

```
[Out] -Sqrt[c + d*x^3]/(48*c^2*x^6) + (5*d*Sqrt[c + d*x^3])/(192*c^3*x^
3) + (d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(2304*c^(7/2)) -
(7*d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(256*c^(7/2))
```

Rubi [A] time = 0.37379, antiderivative size = 107, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2304c^{7/2}}-\frac{7d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{256c^{7/2}}+\frac{5d\sqrt{c+dx^3}}{192c^3x^3}-\frac{\sqrt{c+dx^3}}{48c^2x^6}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -Sqrt[c + d*x^3]/(48*c^2*x^6) + (5*d*Sqrt[c + d*x^3])/(192*c^3*x^
3) + (d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(2304*c^(7/2)) -
(7*d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(256*c^(7/2))
```

Rubi in Sympy [A] time = 50.6554, size = 97, normalized size = 0.91

$$-\frac{\sqrt{c+dx^3}}{48c^2x^6}+\frac{5d\sqrt{c+dx^3}}{192c^3x^3}+\frac{d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2304c^{\frac{7}{2}}}-\frac{7d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{256c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)/(48*c**2*x**6) + 5*d*sqrt(c + d*x**3)/(192*c**3
*x**3) + d**2*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(2304*c**(7/2))
 - 7*d**2*atanh(sqrt(c + d*x**3)/sqrt(c))/(256*c**(7/2))
```

Mathematica [C] time = 0.316924, size = 332, normalized size = 3.1

$$\frac{-\frac{40cd^3x^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{70cd^3x^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\ldots\right)}{(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};\ldots\right)\ldots\right)}\ldots}{192c^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^7*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (5*d^2 - (4*c^2)/x^6 + (c*d)/x^3 - (40*c*d^3*x^3*AppellF1[1, 1/2,
 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(16*c*AppellF
1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(AppellF1[2,
 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[2, 3/2, 1,
3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (70*c*d^3*x^3*AppellF1[3/2,
1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/((-8*c + d*x^3)*(5*d*x
```

```
^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c
*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*Appe
llF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)])))/(192*c^3*S
qrt[c + d*x^3])
```

Maple [C] time = 0.037, size = 540, normalized size = 5.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/8/c*(-1/6*(d*x^3+c)^(1/2)/c/x^6+1/4*d*(d*x^3+c)^(1/2)/c^2/x^3-1
/4*d^2*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2))+1/64*d/c^2*(-1/3
*(d*x^3+c)^(1/2)/c/x^3+1/3*d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(
3/2))-1/768*d^2*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(7/2)-1/13824*
I/c^4*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c
*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*
(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c
*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/
2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alph
a*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d
^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^7),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^7), x)
```

Fricas [A] time = 0.252336, size = 1, normalized size = 0.01

$$\left[\frac{d^2x^6\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+63\,d^2x^6\log\left(\frac{(dx^3+2\,c)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right)+24\left(5\,dx^3-4\,c\right)\sqrt{dx^3+c}\sqrt{c}}{4608\,c^{\frac{7}{2}}x^6},\right.$$
$$\left.-\frac{d^2x^6\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-63\,d^2x^6\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-12\left(5\,dx^3-4\,c\right)\sqrt{dx^3+c}\sqrt{-c}}{2304\,\sqrt{-c}c^3x^6}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^7),x, algorithm="fricas")
```

```
[Out] [1/4608*(d^2*x^6*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*
c)/(d*x^3 - 8*c)) + 63*d^2*x^6*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqr
t(d*x^3 + c)*c)/x^3) + 24*(5*d*x^3 - 4*c)*sqrt(d*x^3 + c)*sqrt(c)
```

```
)/(c^(7/2)*x^6), -1/2304*(d^2*x^6*arctan(3*c/(sqrt(d*x^3 + c)*sqr
t(-c))) - 63*d^2*x^6*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))) - 12*(5
*d*x^3 - 4*c)*sqrt(d*x^3 + c)*sqrt(-c))/(sqrt(-c)*c^3*x^6)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221481, size = 127, normalized size = 1.19

$$\frac{1}{2304}\,d^2\left(\frac{63\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^3}-\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c^3}+\frac{12\left(5\,\left(dx^3+c\right)^{\frac{3}{2}}-9\,\sqrt{dx^3+c}c\right)}{c^3d^2x^6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^7),x, algorithm="giac")
```

```
[Out] 1/2304*d^2*(63*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) -
arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) + 12*(5*(d*x^
3 + c)^(3/2) - 9*sqrt(d*x^3 + c)*c)/(c^3*d^2*x^6))
```

3.315 $\int \frac{x^7}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=630

$$-\frac{32c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{8/3}}+\frac{32c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9d^{8/3}}-\frac{32c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^{8/3}}$$
$$-\frac{104\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{52\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{104c\sqrt{c+dx^3}}{7d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2x^2\sqrt{c+dx^3}}{7d^2}$$

```
[Out] (-2*x^2*Sqrt[c + d*x^3])/(7*d^2) - (104*c*Sqrt[c + d*x^3])/(7*d^(
8/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (32*c^(7/6)*ArcTan[(S
qrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(3*Sqrt[3
]*d^(8/3)) + (32*c^(7/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/
6)*Sqrt[c + d*x^3])])/(9*d^(8/3)) - (32*c^(7/6)*ArcTanh[Sqrt[c +
d*x^3]/(3*Sqrt[c])])/(9*d^(8/3)) + (52*3^(1/4)*Sqrt[2 - Sqrt[3]]*
c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x +
 d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3)
+ d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x
^3]) - (104*Sqrt[2]*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
 c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*3^(1/4)*d^(
8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.50753, antiderivative size = 630, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$-\frac{32c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{8/3}}+\frac{32c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9d^{8/3}}-\frac{32c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^{8/3}}-\frac{104\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{52\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{104c\sqrt{c+dx^3}}{7d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2x^2\sqrt{c+dx^3}}{7d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*x^2*Sqrt[c + d*x^3])/(7*d^2) - (104*c*Sqrt[c + d*x^3])/(7*d^(
8/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (32*c^(7/6)*ArcTan[(S
qrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(3*Sqrt[3
]*d^(8/3)) + (32*c^(7/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/
6)*Sqrt[c + d*x^3])])/(9*d^(8/3)) - (32*c^(7/6)*ArcTanh[Sqrt[c +
d*x^3]/(3*Sqrt[c])])/(9*d^(8/3)) + (52*3^(1/4)*Sqrt[2 - Sqrt[3]]*
c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x +
 d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3)
+ d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x
^3]) - (104*Sqrt[2]*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
 c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*3^(1/4)*d^(
8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.5229, size = 51, normalized size = 0.08

$$\frac{x^8\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{8}{3},\frac{1}{2},1,\frac{11}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**8*sqrt(c + d*x**3)*appellf1(8/3, 1/2, 1, 11/3, -d*x**3/c, d*x*
*3/(8*c))/(64*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.304826, size = 347, normalized size = 0.55

$$\frac{2x^2\left(\frac{1600c^3F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{1664c^2dx^3F_1\left(\frac{5}{3}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\right.\right.\right.}\right.}{35d^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^7/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*x^2*(-5*(c + d*x^3) + (1600*c^3*AppellF1[2/3, 1/2, 1, 5/3, -((
d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2
, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1
/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1
, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (1664*c^2*d*x^3*AppellF1
[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(
64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*
d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] -
 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])))))/
(35*d^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.074, size = 1311, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/d^2*(d*(2/7*x^2*(d*x^3+c)^(1/2)/d+8/21*I*c/d^2*3^(1/2)*(-c*d^2
)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-16
/3*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d
*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*
d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2))))-64/27*I*c/d^5*2^(1/2)*sum(1/_alpha*(-c*d^2)
^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^
(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1
/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+
c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1
/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipt
icPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*
(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2
)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),
```

```
_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^7}{\sqrt{dx^3+c}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^7}{-8c\sqrt{c+dx^3}+dx^3\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(x**7/(-8*c*sqrt(c + d*x**3) + d*x**3*sqrt(c + d*x**3)),
 x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x^7}{\sqrt{dx^3+c}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

3.316 $\int \frac{x^4}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=601

$$-\frac{2\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{4\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{5/3}}+\frac{4\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9d^{5/3}}-\frac{4\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^{5/3}}$$

```
[Out] (-2*Sqrt[c + d*x^3])/(d^(5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) - (4*c^(1/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqr
t[c + d*x^3]])/(3*Sqrt[3]*d^(5/3)) + (4*c^(1/6)*ArcTanh[(c^(1/3)
+ d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(9*d^(5/3)) - (4*c^(
1/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^(5/3)) + (3^(1/4)
*Sqrt[2 - Sqrt[3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(d^(5/3)*Sqrt[(
c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x
)^2]*Sqrt[c + d*x^3]) - (2*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*
Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) +
d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])
/(3^(1/4)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.20619, antiderivative size = 601, normalized size of antiderivative = 1., number of

steps used = 12, number of rules used = 12, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.444$

$$-\frac{2\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{4\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{5/3}}+\frac{4\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9d^{5/3}}-\frac{4\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^{5/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*Sqrt[c + d*x^3])/(d^(5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) - (4*c^(1/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqr
t[c + d*x^3]])/(3*Sqrt[3]*d^(5/3)) + (4*c^(1/6)*ArcTanh[(c^(1/3)
+ d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(9*d^(5/3)) - (4*c^(
1/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^(5/3)) + (3^(1/4)
*Sqrt[2 - Sqrt[3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(d^(5/3)*Sqrt[(
c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x
)^2]*Sqrt[c + d*x^3]) - (2*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*
Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) +
d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])
/(3^(1/4)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.6546, size = 51, normalized size = 0.08

$$\frac{x^5\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{5}{3},\frac{1}{2},1,\frac{8}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{40c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**5*sqrt(c + d*x**3)*appellf1(5/3, 1/2, 1, 8/3, -d*x**3/c, d*x**
3/(8*c))/(40*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.0867093, size = 170, normalized size = 0.28

$$\frac{64cx^5F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{5\left(8c-dx^3\right)\sqrt{c+dx^3}\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (64*c*x^5*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]
)/(5*(8*c - d*x^3)*Sqrt[c + d*x^3]*(64*c*AppellF1[5/3, 1/2, 1, 8/
3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2,
11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3
, -((d*x^3)/c), (d*x^3)/(8*c)])))
```

Maple [C] time = 0.012, size = 848, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 2/3*I/d^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/
d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c
*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)))-8/27*I/d^4*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1
/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/
3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)
*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticP
i(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c
*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c
*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_al
pha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^4}{\sqrt{dx^3+c}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{x^4}{\sqrt{dx^3+c}(dx^3-8\,c)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] integral(-x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^4}{-8c\sqrt{c+dx^3}+dx^3\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(x**4/(-8*c*sqrt(c + d*x**3) + d*x**3*sqrt(c + d*x**3)),
 x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x^4}{\sqrt{dx^3+c}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

3.317 $\int \frac{x}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=141

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{6\sqrt{3}c^{5/6}d^{2/3}}+\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{18c^{5/6}d^{2/3}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{18c^{5/6}d^{2/3}}$$

```
[Out] -ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]/
(6*Sqrt[3]*c^(5/6)*d^(2/3)) + ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*
c^(1/6)*Sqrt[c + d*x^3])]/(18*c^(5/6)*d^(2/3)) - ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])]/(18*c^(5/6)*d^(2/3))
```

Rubi [A] time = 0.755241, antiderivative size = 141, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.32

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{6\sqrt{3}c^{5/6}d^{2/3}}+\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{18c^{5/6}d^{2/3}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{18c^{5/6}d^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]/
(6*Sqrt[3]*c^(5/6)*d^(2/3)) + ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*
c^(1/6)*Sqrt[c + d*x^3])]/(18*c^(5/6)*d^(2/3)) - ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])]/(18*c^(5/6)*d^(2/3))
```

Rubi in Sympy [A] time = 21.1782, size = 51, normalized size = 0.36

$$\frac{x^2\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{16c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, 1/2, 1, 5/3, -d*x**3/c, d*x**
3/(8*c))/(16*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.0803912, size = 168, normalized size = 1.19

$$\frac{20cx^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\sqrt{c+dx^3}\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (20*c*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)]
)/((8*c - d*x^3)*Sqrt[c + d*x^3]*(40*c*AppellF1[2/3, 1/2, 1, 5/3,
 -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/
3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -(
(d*x^3)/c), (d*x^3)/(8*c)])))
```

Maple [C] time = 0.009, size = 416, normalized size = 3.

$$\frac{-\frac{i}{27}\sqrt{2}}{d^3 c}\sum_{\_alpha=RootOf\left(\_Z^3 d-8\,c\right)}\frac{1}{\_alpha}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/27*I/d^3/c*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1
/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^
2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c
*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(
1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c
*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)
*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2
)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8
*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x}{\sqrt{dx^3+c}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

Fricas [A] time = 0.679283, size = 3586, normalized size = 25.43

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] 1/54*sqrt(3)*(1/(c^5*d^4))^(1/6)*arctan(3*(3*sqrt(3)*(5*c^4*d^5*x
^7 + 64*c^5*d^4*x^4 + 32*c^6*d^3*x)*(1/(c^5*d^4))^(2/3) - 3*sqrt(
3)*(c^2*d^4*x^8 + 38*c^3*d^3*x^5 + 64*c^4*d^2*x^2)*(1/(c^5*d^4))^
(1/3) + sqrt(d*x^3 + c)*(6*sqrt(3)*(5*c^5*d^5*x^5 + 32*c^6*d^4*x^
2)*(1/(c^5*d^4))^(5/6) - sqrt(3)*(c*d^3*x^7 + 80*c^2*d^2*x^4 + 16
0*c^3*d*x)*(1/(c^5*d^4))^(1/6)))/(d^3*x^9 + 318*c*d^2*x^6 + 1200*
c^2*d*x^3 + 640*c^3 - 9*(5*c^4*d^5*x^7 + 64*c^5*d^4*x^4 + 32*c^6*
d^3*x)*(1/(c^5*d^4))^(2/3) + 3*sqrt(d*x^3 + c)*(6*(5*c^5*d^5*x^5
+ 32*c^6*d^4*x^2)*(1/(c^5*d^4))^(5/6) - 2*(7*c^3*d^4*x^6 + 152*c^
4*d^3*x^3 + 64*c^5*d^2)*sqrt(1/(c^5*d^4)) + (c*d^3*x^7 + 80*c^2*d
```

```
^2*x^4 + 160*c^3*d*x)*(1/(c^5*d^4))^(1/6)) + (d^3*x^9 - 24*c*d^2*
x^6 + 192*c^2*d*x^3 - 512*c^3)*sqrt((d^3*x^9 - 276*c*d^2*x^6 - 16
08*c^2*d*x^3 - 1088*c^3 - 18*(c^4*d^5*x^7 - 52*c^5*d^4*x^4 - 80*c
^6*d^3*x)*(1/(c^5*d^4))^(2/3) - 6*sqrt(d*x^3 + c)*(24*(c^5*d^5*x^
5 + c^6*d^4*x^2)*(1/(c^5*d^4))^(5/6) - 4*(c^3*d^4*x^6 + 41*c^4*d^
3*x^3 + 40*c^5*d^2)*sqrt(1/(c^5*d^4)) - (c*d^3*x^7 - 28*c^2*d^2*x
^4 - 272*c^3*d*x)*(1/(c^5*d^4))^(1/6)) + 18*(c^2*d^4*x^8 + 20*c^3
*d^3*x^5 - 8*c^4*d^2*x^2)*(1/(c^5*d^4))^(1/3))/(d^3*x^9 - 24*c*d^
2*x^6 + 192*c^2*d*x^3 - 512*c^3)) - 9*(c^2*d^4*x^8 + 38*c^3*d^3*x
^5 + 64*c^4*d^2*x^2)*(1/(c^5*d^4))^(1/3))) + 1/54*sqrt(3)*(1/(c^5
*d^4))^(1/6)*arctan(-3*(3*sqrt(3)*(5*c^4*d^5*x^7 + 64*c^5*d^4*x^4
 + 32*c^6*d^3*x)*(1/(c^5*d^4))^(2/3) - 3*sqrt(3)*(c^2*d^4*x^8 + 3
8*c^3*d^3*x^5 + 64*c^4*d^2*x^2)*(1/(c^5*d^4))^(1/3) - sqrt(d*x^3
+ c)*(6*sqrt(3)*(5*c^5*d^5*x^5 + 32*c^6*d^4*x^2)*(1/(c^5*d^4))^(5
/6) - sqrt(3)*(c*d^3*x^7 + 80*c^2*d^2*x^4 + 160*c^3*d*x)*(1/(c^5*
d^4))^(1/6)))/(d^3*x^9 + 318*c*d^2*x^6 + 1200*c^2*d*x^3 + 640*c^3
 - 9*(5*c^4*d^5*x^7 + 64*c^5*d^4*x^4 + 32*c^6*d^3*x)*(1/(c^5*d^4)
)^(2/3) - 3*sqrt(d*x^3 + c)*(6*(5*c^5*d^5*x^5 + 32*c^6*d^4*x^2)*(
1/(c^5*d^4))^(5/6) - 2*(7*c^3*d^4*x^6 + 152*c^4*d^3*x^3 + 64*c^5*
d^2)*sqrt(1/(c^5*d^4)) + (c*d^3*x^7 + 80*c^2*d^2*x^4 + 160*c^3*d*
x)*(1/(c^5*d^4))^(1/6)) + (d^3*x^9 - 24*c*d^2*x^6 + 192*c^2*d*x^3
 - 512*c^3)*sqrt((d^3*x^9 - 276*c*d^2*x^6 - 1608*c^2*d*x^3 - 1088
*c^3 - 18*(c^4*d^5*x^7 - 52*c^5*d^4*x^4 - 80*c^6*d^3*x)*(1/(c^5*d
^4))^(2/3) + 6*sqrt(d*x^3 + c)*(24*(c^5*d^5*x^5 + c^6*d^4*x^2)*(1
/(c^5*d^4))^(5/6) - 4*(c^3*d^4*x^6 + 41*c^4*d^3*x^3 + 40*c^5*d^2)
*sqrt(1/(c^5*d^4)) - (c*d^3*x^7 - 28*c^2*d^2*x^4 - 272*c^3*d*x)*(
1/(c^5*d^4))^(1/6)) + 18*(c^2*d^4*x^8 + 20*c^3*d^3*x^5 - 8*c^4*d^
2*x^2)*(1/(c^5*d^4))^(1/3))/(d^3*x^9 - 24*c*d^2*x^6 + 192*c^2*d*x
^3 - 512*c^3)) - 9*(c^2*d^4*x^8 + 38*c^3*d^3*x^5 + 64*c^4*d^2*x^2
)*(1/(c^5*d^4))^(1/3))) + 1/108*(1/(c^5*d^4))^(1/6)*log((d^3*x^9
+ 318*c*d^2*x^6 + 1200*c^2*d*x^3 + 640*c^3 + 18*(5*c^4*d^5*x^7 +
64*c^5*d^4*x^4 + 32*c^6*d^3*x)*(1/(c^5*d^4))^(2/3) + 6*sqrt(d*x^3
 + c)*(6*(5*c^5*d^5*x^5 + 32*c^6*d^4*x^2)*(1/(c^5*d^4))^(5/6) + (
7*c^3*d^4*x^6 + 152*c^4*d^3*x^3 + 64*c^5*d^2)*sqrt(1/(c^5*d^4)) +
 (c*d^3*x^7 + 80*c^2*d^2*x^4 + 160*c^3*d*x)*(1/(c^5*d^4))^(1/6))
+ 18*(c^2*d^4*x^8 + 38*c^3*d^3*x^5 + 64*c^4*d^2*x^2)*(1/(c^5*d^4)
)^(1/3))/(d^3*x^9 - 24*c*d^2*x^6 + 192*c^2*d*x^3 - 512*c^3)) - 1/
108*(1/(c^5*d^4))^(1/6)*log((d^3*x^9 + 318*c*d^2*x^6 + 1200*c^2*d
*x^3 + 640*c^3 + 18*(5*c^4*d^5*x^7 + 64*c^5*d^4*x^4 + 32*c^6*d^3*
x)*(1/(c^5*d^4))^(2/3) - 6*sqrt(d*x^3 + c)*(6*(5*c^5*d^5*x^5 + 32
*c^6*d^4*x^2)*(1/(c^5*d^4))^(5/6) + (7*c^3*d^4*x^6 + 152*c^4*d^3*
x^3 + 64*c^5*d^2)*sqrt(1/(c^5*d^4)) + (c*d^3*x^7 + 80*c^2*d^2*x^4
 + 160*c^3*d*x)*(1/(c^5*d^4))^(1/6)) + 18*(c^2*d^4*x^8 + 38*c^3*d
^3*x^5 + 64*c^4*d^2*x^2)*(1/(c^5*d^4))^(1/3))/(d^3*x^9 - 24*c*d^2
*x^6 + 192*c^2*d*x^3 - 512*c^3)) - 1/216*(1/(c^5*d^4))^(1/6)*log(
(d^3*x^9 - 276*c*d^2*x^6 - 1608*c^2*d*x^3 - 1088*c^3 - 18*(c^4*d^
5*x^7 - 52*c^5*d^4*x^4 - 80*c^6*d^3*x)*(1/(c^5*d^4))^(2/3) + 6*sq
rt(d*x^3 + c)*(24*(c^5*d^5*x^5 + c^6*d^4*x^2)*(1/(c^5*d^4))^(5/6)
 - 4*(c^3*d^4*x^6 + 41*c^4*d^3*x^3 + 40*c^5*d^2)*sqrt(1/(c^5*d^4)
) - (c*d^3*x^7 - 28*c^2*d^2*x^4 - 272*c^3*d*x)*(1/(c^5*d^4))^(1/6
)) + 18*(c^2*d^4*x^8 + 20*c^3*d^3*x^5 - 8*c^4*d^2*x^2)*(1/(c^5*d^
4))^(1/3))/(d^3*x^9 - 24*c*d^2*x^6 + 192*c^2*d*x^3 - 512*c^3)) +
1/216*(1/(c^5*d^4))^(1/6)*log((d^3*x^9 - 276*c*d^2*x^6 - 1608*c^2
*d*x^3 - 1088*c^3 - 18*(c^4*d^5*x^7 - 52*c^5*d^4*x^4 - 80*c^6*d^3
*x)*(1/(c^5*d^4))^(2/3) - 6*sqrt(d*x^3 + c)*(24*(c^5*d^5*x^5 + c^
6*d^4*x^2)*(1/(c^5*d^4))^(5/6) - 4*(c^3*d^4*x^6 + 41*c^4*d^3*x^3
+ 40*c^5*d^2)*sqrt(1/(c^5*d^4)) - (c*d^3*x^7 - 28*c^2*d^2*x^4 - 2
72*c^3*d*x)*(1/(c^5*d^4))^(1/6)) + 18*(c^2*d^4*x^8 + 20*c^3*d^3*x
^5 - 8*c^4*d^2*x^2)*(1/(c^5*d^4))^(1/3))/(d^3*x^9 - 24*c*d^2*x^6
+ 192*c^2*d*x^3 - 512*c^3))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x}{-8c\sqrt{c+dx^3}+dx^3\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(x/(-8*c*sqrt(c + d*x**3) + d*x**3*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x}{\sqrt{dx^3 + c}(dx^3 - 8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

3.318 $\int \frac{1}{x^2(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=632

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{48\sqrt{3}c^{11/6}} + \frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{144c^{11/6}} - \frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{144c^{11/6}} - \frac{\sqrt{c+dx^3}}{8c^2x} + \frac{\sqrt[3]{d}\sqrt{c+dx^3}}{8c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$

```
[Out] -Sqrt[c + d*x^3]/(8*c^2*x) + (d^(1/3)*Sqrt[c + d*x^3])/(8*c^2*((1
 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1
/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(48*Sqrt[3]*c^(11/6)
) + (d^(1/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c +
d*x^3])])/(144*c^(11/6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sq
rt[c])])/(144*c^(11/6)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(
1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - S
qrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)]
, -7 - 4*Sqrt[3]])/(16*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x
))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(
1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^
(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSi
n[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)], -7 - 4*Sqrt[3]])/(4*Sqrt[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1
/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.46956, antiderivative size = 632, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{48\sqrt{3}c^{11/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{144c^{11/6}}$$
$$-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{144c^{11/6}}-\frac{\sqrt{c+dx^3}}{8c^2x}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{8c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -Sqrt[c + d*x^3]/(8*c^2*x) + (d^(1/3)*Sqrt[c + d*x^3])/(8*c^2*((1
 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1
/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(48*Sqrt[3]*c^(11/6)
) + (d^(1/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c +
d*x^3])])/(144*c^(11/6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sq
rt[c])])/(144*c^(11/6)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(
1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - S
qrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)]
, -7 - 4*Sqrt[3]])/(16*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x
))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(
1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^
(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSi
n[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)], -7 - 4*Sqrt[3]])/(4*Sqrt[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1
/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.7439, size = 53, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{1}{3},\frac{1}{2},1,\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{8c^2x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, 1/2, 1, 2/3, -d*x**3/c, d*x**3/(
8*c))/(8*c**2*x*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.438546, size = 350, normalized size = 0.55

$$\frac{\frac{-\frac{32cd^2x^6F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{\left(8c-dx^3\right)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-5\left(c+dx^3\right)}{c^2}+\frac{500dx^3F_1\left(\frac{2}{3};\frac{1}{2},\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\right.\right.\right.}}{40x\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] ((500*d*x^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c
)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c),
 (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c
), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d
*x^3)/(8*c)]))) + (-5*(c + d*x^3) - (32*c*d^2*x^6*AppellF1[5/3, 1
/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*Ap
pellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(
AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*Appe
llF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/c^2)/(40
*x*Sqrt[c + d*x^3])
```

Maple [C] time = 0.014, size = 874, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/8/c*(-(d*x^3+c)^(1/2)/c/x-1/3*I/c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-1/216*I/d^2/c^2*
2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^2),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{1}{(dx^5 - 8\,cx^2)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(-1/((d*x^5 - 8*c*x^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{-8cx^2\sqrt{c + dx^3} + dx^5\sqrt{c + dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(1/(-8*c*x**2*sqrt(c + d*x**3) + d*x**5*sqrt(c + d*x**3)
), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^2), x)
```

3.319 $\int \frac{1}{x^5(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=654

$$-\frac{d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{384\sqrt{3}c^{17/6}}+\frac{d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1152c^{17/6}}-\frac{d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1152c^{17/6}}$$
$$-\frac{d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{8\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{32c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{d^{4/3}\sqrt{c+dx^3}}{16c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{d\sqrt{c+dx^3}}{16c^3x}-\frac{\sqrt{c+dx^3}}{32c^2x^4}$$

```
[Out] -Sqrt[c + d*x^3]/(32*c^2*x^4) + (d*Sqrt[c + d*x^3])/(16*c^3*x) -
(d^(4/3)*Sqrt[c + d*x^3])/(16*c^3*((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)) - (d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/S
qrt[c + d*x^3]])/(384*Sqrt[3]*c^(17/6)) + (d^(4/3)*ArcTanh[(c^(1/
3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(1152*c^(17/6)) -
 (d^(4/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(1152*c^(17/6)) +
 (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c
^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)
*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32*c^
(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (d^(4/3)*(c^(1/3) + d^(1/3)*x
)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3)
+ d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]
])/(8*Sqrt[2]*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x)
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.77951, antiderivative size = 654, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{384\sqrt{3}c^{17/6}}+\frac{d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1152c^{17/6}}-\frac{d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1152c^{17/6}}-\frac{d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{d^{4/3}\sqrt{c+dx^3}}{16c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{d\sqrt{c+dx^3}}{16c^3x}-\frac{\sqrt{c+dx^3}}{32c^2x^4}$$

Antiderivative was successfully verified.

```
[In]   Int[1/(x^5*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -Sqrt[c + d*x^3]/(32*c^2*x^4) + (d*Sqrt[c + d*x^3])/(16*c^3*x) -
(d^(4/3)*Sqrt[c + d*x^3])/(16*c^3*((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)) - (d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/S
qrt[c + d*x^3]])/(384*Sqrt[3]*c^(17/6)) + (d^(4/3)*ArcTanh[(c^(1/
3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(1152*c^(17/6)) -
 (d^(4/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(1152*c^(17/6)) +
 (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c
^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)
*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32*c^
(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (d^(4/3)*(c^(1/3) + d^(1/3)*x
)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3)
+ d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]
])/(8*Sqrt[2]*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x)
)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.9157, size = 56, normalized size = 0.09

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{4}{3},\frac{1}{2},1,-\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{32c^2x^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(1/x**5/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-4/3, 1/2, 1, -1/3, -d*x**3/c, d*x**3/
(8*c))/(32*c**2*x**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.325054, size = 364, normalized size = 0.56

$$\frac{-\frac{750c^2d^2x^6F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{64cd^3x^9F_1\left(\frac{5}{3};\frac{1}{2},1;\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},\right.\right.\right.}}{160c^3x^4\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-5*c^2 + 5*c*d*x^3 + 10*d^2*x^6 - (750*c^2*d^2*x^6*AppellF1[2/3,
 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*
AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3
*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*App
ellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (64*c*d
^3*x^9*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(
(8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x
^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (
d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^
3)/(8*c)]))))/(160*c^3*x^4*Sqrt[c + d*x^3])
```

Maple [C] time = 0.035, size = 1351, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/8/c*(-1/4*(d*x^3+c)^(1/2)/c/x^4+5/8*d*(d*x^3+c)^(1/2)/c^2/x+5/2
4*I*d/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/
d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c
*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2))))+1/64*d/c^2*(-(d*x^3+c)^(1/2)/c/x-1/3*I/c*3
^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^
(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)
*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c
*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2))))-1/1728*I/d/c^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1
/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d
^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3
^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*
(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d
^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^
(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_
alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Ro
```

```
otOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^5),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{1}{(dx^8-8\,cx^5)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^5),x, algorithm="fricas")
```

```
[Out] integral(-1/((d*x^8 - 8*c*x^5)*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^5),x, algorithm="giac")
```

```
[Out] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^5), x)
```

3.320 $\int \frac{1}{x^8(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=678

$$-\frac{d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3072\sqrt{3}c^{23/6}}+\frac{d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9216c^{23/6}}-\frac{d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9216c^{23/6}}+\frac{3^{3/4}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{28\sqrt{2}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{112c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{3d^{7/3}\sqrt{c+dx^3}}{56c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{3d^2\sqrt{c+dx^3}}{56c^4x}+\frac{37d\sqrt{c+dx^3}}{1792c^3x^4}-\frac{\sqrt{c+dx^3}}{56c^2x^7}$$

```
[Out] -Sqrt[c + d*x^3]/(56*c^2*x^7) + (37*d*Sqrt[c + d*x^3])/(1792*c^3*
x^4) - (3*d^2*Sqrt[c + d*x^3])/(56*c^4*x) + (3*d^(7/3)*Sqrt[c + d
*x^3])/(56*c^4*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(7/3)*Ar
cTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(3
072*Sqrt[3]*c^(23/6)) + (d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/
(3*c^(1/6)*Sqrt[c + d*x^3])])/(9216*c^(23/6)) - (d^(7/3)*ArcTanh[
Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9216*c^(23/6)) - (3*3^(1/4)*Sqrt[2
 - Sqrt[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)
*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*
EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(112*c^(11/3)*Sqrt[(c^
(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^
2]*Sqrt[c + d*x^3]) + (3^(3/4)*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt
[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1
/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(28
*Sqrt[2]*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.05185, antiderivative size = 678, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3072\sqrt{3}c^{23/6}}+\frac{d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9216c^{23/6}}-\frac{d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9216c^{23/6}}+\frac{3^{3/4}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{28\sqrt{2}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{3\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{112c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{3d^{7/3}\sqrt{c+dx^3}}{56c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{3d^2\sqrt{c+dx^3}}{56c^4x}+\frac{37d\sqrt{c+dx^3}}{1792c^3x^4}-\frac{\sqrt{c+dx^3}}{56c^2x^7}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^8*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -Sqrt[c + d*x^3]/(56*c^2*x^7) + (37*d*Sqrt[c + d*x^3])/(1792*c^3*
x^4) - (3*d^2*Sqrt[c + d*x^3])/(56*c^4*x) + (3*d^(7/3)*Sqrt[c + d
*x^3])/(56*c^4*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(7/3)*Ar
cTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(3
072*Sqrt[3]*c^(23/6)) + (d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/
(3*c^(1/6)*Sqrt[c + d*x^3])])/(9216*c^(23/6)) - (d^(7/3)*ArcTanh[
Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9216*c^(23/6)) - (3*3^(1/4)*Sqrt[2
 - Sqrt[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)
*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*
EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(112*c^(11/3)*Sqrt[(c^
(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^
2]*Sqrt[c + d*x^3]) + (3^(3/4)*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt
[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1
/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(28
*Sqrt[2]*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.9718, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{7}{3},\frac{1}{2},1,-\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{56c^2x^7\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**8/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-7/3, 1/2, 1, -4/3, -d*x**3/c, d*x**3/
(8*c))/(56*c**2*x**7*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.41383, size = 378, normalized size = 0.56

$$\frac{\frac{38750c^2d^3x^9F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{3072cd^4x^{12}F_1\left(\frac{5}{3};\frac{1}{2},1;\ldots\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\ldots\right.\right.\right.}}{8960c^4x^7\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^8*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-5*(32*c^3 - 5*c^2*d*x^3 + 59*c*d^2*x^6 + 96*d^3*x^9) + (38750*c
^2*d^3*x^9*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)
])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c),
(d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c)
, (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*
x^3)/(8*c)]))) - (3072*c*d^4*x^12*AppellF1[5/3, 1/2, 1, 8/3, -((d
*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2,
 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/
2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1
, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(8960*c^4*x^7*Sqrt[c + d
*x^3])
```

Maple [C] time = 0.043, size = 1849, normalized size = 2.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^8/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/8/c*(-1/7*(d*x^3+c)^(1/2)/c/x^7+11/56*d*(d*x^3+c)^(1/2)/c^2/x^4
-55/112*d^2*(d*x^3+c)^(1/2)/c^3/x-55/336*I*d^2/c^3*3^(1/2)*(-c*d^
2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1
/64*d/c^2*(-1/4*(d*x^3+c)^(1/2)/c/x^4+5/8*d*(d*x^3+c)^(1/2)/c^2/x
+5/24*I*d/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((
x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d
*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3)))^(1/2))))+1/512*d^2/c^3*(-(d*x^3+c)^(1/2)/c/x-1/
3*I/c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-
c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2
```

```
)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2))))-1/13824*I/c^4*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1
/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/
3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)
*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticP
i(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c
*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c
*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_al
pha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^8),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^8), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^8),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**8/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^8),x, algorithm="giac")
```

```
[Out] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^8), x)
```

3.321 $\int \frac{x^3}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=66

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{1}{2};\frac{7}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{32c\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 1/2, 7/3, (d*x^3)/(8*c)
, -((d*x^3)/c)])/(32*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.191775, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{1}{2};\frac{7}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{32c\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 1/2, 7/3, (d*x^3)/(8*c)
, -((d*x^3)/c)])/(32*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 28.9058, size = 51, normalized size = 0.77

$$\frac{x^4\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{4}{3},\frac{1}{2},1,\frac{7}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{32c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 1/2, 1, 7/3, -d*x**3/c, d*x**
3/(8*c))/(32*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.271088, size = 168, normalized size = 2.55

$$\frac{14cx^4F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\sqrt{c+dx^3}\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+56cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (14*c*x^4*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)]
)/((8*c - d*x^3)*Sqrt[c + d*x^3]*(56*c*AppellF1[4/3, 1/2, 1, 7/3,
 -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10
/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 10/3,
-((d*x^3)/c), (d*x^3)/(8*c)])))
```

Maple [C] time = 0.045, size = 696, normalized size = 10.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 2/3*I/d^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/
d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ellipti
cF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
)-8/27*I/d^4*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+
1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d
^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^
(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-
c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2
)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^
2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-
8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^3}{\sqrt{dx^3+c}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{x^3}{\sqrt{dx^3+c}(dx^3-8\,c)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] integral(-x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^3}{-8c\sqrt{c+dx^3}+dx^3\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(x**3/(-8*c*sqrt(c + d*x**3) + d*x**3*sqrt(c + d*x**3)),
 x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x^3}{\sqrt{dx^3 + c}(dx^3 - 8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

3.322 $\int \frac{1}{(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=64

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{1}{2};\frac{4}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{8c\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 1/2, 4/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(8*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.0916118, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{1}{2};\frac{4}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{8c\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 1/2, 4/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(8*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.6884, size = 49, normalized size = 0.77

$$\frac{x\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{1}{3},\frac{1}{2},1,\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{8c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 1/2, 1, 4/3, -d*x**3/c, d*x**3/(
8*c))/(8*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.271148, size = 166, normalized size = 2.59

$$\frac{32cxF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\sqrt{c+dx^3}\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (32*c*x*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)])/
((8*c - d*x^3)*Sqrt[c + d*x^3]*(32*c*AppellF1[1/3, 1/2, 1, 4/3, -
((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3,
 -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d
*x^3)/c), (d*x^3)/(8*c)])))
```

Maple [C] time = 0.008, size = 416, normalized size = 6.5

$$\frac{-\frac{i}{27}\sqrt{2}}{d^3c}\sum_{\_alpha=RootOf(\_Z^3d-8c)}\frac{1}{\_alpha^2}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/27*I/d^3/c*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d
-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{1}{\sqrt{dx^3+c}(dx^3-8c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{1}{\sqrt{dx^3+c}(dx^3-8c)},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] integral(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{1}{-8c\sqrt{c+dx^3}+dx^3\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(1/(-8*c*sqrt(c + d*x**3) + d*x**3*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)), x)
```

3.323 $\int \frac{1}{x^3(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{1}{2};\frac{1}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{16cx^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 1/2, 1/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(16*c*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.191922, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{1}{2};\frac{1}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{16cx^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 1/2, 1/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(16*c*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.5795, size = 54, normalized size = 0.82

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{2}{3},\frac{1}{2},1,\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{16c^2x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 1/2, 1, 1/3, -d*x**3/c, d*x**3/(
8*c))/(16*c**2*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.455316, size = 347, normalized size = 5.26

$$\frac{\frac{64dx^3F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{-\frac{7cd^2x^6F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c}\right.}{\left(8c-dx^3\right)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\right.\right.\right.}}{c^2}}{16x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] ((64*d*x^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)
])/((-8*c + d*x^3)*(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c),
 (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c
), (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d
*x^3)/(8*c)]))) - (c + d*x^3 - (7*c*d^2*x^6*AppellF1[4/3, 1/2, 1,
 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(56*c*AppellF1
[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(Appell
```

```
F1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7
/3, 3/2, 1, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/c^2)/(16*x^2*S
qrt[c + d*x^3])
```

Maple [C] time = 0.015, size = 722, normalized size = 10.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/8/c*(-1/2/c/x^2*(d*x^3+c)^(1/2)+1/6*I/c*3^(1/2)*(-c*d^2)^(1/3)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-1/216*I/d^2/c^2*2^(1/2)*sum(1/
_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/
3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d
*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_a
lpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d
^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18
/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)
*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^3),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{1}{(dx^6-8\,cx^3)\sqrt{dx^3+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^3),x, algorithm="fricas")
```

```
[Out] integral(-1/((d*x^6 - 8*c*x^3)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{-8cx^3\sqrt{c+dx^3}+dx^6\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -Integral(1/(-8*c*x**3*sqrt(c + d*x**3) + d*x**6*sqrt(c + d*x**3)
), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^3), x)
```

3.324 $\int \frac{1}{x^6(8c-dx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{5}{3};1,\frac{1}{2};-\frac{2}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{40cx^5\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-5/3, 1, 1/2, -2/3, (d*x^3)/(8*c),
 -((d*x^3)/c)])/(40*c*x^5*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.198099, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.074$

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{5}{3};1,\frac{1}{2};-\frac{2}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{40cx^5\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^6*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-5/3, 1, 1/2, -2/3, (d*x^3)/(8*c),
 -((d*x^3)/c)])/(40*c*x^5*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.9738, size = 56, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{5}{3},\frac{1}{2},1,-\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{40c^2x^5\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**6/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-5/3, 1/2, 1, -2/3, -d*x**3/c, d*x**3/
(8*c))/(40*c**2*x**5*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.309068, size = 364, normalized size = 5.52

$$\frac{\frac{3264c^2d^2x^6F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{161cd^3x^9F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\right.\right.\right.}}{640c^3x^5\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^6*(8*c - d*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-16*c^2 + 7*c*d*x^3 + 23*d^2*x^6 + (3264*c^2*d^2*x^6*AppellF1[1/
3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(32*
c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x
^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*A
ppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) - (161*
c*d^3*x^9*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)]
)/((8*c - d*x^3)*(56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (
d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c)
, (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), (d
```

```
*x^3)/(8*c)])))))/(640*c^3*x^5*Sqrt[c + d*x^3])
```

Maple [C] time = 0.036, size = 1047, normalized size = 15.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^6/(-d*x^3+8*c)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/8/c*(-1/5/c/x^5*(d*x^3+c)^(1/2)+7/20*d/c^2/x^2*(d*x^3+c)^(1/2)-
7/60*I*d/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x
-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Elli
pticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)))+1/64*d/c^2*(-1/2/c/x^2*(d*x^3+c)^(1/2)+1/6*I/c*3^(1/2)*(-c*
d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+
1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-1/1728*I/d/c^3*2^(1
/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(
-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-
c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)
*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1
/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alp
ha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*
d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c
,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^6),x, algorithm="maxima")
```

```
[Out] -integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^6), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^6),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**6/(-d*x**3+8*c)/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^6),x, algorithm="giac")
```

```
[Out] integrate(-1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*x^6), x)
```

3.325 $\int \frac{x^{11}}{(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=90

$$\frac{1024c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^4}+\frac{2c^2}{27d^4\sqrt{c+dx^3}}-\frac{4c\sqrt{c+dx^3}}{d^4}-\frac{2\left(c+dx^3\right)^{3/2}}{9d^4}$$

```
[Out] (2*c^2)/(27*d^4*Sqrt[c + d*x^3]) - (4*c*Sqrt[c + d*x^3])/d^4 - (2
*(c + d*x^3)^(3/2))/(9*d^4) + (1024*c^(3/2)*ArcTanh[Sqrt[c + d*x^
3]/(3*Sqrt[c])])/(81*d^4)
```

Rubi [A] time = 0.266037, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{1024c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^4}+\frac{2c^2}{27d^4\sqrt{c+dx^3}}-\frac{4c\sqrt{c+dx^3}}{d^4}-\frac{2\left(c+dx^3\right)^{3/2}}{9d^4}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*c^2)/(27*d^4*Sqrt[c + d*x^3]) - (4*c*Sqrt[c + d*x^3])/d^4 - (2
*(c + d*x^3)^(3/2))/(9*d^4) + (1024*c^(3/2)*ArcTanh[Sqrt[c + d*x^
3]/(3*Sqrt[c])])/(81*d^4)
```

Rubi in Sympy [A] time = 31.0834, size = 83, normalized size = 0.92

$$\frac{1024c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^4}+\frac{2c^2}{27d^4\sqrt{c+dx^3}}-\frac{4c\sqrt{c+dx^3}}{d^4}-\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] 1024*c**(3/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(81*d**4) + 2*c
**2/(27*d**4*sqrt(c + d*x**3)) - 4*c*sqrt(c + d*x**3)/d**4 - 2*(c
 + d*x**3)**(3/2)/(9*d**4)
```

Mathematica [A] time = 0.181066, size = 70, normalized size = 0.78

$$\frac{2\left(512c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-\frac{3(56c^2+60cdx^3+3d^2x^6)}{\sqrt{c+dx^3}}\right)}{81d^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*((-3*(56*c^2 + 60*c*d*x^3 + 3*d^2*x^6))/Sqrt[c + d*x^3] + 512*
c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))/(81*d^4)
```

Maple [C] time = 0.084, size = 560, normalized size = 6.2

$$-\frac{1}{d}\left(-\frac{2c^2}{3d^3}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}+\frac{2x^3}{9d^2}\sqrt{dx^3+c}-\frac{10c}{9d^3}\sqrt{dx^3+c}\right)$$
$$-8\frac{c}{d^2}\left(2/3\frac{c}{d^2}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}+2/3\frac{\sqrt{dx^3+c}}{d^2}\right)+\frac{128c^2}{3d^4}\frac{1}{\sqrt{dx^3+c}}$$
$$-512\frac{c^3}{d^3}\left(\frac{2}{27cd}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}+\frac{\frac{i}{243}\sqrt{2}}{d^3c^2}\sum_{\_alpha=RootOf(d\_Z^3-8c)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\_alpha^2d^2-i\sqrt{3}\left(-cd^2\right)^{2/3}-\sqrt[3]{\ }\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/d*(-2/3/d^3*c^2/((x^3+c/d)*d)^(1/2)+2/9/d^2*x^3*(d*x^3+c)^(1/2
)-10/9*c*(d*x^3+c)^(1/2)/d^3)-8*c/d^2*(2/3/d^2*c/((x^3+c/d)*d)^(1
/2)+2/3*(d*x^3+c)^(1/2)/d^2)+128/3*c^2/d^4/(d*x^3+c)^(1/2)-512*c^
3/d^3*(2/27/d/c/((x^3+c/d)*d)^(1/2)+1/243*I/d^3/c^2*2^(1/2)*sum((
-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-
c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*
(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/
(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2
-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))
*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_a
lpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I
*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^
2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^11/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.237121, size = 1, normalized size = 0.01

$$\left[-\frac{2\left(9d^2x^6+180cdx^3-256\sqrt{dx^3+c}c^{\frac{3}{2}}\log\left(\frac{dx^3+6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)+168c^2\right)}{81\sqrt{dx^3+c}d^4},\ -\frac{2\left(9d^2x^6+180cdx^3-512\sqrt{dx^3+c}\sqrt{-c}c\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)+168c^2\right)}{81\sqrt{dx^3+c}d^4}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^11/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] [-2/81*(9*d^2*x^6 + 180*c*d*x^3 - 256*sqrt(d*x^3 + c)*c^(3/2)*log
((d*x^3 + 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c)/(d*x^3 - 8*c)) + 168*
```

```
c^2)/(sqrt(d*x^3 + c)*d^4), -2/81*(9*d^2*x^6 + 180*c*d*x^3 - 512*
sqrt(d*x^3 + c)*sqrt(-c)*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) +
 168*c^2)/(sqrt(d*x^3 + c)*d^4)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219514, size = 111, normalized size = 1.23

$$-\frac{1024\,c^2\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{81\,\sqrt{-c}d^4}+\frac{2\,c^2}{27\,\sqrt{dx^3+c}d^4}-\frac{2\,\left(\left(dx^3+c\right)^{\frac{3}{2}}d^8+18\,\sqrt{dx^3+c}cd^8\right)}{9\,d^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^11/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] -1024/81*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^4)
+ 2/27*c^2/(sqrt(d*x^3 + c)*d^4) - 2/9*((d*x^3 + c)^(3/2)*d^8 + 1
8*sqrt(d*x^3 + c)*c*d^8)/d^12
```

3.326 $\int \frac{x^8}{(8c-dx^3)(c+dx^3)^{3/2}} dx$

Optimal. Leaf size=71

$$-\frac{2c}{27d^3\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{3d^3}+\frac{128\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^3}$$

```
[Out] (-2*c)/(27*d^3*Sqrt[c + d*x^3]) - (2*Sqrt[c + d*x^3])/(3*d^3) + (
128*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(81*d^3)
```

Rubi [A] time = 0.212102, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$-\frac{2c}{27d^3\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{3d^3}+\frac{128\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-2*c)/(27*d^3*Sqrt[c + d*x^3]) - (2*Sqrt[c + d*x^3])/(3*d^3) + (
128*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(81*d^3)
```

Rubi in Sympy [A] time = 26.4641, size = 65, normalized size = 0.92

$$\frac{128\sqrt{c}\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^3}-\frac{2c}{27d^3\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{3d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] 128*sqrt(c)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(81*d**3) - 2*c/(
27*d**3*sqrt(c + d*x**3)) - 2*sqrt(c + d*x**3)/(3*d**3)
```

Mathematica [A] time = 0.107375, size = 67, normalized size = 0.94

$$\frac{2\left(64\sqrt{c}\sqrt{c+dx^3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-30c-27dx^3\right)}{81d^3\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*(-30*c - 27*d*x^3 + 64*Sqrt[c]*Sqrt[c + d*x^3]*ArcTanh[Sqrt[c
+ d*x^3]/(3*Sqrt[c])]))/(81*d^3*Sqrt[c + d*x^3])
```

Maple [C] time = 0.016, size = 501, normalized size = 7.1

$$-\frac{1}{d^2}\left(d\left(\frac{2c}{3d^2}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}+\frac{2}{3d^2}\sqrt{dx^3+c}\right)-\frac{16c}{3d}\frac{1}{\sqrt{dx^3+c}}\right)$$
$$-64\frac{c^2}{d^2}\left(\frac{2}{27cd}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}+\frac{\frac{i}{243}\sqrt{2}}{d^3c^2}\sum_{\_alpha=RootOf(\_Z^3d-8c)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\_alpha^2d^2-i\sqrt{3}\left(-cd^2\right)^{2/3}-\sqrt[3]{\cdot}\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/d^2*(d*(2/3/d^2*c/((x^3+c/d)*d)^(1/2)+2/3*(d*x^3+c)^(1/2)/d^2)
-16/3*c/d/(d*x^3+c)^(1/2))-64*c^2/d^2*(2/27/d/c/((x^3+c/d)*d)^(1/
2)+1/243*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(
-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*
(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(
1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2
)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)
*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2
)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I
*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2
/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^8/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.232643, size = 1, normalized size = 0.01

$$\left[-\frac{2\left(27\,dx^3-32\,\sqrt{dx^3+c}\sqrt{c}\log\left(\frac{dx^3+6\,\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)+30\,c\right)}{81\,\sqrt{dx^3+c}d^3},\right.$$
$$\left.-\frac{2\left(27\,dx^3-64\,\sqrt{dx^3+c}\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)+30\,c\right)}{81\,\sqrt{dx^3+c}d^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^8/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] [-2/81*(27*d*x^3 - 32*sqrt(d*x^3 + c)*sqrt(c)*log((d*x^3 + 6*sqrt
(d*x^3 + c)*sqrt(c) + 10*c)/(d*x^3 - 8*c)) + 30*c)/(sqrt(d*x^3 +
c)*d^3), -2/81*(27*d*x^3 - 64*sqrt(d*x^3 + c)*sqrt(-c)*arctan(1/3
*sqrt(d*x^3 + c)/sqrt(-c)) + 30*c)/(sqrt(d*x^3 + c)*d^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219454, size = 78, normalized size = 1.1

$$-\frac{128\,c\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{81\,\sqrt{-c}d^3}-\frac{2\,\sqrt{dx^3+c}}{3\,d^3}-\frac{2\,c}{27\,\sqrt{dx^3+c}d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^8/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] -128/81*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^3) - 2
/3*sqrt(d*x^3 + c)/d^3 - 2/27*c/(sqrt(d*x^3 + c)*d^3)
```

3.327 $\int \frac{x^5}{(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=52

$$\frac{2}{27d^2\sqrt{c+dx^3}}+\frac{16\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81\sqrt{c}d^2}$$

```
[Out] 2/(27*d^2*Sqrt[c + d*x^3]) + (16*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])])/(81*Sqrt[c]*d^2)
```

Rubi [A] time = 0.153006, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{2}{27d^2\sqrt{c+dx^3}}+\frac{16\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81\sqrt{c}d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] 2/(27*d^2*Sqrt[c + d*x^3]) + (16*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])])/(81*Sqrt[c]*d^2)
```

Rubi in Sympy [A] time = 16.5167, size = 46, normalized size = 0.88

$$\frac{2}{27d^2\sqrt{c+dx^3}}+\frac{16\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81\sqrt{c}d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] 2/(27*d**2*sqrt(c + d*x**3)) + 16*atanh(sqrt(c + d*x**3)/(3*sqrt(
c)))/(81*sqrt(c)*d**2)
```

Mathematica [A] time = 0.0673865, size = 49, normalized size = 0.94

$$\frac{2\left(\frac{3}{\sqrt{c+dx^3}}+\frac{8\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{\sqrt{c}}\right)}{81d^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*(3/Sqrt[c + d*x^3] + (8*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/
Sqrt[c]))/(81*d^2)
```

Maple [C] time = 0.014, size = 456, normalized size = 8.8

$$\frac{2}{3d^2}\frac{1}{\sqrt{dx^3+c}} -8\frac{c}{d}\left(\frac{2}{27\,cd}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}+\frac{\frac{i}{243}\sqrt{2}}{d^3c^2}\sum_{\_alpha=RootOf(\_Z^3d-8\,c)}\frac{\sqrt[3]{-cd^2}\left(i\sqrt[3]{-cd^2}\_alpha\sqrt{3}d+2\_alpha^2d^2-i\sqrt{3}\left(-cd^2\right)^{2/3}-\sqrt[3]{-c}\right.}{\sqrt{dx^3+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 2/3/d^2/(d*x^3+c)^(1/2)-8*c/d*(2/27/d/c/((x^3+c/d)*d)^(1/2)+1/243
*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/
2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/
d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(
1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3))
)/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*
3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*
_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*
(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*
d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^5/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.235296, size = 1, normalized size = 0.02

$$\left[\frac{2\left(4\sqrt{dx^3+c}\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+3\sqrt{c}\right)}{81\sqrt{dx^3+c}\sqrt{c}d^2}, -\frac{2\left(8\sqrt{dx^3+c}\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-3\sqrt{-c}\right)}{81\sqrt{dx^3+c}\sqrt{-c}d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^5/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] [2/81*(4*sqrt(d*x^3 + c)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x
^3 + c)*c)/(d*x^3 - 8*c)) + 3*sqrt(c))/(sqrt(d*x^3 + c)*sqrt(c)*d
^2), -2/81*(8*sqrt(d*x^3 + c)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c
))) - 3*sqrt(-c))/(sqrt(d*x^3 + c)*sqrt(-c)*d^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21805, size = 63, normalized size = 1.21

$$-\frac{2\left(\frac{8\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}d}-\frac{3}{\sqrt{dx^3+c}d}\right)}{81\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^5/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] -2/81*(8*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) - 3/(s
qrt(d*x^3 + c)*d))/d
```

3.328 $\int \frac{x^2}{(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=55

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{3/2}d}-\frac{2}{27cd\sqrt{c+dx^3}}$$

```
[Out] -2/(27*c*d*Sqrt[c + d*x^3]) + (2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])])/(81*c^(3/2)*d)
```

Rubi [A] time = 0.142207, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{3/2}d}-\frac{2}{27cd\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] -2/(27*c*d*Sqrt[c + d*x^3]) + (2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[
c])])/(81*c^(3/2)*d)
```

Rubi in Sympy [A] time = 17.007, size = 44, normalized size = 0.8

$$-\frac{2}{27cd\sqrt{c+dx^3}}+\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{\frac{3}{2}}d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] -2/(27*c*d*sqrt(c + d*x**3)) + 2*atanh(sqrt(c + d*x**3)/(3*sqrt(c
)))/(81*c**(3/2)*d)
```

Mathematica [A] time = 0.0654167, size = 52, normalized size = 0.95

$$\frac{2\left(\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)-\frac{3\sqrt{c}}{\sqrt{c+dx^3}}\right)}{81c^{3/2}d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*((-3*Sqrt[c])/Sqrt[c + d*x^3] + ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])]))/(81*c^(3/2)*d)
```

Maple [C] time = 0.013, size = 435, normalized size = 7.9

$$-\frac{2}{27\,cd}\,\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}$$
$$-\frac{\frac{i}{243}\sqrt{2}}{d^3c^2}\sum_{\_alpha=RootOf(\_Z^3d-8c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] -2/27/d/c/((x^3+c/d)*d)^(1/2)-1/243*I/d^3/c^2*2^(1/2)*sum((-c*d^2
)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/
3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)
^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(
1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3
+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(
1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellip
ticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2
*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/
2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/
3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))
,_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^2/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.228689, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{dx^3+c}\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8\,c}\right)-6\sqrt{c}}{81\sqrt{dx^3+c}c^{\frac{3}{2}}d},-\frac{2\left(\sqrt{dx^3+c}\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+3\sqrt{-c}\right)}{81\sqrt{dx^3+c}\sqrt{-c}cd}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^2/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] [1/81*(sqrt(d*x^3 + c)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3
 + c)*c)/(d*x^3 - 8*c)) - 6*sqrt(c))/(sqrt(d*x^3 + c)*c^(3/2)*d),
 -2/81*(sqrt(d*x^3 + c)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) +
3*sqrt(-c))/(sqrt(d*x^3 + c)*sqrt(-c)*c*d)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21788, size = 65, normalized size = 1.18

$$-\frac{2\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{81\,\sqrt{-c}cd}-\frac{2}{27\,\sqrt{dx^3+c}cd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^2/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] -2/81*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c*d) - 2/27/
(sqrt(d*x^3 + c)*c*d)
```

3.329 $\int \frac{1}{x(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=76

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{324c^{5/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12c^{5/2}}+\frac{2}{27c^2\sqrt{c+dx^3}}$$

```
[Out] 2/(27*c^2*Sqrt[c + d*x^3]) + ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
/(324*c^(5/2)) - ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(12*c^(5/2))
```

Rubi [A] time = 0.254474, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{324c^{5/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12c^{5/2}}+\frac{2}{27c^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] 2/(27*c^2*Sqrt[c + d*x^3]) + ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
/(324*c^(5/2)) - ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(12*c^(5/2))
```

Rubi in Sympy [A] time = 31.3079, size = 65, normalized size = 0.86

$$\frac{2}{27c^2\sqrt{c+dx^3}}+\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{324c^{\frac{5}{2}}}-\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{12c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] 2/(27*c**2*sqrt(c + d*x**3)) + atanh(sqrt(c + d*x**3)/(3*sqrt(c))
)/(324*c**(5/2)) - atanh(sqrt(c + d*x**3)/sqrt(c))/(12*c**(5/2))
```

Mathematica [C] time = 0.271127, size = 310, normalized size = 4.08

$$\frac{2\left(-\frac{8cdx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{15cdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\right.}{(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},\right.\right.}\right.}{27c^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*(1 - (8*c*d*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(
8*c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c),
(d*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x
^3)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)
]))) + (15*c*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)
/(d*x^3)])/((-8*c + d*x^3)*(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(
c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/
(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^
```

```
3)), (8*c)/(d*x^3)])))))/(27*c^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.036, size = 485, normalized size = 6.4

$$\frac{1}{8c}\left(\frac{2}{3c}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}-\frac{2}{3}\mathrm{Artanh}\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{3}{2}}\right)-\frac{d}{8c}\left(\frac{2}{27\,cd}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}+\frac{\frac{i}{243}\sqrt{2}}{d^3c^2}\sum_{\_alpha=RootOf\left(d\_Z^3-8c\right)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/8/c*(2/3/c/((x^3+c/d)*d)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1
/2))/c^(3/2))-1/8*d/c*(2/27/d/c/((x^3+c/d)*d)^(1/2)+1/243*I/d^3/c
^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^
2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1
/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*
d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d
-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)
^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x), x)
```

Fricas [A] time = 0.238704, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{dx^3+c}\log\left(\frac{(dx^3+10c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8c}\right)+27\sqrt{dx^3+c}\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)+48\sqrt{c}}{648\sqrt{dx^3+c}c^{\frac{5}{2}}},\ -\frac{\sqrt{dx^3+c}\arctan\left(\frac{3c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-27\sqrt{dx^3+c}\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-24\sqrt{-c}}{324\sqrt{dx^3+c}\sqrt{-c}c^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x),x, algorithm="fricas")
```

```
[Out] [1/648*(sqrt(d*x^3 + c)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^
3 + c)*c)/(d*x^3 - 8*c)) + 27*sqrt(d*x^3 + c)*log(((d*x^3 + 2*c)*
```

```
sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3) + 48*sqrt(c))/(sqrt(d*x^3 + c
)*c^(5/2)), -1/324*(sqrt(d*x^3 + c)*arctan(3*c/(sqrt(d*x^3 + c)*s
qrt(-c))) - 27*sqrt(d*x^3 + c)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c)
)) - 24*sqrt(-c))/(sqrt(d*x^3 + c)*sqrt(-c)*c^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216823, size = 92, normalized size = 1.21

$$\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{12\sqrt{-c}c^2} - \frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{324\sqrt{-c}c^2} + \frac{2}{27\sqrt{dx^3+c}c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x),x, algorithm="giac")
```

```
[Out] 1/12*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) - 1/324*arct
an(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) + 2/27/(sqrt(d*x^
3 + c)*c^2)
```

3.330 $\int \frac{1}{x^4(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=100

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2592c^{7/2}}+\frac{11d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{7/2}}-\frac{25d}{216c^3\sqrt{c+dx^3}}-\frac{1}{24c^2x^3\sqrt{c+dx^3}}$$

```
[Out] (-25*d)/(216*c^3*Sqrt[c + d*x^3]) - 1/(24*c^2*x^3*Sqrt[c + d*x^3]
) + (d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(2592*c^(7/2)) + (11
*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(96*c^(7/2))
```

Rubi [A] time = 0.375128, antiderivative size = 100, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2592c^{7/2}}+\frac{11d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{7/2}}-\frac{25d}{216c^3\sqrt{c+dx^3}}-\frac{1}{24c^2x^3\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-25*d)/(216*c^3*Sqrt[c + d*x^3]) - 1/(24*c^2*x^3*Sqrt[c + d*x^3]
) + (d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(2592*c^(7/2)) + (11
*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(96*c^(7/2))
```

Rubi in Sympy [A] time = 51.3181, size = 92, normalized size = 0.92

$$-\frac{1}{24c^2x^3\sqrt{c+dx^3}}-\frac{25d}{216c^3\sqrt{c+dx^3}}+\frac{d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2592c^{\frac{7}{2}}}+\frac{11d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] -1/(24*c**2*x**3*sqrt(c + d*x**3)) - 25*d/(216*c**3*sqrt(c + d*x*
*3)) + d*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(2592*c**(7/2)) + 11
*d*atanh(sqrt(c + d*x**3)/sqrt(c))/(96*c**(7/2))
```

Mathematica [C] time = 0.384107, size = 326, normalized size = 3.26

$$\frac{\frac{200cd^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{330cd^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3}\right.}{(8c-dx^3)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\right.\right.}}{216c^3x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-9*c - 25*d*x^3 + (200*c*d^2*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3
)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2,
 -((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((
d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c)
, (d*x^3)/(8*c)]))) + (330*c*d^2*x^6*AppellF1[3/2, 1/2, 1, 5/2, -
(c/(d*x^3)), (8*c)/(d*x^3)])/((8*c - d*x^3)*(5*d*x^3*AppellF1[3/2
```

```
, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2,
1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2,
1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)])))/(216*c^3*x^3*Sqrt[c + d*x
^3])
```

Maple [C] time = 0.04, size = 549, normalized size = 5.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/8/c*(-1/3*(d*x^3+c)^(1/2)/c^2/x^3-2/3*d/c^2/((x^3+c/d)*d)^(1/2)
+d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2))+1/64*d/c^2*(2/3/c/((
x^3+c/d)*d)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2))-1
/64*d^2/c^2*(2/27/d/c/((x^3+c/d)*d)^(1/2)+1/243*I/d^3/c^2*2^(1/2)
*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/
(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*
x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha
^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^
(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(
2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(
1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^4),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^4), x)
```

Fricas [A] time = 0.240818, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{dx^3+c}dx^3\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+297\sqrt{dx^3+c}dx^3\log\left(\frac{(dx^3+2\,c)\sqrt{c}+2\sqrt{dx^3+c}c}{x^3}\right)-24\left(25\,dx^3+9\,c\right)\sqrt{c}}{5184\sqrt{dx^3+c}c^{\frac{7}{2}}x^3},\right.$$
$$\left.-\frac{\sqrt{dx^3+c}dx^3\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+297\sqrt{dx^3+c}dx^3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+12\left(25\,dx^3+9\,c\right)\sqrt{-c}}{2592\sqrt{dx^3+c}\sqrt{-c}c^3x^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/5184*(sqrt(d*x^3 + c)*d*x^3*log(((d*x^3 + 10*c)*sqrt(c) + 6*sq
rt(d*x^3 + c)*c)/(d*x^3 - 8*c)) + 297*sqrt(d*x^3 + c)*d*x^3*log((
(d*x^3 + 2*c)*sqrt(c) + 2*sqrt(d*x^3 + c)*c)/x^3) - 24*(25*d*x^3
```

```
+ 9*c)*sqrt(c))/(sqrt(d*x^3 + c)*c^(7/2)*x^3), -1/2592*(sqrt(d*x^
3 + c)*d*x^3*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) + 297*sqrt(d*
x^3 + c)*d*x^3*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))) + 12*(25*d*x^
3 + 9*c)*sqrt(-c))/(sqrt(d*x^3 + c)*sqrt(-c)*c^3*x^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21834, size = 128, normalized size = 1.28

$$-\frac{1}{2592}\,d\left(\frac{297\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^3}+\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c^3}+\frac{12\,(25\,dx^3+9\,c)}{\left((dx^3+c)^{\frac{3}{2}}-\sqrt{dx^3+c}c\right)c^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^4),x, algorithm="giac")
```

```
[Out] -1/2592*d*(297*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) +
arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) + 12*(25*d*x^
3 + 9*c)/(((d*x^3 + c)^(3/2) - sqrt(d*x^3 + c)*c)*c^3))
```

3.331 $\int \frac{1}{x^7(8c-dx^3)(c+dx^3)^{3/2}} \, dx$

Optimal. Leaf size=128

$$\frac{d^2 \tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{20736c^{9/2}} - \frac{109d^2 \tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{768c^{9/2}} + \frac{245d^2}{1728c^4\sqrt{c+dx^3}} + \frac{3d}{64c^3x^3\sqrt{c+dx^3}} - \frac{1}{48c^2x^6\sqrt{c+dx^3}}$$

```
[Out] (245*d^2)/(1728*c^4*Sqrt[c + d*x^3]) - 1/(48*c^2*x^6*Sqrt[c + d*x
^3]) + (3*d)/(64*c^3*x^3*Sqrt[c + d*x^3]) + (d^2*ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])])/(20736*c^(9/2)) - (109*d^2*ArcTanh[Sqrt[c +
 d*x^3]/Sqrt[c]])/(768*c^(9/2))
```

Rubi [A] time = 0.487813, antiderivative size = 128, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.296

$$\frac{d^2 \tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{20736c^{9/2}} - \frac{109d^2 \tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{768c^{9/2}} + \frac{245d^2}{1728c^4\sqrt{c+dx^3}} + \frac{3d}{64c^3x^3\sqrt{c+dx^3}} - \frac{1}{48c^2x^6\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (245*d^2)/(1728*c^4*Sqrt[c + d*x^3]) - 1/(48*c^2*x^6*Sqrt[c + d*x
^3]) + (3*d)/(64*c^3*x^3*Sqrt[c + d*x^3]) + (d^2*ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])])/(20736*c^(9/2)) - (109*d^2*ArcTanh[Sqrt[c +
 d*x^3]/Sqrt[c]])/(768*c^(9/2))
```

Rubi in Sympy [A] time = 70.4029, size = 119, normalized size = 0.93

$$-\frac{1}{48c^2x^6\sqrt{c+dx^3}} + \frac{3d}{64c^3x^3\sqrt{c+dx^3}} + \frac{245d^2}{1728c^4\sqrt{c+dx^3}} + \frac{d^2 \operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{20736c^{\frac{9}{2}}} - \frac{109d^2 \operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{768c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] -1/(48*c**2*x**6*sqrt(c + d*x**3)) + 3*d/(64*c**3*x**3*sqrt(c + d
*x**3)) + 245*d**2/(1728*c**4*sqrt(c + d*x**3)) + d**2*atanh(sqrt
(c + d*x**3)/(3*sqrt(c)))/(20736*c**(9/2)) - 109*d**2*atanh(sqrt(
c + d*x**3)/sqrt(c))/(768*c**(9/2))
```

Mathematica [C] time = 0.362232, size = 336, normalized size = 2.62

$$\frac{-\frac{1960cd^3x^9F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)} + \frac{3270cd^3x^9F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\ldots\right)}{(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};\ldots\right.}}{1728c^4x^6\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^7*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-36*c^2 + 81*c*d*x^3 + 245*d^2*x^6 - (1960*c*d^3*x^9*AppellF1[1,
 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(16*c*Ap
pellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(Appell
```

```
F1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[2, 3/2
, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (3270*c*d^3*x^9*AppellF
1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/((-8*c + d*x^3)
*(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)]
 + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] -
 c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)])))/(17
28*c^4*x^6*Sqrt[c + d*x^3])
```

Maple [C] time = 0.044, size = 636, normalized size = 5.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/8/c*(-1/6*(d*x^3+c)^(1/2)/c^2/x^6+7/12*d*(d*x^3+c)^(1/2)/c^3/x^
3+2/3*d^2/c^3/((x^3+c/d)*d)^(1/2)-5/4*d^2*arctanh((d*x^3+c)^(1/2)
/c^(1/2))/c^(7/2))+1/64*d/c^2*(-1/3*(d*x^3+c)^(1/2)/c^2/x^3-2/3*d
/c^2/((x^3+c/d)*d)^(1/2)+d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/
2))+1/512*d^2/c^3*(2/3/c/((x^3+c/d)*d)^(1/2)-2/3*arctanh((d*x^3+c
)^(1/2)/c^(1/2))/c^(3/2))-1/512*d^3/c^3*(2/27/d/c/((x^3+c/d)*d)^(
1/2)+1/243*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d
*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2
)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)
^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/
3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d
^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d
-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^
(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c
)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^7),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^7), x)
```

Fricas [A] time = 0.243703, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{dx^3+c}d^2x^6\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+2943\sqrt{dx^3+c}d^2x^6\log\left(\frac{(dx^3+2\,c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)+24\left(245\,d^2x^6+81\,cdx^3-36\,c\right.}{41472\sqrt{dx^3+c}c^{\frac{9}{2}}x^6}\right.$$

$$\left.-\frac{\sqrt{dx^3+c}d^2x^6\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-2943\sqrt{dx^3+c}d^2x^6\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-12\left(245\,d^2x^6+81\,cdx^3-36\,c^2\right)\sqrt{-c}}{20736\sqrt{dx^3+c}\sqrt{-c}c^4x^6}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^7),x, algorithm="fricas")
```

```
[Out] [1/41472*(sqrt(d*x^3 + c)*d^2*x^6*log(((d*x^3 + 10*c)*sqrt(c) + 6
*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) + 2943*sqrt(d*x^3 + c)*d^2*x^6
*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3) + 24*(245
*d^2*x^6 + 81*c*d*x^3 - 36*c^2)*sqrt(c))/(sqrt(d*x^3 + c)*c^(9/2)
*x^6), -1/20736*(sqrt(d*x^3 + c)*d^2*x^6*arctan(3*c/(sqrt(d*x^3 +
 c)*sqrt(-c))) - 2943*sqrt(d*x^3 + c)*d^2*x^6*arctan(c/(sqrt(d*x^
3 + c)*sqrt(-c))) - 12*(245*d^2*x^6 + 81*c*d*x^3 - 36*c^2)*sqrt(-
c))/(sqrt(d*x^3 + c)*sqrt(-c)*c^4*x^6)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**7/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219562, size = 146, normalized size = 1.14

$$\frac{1}{20736}\, d^2\left(\frac{2943\, \arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^4} - \frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}c^4} + \frac{1536}{\sqrt{dx^3+c}c^4} + \frac{108\left(13\left(dx^3+c\right)^{\frac{3}{2}} - 17\sqrt{dx^3+c}c\right)}{c^4 d^2 x^6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^7),x, algorithm="giac")
```

```
[Out] 1/20736*d^2*(2943*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^4)
 - arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^4) + 1536/(sq
rt(d*x^3 + c)*c^4) + 108*(13*(d*x^3 + c)^(3/2) - 17*sqrt(d*x^3 +
c)*c)/(c^4*d^2*x^6))
```

3.332 $\int \frac{x^7}{(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=629

$$-\frac{56\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{28\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{9\,3^{3/4}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{56\sqrt{c+dx^3}}{27d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{32\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27\sqrt{3}d^{8/3}}+\frac{32\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{81d^{8/3}}-\frac{32\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^{8/3}}+\frac{2x^2}{27d^2\sqrt{c+dx^3}}$$

```
[Out] (2*x^2)/(27*d^2*Sqrt[c + d*x^3]) - (56*Sqrt[c + d*x^3])/(27*d^(8/
3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (32*c^(1/6)*ArcTan[(Sqr
t[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(27*Sqrt[3]
*d^(8/3)) + (32*c^(1/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6
)*Sqrt[c + d*x^3])]])/(81*d^(8/3)) - (32*c^(1/6)*ArcTanh[Sqrt[c +
d*x^3]/(3*Sqrt[c])]])/(81*d^(8/3)) + (28*Sqrt[2 - Sqrt[3]]*c^(1/3)
*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3
)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((
1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)], -7 - 4*Sqrt[3]])/(9*3^(3/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3)
 + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*
x^3]) - (56*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
 c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*d^
(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.51981, antiderivative size = 629, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$-\frac{56\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{28\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{9\,3^{3/4}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{56\sqrt{c+dx^3}}{27d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{32\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27\sqrt{3}d^{8/3}}+\frac{32\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{81d^{8/3}}-\frac{32\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^{8/3}}+\frac{2x^2}{27d^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*x^2)/(27*d^2*Sqrt[c + d*x^3]) - (56*Sqrt[c + d*x^3])/(27*d^(8/
3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (32*c^(1/6)*ArcTan[(Sqr
t[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(27*Sqrt[3]
*d^(8/3)) + (32*c^(1/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6
)*Sqrt[c + d*x^3])]])/(81*d^(8/3)) - (32*c^(1/6)*ArcTanh[Sqrt[c +
d*x^3]/(3*Sqrt[c])]])/(81*d^(8/3)) + (28*Sqrt[2 - Sqrt[3]]*c^(1/3)
*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3
)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((
1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)], -7 - 4*Sqrt[3]]])/(9*3^(3/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3)
 + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*
x^3]) - (56*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
 c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]]])/(27*3^(1/4)*d^
(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.5215, size = 51, normalized size = 0.08

$$\frac{x^8\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{8}{3},1,\frac{3}{2},\frac{11}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{64c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] x**8*sqrt(c + d*x**3)*appellf1(8/3, 1, 3/2, 11/3, d*x**3/(8*c), -
d*x**3/c)/(64*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.254758, size = 337, normalized size = 0.54

$$\frac{2x^2\left(-\frac{1600c^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{896cdx^3F_1\left(\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F\right.\right.}\right.}{135d^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^7/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*x^2*(5 - (1600*c^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d
*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((
d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -
((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x
^3)/c), (d*x^3)/(8*c)]))) + (896*c*d*x^3*AppellF1[5/3, 1/2, 1, 8/
3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/
3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[
8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3,
 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])))))/(135*d^2*Sqrt[c
+ d*x^3])
```

Maple [C] time = 0.088, size = 1810, normalized size = 2.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/d^2*(d*(-2/3/d*x^2/((x^3+c/d)*d)^(1/2)-8/9*I/d^2*3^(1/2)*(-c*d
^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+
8*c*(2/3/c*x^2/((x^3+c/d)*d)^(1/2)+2/9*I/c*3^(1/2)/d*(-c*d^2)^(1/
3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-64*c^2
/d^2*(-2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)-2/81*I/c^2*3^(1/2)/d*(-c*
d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+
1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)
```

```
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+
1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d
-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^7}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{x^7}{(d^2x^6-7\,cdx^3-8\,c^2)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] integral(-x^7/((d^2*x^6 - 7*c*d*x^3 - 8*c^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**7/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x^7}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

3.333 $\int \frac{x^4}{(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=635

$$-\frac{4\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27\sqrt{3}c^{5/6}d^{5/3}}+\frac{4\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{81c^{5/6}d^{5/3}}-\frac{4\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{5/6}d^{5/3}}$$
$$+\frac{2\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}c^{2/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{9\,3^{3/4}c^{2/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{2\sqrt{c+dx^3}}{27cd^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2x^2}{27cd\sqrt{c+dx^3}}$$

```
[Out] (-2*x^2)/(27*c*d*Sqrt[c + d*x^3]) + (2*Sqrt[c + d*x^3])/(27*c*d^(
5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (4*ArcTan[(Sqrt[3]*c^
(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(27*Sqrt[3]*c^(5/6
)*d^(5/3)) + (4*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c
 + d*x^3])])/(81*c^(5/6)*d^(5/3)) - (4*ArcTanh[Sqrt[c + d*x^3]/(3
*Sqrt[c])])/(81*c^(5/6)*d^(5/3)) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) +
d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])
*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 -
4*Sqrt[3]])/(9*3^(3/4)*c^(2/3)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d
^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]
) + (2*Sqrt[2]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1
/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellip
ticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*c^(2/3)*d^(5/3)
*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.51778, antiderivative size = 635, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$-\frac{4\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27\sqrt{3}c^{5/6}d^{5/3}}+\frac{4\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{81c^{5/6}d^{5/3}}-\frac{4\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{5/6}d^{5/3}}$$
$$+\frac{2\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}c^{2/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{9\,3^{3/4}c^{2/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{2\sqrt{c+dx^3}}{27cd^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{2x^2}{27cd\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-2*x^2)/(27*c*d*Sqrt[c + d*x^3]) + (2*Sqrt[c + d*x^3])/(27*c*d^(
5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (4*ArcTan[(Sqrt[3]*c^
(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(27*Sqrt[3]*c^(5/6
)*d^(5/3)) + (4*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c
 + d*x^3])])/(81*c^(5/6)*d^(5/3)) - (4*ArcTanh[Sqrt[c + d*x^3]/(3
*Sqrt[c])])/(81*c^(5/6)*d^(5/3)) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) +
d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])
*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 -
4*Sqrt[3]])/(9*3^(3/4)*c^(2/3)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d
^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]
) + (2*Sqrt[2]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1
/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellip
ticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*c^(2/3)*d^(5/3)
*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.2483, size = 51, normalized size = 0.08

$$\frac{x^5\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{5}{3},1,\frac{3}{2},\frac{8}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{40c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] x**5*sqrt(c + d*x**3)*appellf1(5/3, 1, 3/2, 8/3, d*x**3/(8*c), -d
*x**3/c)/(40*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.261297, size = 340, normalized size = 0.54

$$\frac{2x^2\left(-\frac{32x^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{1600cF_1\left(\right.}{d(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-\right.\right.}\right.}{135\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*x^2*(-5/(c*d) + (1600*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c
), (d*x^3)/(8*c)])/(d*(8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5
/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2,
 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3,
 -((d*x^3)/c), (d*x^3)/(8*c)]))) - (32*x^3*AppellF1[5/3, 1/2, 1,
8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[
5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF
1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/
3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])))))/(135*Sqrt[c +
d*x^3])
```

Maple [C] time = 0.013, size = 1346, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/d*(2/3/c*x^2/((x^3+c/d)*d)^(1/2)+2/9*I/c*3^(1/2)/d*(-c*d^2)^(1
/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-8*c/d*
(-2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)-2/81*I/c^2*3^(1/2)/d*(-c*d^2)^
(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/243
*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*
(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^
(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3
)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^
2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)
```

```
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^4}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{x^4}{(d^2x^6-7\,cdx^3-8\,c^2)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] integral(-x^4/((d^2*x^6 - 7*c*d*x^3 - 8*c^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x^4}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

3.334 $\int \frac{x}{(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=632

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{54\sqrt{3}c^{11/6}d^{2/3}}+\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{162c^{11/6}d^{2/3}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{162c^{11/6}d^{2/3}}-\frac{2\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}c^{5/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{9\ 3^{3/4}c^{5/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{27c^2d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{2x^2}{27c^2\sqrt{c+dx^3}}$$

```
[Out] (2*x^2)/(27*c^2*Sqrt[c + d*x^3]) - (2*Sqrt[c + d*x^3])/(27*c^2*d^
(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - ArcTan[(Sqrt[3]*c^(1
/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]/(54*Sqrt[3]*c^(11/6)*
d^(2/3)) + ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*
x^3])]/(162*c^(11/6)*d^(2/3)) - ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c
])]/(162*c^(11/6)*d^(2/3)) + (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/3
)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/
3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt
[3]])/(9*3^(3/4)*c^(5/3)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)
*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (2
*Sqrt[2]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x
+ d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[A
rcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*c^(5/3)*d^(2/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.47869, antiderivative size = 632, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.52$

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{54\sqrt{3}c^{11/6}d^{2/3}}+\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{162c^{11/6}d^{2/3}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{162c^{11/6}d^{2/3}}-\frac{2\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}c^{5/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{9\ 3^{3/4}c^{5/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2\sqrt{c+dx^3}}{27c^2d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{2x^2}{27c^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*x^2)/(27*c^2*Sqrt[c + d*x^3]) - (2*Sqrt[c + d*x^3])/(27*c^2*d^
(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - ArcTan[(Sqrt[3]*c^(1
/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]/(54*Sqrt[3]*c^(11/6)*
d^(2/3)) + ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*
x^3])]/(162*c^(11/6)*d^(2/3)) - ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c
])]/(162*c^(11/6)*d^(2/3)) + (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/3
)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/
3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt
[3]])/(9*3^(3/4)*c^(5/3)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)
*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (2
*Sqrt[2]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x
+ d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[A
rcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*c^(5/3)*d^(2/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 20.8861, size = 51, normalized size = 0.08

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},1,\frac{3}{2},\frac{5}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{16c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, 1, 3/2, 5/3, d*x**3/(8*c), -d
*x**3/c)/(16*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.313553, size = 336, normalized size = 0.53

$$\frac{2x^2\left(\frac{\frac{32cdx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+5}{c^2}-\frac{250F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\cdots\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\cdots\right.\right.\right.}\right.}{135\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*x^2*((-250*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8
*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c
), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)
/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c),
(d*x^3)/(8*c)]))) + (5 + (32*c*d*x^3*AppellF1[5/3, 1/2, 1, 8/3, -
((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/3, 1
/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3,
 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2
, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/c^2))/(135*Sqrt[c + d
*x^3])
```

Maple [C] time = 0.01, size = 875, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)+2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1
/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-1/243*I
/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-
I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(
d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1
/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)
^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*
_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)
^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/
d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^
2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*
_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/
3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")

[Out] -integrate(x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{x}{(d^2x^6 - 7\,cdx^3 - 8\,c^2)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")

[Out] integral(-x/((d^2*x^6 - 7*c*d*x^3 - 8*c^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")

[Out] integrate(-x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

3.335 $\int \frac{1}{x^2(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=653

$$\frac{43\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{108\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{43\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{144\,3^{3/4}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{432\sqrt{3}c^{17/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1296c^{17/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1296c^{17/6}}-\frac{43\sqrt{c+dx^3}}{216c^3x}+\frac{43\sqrt[3]{d}\sqrt{c+dx^3}}{216c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{2}{27c^2x\sqrt{c+dx^3}}$$

```
[Out] 2/(27*c^2*x*Sqrt[c + d*x^3]) - (43*Sqrt[c + d*x^3])/(216*c^3*x) +
 (43*d^(1/3)*Sqrt[c + d*x^3])/(216*c^3*((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*
x))/Sqrt[c + d*x^3]])/(432*Sqrt[3]*c^(17/6)) + (d^(1/3)*ArcTanh[(
c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(1296*c^(17/
6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(1296*c^(17/
6)) - (43*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c
^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)
*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(144*3
^(3/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3]
)*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (43*d^(1/3)*(c^(1/3)
 + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7
 - 4*Sqrt[3]])/(108*Sqrt[2]*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3
) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d
*x^3])
```

Rubi [A] time = 1.74883, antiderivative size = 653, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$\frac{43\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{108\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{43\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{144\ 3^{3/4}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{432\sqrt{3}c^{17/6}} + \frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1296c^{17/6}} - \frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1296c^{17/6}} - \frac{43\sqrt{c+dx^3}}{216c^3x} + \frac{43\sqrt[3]{d}\sqrt{c+dx^3}}{216c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)} + \frac{2}{27c^2x\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] 2/(27*c^2*x*Sqrt[c + d*x^3]) - (43*Sqrt[c + d*x^3])/(216*c^3*x) +
 (43*d^(1/3)*Sqrt[c + d*x^3])/(216*c^3*((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*
x))/Sqrt[c + d*x^3]])/(432*Sqrt[3]*c^(17/6)) + (d^(1/3)*ArcTanh[(
c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(1296*c^(17/
6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(1296*c^(17/
6)) - (43*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c
^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)
*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(144*3
^(3/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3]
)*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (43*d^(1/3)*(c^(1/3)
 + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7
 - 4*Sqrt[3]])/(108*Sqrt[2]*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3
) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d
*x^3])
```

Rubi in Sympy [A] time = 26.4187, size = 53, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{1}{3},1,\frac{3}{2},\frac{2}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{8c^3x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, 1, 3/2, 2/3, d*x**3/(8*c), -d*x*
*3/c)/(8*c**3*x*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.436857, size = 356, normalized size = 0.55

$$\frac{\frac{4375dx^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{c(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{\frac{1376cd^2x^6F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{d}{}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\right.\right.\right.}}{4c}}{270\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((4375*d*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*
c)])/(c*(8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/
c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3
)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c),
 (d*x^3)/(8*c)]))) - (135*c + 215*d*x^3 + (1376*c*d^2*x^6*AppellF
1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*
(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3
*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]
- 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/
(4*c^3*x))/(270*Sqrt[c + d*x^3])
```

Maple [C] time = 0.045, size = 1361, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/8/c*(-2/3*d*x^2/c^2/((x^3+c/d)*d)^(1/2)-(d*x^3+c)^(1/2)/c^2/x-5
/9*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d
*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*
d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2))))-1/8*d/c*(-2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)-
2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x
-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*
(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c
*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)
^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*
d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I
*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*E
llipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alp
ha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3
```

```
^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^2),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{1}{(d^2x^8-7\,cdx^5-8\,c^2x^2)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(-1/((d^2*x^8 - 7*c*d*x^5 - 8*c^2*x^2)*sqrt(d*x^3 + c)),
x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^2), x)
```

3.336 $\int \frac{1}{x^5(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=675

$$-\frac{d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3456\sqrt{3}c^{23/6}}+\frac{d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{10368c^{23/6}}-\frac{d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{10368c^{23/6}}-\frac{113d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{216\sqrt{2}\sqrt[4]{3}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{113\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{288\ 3^{3/4}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{113d^{4/3}\sqrt{c+dx^3}}{432c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{113d\sqrt{c+dx^3}}{432c^4x}-\frac{91\sqrt{c+dx^3}}{864c^3x^4}+\frac{2}{27c^2x^4\sqrt{c+dx^3}}$$

```
[Out] 2/(27*c^2*x^4*Sqrt[c + d*x^3]) - (91*Sqrt[c + d*x^3])/(864*c^3*x^
4) + (113*d*Sqrt[c + d*x^3])/(432*c^4*x) - (113*d^(4/3)*Sqrt[c +
d*x^3])/(432*c^4*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(4/3)*
ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/
(3456*Sqrt[3]*c^(23/6)) + (d^(4/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^
2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(10368*c^(23/6)) - (d^(4/3)*ArcTa
nh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(10368*c^(23/6)) + (113*Sqrt[2 -
 Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d
^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*El
lipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(288*3^(3/4)*c^(11/3)*Sq
rt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/
3)*x)^2]*Sqrt[c + d*x^3]) - (113*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sq
rt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^
(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(
216*Sqrt[2]*3^(1/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))
/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.04271, antiderivative size = 675, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3456\sqrt{3}c^{23/6}}+\frac{d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{10368c^{23/6}}-\frac{d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{10368c^{23/6}}-\frac{113d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{216\sqrt{2}\sqrt[4]{3}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{113\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{288\ 3^{3/4}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{113d^{4/3}\sqrt{c+dx^3}}{432c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{113d\sqrt{c+dx^3}}{432c^4x}-\frac{91\sqrt{c+dx^3}}{864c^3x^4}+\frac{2}{27c^2x^4\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] 2/(27*c^2*x^4*Sqrt[c + d*x^3]) - (91*Sqrt[c + d*x^3])/(864*c^3*x^
4) + (113*d*Sqrt[c + d*x^3])/(432*c^4*x) - (113*d^(4/3)*Sqrt[c +
d*x^3])/(432*c^4*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(4/3)*
ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/
(3456*Sqrt[3]*c^(23/6)) + (d^(4/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^
2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(10368*c^(23/6)) - (d^(4/3)*ArcTa
nh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(10368*c^(23/6)) + (113*Sqrt[2 -
 Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d
^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*El
lipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(288*3^(3/4)*c^(11/3)*Sq
rt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/
3)*x)^2]*Sqrt[c + d*x^3]) - (113*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sq
rt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^
(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(
216*Sqrt[2]*3^(1/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))
/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.5739, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{4}{3},1,\frac{3}{2},-\frac{1}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{32c^3x^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-4/3, 1, 3/2, -1/3, d*x**3/(8*c), -d*x
**3/c)/(32*c**3*x**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.376757, size = 364, normalized size = 0.54

$$\frac{-\frac{90250c^2d^2x^6F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{7232cd^3x^9F_1\left(\frac{5}{3};\frac{1}{2},1\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},\right.\right.\right.}}{4320c^4x^4\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-135*c^2 + 675*c*d*x^3 + 1130*d^2*x^6 - (90250*c^2*d^2*x^6*Appel
lF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3
)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] +
 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]
 - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) +
 (7232*c*d^3*x^9*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)
/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3
)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*
x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)
/c), (d*x^3)/(8*c)]))))/(4320*c^4*x^4*Sqrt[c + d*x^3])
```

Maple [C] time = 0.042, size = 1864, normalized size = 2.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/8/c*(-1/4*(d*x^3+c)^(1/2)/c^2/x^4+13/8*d*(d*x^3+c)^(1/2)/c^3/x+
2/3*d^2/c^3*x^2/((x^3+c/d)*d)^(1/2)+55/72*I*d/c^3*3^(1/2)*(-c*d^2
)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/
64*d/c^2*(-2/3*d*x^2/c^2/((x^3+c/d)*d)^(1/2)-(d*x^3+c)^(1/2)/c^2/
x-5/9*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-
1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(
-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2))))-1/64*d^2/c^2*(-2/27/c^2*x^2/((x^3+c/d)*d
)^(1/2)-2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1
/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Ellip
ticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^
(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
```

```
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_a
lpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/
(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*
x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha
^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^
(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(
2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(
1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^5),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^5), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^5),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^5),x, algorithm="giac")
```

```
[Out] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^5), x)
```

3.337 $\int \frac{1}{x^8(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=699

$$
-\frac{d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27648\sqrt{3}c^{29/6}}+\frac{d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{82944c^{29/6}}-\frac{d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{82944c^{29/6}}
$$
$$
+\frac{953d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1512\sqrt{2}\sqrt[4]{3}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}
$$
$$
-\frac{953\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2016\ 3^{3/4}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}
$$
$$
+\frac{953d^{7/3}\sqrt{c+dx^3}}{3024c^5\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{953d^2\sqrt{c+dx^3}}{3024c^5x}
$$
$$
+\frac{6095d\sqrt{c+dx^3}}{48384c^4x^4}-\frac{139\sqrt{c+dx^3}}{1512c^3x^7}+\frac{2}{27c^2x^7\sqrt{c+dx^3}}
$$

```
[Out] 2/(27*c^2*x^7*Sqrt[c + d*x^3]) - (139*Sqrt[c + d*x^3])/(1512*c^3*
x^7) + (6095*d*Sqrt[c + d*x^3])/(48384*c^4*x^4) - (953*d^2*Sqrt[c
 + d*x^3])/(3024*c^5*x) + (953*d^(7/3)*Sqrt[c + d*x^3])/(3024*c^5
*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(7/3)*ArcTan[(Sqrt[3]*
c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(27648*Sqrt[3]*c
^(29/6)) + (d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sq
rt[c + d*x^3])])/(82944*c^(29/6)) - (d^(7/3)*ArcTanh[Sqrt[c + d*x
^3]/(3*Sqrt[c])])/(82944*c^(29/6)) - (953*Sqrt[2 - Sqrt[3]]*d^(7/
3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2
/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[
((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)], -7 - 4*Sqrt[3]])/(2016*3^(3/4)*c^(14/3)*Sqrt[(c^(1/3)*(c
^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[
c + d*x^3]) + (953*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(1512*Sqrt[2]*3
^(1/4)*c^(14/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.32864, antiderivative size = 699, normalized size of antiderivative = 1., number of

steps used = 17, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27648\sqrt{3}c^{29/6}}+\frac{d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{82944c^{29/6}}-\frac{d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{82944c^{29/6}}+\frac{953d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1512\sqrt{2}\sqrt[4]{3}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{953\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2016\ 3^{3/4}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{953d^{7/3}\sqrt{c+dx^3}}{3024c^5\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{953d^2\sqrt{c+dx^3}}{3024c^5x}+\frac{6095d\sqrt{c+dx^3}}{48384c^4x^4}-\frac{139\sqrt{c+dx^3}}{1512c^3x^7}+\frac{2}{27c^2x^7\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^8*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] 2/(27*c^2*x^7*Sqrt[c + d*x^3]) - (139*Sqrt[c + d*x^3])/(1512*c^3*
x^7) + (6095*d*Sqrt[c + d*x^3])/(48384*c^4*x^4) - (953*d^2*Sqrt[c
 + d*x^3])/(3024*c^5*x) + (953*d^(7/3)*Sqrt[c + d*x^3])/(3024*c^5
*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^(7/3)*ArcTan[(Sqrt[3]*
c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(27648*Sqrt[3]*c
^(29/6)) + (d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sq
rt[c + d*x^3])])/(82944*c^(29/6)) - (d^(7/3)*ArcTanh[Sqrt[c + d*x
^3]/(3*Sqrt[c])])/(82944*c^(29/6)) - (953*Sqrt[2 - Sqrt[3]]*d^(7/
3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2
/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[
((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)], -7 - 4*Sqrt[3]])/(2016*3^(3/4)*c^(14/3)*Sqrt[(c^(1/3)*(c
^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[
c + d*x^3]) + (953*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(1512*Sqrt[2]*3
^(1/4)*c^(14/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.5322, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{7}{3},1,\frac{3}{2},-\frac{4}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{56c^3x^7\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**8/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-7/3, 1, 3/2, -4/3, d*x**3/(8*c), -d*x
**3/c)/(56*c**3*x**7*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.366489, size = 378, normalized size = 0.54

$$\frac{\frac{6100250c^2d^3x^9F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{487936cd^4x^{12}F_1\left(\frac{5}{3};\frac{1}{2},1\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\right.\right.\right.}}{241920c^5x^7\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^8*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-5*(864*c^3 - 1647*c^2*d*x^3 + 9153*c*d^2*x^6 + 15248*d^3*x^9) +
 (6100250*c^2*d^3*x^9*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d
*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((
d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -
((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x
^3)/c), (d*x^3)/(8*c)]))) - (487936*c*d^4*x^12*AppellF1[5/3, 1/2,
 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*Appel
lF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(App
ellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF
1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(241920*c^5
*x^7*Sqrt[c + d*x^3])
```

Maple [C] time = 0.046, size = 2389, normalized size = 3.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^8/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/8/c*(-1/7*(d*x^3+c)^(1/2)/c^2/x^7+25/56*d*(d*x^3+c)^(1/2)/c^3/x
^4-237/112*d^2*(d*x^3+c)^(1/2)/c^4/x-2/3*d^3/c^4*x^2/((x^3+c/d)*d
)^(1/2)-935/1008*I*d^2/c^4*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3
+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c
*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/64*d/c^2*(-1/4*(d*x^3+c
)^(1/2)/c^2/x^4+13/8*d*(d*x^3+c)^(1/2)/c^3/x+2/3*d^2/c^3*x^2/((x^
3+c/d)*d)^(1/2)+55/72*I*d/c^3*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/512*d^2/c^3*(-2/3*d*
x^2/c^2/((x^3+c/d)*d)^(1/2)-(d*x^3+c)^(1/2)/c^2/x-5/9*I/c^2*3^(1/
2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3
))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*
(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3
```

```
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Ell
ipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2))))-1/512*d^3/c^3*(-2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)-2/81*I/c
^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c
*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)
^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1
/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/
3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)
*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticP
i(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c
*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c
*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_al
pha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^8),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^8), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^8),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**8/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^8),x, algorithm="giac")
```

```
[Out] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^8), x)
```

3.338 $\int \frac{x^3}{(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=66

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{3}{2};\frac{7}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{32c^2\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 3/2, 7/3, (d*x^3)/(8*c)
, -((d*x^3)/c)])/(32*c^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.20072, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{3}{2};\frac{7}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{32c^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 3/2, 7/3, (d*x^3)/(8*c)
, -((d*x^3)/c)])/(32*c^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 29., size = 51, normalized size = 0.77

$$\frac{x^4\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{4}{3},1,\frac{3}{2},\frac{7}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{32c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 1, 3/2, 7/3, d*x**3/(8*c), -d
*x**3/c)/(32*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.246453, size = 338, normalized size = 5.12

$$\frac{2x\left(\frac{7x^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+56cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{256cF_1\left(\frac{1}{3};\frac{1}{2}\right.}{d(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\right.\right.}\right.}{27\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*x*(-(1/(c*d)) + (256*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c)
, (d*x^3)/(8*c)])/(d*(8*c - d*x^3)*(32*c*AppellF1[1/3, 1/2, 1, 4/
3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2,
7/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3,
-((d*x^3)/c), (d*x^3)/(8*c)]))) + (7*x^3*AppellF1[4/3, 1/2, 1, 7/
3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(56*c*AppellF1[4/
3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[
7/3, 1/2, 2, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3,
```

```
 3/2, 1, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(27*Sqrt[c + d*x
^3])
```

Maple [C] time = 0.057, size = 1038, normalized size = 15.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/d*(2/3/c*x/((x^3+c/d)*d)^(1/2)-2/9*I/c*3^(1/2)/d*(-c*d^2)^(1/3
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-8*c/d*(-2/27/c^2*x/((x^3+c/d
)*d)^(1/2)+2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(
1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3))
)/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1
/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2
)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2
)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Elliptic
Pi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-
c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*
c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_a
lpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^3}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{x^3}{(d^2x^6-7\,cdx^3-8\,c^2)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] integral(-x^3/((d^2*x^6 - 7*c*d*x^3 - 8*c^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{x^3}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

3.339 $\int \frac{1}{(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=64

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{3}{2};\frac{4}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{8c^2\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 3/2, 4/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(8*c^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.0905354, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{3}{2};\frac{4}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{8c^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 3/2, 4/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(8*c^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.7198, size = 49, normalized size = 0.77

$$\frac{x\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{1}{3},1,\frac{3}{2},\frac{4}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{8c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 1, 3/2, 4/3, d*x**3/(8*c), -d*x*
*3/c)/(8*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.280506, size = 334, normalized size = 5.22

$$\frac{2x\left(\frac{1-\frac{7cdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{\left(8c-dx^3\right)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+56cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}}{c^2}+\frac{176F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{d}{}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3}\right.\right.\right.}\right.}{27\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*x*((176*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)
])/((8*c - d*x^3)*(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c),
(d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c)
, (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d*
x^3)/(8*c)]))) + (1 - (7*c*d*x^3*AppellF1[4/3, 1/2, 1, 7/3, -((d*
x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(56*c*AppellF1[4/3, 1/2,
```

```
1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2
, 2, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1,
 10/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/c^2))/(27*Sqrt[c + d*x^3]
)
```

Maple [C] time = 0.01, size = 721, normalized size = 11.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 2/27/c^2*x/((x^3+c/d)*d)^(1/2)-2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))-1/243*I/c^2/d^3*2^(1/2)*sum(1
/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1
/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*
d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_
alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*
d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/1
8/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3
)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/
2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{1}{(d^2x^6-7\,cdx^3-8\,c^2)\sqrt{dx^3+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="fricas")
```

```
[Out] integral(-1/((d^2*x^6 - 7*c*d*x^3 - 8*c^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)),x, algorithm="giac")
```

```
[Out] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)), x)
```

3.340 $\int \frac{1}{x^3(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{3}{2};\frac{1}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{16c^2x^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 3/2, 1/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(16*c^2*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.195566, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{3}{2};\frac{1}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{16c^2x^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 3/2, 1/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(16*c^2*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.2822, size = 54, normalized size = 0.82

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{2}{3},1,\frac{3}{2},\frac{1}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{16c^3x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 1, 3/2, 1/3, d*x**3/(8*c), -d*x*
*3/c)/(16*c**3*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.431851, size = 351, normalized size = 5.32

$$\frac{-\frac{7360c^2dx^3F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{413cd^2x^6F_1\left(\frac{4}{3};\frac{1}{2},1;\ldots\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},\ldots\right.\right.\right.}}{432c^3x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-27*c - 59*d*x^3 - (7360*c^2*d*x^3*AppellF1[1/3, 1/2, 1, 4/3, -(
(d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(32*c*AppellF1[1/3, 1/
2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3,
1/2, 2, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2,
1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (413*c*d^2*x^6*AppellF1
[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(
56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*
d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)] -
 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(
```

```
432*c^3*x^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.037, size = 1053, normalized size = 16.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/8/c*(-1/2/c^2*(d*x^3+c)^(1/2)/x^2-2/3*d/c^2*x/((x^3+c/d)*d)^(1/
2)+7/18*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((
x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ell
ipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)))-1/8*d/c*(-2/27/c^2*x/((x^3+c/d)*d)^(1/2)+2/81*I/c^2*3^(1/2
)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/
3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/243*I/c^2/
d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^3),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(-\frac{1}{(d^2x^9-7\,cdx^6-8\,c^2x^3)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^3),x, algorithm="fricas")
```

```
[Out] integral(-1/((d^2*x^9 - 7*c*d*x^6 - 8*c^2*x^3)*sqrt(d*x^3 + c)),
x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^3), x)
```

3.341 $\int \frac{1}{x^6(8c-dx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{5}{3};1,\frac{3}{2};-\frac{2}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{40c^2x^5\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-5/3, 1, 3/2, -2/3, (d*x^3)/(8*c),
 -((d*x^3)/c)])/(40*c^2*x^5*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.201058, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{5}{3};1,\frac{3}{2};-\frac{2}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{40c^2x^5\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^6*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-5/3, 1, 3/2, -2/3, (d*x^3)/(8*c),
 -((d*x^3)/c)])/(40*c^2*x^5*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.491, size = 56, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{5}{3},1,\frac{3}{2},-\frac{2}{3},\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{40c^3x^5\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**6/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-5/3, 1, 3/2, -2/3, d*x**3/(8*c), -d*x
**3/c)/(40*c**3*x**5*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.338136, size = 364, normalized size = 5.52

$$\frac{\frac{382528c^2d^2x^6F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{20867cd^3x^9F_1\left(\frac{4}{3};\frac{1}{2},1;\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\right.\right.\right.}}{17280c^4x^5\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^6*(8*c - d*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-432*c^2 + 1269*c*d*x^3 + 2981*d^2*x^6 + (382528*c^2*d^2*x^6*App
ellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x
^3)*(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)]
 + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), (d*x^3)/(8*c
)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])))
 - (20867*c*d^3*x^9*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x
^3)/(8*c)])/((8*c - d*x^3)*(56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*
x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -(
(d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x
```

```
^3)/c), (d*x^3)/(8*c)])))/(17280*c^4*x^5*Sqrt[c + d*x^3])
```

Maple [C] time = 0.043, size = 1402, normalized size = 21.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^6/(-d*x^3+8*c)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/8/c*(-1/5/c^2*(d*x^3+c)^(1/2)/x^5+17/20*d/c^3*(d*x^3+c)^(1/2)/x
^2+2/3*d^2/c^3*x/((x^3+c/d)*d)^(1/2)-91/180*I*d/c^3*3^(1/2)*(-c*d
^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/64*d/c^2*(-1/2/c^2
*(d*x^3+c)^(1/2)/x^2-2/3*d/c^2*x/((x^3+c/d)*d)^(1/2)+7/18*I/c^2*3
^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^
(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-1/64*d^2
/c^2*(-2/27/c^2*x/((x^3+c/d)*d)^(1/2)+2/81*I/c^2*3^(1/2)/d*(-c*d^
2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/243*I/c^2/d^3*2^(1/2
)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c
*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*
d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(
-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*
d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2
)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha
*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^
2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{1}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^6),x, algorithm="maxima")
```

```
[Out] -integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^6), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^6),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**6/(-d*x**3+8*c)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int -\frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^6),x, algorithm="giac")
```

```
[Out] integrate(-1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)*x^6), x)
```

3.342 $\int \frac{x\sqrt{a+bx^3}}{2\left(5+3\sqrt{3}\right)a+bx^3}\,dx$

Optimal. Leaf size=737

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} + \frac{2\sqrt{a+bx^3}}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)} + \frac{3^{3/4}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}b^{2/3}} + \frac{\sqrt[6]{a}\tan^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{a+bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}} + \frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{\sqrt{2}b^{2/3}} + \frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$

```
[Out] (2*Sqrt[a + b*x^3])/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x))
 + (3^(3/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3
) + b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) +
 (a^(1/6)*ArcTan[((1 - Sqrt[3])*Sqrt[a + b*x^3])/(Sqrt[2]*3^(3/4)
*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTanh[
(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/3) - 2*b^(1/3)*x))/(Sqrt[2]*
Sqrt[a + b*x^3])])/(Sqrt[2]*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTanh[(
3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqr
t[a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*
a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) +
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3
]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*S
qrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1
/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.684067, antiderivative size = 737, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.152$

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{3^{3/4}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[6]{a}\tan^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{a+bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{\sqrt{2}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(x*Sqrt[a + b*x^3])/(2*(5 + 3*Sqrt[3])*a + b*x^3),x]
```

```
[Out] (2*Sqrt[a + b*x^3])/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x))
 + (3^(3/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3
) + b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) +
 (a^(1/6)*ArcTan[((1 - Sqrt[3])*Sqrt[a + b*x^3])/(Sqrt[2]*3^(3/4)
*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTanh[
(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/3) - 2*b^(1/3)*x))/(Sqrt[2]*
Sqrt[a + b*x^3])])/(Sqrt[2]*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTanh[(
3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqr
t[a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*
a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) +
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3
]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*S
qrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1
/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 32.0893, size = 70, normalized size = 0.09

$$\frac{x^2\sqrt{a+bx^3}\,\text{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},-\frac{bx^3}{a},-\frac{bx^3}{2a\left(5+3\sqrt{3}\right)}\right)}{4a\sqrt{1+\frac{bx^3}{a}}\left(5+3\sqrt{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a)**(1/2)/(b*x**3+2*a*(5+3*3**(1/2))),x)
```

```
[Out] x**2*sqrt(a + b*x**3)*appellf1(2/3, -1/2, 1, 5/3, -b*x**3/a, -b*x
**3/(2*a*(5 + 3*sqrt(3))))/(4*a*sqrt(1 + b*x**3/a)*(5 + 3*sqrt(3)
```

```
))
```

Mathematica [C] time = 0.490363, size = 250, normalized size = 0.34

$$\frac{10\left(26+15\sqrt{3}\right)ax^2\sqrt{a+bx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right)}{\left(5+3\sqrt{3}\right)\left(2\left(5+3\sqrt{3}\right)a+bx^3\right)\left(10\left(5+3\sqrt{3}\right)aF_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right)-3bx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[a + b*x^3])/(2*(5 + 3*Sqrt[3])*a + b*x^3),x]
```

```
[Out] (10*(26 + 15*Sqrt[3])*a*x^2*Sqrt[a + b*x^3]*AppellF1[2/3, -1/2, 1
, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))])/((5 + 3*Sq
rt[3])*(2*(5 + 3*Sqrt[3])*a + b*x^3)*(10*(5 + 3*Sqrt[3])*a*Appell
F1[2/3, -1/2, 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a
))] - 3*b*x^3*(AppellF1[5/3, -1/2, 2, 8/3, -((b*x^3)/a), -((b*x^3
)/(10*a + 6*Sqrt[3]*a))] - (5 + 3*Sqrt[3])*AppellF1[5/3, 1/2, 1,
8/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))])))
```

Maple [C] time = 0.334, size = 977, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a)^(1/2)/(b*x^3+2*a*(5+3*3^(1/2))),x)
```

```
[Out] -2/3*I*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b
*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b
*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*
b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(
1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3)))^(1/2)))+1/9*I/b^3*2^(1/2)*sum(1/_alpha*(2*3^(1/2)+3)
*(-a*b^2)^(1/3)*(1/2*I*b*(2*x+1/b*((-a*b^2)^(1/3)-I*3^(1/2)*(-a*b
^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)*(b*(x-1/b*(-a*b^2)^(1/3))/(-3*(
-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)^(1/3)))^(1/2)*(-1/2*I*b*(2*x+1/b
*((-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)
/(b*x^3+a)^(1/2)*(-3*I*(-a*b^2)^(1/3)*_alpha*3^(1/2)*b+4*b^2*_alp
ha^2*3^(1/2)+3*I*(-a*b^2)^(2/3)*3^(1/2)-2*3^(1/2)*(-a*b^2)^(1/3)*
_alpha*b+6*I*(-a*b^2)^(1/3)*_alpha*b-6*b^2*_alpha^2-2*3^(1/2)*(-a
*b^2)^(2/3)-6*I*(-a*b^2)^(2/3)+3*(-a*b^2)^(1/3)*_alpha*b+3*(-a*b^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),-1/6/b
*(2*I*3^(1/2)*(-a*b^2)^(1/3)*_alpha^2*b-I*3^(1/2)*(-a*b^2)^(2/3)*
_alpha-4*I*(-a*b^2)^(1/3)*_alpha^2*b+I*3^(1/2)*a*b+2*3^(1/2)*(-a*
b^2)^(2/3)*_alpha+2*I*(-a*b^2)^(2/3)*_alpha+2*3^(1/2)*a*b-2*I*a*b
-3*(-a*b^2)^(2/3)*_alpha-3*a*b)/a,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3
/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)),_alph
a=RootOf(b*_Z^3+6*a*3^(1/2)+10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3+ax}}{bx^3+2\,a\left(3\,\sqrt{3}+5\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a)*x/(b*x^3 + 2*a*(3*sqrt(3) + 5)),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a)*x/(b*x^3 + 2*((3*sqrt(3)) + 5)*a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a)*x/(b*x^3 + 2*a*(3*sqrt(3) + 5)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\sqrt{a + bx^3}}{10a + 6\sqrt{3}a + bx^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a)**(1/2)/(b*x**3+2*a*(5+3*3**(1/2))),x)
```

```
[Out] Integral(x*sqrt(a + b*x**3)/(10*a + 6*sqrt(3)*a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.541736, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a)*x/(b*x^3 + 2*a*(3*sqrt(3) + 5)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.343 $\int \frac{x\sqrt{a-bx^3}}{2\left(5+3\sqrt{3}\right)a-bx^3}\,dx$

Optimal. Leaf size=757

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{a-bx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{a-bx^3}}+\frac{2\sqrt{a-bx^3}}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)}+\frac{3^{3/4}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[6]{a}\tan^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{\sqrt{2}b^{2/3}}$$

```
[Out] (2*Sqrt[a - b*x^3])/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x))
 + (3^(3/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3
) - b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) +
 (a^(1/6)*ArcTan[((1 - Sqrt[3])*Sqrt[a - b*x^3])/(Sqrt[2]*3^(3/4)
*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTanh[
(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) - b^(1/3)*x))/(Sqrt[2]*Sq
rt[a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTanh[(
3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*S
qrt[a - b*x^3])])/(Sqrt[2]*b^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*
a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) -
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) -
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*Sqrt[a - b*x^3
]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) - b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*S
qrt[(a^(1/3)*(a^(1/3) - b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) - b^(1
/3)*x)^2]*Sqrt[a - b*x^3])
```

Rubi [A] time = 0.721095, antiderivative size = 757, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{a-bx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{a-bx^3}}$$
$$+\frac{2\sqrt{a-bx^3}}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)}+\frac{3^{3/4}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$
$$+\frac{\sqrt[6]{a}\tan^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$
$$+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{\sqrt{2}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*Sqrt[a - b*x^3])/(2*(5 + 3*Sqrt[3])*a - b*x^3),x]
```

```
[Out] (2*Sqrt[a - b*x^3])/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x))
 + (3^(3/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3
) - b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) +
 (a^(1/6)*ArcTan[((1 - Sqrt[3])*Sqrt[a - b*x^3])/(Sqrt[2]*3^(3/4)
*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTanh[
(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) - b^(1/3)*x))/(Sqrt[2]*Sq
rt[a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTanh[(
3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*S
qrt[a - b*x^3])])/(Sqrt[2]*b^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*
a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) -
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) -
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*Sqrt[a - b*x^3
]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) - b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*S
qrt[(a^(1/3)*(a^(1/3) - b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) - b^(1
/3)*x)^2]*Sqrt[a - b*x^3])
```

Rubi in Sympy [A] time = 35.0847, size = 66, normalized size = 0.09

$$\frac{x^2\sqrt{a-bx^3}\operatorname{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},\frac{bx^3}{a},\frac{bx^3}{2a\left(5+3\sqrt{3}\right)}\right)}{4a\sqrt{1-\frac{bx^3}{a}}\left(5+3\sqrt{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x*(-b*x**3+a)**(1/2)/(-b*x**3+2*a*(5+3*3**(1/2))),x)
```

```
[Out] x**2*sqrt(a - b*x**3)*appellf1(2/3, -1/2, 1, 5/3, b*x**3/a, b*x**
3/(2*a*(5 + 3*sqrt(3))))/(4*a*sqrt(1 - b*x**3/a)*(5 + 3*sqrt(3)))
```

Mathematica [C] time = 0.561634, size = 244, normalized size = 0.32

$$\frac{10\left(26+15\sqrt{3}\right)ax^2\sqrt{a-bx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)}{\left(5+3\sqrt{3}\right)\left(2\left(5+3\sqrt{3}\right)a-bx^3\right)\left(3bx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)-\left(5+3\sqrt{3}\right)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)\right)+10(5\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(x*Sqrt[a - b*x^3])/(2*(5 + 3*Sqrt[3])*a - b*x^3),x]
```

```
[Out] (10*(26 + 15*Sqrt[3])*a*x^2*Sqrt[a - b*x^3]*AppellF1[2/3, -1/2, 1
, 5/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[3]*a)])/((5 + 3*Sqrt[3])
*(2*(5 + 3*Sqrt[3])*a - b*x^3)*(10*(5 + 3*Sqrt[3])*a*AppellF1[2/3
, -1/2, 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[3]*a)] + 3*b*x^
3*(AppellF1[5/3, -1/2, 2, 8/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[
3]*a)] - (5 + 3*Sqrt[3])*AppellF1[5/3, 1/2, 1, 8/3, (b*x^3)/a, (b
*x^3)/(10*a + 6*Sqrt[3]*a)])))
```

Maple [C] time = 0.345, size = 924, normalized size = 1.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(-b*x^3+a)^(1/2)/(-b*x^3+2*a*(5+3*3^(1/2))),x)
```

```
[Out] 2/3*I*3^(1/2)/b*(a*b^2)^(1/3)*(-I*(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3))^(1/2)*((x-1/b*(a*
b^2)^(1/3))/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))
^(1/2)*(I*(x+1/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3
^(1/2)*b/(a*b^2)^(1/3))^(1/2)/(-b*x^3+a)^(1/2)*((-3/2/b*(a*b^2)^(
1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(-I*(x+
1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b
^2)^(1/3))^(1/2),(-I*3^(1/2)/b*(a*b^2)^(1/3)/(-3/2/b*(a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2))+1/b*(a*b^2)^(1/3)*Ellipt
icF(1/3*3^(1/2)*(-I*(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2
)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3))^(1/2),(-I*3^(1/2)/b*(a*b^2)^(1/
3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2))-
1/9*I/b^3*2^(1/2)*sum(1/_alpha*(2*3^(1/2)+3)*(a*b^2)^(1/3)*(-1/2*
I*b*(2*x+1/b*(I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3)))/(a*b^2)^(1/
3))^(1/2)*(b*(x-1/b*(a*b^2)^(1/3))/(-3*(a*b^2)^(1/3)-I*3^(1/2)*(a
*b^2)^(1/3)))^(1/2)*(1/2*I*b*(2*x+1/b*(-I*3^(1/2)*(a*b^2)^(1/3)+(
a*b^2)^(1/3)))/(a*b^2)^(1/3))^(1/2)/(-b*x^3+a)^(1/2)*(3*I*(a*b^2)
^(1/3)*_alpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)-3*I*(a*b^2)^(2/3)*
3^(1/2)-2*(a*b^2)^(1/3)*_alpha*3^(1/2)*b-6*I*(a*b^2)^(1/3)*_alpha
*b-6*b^2*_alpha^2-2*(a*b^2)^(2/3)*3^(1/2)+6*I*(a*b^2)^(2/3)+3*(a*
b^2)^(1/3)*_alpha*b+3*(a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(-I*(
x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a
*b^2)^(1/3))^(1/2),1/6/b*(-2*I*(a*b^2)^(1/3)*_alpha^2*3^(1/2)*b+I
*(a*b^2)^(2/3)*_alpha*3^(1/2)+4*I*(a*b^2)^(1/3)*_alpha^2*b+2*(a*b
^2)^(2/3)*_alpha*3^(1/2)-2*I*(a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-3
*(a*b^2)^(2/3)*_alpha-2*3^(1/2)*a*b-2*I*a*b+3*a*b)/a,(-I*3^(1/2)/
b*(a*b^2)^(1/3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/
3)))^(1/2)),_alpha=RootOf(b*_Z^3-6*a*3^(1/2)-10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{-bx^3+ax}}{bx^3-2\,a\left(3\,\sqrt{3}+5\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 + a)*x/(b*x^3 - 2*a*(3*sqrt(3) + 5)),x, algorithm="maxima
```

```
[Out] -integrate(sqrt(-b*x^3 + a)*x/(b*x^3 - 2*((3*sqrt(3)) + 5)*a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 + a)*x/(b*x^3 - 2*a*(3*sqrt(3) + 5)),x, algorithm="fricas
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x\sqrt{a-bx^3}}{-6\sqrt{3}a-10a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(-b*x**3+a)**(1/2)/(-b*x**3+2*a*(5+3*3**(1/2))),x)
```

```
[Out] -Integral(x*sqrt(a - b*x**3)/(-6*sqrt(3)*a - 10*a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.557731, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 + a)*x/(b*x^3 - 2*a*(3*sqrt(3) + 5)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.344 $\int \frac{x\sqrt{-a+bx^3}}{-2\left(5+3\sqrt{3}\right)a+bx^3}\,dx$

Optimal. Leaf size=774

$$-\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7+4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{bx^3-a}}+\frac{\sqrt[4]{3}\sqrt{2+\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7+4\sqrt{3}\right)}{b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{bx^3-a}}-\frac{2\sqrt{bx^3-a}}{b^{2/3}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{\sqrt{2}b^{2/3}}+\frac{3^{3/4}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}b^{2/3}}-\frac{\sqrt[6]{a}\tanh^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{bx^3-a}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}$$

```
[Out] (-2*Sqrt[-a + b*x^3])/(b^(2/3)*((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x
)) + (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1
/3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(2*Sqrt[2]*b^(2/3)
) + (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/
3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(Sqrt[2]*b^(2/3))
 + (3^(3/4)*a^(1/6)*ArcTanh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/
3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(2*Sqrt[2]*b^(2/3))
 - (a^(1/6)*ArcTanh[((1 - Sqrt[3])*Sqrt[-a + b*x^3])/(Sqrt[2]*3^(
3/4)*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*Sqrt[2 + Sqr
t[3]]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(1/3)*b^(1/
3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*Ellipt
icE[ArcSin[((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 - Sqrt[3])*a^(
1/3) - b^(1/3)*x)], -7 + 4*Sqrt[3]])/(b^(2/3)*Sqrt[-((a^(1/3)*(a^
(1/3) - b^(1/3)*x))/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)^2)]*Sqrt[
-a + b*x^3]) - (2*Sqrt[2]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(
2/3) + a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) -
b^(1/3)*x)^2]*EllipticF[ArcSin[((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x
)/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)], -7 + 4*Sqrt[3]])/(3^(1/4)
*b^(2/3)*Sqrt[-((a^(1/3)*(a^(1/3) - b^(1/3)*x))/((1 - Sqrt[3])*a^
(1/3) - b^(1/3)*x)^2)]*Sqrt[-a + b*x^3])
```

Rubi [A] time = 0.733726, antiderivative size = 774, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$-\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7+4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{bx^3-a}}+\frac{\sqrt[4]{3}\sqrt{2+\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7+4\sqrt{3}\right)}{b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{bx^3-a}}-\frac{2\sqrt{bx^3-a}}{b^{2/3}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{\sqrt{2}b^{2/3}}+\frac{3^{3/4}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}b^{2/3}}-\frac{\sqrt[6]{a}\tanh^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{bx^3-a}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*Sqrt[-a + b*x^3])/(-2*(5 + 3*Sqrt[3])*a + b*x^3),x]
```

```
[Out] (-2*Sqrt[-a + b*x^3])/(b^(2/3)*((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x
)) + (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1
/3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])]])/(2*Sqrt[2]*b^(2/3)
) + (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/
3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])]])/(Sqrt[2]*b^(2/3))
 + (3^(3/4)*a^(1/6)*ArcTanh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/
3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])]])/(2*Sqrt[2]*b^(2/3))
 - (a^(1/6)*ArcTanh[((1 - Sqrt[3])*Sqrt[-a + b*x^3])/(Sqrt[2]*3^(
3/4)*Sqrt[a])]])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*Sqrt[2 + Sqr
t[3]]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(1/3)*b^(1/
3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*Ellipt
icE[ArcSin[((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 - Sqrt[3])*a^(
1/3) - b^(1/3)*x)], -7 + 4*Sqrt[3]])/(b^(2/3)*Sqrt[-((a^(1/3)*(a^
(1/3) - b^(1/3)*x))/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)^2)]*Sqrt[
-a + b*x^3]) - (2*Sqrt[2]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(
2/3) + a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) -
b^(1/3)*x)^2]*EllipticF[ArcSin[((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x
)/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)], -7 + 4*Sqrt[3]])/(3^(1/4)
*b^(2/3)*Sqrt[-((a^(1/3)*(a^(1/3) - b^(1/3)*x))/((1 - Sqrt[3])*a^
(1/3) - b^(1/3)*x)^2)]*Sqrt[-a + b*x^3])
```

Rubi in Sympy [A] time = 34.4747, size = 68, normalized size = 0.09

$$-\frac{x^2\sqrt{-a+bx^3}\,\mathrm{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},\frac{bx^3}{a},\frac{bx^3}{2a\left(5+3\sqrt{3}\right)}\right)}{4a\sqrt{1-\frac{bx^3}{a}}\left(5+3\sqrt{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3-a)**(1/2)/(b*x**3-2*a*(5+3*3**(1/2))),x)
```

```
[Out] -x**2*sqrt(-a + b*x**3)*appellf1(2/3, -1/2, 1, 5/3, b*x**3/a, b*x
**3/(2*a*(5 + 3*sqrt(3))))/(4*a*sqrt(1 - b*x**3/a)*(5 + 3*sqrt(3)
))
```

Mathematica [C] time = 0.569207, size = 245, normalized size = 0.32

$$-\frac{10\left(26+15\sqrt{3}\right)ax^2\sqrt{bx^3-a}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)}{\left(5+3\sqrt{3}\right)\left(2\left(5+3\sqrt{3}\right)a-bx^3\right)\left(3bx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)-\left(5+3\sqrt{3}\right)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)\right)+10\,(}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[-a + b*x^3])/(-2*(5 + 3*Sqrt[3])*a + b*x^3),x]
```

```
[Out] (-10*(26 + 15*Sqrt[3])*a*x^2*Sqrt[-a + b*x^3]*AppellF1[2/3, -1/2,
 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[3]*a)])/((5 + 3*Sqrt[3
])*(2*(5 + 3*Sqrt[3])*a - b*x^3)*(10*(5 + 3*Sqrt[3])*a*AppellF1[2
/3, -1/2, 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[3]*a)] + 3*b*
x^3*(AppellF1[5/3, -1/2, 2, 8/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqr
t[3]*a)] - (5 + 3*Sqrt[3])*AppellF1[5/3, 1/2, 1, 8/3, (b*x^3)/a,
(b*x^3)/(10*a + 6*Sqrt[3]*a)])))
```

Maple [C] time = 0.118, size = 926, normalized size = 1.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3-a)^(1/2)/(b*x^3-2*a*(5+3*3^(1/2))),x)
```

```
[Out] 2/3*I*3^(1/2)/b*(a*b^2)^(1/3)*(-I*(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3))^(1/2)*((x-1/b*(a*
b^2)^(1/3))/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))
^(1/2)*(I*(x+1/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3
^(1/2)*b/(a*b^2)^(1/3))^(1/2)/(b*x^3-a)^(1/2)*((-3/2/b*(a*b^2)^(1
/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(-I*(x+1
/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^
2)^(1/3))^(1/2),(-I*3^(1/2)/b*(a*b^2)^(1/3)/(-3/2/b*(a*b^2)^(1/3)
-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2))+1/b*(a*b^2)^(1/3)*Ellipti
cF(1/3*3^(1/2)*(-I*(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)
^(1/3))*3^(1/2)*b/(a*b^2)^(1/3))^(1/2),(-I*3^(1/2)/b*(a*b^2)^(1/3
)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2)))-1
/9*I/b^3*2^(1/2)*sum(1/_alpha*(2*3^(1/2)+3)*(a*b^2)^(1/3)*(-1/2*I
*b*(2*x+1/b*(I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3)))/(a*b^2)^(1/3
))^(1/2)*(b*(x-1/b*(a*b^2)^(1/3))/(-3*(a*b^2)^(1/3)-I*3^(1/2)*(a*
b^2)^(1/3)))^(1/2)*(1/2*I*b*(2*x+1/b*(-I*3^(1/2)*(a*b^2)^(1/3)+(a
*b^2)^(1/3)))/(a*b^2)^(1/3))^(1/2)/(b*x^3-a)^(1/2)*(3*I*(a*b^2)^(
1/3)*_alpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)-3*I*(a*b^2)^(2/3)*3^
(1/2)-2*(a*b^2)^(1/3)*_alpha*3^(1/2)*b-6*I*(a*b^2)^(1/3)*_alpha*b
-6*b^2*_alpha^2-2*(a*b^2)^(2/3)*3^(1/2)+6*I*(a*b^2)^(2/3)+3*(a*b^
2)^(1/3)*_alpha*b+3*(a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(-I*(x+
1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b
^2)^(1/3))^(1/2),1/6/b*(-2*I*(a*b^2)^(1/3)*_alpha^2*3^(1/2)*b+I*(
a*b^2)^(2/3)*_alpha*3^(1/2)+4*I*(a*b^2)^(1/3)*_alpha^2*b+2*(a*b^2
)^(2/3)*_alpha*3^(1/2)-2*I*(a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-3*(
a*b^2)^(2/3)*_alpha-2*3^(1/2)*a*b-2*I*a*b+3*a*b)/a,(-I*3^(1/2)/b*
(a*b^2)^(1/3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)
))^(1/2)),_alpha=RootOf(b*_Z^3-6*a*3^(1/2)-10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3 - a}x}{bx^3 - 2a\left(3\sqrt{3} + 5\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(b*x^3 - a)*x/(b*x^3 - 2*a*(3*sqrt(3) + 5)),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 - a)*x/(b*x^3 - 2*((3*sqrt(3)) + 5)*a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(b*x^3 - a)*x/(b*x^3 - 2*a*(3*sqrt(3) + 5)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\sqrt{-a + bx^3}}{-6\sqrt{3}a - 10a + bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3-a)**(1/2)/(b*x**3-2*a*(5+3*3**(1/2))),x)
```

```
[Out] Integral(x*sqrt(-a + b*x**3)/(-6*sqrt(3)*a - 10*a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.547919, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(b*x^3 - a)*x/(b*x^3 - 2*a*(3*sqrt(3) + 5)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.345 $\int \frac{x\sqrt{-a-bx^3}}{-2\left(5+3\sqrt{3}\right)a-bx^3}\,dx$

Optimal. Leaf size=768

$$-\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}\right)|-7+4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{-a-bx^3}}+\frac{\sqrt[4]{3}\sqrt{2+\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}\right)|-7+4\sqrt{3}\right)}{b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{-a-bx^3}}-\frac{2\sqrt{-a-bx^3}}{b^{2/3}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{\sqrt{2}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{3^{3/4}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}-\frac{\sqrt[6]{a}\tanh^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{-a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}$$

```
[Out] (-2*Sqrt[-a - b*x^3])/(b^(2/3)*((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x
)) + (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1
/3) - 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(Sqrt[2]*b^(2/3)
) + (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/
3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*b^(2/3))
 + (3^(3/4)*a^(1/6)*ArcTanh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/
3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*b^(2/3))
 - (a^(1/6)*ArcTanh[((1 - Sqrt[3])*Sqrt[-a - b*x^3])/(Sqrt[2]*3^(
3/4)*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*Sqrt[2 + Sqr
t[3]]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/
3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellipt
icE[ArcSin[((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)], -7 + 4*Sqrt[3]])/(b^(2/3)*Sqrt[-((a^(1/3)*(a^
(1/3) + b^(1/3)*x))/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)^2)]*Sqrt[
-a - b*x^3]) - (2*Sqrt[2]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) +
b^(1/3)*x)^2]*EllipticF[ArcSin[((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x
)/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 + 4*Sqrt[3]])/(3^(1/4)
*b^(2/3)*Sqrt[-((a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 - Sqrt[3])*a^
(1/3) + b^(1/3)*x)^2)]*Sqrt[-a - b*x^3])
```

Rubi [A] time = 0.729289, antiderivative size = 768, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 37, $\frac{\text{number of rules}}{\text{integrand size}} = 0.135$

$$
-\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}\right)|-7+4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{-a-bx^3}}
+\frac{\sqrt[4]{3}\sqrt{2+\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}\right)|-7+4\sqrt{3}\right)}{b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{-a-bx^3}}
-\frac{2\sqrt{-a-bx^3}}{b^{2/3}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}
+\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{\sqrt{2}b^{2/3}}
+\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}
+\frac{3^{3/4}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}
-\frac{\sqrt[6]{a}\tanh^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{-a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}
$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(x*Sqrt[-a - b*x^3])/(-2*(5 + 3*Sqrt[3])*a - b*x^3),x]
```

```
[Out] (-2*Sqrt[-a - b*x^3])/(b^(2/3)*((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x
)) + (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1
/3) - 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(Sqrt[2]*b^(2/3)
) + (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/
3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*b^(2/3))
 + (3^(3/4)*a^(1/6)*ArcTanh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/
3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*b^(2/3))
 - (a^(1/6)*ArcTanh[((1 - Sqrt[3])*Sqrt[-a - b*x^3])/(Sqrt[2]*3^(
3/4)*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*Sqrt[2 + Sqr
t[3]]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/
3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellipt
icE[ArcSin[((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)], -7 + 4*Sqrt[3]])/(b^(2/3)*Sqrt[-((a^(1/3)*(a^
(1/3) + b^(1/3)*x))/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)^2)]*Sqrt[
-a - b*x^3]) - (2*Sqrt[2]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) +
b^(1/3)*x)^2]*EllipticF[ArcSin[((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x
)/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 + 4*Sqrt[3]])/(3^(1/4)
*b^(2/3)*Sqrt[-((a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 - Sqrt[3])*a^
(1/3) + b^(1/3)*x)^2)]*Sqrt[-a - b*x^3])
```

Rubi in Sympy [A] time = 35.5355, size = 73, normalized size = 0.1

$$
-\frac{x^2\sqrt{-a-bx^3}\,\text{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},-\frac{bx^3}{a},-\frac{bx^3}{2a\left(5+3\sqrt{3}\right)}\right)}{4a\sqrt{1+\frac{bx^3}{a}}\left(5+3\sqrt{3}\right)}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x*(-b*x**3-a)**(1/2)/(-b*x**3-2*a*(5+3*3**(1/2))),x)
```

```
[Out] -x**2*sqrt(-a - b*x**3)*appellf1(2/3, -1/2, 1, 5/3, -b*x**3/a, -b
*x**3/(2*a*(5 + 3*sqrt(3))))/(4*a*sqrt(1 + b*x**3/a)*(5 + 3*sqrt(
3)))
```

Mathematica [C] time = 0.522787, size = 253, normalized size = 0.33

$$-\frac{10\left(26+15\sqrt{3}\right)ax^2\sqrt{-a-bx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right)}{\left(5+3\sqrt{3}\right)\left(2\left(5+3\sqrt{3}\right)a+bx^3\right)\left(10\left(5+3\sqrt{3}\right)aF_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right)-3bx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+1}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[-a - b*x^3])/(-2*(5 + 3*Sqrt[3])*a - b*x^3),x]
```

```
[Out] (-10*(26 + 15*Sqrt[3])*a*x^2*Sqrt[-a - b*x^3]*AppellF1[2/3, -1/2,
 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))])/((5 + 3*
Sqrt[3])*(2*(5 + 3*Sqrt[3])*a + b*x^3)*(10*(5 + 3*Sqrt[3])*a*Appe
llF1[2/3, -1/2, 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]
*a))] - 3*b*x^3*(AppellF1[5/3, -1/2, 2, 8/3, -((b*x^3)/a), -((b*x
^3)/(10*a + 6*Sqrt[3]*a))] - (5 + 3*Sqrt[3])*AppellF1[5/3, 1/2, 1
, 8/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))])))
```

Maple [C] time = 0.138, size = 983, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(-b*x^3-a)^(1/2)/(-b*x^3-2*a*(5+3*3^(1/2))),x)
```

```
[Out] -2/3*I*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b
*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(-b*x^3-a)^(1/2)*((-3/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^
(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*
3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2
/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a
*b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^
(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3)))^(1/2)))+1/9*I/b^3*2^(1/2)*sum(1/_alpha*(2*3^(1/2)+3
)*(-a*b^2)^(1/3)*(1/2*I*b*(2*x+1/b*((-a*b^2)^(1/3)-I*3^(1/2)*(-a*
b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)*(b*(x-1/b*(-a*b^2)^(1/3))/(-3*
(-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)^(1/3)))^(1/2)*(-1/2*I*b*(2*x+1/
b*((-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2
)/(-b*x^3-a)^(1/2)*(-3*I*(-a*b^2)^(1/3)*_alpha*3^(1/2)*b+4*b^2*_a
lpha^2*3^(1/2)+3*I*(-a*b^2)^(2/3)*3^(1/2)-2*3^(1/2)*(-a*b^2)^(1/3
)*_alpha*b+6*I*(-a*b^2)^(1/3)*_alpha*b-6*b^2*_alpha^2-2*3^(1/2)*(
-a*b^2)^(2/3)-6*I*(-a*b^2)^(2/3)+3*(-a*b^2)^(1/3)*_alpha*b+3*(-a*
b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2
*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),-1/6
/b*(2*I*3^(1/2)*(-a*b^2)^(1/3)*_alpha^2*b-I*3^(1/2)*(-a*b^2)^(2/3
)*_alpha-4*I*(-a*b^2)^(1/3)*_alpha^2*b+I*3^(1/2)*a*b+2*3^(1/2)*(-
a*b^2)^(2/3)*_alpha+2*I*(-a*b^2)^(2/3)*_alpha+2*3^(1/2)*a*b-2*I*a
*b-3*(-a*b^2)^(2/3)*_alpha-3*a*b)/a,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(
-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)),_al
pha=RootOf(b*_Z^3+6*a*3^(1/2)+10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{-bx^3 - a}x}{bx^3 + 2a(3\sqrt{3} + 5)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 - a)*x/(b*x^3 + 2*a*(3*sqrt(3) + 5)),x, algorithm="maxima
```

```
[Out] -integrate(sqrt(-b*x^3 - a)*x/(b*x^3 + 2*((3*sqrt(3)) + 5)*a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 - a)*x/(b*x^3 + 2*a*(3*sqrt(3) + 5)),x, algorithm="fricas
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x\sqrt{-a - bx^3}}{10a + 6\sqrt{3}a + bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(-b*x**3-a)**(1/2)/(-b*x**3-2*a*(5+3*3**(1/2))),x)
```

```
[Out] -Integral(x*sqrt(-a - b*x**3)/(10*a + 6*sqrt(3)*a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.557379, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 - a)*x/(b*x^3 + 2*a*(3*sqrt(3) + 5)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.346 $\int \frac{x\sqrt{a+bx^3}}{2\left(5-3\sqrt{3}\right)a+bx^3}\,dx$

Optimal. Leaf size=738

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{\sqrt{2}b^{2/3}}-\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{3^{3/4}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[6]{a}\tanh^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{a+bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}$$

```
[Out] (2*Sqrt[a + b*x^3])/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x))
 - (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3
) - 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(Sqrt[2]*b^(2/3)) -
 (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3)
+ b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (
3^(3/4)*a^(1/6)*ArcTanh[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) +
 b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (a
^(1/6)*ArcTanh[((1 + Sqrt[3])*Sqrt[a + b*x^3])/(Sqrt[2]*3^(3/4)*S
qrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*
a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) +
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3
]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*S
qrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1
/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.642932, antiderivative size = 738, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.152$

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{\sqrt{2}b^{2/3}}-\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{3^{3/4}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[6]{a}\tanh^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{a+bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(x*Sqrt[a + b*x^3])/(2*(5 - 3*Sqrt[3])*a + b*x^3),x]
```

```
[Out] (2*Sqrt[a + b*x^3])/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x))
 - (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3
) - 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(Sqrt[2]*b^(2/3)) -
 (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3)
+ b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (
3^(3/4)*a^(1/6)*ArcTanh[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) +
 b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (a
^(1/6)*ArcTanh[((1 + Sqrt[3])*Sqrt[a + b*x^3])/(Sqrt[2]*3^(3/4)*S
qrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*
a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) +
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) +
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a + b*x^3
]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*S
qrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1
/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 32.525, size = 70, normalized size = 0.09

$$\frac{x^2\sqrt{a+bx^3}\,\mathrm{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},-\frac{bx^3}{a},-\frac{bx^3}{2a\left(-3\sqrt{3}+5\right)}\right)}{4a\sqrt{1+\frac{bx^3}{a}}\left(-3\sqrt{3}+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a)**(1/2)/(b*x**3+2*a*(5-3*3**(1/2))),x)
```

```
[Out] x**2*sqrt(a + b*x**3)*appellf1(2/3, -1/2, 1, 5/3, -b*x**3/a, -b*x
**3/(2*a*(-3*sqrt(3) + 5)))/(4*a*sqrt(1 + b*x**3/a)*(-3*sqrt(3) +
 5))
```

Mathematica [C] time = 0.65162, size = 250, normalized size = 0.34

$$\frac{10\left(15\sqrt{3}-26\right)ax^2\sqrt{a+bx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{10a-6\sqrt{3}a}\right)}{\left(3\sqrt{3}-5\right)\left(2\left(3\sqrt{3}-5\right)a-bx^3\right)\left(3bx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};-\frac{bx^3}{a},-\frac{bx^3}{10a-6\sqrt{3}a}\right)+\left(3\sqrt{3}-5\right)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{bx^3}{a},-\frac{bx^3}{10a-6\sqrt{3}a}\right)\right)\dots}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[a + b*x^3])/(2*(5 - 3*Sqrt[3])*a + b*x^3),x]
```

```
[Out] (10*(-26 + 15*Sqrt[3])*a*x^2*Sqrt[a + b*x^3]*AppellF1[2/3, -1/2,
1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[3]*a))])/((-5 + 3*
Sqrt[3])*(2*(-5 + 3*Sqrt[3])*a - b*x^3)*(10*(-5 + 3*Sqrt[3])*a*Ap
pellF1[2/3, -1/2, 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[
3]*a))] + 3*b*x^3*(AppellF1[5/3, -1/2, 2, 8/3, -((b*x^3)/a), -((b
*x^3)/(10*a - 6*Sqrt[3]*a))] + (-5 + 3*Sqrt[3])*AppellF1[5/3, 1/2
, 1, 8/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[3]*a))])))
```

Maple [C] time = 0.233, size = 977, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a)^(1/2)/(b*x^3+2*a*(5-3*3^(1/2))),x)
```

```
[Out] -2/3*I*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b
*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*((-3/2/b
*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*
b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(
1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3)))^(1/2)))+1/9*I/b^3*2^(1/2)*sum(1/_alpha*(2*3^(1/2)-3)
*(-a*b^2)^(1/3)*(1/2*I*b*(2*x+1/b*((-a*b^2)^(1/3)-I*3^(1/2)*(-a*b
^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)*(b*(x-1/b*(-a*b^2)^(1/3))/(-3*(
-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)^(1/3)))^(1/2)*(-1/2*I*b*(2*x+1/b
*((-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)
/(b*x^3+a)^(1/2)*(3*I*(-a*b^2)^(1/3)*_alpha*3^(1/2)*b+4*b^2*_alph
a^2*3^(1/2)-3*I*(-a*b^2)^(2/3)*3^(1/2)-2*3^(1/2)*(-a*b^2)^(1/3)*_
alpha*b+6*I*(-a*b^2)^(1/3)*_alpha*b+6*b^2*_alpha^2-2*3^(1/2)*(-a*
b^2)^(2/3)-6*I*(-a*b^2)^(2/3)-3*(-a*b^2)^(1/3)*_alpha*b-3*(-a*b^2
)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),-1/6/b*
(2*I*3^(1/2)*(-a*b^2)^(1/3)*_alpha^2*b-I*3^(1/2)*(-a*b^2)^(2/3)*_
alpha+4*I*(-a*b^2)^(1/3)*_alpha^2*b-2*3^(1/2)*(-a*b^2)^(2/3)*_alp
ha+I*3^(1/2)*a*b-2*I*(-a*b^2)^(2/3)*_alpha-2*3^(1/2)*a*b-3*(-a*b^
2)^(2/3)*_alpha+2*I*a*b-3*a*b)/a,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)),_alpha
=RootOf(b*_Z^3-6*a*3^(1/2)+10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3+ax}}{bx^3-2\,a\left(3\,\sqrt{3}-5\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(b*x^3 + a)*x/(b*x^3 - 2*a*(3*sqrt(3) - 5)),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a)*x/(b*x^3 - 2*((3*sqrt(3)) - 5)*a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(b*x^3 + a)*x/(b*x^3 - 2*a*(3*sqrt(3) - 5)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\sqrt{a+bx^3}}{-6\sqrt{3}a+10a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a)**(1/2)/(b*x**3+2*a*(5-3*3**(1/2))),x)
```

```
[Out] Integral(x*sqrt(a + b*x**3)/(-6*sqrt(3)*a + 10*a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.549616, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(b*x^3 + a)*x/(b*x^3 - 2*a*(3*sqrt(3) - 5)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.347 $\int \frac{x\sqrt{a-bx^3}}{2\left(5-3\sqrt{3}\right)a-bx^3}\,dx$

Optimal. Leaf size=758

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{a-bx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{a-bx^3}}$$
$$+\frac{2\sqrt{a-bx^3}}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)}-\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$
$$-\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{\sqrt{2}b^{2/3}}$$
$$+\frac{3^{3/4}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[6]{a}\tanh^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}$$

```
[Out] (2*Sqrt[a - b*x^3])/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x))
 - (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3
) - b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) -
 (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3)
+ 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])])/(Sqrt[2]*b^(2/3)) + (
3^(3/4)*a^(1/6)*ArcTanh[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) -
 b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (a
^(1/6)*ArcTanh[((1 + Sqrt[3])*Sqrt[a - b*x^3])/(Sqrt[2]*3^(3/4)*S
qrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*
a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) -
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) -
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*Sqrt[a - b*x^3
]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) - b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*S
qrt[(a^(1/3)*(a^(1/3) - b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) - b^(1
/3)*x)^2]*Sqrt[a - b*x^3])
```

Rubi [A] time = 0.657208, antiderivative size = 758, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{a-bx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{a-bx^3}}$$
$$+\frac{2\sqrt{a-bx^3}}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)}-\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$
$$-\frac{\sqrt[4]{3}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{\sqrt{2}b^{2/3}}$$
$$+\frac{3^{3/4}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[6]{a}\tanh^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*Sqrt[a - b*x^3])/(2*(5 - 3*Sqrt[3])*a - b*x^3),x]
```

```
[Out] (2*Sqrt[a - b*x^3])/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x))
 - (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3
) - b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) -
 (3^(1/4)*a^(1/6)*ArcTan[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3)
+ 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])])/(Sqrt[2]*b^(2/3)) + (
3^(3/4)*a^(1/6)*ArcTanh[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) -
 b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (a
^(1/6)*ArcTanh[((1 + Sqrt[3])*Sqrt[a - b*x^3])/(Sqrt[2]*3^(3/4)*S
qrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*
a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) -
 b^(1/3)*x)], -7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) -
b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*Sqrt[a - b*x^3
]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(
1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)
^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 + Sq
rt[3])*a^(1/3) - b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*S
qrt[(a^(1/3)*(a^(1/3) - b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) - b^(1
/3)*x)^2]*Sqrt[a - b*x^3])
```

Rubi in Sympy [A] time = 35.4711, size = 66, normalized size = 0.09

$$\frac{x^2\sqrt{a-bx^3}\operatorname{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},\frac{bx^3}{a},\frac{bx^3}{2a\left(-3\sqrt{3}+5\right)}\right)}{4a\sqrt{1-\frac{bx^3}{a}}\left(-3\sqrt{3}+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x*(-b*x**3+a)**(1/2)/(-b*x**3+2*a*(5-3*3**(1/2))),x)
```

```
[Out] x**2*sqrt(a - b*x**3)*appellf1(2/3, -1/2, 1, 5/3, b*x**3/a, b*x**
3/(2*a*(-3*sqrt(3) + 5)))/(4*a*sqrt(1 - b*x**3/a)*(-3*sqrt(3) + 5
))
```

Mathematica [C] time = 0.597577, size = 242, normalized size = 0.32

$$-\frac{10\left(26-15\sqrt{3}\right)ax^2\sqrt{a-bx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)}{\left(3\sqrt{3}-5\right)\left(2\left(3\sqrt{3}-5\right)a+bx^3\right)\left(10\left(3\sqrt{3}-5\right)aF_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)-3bx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)+\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[a - b*x^3])/(2*(5 - 3*Sqrt[3])*a - b*x^3),x]
```

```
[Out] (-10*(26 - 15*Sqrt[3])*a*x^2*Sqrt[a - b*x^3]*AppellF1[2/3, -1/2,
1, 5/3, (b*x^3)/a, (b*x^3)/(10*a - 6*Sqrt[3]*a)])/((-5 + 3*Sqrt[3
])*(2*(-5 + 3*Sqrt[3])*a + b*x^3)*(10*(-5 + 3*Sqrt[3])*a*AppellF1
[2/3, -1/2, 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a - 6*Sqrt[3]*a)] - 3*
b*x^3*(AppellF1[5/3, -1/2, 2, 8/3, (b*x^3)/a, (b*x^3)/(10*a - 6*S
qrt[3]*a)] + (-5 + 3*Sqrt[3])*AppellF1[5/3, 1/2, 1, 8/3, (b*x^3)/
a, (b*x^3)/(10*a - 6*Sqrt[3]*a)])))
```

Maple [C] time = 0.214, size = 924, normalized size = 1.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(-b*x^3+a)^(1/2)/(-b*x^3+2*a*(5-3*3^(1/2))),x)
```

```
[Out] 2/3*I*3^(1/2)/b*(a*b^2)^(1/3)*(-I*(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3))^(1/2)*((x-1/b*(a*
b^2)^(1/3))/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))
^(1/2)*(I*(x+1/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3
^(1/2)*b/(a*b^2)^(1/3))^(1/2)/(-b*x^3+a)^(1/2)*((-3/2/b*(a*b^2)^(
1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(-I*(x+
1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b
^2)^(1/3))^(1/2),(-I*3^(1/2)/b*(a*b^2)^(1/3)/(-3/2/b*(a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2))+1/b*(a*b^2)^(1/3)*Ellipt
icF(1/3*3^(1/2)*(-I*(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2
)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3))^(1/2),(-I*3^(1/2)/b*(a*b^2)^(1/
3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2)))-
1/9*I/b^3*2^(1/2)*sum(1/_alpha*(2*3^(1/2)-3)*(a*b^2)^(1/3)*(-1/2*
I*b*(2*x+1/b*(I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3)))/(a*b^2)^(1/
3))^(1/2)*(b*(x-1/b*(a*b^2)^(1/3))/(-3*(a*b^2)^(1/3)-I*3^(1/2)*(a
*b^2)^(1/3)))^(1/2)*(1/2*I*b*(2*x+1/b*(-I*3^(1/2)*(a*b^2)^(1/3)+(
a*b^2)^(1/3)))/(a*b^2)^(1/3))^(1/2)/(-b*x^3+a)^(1/2)*(-3*I*(a*b^2
)^(1/3)*_alpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)+3*I*(a*b^2)^(2/3)
*3^(1/2)-2*(a*b^2)^(1/3)*_alpha*3^(1/2)*b-6*I*(a*b^2)^(1/3)*_alph
a*b+6*b^2*_alpha^2-2*(a*b^2)^(2/3)*3^(1/2)+6*I*(a*b^2)^(2/3)-3*(a
*b^2)^(1/3)*_alpha*b-3*(a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(-I*
(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(
a*b^2)^(1/3))^(1/2),1/6/b*(-2*I*(a*b^2)^(1/3)*_alpha^2*3^(1/2)*b+
I*(a*b^2)^(2/3)*_alpha*3^(1/2)-4*I*(a*b^2)^(1/3)*_alpha^2*b-2*(a*
b^2)^(2/3)*_alpha*3^(1/2)+2*I*(a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-
3*(a*b^2)^(2/3)*_alpha+2*3^(1/2)*a*b+2*I*a*b+3*a*b)/a,(-I*3^(1/2)
/b*(a*b^2)^(1/3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1
/3)))^(1/2)),_alpha=RootOf(b*_Z^3+6*a*3^(1/2)-10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{-bx^3+ax}}{bx^3+2a\left(3\sqrt{3}-5\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 + a)*x/(b*x^3 + 2*a*(3*sqrt(3) - 5)),x, algorithm="maxima
```

```
[Out] -integrate(sqrt(-b*x^3 + a)*x/(b*x^3 + 2*((3*sqrt(3)) - 5)*a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 + a)*x/(b*x^3 + 2*a*(3*sqrt(3) - 5)),x, algorithm="fricas
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x\sqrt{a-bx^3}}{-10a+6\sqrt{3}a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(-b*x**3+a)**(1/2)/(-b*x**3+2*a*(5-3*3**(1/2))),x)
```

```
[Out] -Integral(x*sqrt(a - b*x**3)/(-10*a + 6*sqrt(3)*a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.579187, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(-b*x^3 + a)*x/(b*x^3 + 2*a*(3*sqrt(3) - 5)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.348 $\int \frac{x\sqrt{-a+bx^3}}{2\left(5-3\sqrt{3}\right)a-bx^3}\,dx$

Optimal. Leaf size=774

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7+4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{bx^3-a}} - \frac{\sqrt[4]{3}\sqrt{2+\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7+4\sqrt{3}\right)}{b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{bx^3-a}} + \frac{2\sqrt{bx^3-a}}{b^{2/3}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)} - \frac{3^{3/4}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}b^{2/3}} + \frac{\sqrt[6]{a}\tan^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{bx^3-a}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}} + \frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}b^{2/3}} + \frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{\sqrt{2}b^{2/3}}$$

```
[Out] (2*Sqrt[-a + b*x^3])/(b^(2/3)*((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)
) - (3^(3/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/
3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(2*Sqrt[2]*b^(2/3))
 + (a^(1/6)*ArcTan[((1 + Sqrt[3])*Sqrt[-a + b*x^3])/(Sqrt[2]*3^(3
/4)*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTa
nh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) - b^(1/3)*x))/(Sqrt[2]
*Sqrt[-a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTa
nh[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[
2]*Sqrt[-a + b*x^3])])/(Sqrt[2]*b^(2/3)) - (3^(1/4)*Sqrt[2 + Sqrt
[3]]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*Ellipti
cE[ArcSin[((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 - Sqrt[3])*a^(1
/3) - b^(1/3)*x)], -7 + 4*Sqrt[3]])/(b^(2/3)*Sqrt[-((a^(1/3)*(a^(
1/3) - b^(1/3)*x))/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)^2)]*Sqrt[-
a + b*x^3]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2
/3) + a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) - b
^(1/3)*x)^2]*EllipticF[ArcSin[((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)
/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)], -7 + 4*Sqrt[3]])/(3^(1/4)*
b^(2/3)*Sqrt[-((a^(1/3)*(a^(1/3) - b^(1/3)*x))/((1 - Sqrt[3])*a^(
1/3) - b^(1/3)*x)^2)]*Sqrt[-a + b*x^3])
```

Rubi [A] time = 0.677777, antiderivative size = 774, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.139$

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7+4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{bx^3-a}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2+\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}+\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}{\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x}\right)|-7+4\sqrt{3}\right)}{b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)^2}}\sqrt{bx^3-a}}$$
$$+\frac{2\sqrt{bx^3-a}}{b^{2/3}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-\sqrt[3]{b}x\right)}-\frac{3^{3/4}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}b^{2/3}}$$
$$+\frac{\sqrt[6]{a}\tan^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{bx^3-a}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}b^{2/3}}$$
$$+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{\sqrt{2}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*Sqrt[-a + b*x^3])/(2*(5 - 3*Sqrt[3])*a - b*x^3),x]
```

```
[Out] (2*Sqrt[-a + b*x^3])/(b^(2/3)*((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)
) - (3^(3/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/
3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(2*Sqrt[2]*b^(2/3))
 + (a^(1/6)*ArcTan[((1 + Sqrt[3])*Sqrt[-a + b*x^3])/(Sqrt[2]*3^(3
/4)*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTa
nh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) - b^(1/3)*x))/(Sqrt[2]
*Sqrt[-a + b*x^3])])/(2*Sqrt[2]*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTa
nh[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[
2]*Sqrt[-a + b*x^3])])/(Sqrt[2]*b^(2/3)) - (3^(1/4)*Sqrt[2 + Sqrt
[3]]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2/3) + a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)^2]*Ellipti
cE[ArcSin[((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)/((1 - Sqrt[3])*a^(1
/3) - b^(1/3)*x)], -7 + 4*Sqrt[3]])/(b^(2/3)*Sqrt[-((a^(1/3)*(a^(
1/3) - b^(1/3)*x))/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)^2)]*Sqrt[-
a + b*x^3]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) - b^(1/3)*x)*Sqrt[(a^(2
/3) + a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) - b
^(1/3)*x)^2]*EllipticF[ArcSin[((1 + Sqrt[3])*a^(1/3) - b^(1/3)*x)
/((1 - Sqrt[3])*a^(1/3) - b^(1/3)*x)], -7 + 4*Sqrt[3]])/(3^(1/4)*
b^(2/3)*Sqrt[-((a^(1/3)*(a^(1/3) - b^(1/3)*x))/((1 - Sqrt[3])*a^(
1/3) - b^(1/3)*x)^2)]*Sqrt[-a + b*x^3])
```

Rubi in Sympy [A] time = 35.0854, size = 66, normalized size = 0.09

$$\frac{x^2\sqrt{-a+bx^3}\operatorname{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},\frac{bx^3}{a},\frac{bx^3}{2a\left(-3\sqrt{3}+5\right)}\right)}{4a\sqrt{1-\frac{bx^3}{a}}\left(-3\sqrt{3}+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3-a)**(1/2)/(-b*x**3+2*a*(5-3*3**(1/2))),x)
```

```
[Out] x**2*sqrt(-a + b*x**3)*appellf1(2/3, -1/2, 1, 5/3, b*x**3/a, b*x*
*3/(2*a*(-3*sqrt(3) + 5)))/(4*a*sqrt(1 - b*x**3/a)*(-3*sqrt(3) +
5))
```

Mathematica [C] time = 0.640479, size = 243, normalized size = 0.31

$$-\frac{10\left(26-15\sqrt{3}\right)ax^2\sqrt{bx^3-a}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)}{\left(3\sqrt{3}-5\right)\left(2\left(3\sqrt{3}-5\right)a+bx^3\right)\left(10\left(3\sqrt{3}-5\right)aF_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)-3bx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)+\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[-a + b*x^3])/(2*(5 - 3*Sqrt[3])*a - b*x^3),x]
```

```
[Out] (-10*(26 - 15*Sqrt[3])*a*x^2*Sqrt[-a + b*x^3]*AppellF1[2/3, -1/2,
 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a - 6*Sqrt[3]*a)])/((-5 + 3*Sqrt[
3])*(2*(-5 + 3*Sqrt[3])*a + b*x^3)*(10*(-5 + 3*Sqrt[3])*a*AppellF
1[2/3, -1/2, 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a - 6*Sqrt[3]*a)] - 3
*b*x^3*(AppellF1[5/3, -1/2, 2, 8/3, (b*x^3)/a, (b*x^3)/(10*a - 6*
Sqrt[3]*a)] + (-5 + 3*Sqrt[3])*AppellF1[5/3, 1/2, 1, 8/3, (b*x^3)
/a, (b*x^3)/(10*a - 6*Sqrt[3]*a)])))
```

Maple [C] time = 0.11, size = 926, normalized size = 1.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3-a)^(1/2)/(-b*x^3+2*a*(5-3*3^(1/2))),x)
```

```
[Out] -2/3*I*3^(1/2)/b*(a*b^2)^(1/3)*(-I*(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3))^(1/2)*((x-1/b*(a
*b^2)^(1/3))/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))
)^(1/2)*(I*(x+1/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*
3^(1/2)*b/(a*b^2)^(1/3))^(1/2)/(b*x^3-a)^(1/2)*((-3/2/b*(a*b^2)^(
1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*EllipticE(1/3*3^(1/2)*(-I*(x+
1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b
^2)^(1/3))^(1/2),(-I*3^(1/2)/b*(a*b^2)^(1/3)/(-3/2/b*(a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2))+1/b*(a*b^2)^(1/3)*Ellipt
icF(1/3*3^(1/2)*(-I*(x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2
)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3))^(1/2),(-I*3^(1/2)/b*(a*b^2)^(1/
3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2)))+
1/9*I/b^3*2^(1/2)*sum(1/_alpha*(2*3^(1/2)-3)*(a*b^2)^(1/3)*(-1/2*
I*b*(2*x+1/b*(I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3)))/(a*b^2)^(1/
3))^(1/2)*(b*(x-1/b*(a*b^2)^(1/3))/(-3*(a*b^2)^(1/3)-I*3^(1/2)*(a
*b^2)^(1/3)))^(1/2)*(1/2*I*b*(2*x+1/b*(-I*3^(1/2)*(a*b^2)^(1/3)+(
a*b^2)^(1/3)))/(a*b^2)^(1/3))^(1/2)/(b*x^3-a)^(1/2)*(-3*I*(a*b^2)
^(1/3)*_alpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)+3*I*(a*b^2)^(2/3)*
3^(1/2)-2*(a*b^2)^(1/3)*_alpha*3^(1/2)*b-6*I*(a*b^2)^(1/3)*_alpha
*b+6*b^2*_alpha^2-2*(a*b^2)^(2/3)*3^(1/2)+6*I*(a*b^2)^(2/3)-3*(a*
b^2)^(1/3)*_alpha*b-3*(a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(-I*(
x+1/2/b*(a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a
*b^2)^(1/3))^(1/2),1/6/b*(-2*I*(a*b^2)^(1/3)*_alpha^2*3^(1/2)*b+I
*(a*b^2)^(2/3)*_alpha*3^(1/2)-4*I*(a*b^2)^(1/3)*_alpha^2*b-2*(a*b
^2)^(2/3)*_alpha*3^(1/2)+2*I*(a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-3
*(a*b^2)^(2/3)*_alpha+2*3^(1/2)*a*b+2*I*a*b+3*a*b)/a,(-I*3^(1/2)/
b*(a*b^2)^(1/3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/
3)))^(1/2)),_alpha=RootOf(b*_Z^3+6*a*3^(1/2)-10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{bx^3 - ax}}{bx^3 + 2\,a\left(3\,\sqrt{3} - 5\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(b*x^3 - a)*x/(b*x^3 + 2*a*(3*sqrt(3) - 5)),x, algorithm="maxima"
```

```
[Out] -integrate(sqrt(b*x^3 - a)*x/(b*x^3 + 2*((3*sqrt(3)) - 5)*a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(b*x^3 - a)*x/(b*x^3 + 2*a*(3*sqrt(3) - 5)),x, algorithm="fricas"
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x\sqrt{-a + bx^3}}{-10a + 6\sqrt{3}a + bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3-a)**(1/2)/(-b*x**3+2*a*(5-3*3**(1/2))),x)
```

```
[Out] -Integral(x*sqrt(-a + b*x**3)/(-10*a + 6*sqrt(3)*a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.568093, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(b*x^3 - a)*x/(b*x^3 + 2*a*(3*sqrt(3) - 5)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.349 $\int \frac{x\sqrt{-a-bx^3}}{2\left(5-3\sqrt{3}\right)a+bx^3}\,dx$

Optimal. Leaf size=768

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}\right)|-7+4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{-a-bx^3}}-\frac{\sqrt[4]{3}\sqrt{2+\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}\right)|-7+4\sqrt{3}\right)}{b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{-a-bx^3}}+\frac{2\sqrt{-a-bx^3}}{b^{2/3}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{3^{3/4}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}+\frac{\sqrt[6]{a}\tan^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{-a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{\sqrt{2}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$

```
[Out] (2*Sqrt[-a - b*x^3])/(b^(2/3)*((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)
) - (3^(3/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/
3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*b^(2/3))
 + (a^(1/6)*ArcTan[((1 + Sqrt[3])*Sqrt[-a - b*x^3])/(Sqrt[2]*3^(3
/4)*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTa
nh[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3) - 2*b^(1/3)*x))/(Sqrt[
2]*Sqrt[-a - b*x^3])])/(Sqrt[2]*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTa
nh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]
*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) - (3^(1/4)*Sqrt[2 + Sqrt
[3]]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellipti
cE[ArcSin[((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 - Sqrt[3])*a^(1
/3) + b^(1/3)*x)], -7 + 4*Sqrt[3]])/(b^(2/3)*Sqrt[-((a^(1/3)*(a^(
1/3) + b^(1/3)*x))/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)^2)]*Sqrt[-
a - b*x^3]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2
/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) + b
^(1/3)*x)^2]*EllipticF[ArcSin[((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 + 4*Sqrt[3]])/(3^(1/4)*
b^(2/3)*Sqrt[-((a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2)]*Sqrt[-a - b*x^3])
```

Rubi [A] time = 0.645224, antiderivative size = 768, normalized size of antiderivative = 1., number

of steps used = 5, number of rules used = 5, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.139$

$$\frac{2\sqrt{2}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}\right)|-7+4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{-a-bx^3}}$$
$$-\frac{\sqrt[4]{3}\sqrt{2+\sqrt{3}}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}\right)|-7+4\sqrt{3}\right)}{b^{2/3}\sqrt{-\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{-a-bx^3}}$$
$$+\frac{2\sqrt{-a-bx^3}}{b^{2/3}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)}-\frac{3^{3/4}\sqrt[6]{a}\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$
$$+\frac{\sqrt[6]{a}\tan^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{-a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{\sqrt{2}\sqrt[4]{3}b^{2/3}}+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{\sqrt{2}b^{2/3}}$$
$$+\frac{\sqrt[4]{3}\sqrt[6]{a}\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}b^{2/3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(x*Sqrt[-a - b*x^3])/(2*(5 - 3*Sqrt[3])*a + b*x^3),x]
```

```
[Out] (2*Sqrt[-a - b*x^3])/(b^(2/3)*((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)
) - (3^(3/4)*a^(1/6)*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/
3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*b^(2/3))
 + (a^(1/6)*ArcTan[((1 + Sqrt[3])*Sqrt[-a - b*x^3])/(Sqrt[2]*3^(3
/4)*Sqrt[a])])/(Sqrt[2]*3^(1/4)*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTa
nh[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3) - 2*b^(1/3)*x))/(Sqrt[
2]*Sqrt[-a - b*x^3])])/(Sqrt[2]*b^(2/3)) + (3^(1/4)*a^(1/6)*ArcTa
nh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]
*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*b^(2/3)) - (3^(1/4)*Sqrt[2 + Sqrt
[3]]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellipti
cE[ArcSin[((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 - Sqrt[3])*a^(1
/3) + b^(1/3)*x)], -7 + 4*Sqrt[3]])/(b^(2/3)*Sqrt[-((a^(1/3)*(a^(
1/3) + b^(1/3)*x))/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)^2)]*Sqrt[-
a - b*x^3]) + (2*Sqrt[2]*a^(1/3)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2
/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 - Sqrt[3])*a^(1/3) + b
^(1/3)*x)^2]*EllipticF[ArcSin[((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
/((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 + 4*Sqrt[3]])/(3^(1/4)*
b^(2/3)*Sqrt[-((a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 - Sqrt[3])*a^(
1/3) + b^(1/3)*x)^2)]*Sqrt[-a - b*x^3])
```

Rubi in Sympy [A] time = 33.9893, size = 71, normalized size = 0.09

$$\frac{x^2\sqrt{-a-bx^3}\,\text{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},-\frac{bx^3}{a},-\frac{bx^3}{2a\left(-3\sqrt{3}+5\right)}\right)}{4a\sqrt{1+\frac{bx^3}{a}}\left(-3\sqrt{3}+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(-b*x**3-a)**(1/2)/(b*x**3+2*a*(5-3*3**(1/2))),x)
```

```
[Out] x**2*sqrt(-a - b*x**3)*appellf1(2/3, -1/2, 1, 5/3, -b*x**3/a, -b*
x**3/(2*a*(-3*sqrt(3) + 5)))/(4*a*sqrt(1 + b*x**3/a)*(-3*sqrt(3)
+ 5))
```

Mathematica [C] time = 0.634986, size = 253, normalized size = 0.33

$$\frac{10\left(15\sqrt{3}-26\right)ax^2\sqrt{-a-bx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{10a-6\sqrt{3}a}\right)}{\left(3\sqrt{3}-5\right)\left(2\left(3\sqrt{3}-5\right)a-bx^3\right)\left(3bx^3\left(F_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};-\frac{bx^3}{a},-\frac{bx^3}{10a-6\sqrt{3}a}\right)+\left(3\sqrt{3}-5\right)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{bx^3}{a},-\frac{bx^3}{10a-6\sqrt{3}a}\right)\right)\cdots}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[-a - b*x^3])/(2*(5 - 3*Sqrt[3])*a + b*x^3),x]
```

```
[Out] (10*(-26 + 15*Sqrt[3])*a*x^2*Sqrt[-a - b*x^3]*AppellF1[2/3, -1/2,
 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[3]*a))])/((-5 + 3
*Sqrt[3])*(2*(-5 + 3*Sqrt[3])*a - b*x^3)*(10*(-5 + 3*Sqrt[3])*a*A
ppellF1[2/3, -1/2, 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt
[3]*a))] + 3*b*x^3*(AppellF1[5/3, -1/2, 2, 8/3, -((b*x^3)/a), -((
b*x^3)/(10*a - 6*Sqrt[3]*a))] + (-5 + 3*Sqrt[3])*AppellF1[5/3, 1/
2, 1, 8/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[3]*a))])))
```

Maple [C] time = 0.103, size = 983, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(-b*x^3-a)^(1/2)/(b*x^3+2*a*(5-3*3^(1/2))),x)
```

```
[Out] 2/3*I*3^(1/2)/b*(-a*b^2)^(1/3)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)*((x-1/b*
(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3)))^(1/2)*(-I*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2)/(-b*x^3-a)^(1/2)*((-3/2/b
*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3
^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+1/b*(-a*
b^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),(I*3^(
1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3)))^(1/2)))-1/9*I/b^3*2^(1/2)*sum(1/_alpha*(2*3^(1/2)-3)
*(-a*b^2)^(1/3)*(1/2*I*b*(2*x+1/b*((-a*b^2)^(1/3)-I*3^(1/2)*(-a*b
^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)*(b*(x-1/b*(-a*b^2)^(1/3))/(-3*(
-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)^(1/3)))^(1/2)*(-1/2*I*b*(2*x+1/b
*((-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)
/(-b*x^3-a)^(1/2)*(3*I*(-a*b^2)^(1/3)*_alpha*3^(1/2)*b+4*b^2*_alp
ha^2*3^(1/2)-3*I*(-a*b^2)^(2/3)*3^(1/2)-2*3^(1/2)*(-a*b^2)^(1/3)*
_alpha*b+6*I*(-a*b^2)^(1/3)*_alpha*b+6*b^2*_alpha^2-2*3^(1/2)*(-a
*b^2)^(2/3)-6*I*(-a*b^2)^(2/3)-3*(-a*b^2)^(1/3)*_alpha*b-3*(-a*b^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2)*b/(-a*b^2)^(1/3))^(1/2),-1/6/b
*(2*I*3^(1/2)*(-a*b^2)^(1/3)*_alpha^2*b-I*3^(1/2)*(-a*b^2)^(2/3)*
_alpha+4*I*(-a*b^2)^(1/3)*_alpha^2*b-2*3^(1/2)*(-a*b^2)^(2/3)*_al
pha+I*3^(1/2)*a*b-2*I*(-a*b^2)^(2/3)*_alpha-2*3^(1/2)*a*b-3*(-a*b
^2)^(2/3)*_alpha+2*I*a*b-3*a*b)/a,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3
/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)),_alph
a=RootOf(b*_Z^3-6*a*3^(1/2)+10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{-bx^3 - ax}}{bx^3 - 2\,a\left(3\,\sqrt{3} - 5\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-b*x^3 - a)*x/(b*x^3 - 2*a*(3*sqrt(3) - 5)),x, algorithm="maxima"
```

```
[Out] integrate(sqrt(-b*x^3 - a)*x/(b*x^3 - 2*((3*sqrt(3)) - 5)*a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-b*x^3 - a)*x/(b*x^3 - 2*a*(3*sqrt(3) - 5)),x, algorithm="fricas"
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\sqrt{-a - bx^3}}{-6\sqrt{3}a + 10a + bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(-b*x**3-a)**(1/2)/(b*x**3+2*a*(5-3*3**(1/2))),x)
```

```
[Out] Integral(x*sqrt(-a - b*x**3)/(-6*sqrt(3)*a + 10*a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.552624, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-b*x^3 - a)*x/(b*x^3 - 2*a*(3*sqrt(3) - 5)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.350 $\int \frac{x}{\sqrt{a+bx^3}\left(2\left(5+3\sqrt{3}\right)a+bx^3\right)}\,dx$

Optimal. Leaf size=318

$$-\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{a+bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}$$

```
[Out] -((2 - Sqrt[3])*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) +
b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])]])/(2*Sqrt[2]*3^(3/4)*a^(5/6
)*b^(2/3)) - ((2 - Sqrt[3])*ArcTan[((1 - Sqrt[3])*Sqrt[a + b*x^3]
)/(Sqrt[2]*3^(3/4)*Sqrt[a])]])/(3*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3))
 - ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/3)
 - 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])]])/(3*Sqrt[2]*3^(1/4)*a
^(5/6)*b^(2/3)) - ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*(1 - Sqrt[3])*a
^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])]])/(6*Sqrt
[2]*3^(1/4)*a^(5/6)*b^(2/3))
```

Rubi [A] time = 0.244243, antiderivative size = 318, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.03

$$-\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{a+bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[a + b*x^3]*(2*(5 + 3*Sqrt[3])*a + b*x^3)),x]
```

```
[Out] -((2 - Sqrt[3])*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) +
b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])]])/(2*Sqrt[2]*3^(3/4)*a^(5/6
)*b^(2/3)) - ((2 - Sqrt[3])*ArcTan[((1 - Sqrt[3])*Sqrt[a + b*x^3]
)/(Sqrt[2]*3^(3/4)*Sqrt[a])]])/(3*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3))
 - ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/3)
 - 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])]])/(3*Sqrt[2]*3^(1/4)*a
^(5/6)*b^(2/3)) - ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*(1 - Sqrt[3])*a
^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])]])/(6*Sqrt
[2]*3^(1/4)*a^(5/6)*b^(2/3))
```

Rubi in Sympy [A] time = 32.4522, size = 70, normalized size = 0.22

$$\frac{x^2\sqrt{a+bx^3}\operatorname{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},-\frac{bx^3}{a},-\frac{bx^3}{2a\left(5+3\sqrt{3}\right)}\right)}{4a^2\sqrt{1+\frac{bx^3}{a}}\left(5+3\sqrt{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+2*a*(5+3*3**(1/2)))/(b*x**3+a)**(1/2),x)
```

```
[Out] x**2*sqrt(a + b*x**3)*appellf1(2/3, 1/2, 1, 5/3, -b*x**3/a, -b*x*
*3/(2*a*(5 + 3*sqrt(3))))/(4*a**2*sqrt(1 + b*x**3/a)*(5 + 3*sqrt(
3)))
```

Mathematica [C] time = 0.547894, size = 249, normalized size = 0.78

$$\frac{10\left(26+15\sqrt{3}\right)ax^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right)}{\left(5+3\sqrt{3}\right)\sqrt{a+bx^3}\left(2\left(5+3\sqrt{3}\right)a+bx^3\right)\left(10\left(5+3\sqrt{3}\right)aF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right)-3bx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{bx^3}{a},-\frac{}{6}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[a + b*x^3]*(2*(5 + 3*Sqrt[3])*a + b*x^3)),x]
```

```
[Out] (10*(26 + 15*Sqrt[3])*a*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((b*x^3)/
a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))])/((5 + 3*Sqrt[3])*Sqrt[a + b
*x^3]*(2*(5 + 3*Sqrt[3])*a + b*x^3)*(10*(5 + 3*Sqrt[3])*a*AppellF
1[2/3, 1/2, 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))
] - 3*b*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((b*x^3)/a), -((b*x^3)/(
10*a + 6*Sqrt[3]*a))] + (5 + 3*Sqrt[3])*AppellF1[5/3, 3/2, 1, 8/3
, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))])))
```

Maple [C] time = 0.099, size = 538, normalized size = 1.7

$$\frac{-\frac{i}{27}\sqrt{2}}{ab^3}\sum_{\_alpha=RootOf\left(b\_Z^3+6\,a\sqrt{3}+10\,a\right)}\frac{1}{\_alpha}\sqrt[3]{-ab^2}\sqrt{\frac{i}{2}b\left(2\,x+\frac{1}{b}\left(\sqrt[3]{-ab^2}-i\sqrt{3}\sqrt[3]{-ab^2}\right)\right)\frac{1}{\sqrt[3]{-ab^2}}}\sqrt{b\left(x-\frac{1}{b}\sqrt[3]{-ab^2}\right)\left(-3\sqrt[3]{}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+2*a*(5+3*3^(1/2)))/(b*x^3+a)^(1/2),x)
```

```
[Out] -1/27*I/b^3/a*2^(1/2)*sum(1/_alpha*(-a*b^2)^(1/3)*(1/2*I*b*(2*x+1
/b*((-a*b^2)^(1/3)-I*3^(1/2)*(-a*b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/
2)*(b*(x-1/b*(-a*b^2)^(1/3))/(-3*(-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2
)^(1/3)))^(1/2)*(-1/2*I*b*(2*x+1/b*((-a*b^2)^(1/3)+I*3^(1/2)*(-a*
b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*(-3*I*(-a*b^2)
^(1/3)*_alpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)+3*I*(-a*b^2)^(2/3)
*3^(1/2)-2*3^(1/2)*(-a*b^2)^(1/3)*_alpha*b+6*I*(-a*b^2)^(1/3)*_al
pha*b-6*b^2*_alpha^2-2*3^(1/2)*(-a*b^2)^(2/3)-6*I*(-a*b^2)^(2/3)+
3*(-a*b^2)^(1/3)*_alpha*b+3*(-a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2
)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2),-1/6/b*(2*I*3^(1/2)*(-a*b^2)^(1/3)*_a
lpha^2*b-I*3^(1/2)*(-a*b^2)^(2/3)*_alpha-4*I*(-a*b^2)^(1/3)*_alph
a^2*b+I*3^(1/2)*a*b+2*3^(1/2)*(-a*b^2)^(2/3)*_alpha+2*I*(-a*b^2)^
(2/3)*_alpha+2*3^(1/2)*a*b-2*I*a*b-3*(-a*b^2)^(2/3)*_alpha-3*a*b)
/a,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3)))^(1/2)),_alpha=RootOf(b*_Z^3+6*a*3^(1/2)+10*
a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(bx^3+2\,a\left(3\,\sqrt{3}+5\right)\right)\sqrt{bx^3+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + 2*a*(3*sqrt(3) + 5))*sqrt(b*x^3 + a)),x, algorithm="maxima
```

```
[Out] integrate(x/((b*x^3 + 2*((3*sqrt(3)) + 5)*a)*sqrt(b*x^3 + a)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 + 2*a*(3*sqrt(3) + 5))*sqrt(b*x^3 + a)),x, algorithm="fricas
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{a+bx^3}\left(10a+6\sqrt{3}a+bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(b*x**3+2*a*(5+3*3**(1/2)))/(b*x**3+a)**(1/2),x)
```

```
[Out] Integral(x/(sqrt(a + b*x**3)*(10*a + 6*sqrt(3)*a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.543146, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 + 2*a*(3*sqrt(3) + 5))*sqrt(b*x^3 + a)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.351 $\int \frac{x}{\sqrt{a-bx^3}\left(2\left(5+3\sqrt{3}\right)a-bx^3\right)}\,dx$

Optimal. Leaf size=324

$$-\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}$$

```
[Out] -((2 - Sqrt[3])*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) -
b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(2*Sqrt[2]*3^(3/4)*a^(5/6
)*b^(2/3)) - ((2 - Sqrt[3])*ArcTan[((1 - Sqrt[3])*Sqrt[a - b*x^3]
)/(Sqrt[2]*3^(3/4)*Sqrt[a])]])/(3*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3))
 - ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3)
 - b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(6*Sqrt[2]*3^(1/4)*a^(
5/6)*b^(2/3)) - ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*a^(1/6)*((1 + Sqr
t[3])*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(3*Sqrt
[2]*3^(1/4)*a^(5/6)*b^(2/3))
```

Rubi [A] time = 0.215383, antiderivative size = 324, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029

$$-\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[a - b*x^3]*(2*(5 + 3*Sqrt[3])*a - b*x^3)),x]
```

```
[Out] -((2 - Sqrt[3])*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) -
b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(2*Sqrt[2]*3^(3/4)*a^(5/6
)*b^(2/3)) - ((2 - Sqrt[3])*ArcTan[((1 - Sqrt[3])*Sqrt[a - b*x^3]
)/(Sqrt[2]*3^(3/4)*Sqrt[a])]])/(3*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3))
 - ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3)
 - b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(6*Sqrt[2]*3^(1/4)*a^(
5/6)*b^(2/3)) - ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*a^(1/6)*((1 + Sqr
t[3])*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(3*Sqrt
[2]*3^(1/4)*a^(5/6)*b^(2/3))
```

Rubi in Sympy [A] time = 35.5255, size = 66, normalized size = 0.2

$$\frac{x^2\sqrt{a-bx^3}\operatorname{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},\frac{bx^3}{a},\frac{bx^3}{2a\left(5+3\sqrt{3}\right)}\right)}{4a^2\sqrt{1-\frac{bx^3}{a}}\left(5+3\sqrt{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-b*x**3+2*a*(5+3*3**(1/2)))/(-b*x**3+a)**(1/2),x)
```

```
[Out] x**2*sqrt(a - b*x**3)*appellf1(2/3, 1/2, 1, 5/3, b*x**3/a, b*x**3
/(2*a*(5 + 3*sqrt(3))))/(4*a**2*sqrt(1 - b*x**3/a)*(5 + 3*sqrt(3)
))
```

Mathematica [C] time = 0.551758, size = 243, normalized size = 0.75

$$\frac{10\left(26+15\sqrt{3}\right)ax^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)}{\left(5+3\sqrt{3}\right)\sqrt{a-bx^3}\left(2\left(5+3\sqrt{3}\right)a-bx^3\right)\left(3bx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)+\left(5+3\sqrt{3}\right)F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[a - b*x^3]*(2*(5 + 3*Sqrt[3])*a - b*x^3)),x]
```

```
[Out] (10*(26 + 15*Sqrt[3])*a*x^2*AppellF1[2/3, 1/2, 1, 5/3, (b*x^3)/a,
 (b*x^3)/(10*a + 6*Sqrt[3]*a)])/((5 + 3*Sqrt[3])*Sqrt[a - b*x^3]*
(2*(5 + 3*Sqrt[3])*a - b*x^3)*(10*(5 + 3*Sqrt[3])*a*AppellF1[2/3,
 1/2, 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[3]*a)] + 3*b*x^3*
(AppellF1[5/3, 1/2, 2, 8/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[3]*
a)] + (5 + 3*Sqrt[3])*AppellF1[5/3, 3/2, 1, 8/3, (b*x^3)/a, (b*x^
3)/(10*a + 6*Sqrt[3]*a)])))
```

Maple [C] time = 0.101, size = 509, normalized size = 1.6

$$\frac{\frac{i}{27}\sqrt{2}}{ab^3}\sum_{\_alpha=RootOf\left(b\_Z^3-6a\sqrt{3}-10a\right)}\frac{1}{\_alpha}\sqrt[3]{ab^2}\sqrt{-\frac{i}{2}b\left(2x+\frac{1}{b}\left(i\sqrt{3}\sqrt[3]{ab^2}+\sqrt[3]{ab^2}\right)\right)\frac{1}{\sqrt[3]{ab^2}}}\sqrt{b\left(x-\frac{1}{b}\sqrt[3]{ab^2}\right)\left(-3\sqrt[3]{ab^2}-i\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-b*x^3+2*a*(5+3*3^(1/2)))/(-b*x^3+a)^(1/2),x)
```

```
[Out] 1/27*I/b^3/a*2^(1/2)*sum(1/_alpha*(a*b^2)^(1/3)*(-1/2*I*b*(2*x+1/
b*(I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3)))/(a*b^2)^(1/3))^(1/2)*(
b*(x-1/b*(a*b^2)^(1/3))/(-3*(a*b^2)^(1/3)-I*3^(1/2)*(a*b^2)^(1/3)
))^(1/2)*(1/2*I*b*(2*x+1/b*(-I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3
)))/(a*b^2)^(1/3))^(1/2)/(-b*x^3+a)^(1/2)*(3*I*(a*b^2)^(1/3)*_alp
ha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)-3*I*(a*b^2)^(2/3)*3^(1/2)-2*(
a*b^2)^(1/3)*_alpha*3^(1/2)*b-6*I*(a*b^2)^(1/3)*_alpha*b-6*b^2*_a
lpha^2-2*(a*b^2)^(2/3)*3^(1/2)+6*I*(a*b^2)^(2/3)+3*(a*b^2)^(1/3)*
_alpha*b+3*(a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(-I*(x+1/2/b*(a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3)
)^(1/2),1/6/b*(-2*I*(a*b^2)^(1/3)*_alpha^2*3^(1/2)*b+I*(a*b^2)^(2
/3)*_alpha*3^(1/2)+4*I*(a*b^2)^(1/3)*_alpha^2*b+2*(a*b^2)^(2/3)*_
alpha*3^(1/2)-2*I*(a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-3*(a*b^2)^(2
/3)*_alpha-2*3^(1/2)*a*b-2*I*a*b+3*a*b)/a,(-I*3^(1/2)/b*(a*b^2)^(
1/3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2))
,_alpha=RootOf(b*_Z^3-6*a*3^(1/2)-10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x}{\left(bx^3-2a\left(3\sqrt{3}+5\right)\right)\sqrt{-bx^3+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 - 2*a*(3*sqrt(3) + 5))*sqrt(-b*x^3 + a)),x, algorithm="maxi
```

```
[Out] -integrate(x/((b*x^3 - 2*((3*sqrt(3)) + 5)*a)*sqrt(-b*x^3 + a)),
x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 - 2*a*(3*sqrt(3) + 5))*sqrt(-b*x^3 + a)),x, algorithm="frica
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x}{-6\sqrt{3}a\sqrt{a-bx^3}-10a\sqrt{a-bx^3}+bx^3\sqrt{a-bx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-b*x**3+2*a*(5+3*3**(1/2)))/(-b*x**3+a)**(1/2),x)
```

```
[Out] -Integral(x/(-6*sqrt(3)*a*sqrt(a - b*x**3) - 10*a*sqrt(a - b*x**3
) + b*x**3*sqrt(a - b*x**3)), x)
```

GIAC/XCAS [A] time = 0.571124, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 - 2*a*(3*sqrt(3) + 5))*sqrt(-b*x^3 + a)),x, algorithm="giac
```

```
[Out] sage0*x
```

3.352 $\int \frac{x}{\sqrt{-a+bx^3}\left(-2\left(5+3\sqrt{3}\right)a+bx^3\right)}\,dx$

Optimal. Leaf size=328

$$\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{bx^3-a}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}$$

```
[Out] ((2 - Sqrt[3])*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) - b
^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])]])/(6*Sqrt[2]*3^(1/4)*a^(5/6
)*b^(2/3)) + ((2 - Sqrt[3])*ArcTan[(3^(1/4)*a^(1/6)*((1 + Sqrt[3]
)*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])]])/(3*Sqrt[2]
*3^(1/4)*a^(5/6)*b^(2/3)) + ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*(1 +
Sqrt[3])*a^(1/6)*(a^(1/3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3]
)]])/(2*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)) - ((2 - Sqrt[3])*ArcTanh[
((1 - Sqrt[3])*Sqrt[-a + b*x^3])/(Sqrt[2]*3^(3/4)*Sqrt[a])]])/(3*S
qrt[2]*3^(3/4)*a^(5/6)*b^(2/3))
```

Rubi [A] time = 0.204681, antiderivative size = 328, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029

$$\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{bx^3-a}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[-a + b*x^3]*(-2*(5 + 3*Sqrt[3])*a + b*x^3)),x]
```

```
[Out] ((2 - Sqrt[3])*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) - b
^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])]])/(6*Sqrt[2]*3^(1/4)*a^(5/6
)*b^(2/3)) + ((2 - Sqrt[3])*ArcTan[(3^(1/4)*a^(1/6)*((1 + Sqrt[3]
)*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])]])/(3*Sqrt[2]
*3^(1/4)*a^(5/6)*b^(2/3)) + ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*(1 +
Sqrt[3])*a^(1/6)*(a^(1/3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3]
)]])/(2*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)) - ((2 - Sqrt[3])*ArcTanh[
((1 - Sqrt[3])*Sqrt[-a + b*x^3])/(Sqrt[2]*3^(3/4)*Sqrt[a])]])/(3*S
qrt[2]*3^(3/4)*a^(5/6)*b^(2/3))
```

Rubi in Sympy [A] time = 35.3114, size = 66, normalized size = 0.2

$$\frac{x^2\sqrt{-a+bx^3}\,\mathrm{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},\frac{bx^3}{a},\frac{bx^3}{2a\left(5+3\sqrt{3}\right)}\right)}{4a^2\sqrt{1-\frac{bx^3}{a}}\left(5+3\sqrt{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3-2*a*(5+3*3**(1/2)))/(b*x**3-a)**(1/2),x)
```

```
[Out] x**2*sqrt(-a + b*x**3)*appellf1(2/3, 1/2, 1, 5/3, b*x**3/a, b*x**
3/(2*a*(5 + 3*sqrt(3))))/(4*a**2*sqrt(1 - b*x**3/a)*(5 + 3*sqrt(3
)))
```

Mathematica [C] time = 0.539309, size = 244, normalized size = 0.74

$$-\frac{10\left(26+15\sqrt{3}\right)ax^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)}{\left(5+3\sqrt{3}\right)\left(2\left(5+3\sqrt{3}\right)a-bx^3\right)\sqrt{bx^3-a}\left(3bx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)+\left(5+3\sqrt{3}\right)F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a+10a}\right)\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[-a + b*x^3]*(-2*(5 + 3*Sqrt[3])*a + b*x^3)),x]
```

```
[Out] (-10*(26 + 15*Sqrt[3])*a*x^2*AppellF1[2/3, 1/2, 1, 5/3, (b*x^3)/a
, (b*x^3)/(10*a + 6*Sqrt[3]*a)])/((5 + 3*Sqrt[3])*(2*(5 + 3*Sqrt[
3])*a - b*x^3)*Sqrt[-a + b*x^3]*(10*(5 + 3*Sqrt[3])*a*AppellF1[2/
3, 1/2, 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[3]*a)] + 3*b*x^
3*(AppellF1[5/3, 1/2, 2, 8/3, (b*x^3)/a, (b*x^3)/(10*a + 6*Sqrt[3
]*a)] + (5 + 3*Sqrt[3])*AppellF1[5/3, 3/2, 1, 8/3, (b*x^3)/a, (b*
x^3)/(10*a + 6*Sqrt[3]*a)])))
```

Maple [C] time = 0.094, size = 510, normalized size = 1.6

$$\frac{-\frac{i}{27}\sqrt{2}}{ab^3}\sum_{\_alpha=RootOf\left(b\_Z^3-6a\sqrt{3}-10a\right)}\frac{1}{\_alpha}\sqrt[3]{ab^2}\sqrt{-\frac{i}{2}b\left(2x+\frac{1}{b}\left(i\sqrt{3}\sqrt[3]{ab^2}+\sqrt[3]{ab^2}\right)\right)\frac{1}{\sqrt[3]{ab^2}}}\sqrt{b\left(x-\frac{1}{b}\sqrt[3]{ab^2}\right)\left(-3\sqrt[3]{ab^2}-\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3-2*a*(5+3*3^(1/2)))/(b*x^3-a)^(1/2),x)
```

```
[Out] -1/27*I/b^3/a*2^(1/2)*sum(1/_alpha*(a*b^2)^(1/3)*(-1/2*I*b*(2*x+1
/b*(I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3)))/(a*b^2)^(1/3))^(1/2)*
(b*(x-1/b*(a*b^2)^(1/3))/(-3*(a*b^2)^(1/3)-I*3^(1/2)*(a*b^2)^(1/3
)))^(1/2)*(1/2*I*b*(2*x+1/b*(-I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/
3)))/(a*b^2)^(1/3))^(1/2)/(b*x^3-a)^(1/2)*(3*I*(a*b^2)^(1/3)*_alp
ha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)-3*I*(a*b^2)^(2/3)*3^(1/2)-2*(
a*b^2)^(1/3)*_alpha*3^(1/2)*b-6*I*(a*b^2)^(1/3)*_alpha*b-6*b^2*_a
lpha^2-2*(a*b^2)^(2/3)*3^(1/2)+6*I*(a*b^2)^(2/3)+3*(a*b^2)^(1/3)*
_alpha*b+3*(a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(-I*(x+1/2/b*(a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3)
)^(1/2),1/6/b*(-2*I*(a*b^2)^(1/3)*_alpha^2*3^(1/2)*b+I*(a*b^2)^(2
/3)*_alpha*3^(1/2)+4*I*(a*b^2)^(1/3)*_alpha^2*b+2*(a*b^2)^(2/3)*_
alpha*3^(1/2)-2*I*(a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-3*(a*b^2)^(2
/3)*_alpha-2*3^(1/2)*a*b-2*I*a*b+3*a*b)/a,(-I*3^(1/2)/b*(a*b^2)^(
1/3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2))
,_alpha=RootOf(b*_Z^3-6*a*3^(1/2)-10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{\left(bx^3-2a\left(3\sqrt{3}+5\right)\right)\sqrt{bx^3-a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 - 2*a*(3*sqrt(3) + 5))*sqrt(b*x^3 - a)),x, algorithm="maxima
```

```
[Out] integrate(x/((b*x^3 - 2*((3*sqrt(3)) + 5)*a)*sqrt(b*x^3 - a)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 - 2*a*(3*sqrt(3) + 5))*sqrt(b*x^3 - a)),x, algorithm="fricas
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{-a + bx^3}\left(-6\sqrt{3}a - 10a + bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3-2*a*(5+3*3**(1/2)))/(b*x**3-a)**(1/2),x)
```

```
[Out] Integral(x/(sqrt(-a + b*x**3)*(-6*sqrt(3)*a - 10*a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.542333, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 - 2*a*(3*sqrt(3) + 5))*sqrt(b*x^3 - a)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.353 $\int \frac{x}{\sqrt{-a-bx^3}\left(-2\left(5+3\sqrt{3}\right)a-bx^3\right)}\,dx$

Optimal. Leaf size=330

$$\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{-a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}$$

```
[Out] ((2 - Sqrt[3])*ArcTan[(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/3) - 2
*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(3*Sqrt[2]*3^(1/4)*a^(5
/6)*b^(2/3)) + ((2 - Sqrt[3])*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/
6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(6*Sqrt[2]
*3^(1/4)*a^(5/6)*b^(2/3)) + ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*(1 +
Sqrt[3])*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3]
)])/(2*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)) - ((2 - Sqrt[3])*ArcTanh[
((1 - Sqrt[3])*Sqrt[-a - b*x^3])/(Sqrt[2]*3^(3/4)*Sqrt[a])])/(3*S
qrt[2]*3^(3/4)*a^(5/6)*b^(2/3))
```

Rubi [A] time = 0.212059, antiderivative size = 330, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 37, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.027

$$\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2-\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2-\sqrt{3}\right)\tanh^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt{-a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[-a - b*x^3]*(-2*(5 + 3*Sqrt[3])*a - b*x^3)),x]
```


```
[Out] ((2 - Sqrt[3])*ArcTan[(3^(1/4)*a^(1/6)*((1 + Sqrt[3])*a^(1/3) - 2
*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(3*Sqrt[2]*3^(1/4)*a^(5
/6)*b^(2/3)) + ((2 - Sqrt[3])*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/
6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(6*Sqrt[2]
*3^(1/4)*a^(5/6)*b^(2/3)) + ((2 - Sqrt[3])*ArcTanh[(3^(1/4)*(1 +
Sqrt[3])*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3]
)])/(2*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)) - ((2 - Sqrt[3])*ArcTanh[
((1 - Sqrt[3])*Sqrt[-a - b*x^3])/(Sqrt[2]*3^(3/4)*Sqrt[a])])/(3*S
qrt[2]*3^(3/4)*a^(5/6)*b^(2/3))
```

Rubi in Sympy [A] time = 36.6614, size = 71, normalized size = 0.22

$$\frac{x^2\sqrt{-a-bx^3}\,\operatorname{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},-\frac{bx^3}{a},-\frac{bx^3}{2a\left(5+3\sqrt{3}\right)}\right)}{4a^2\sqrt{1+\frac{bx^3}{a}}\left(5+3\sqrt{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-b*x**3-2*a*(5+3*3**(1/2)))/(-b*x**3-a)**(1/2),x)
```

```
[Out] x**2*sqrt(-a - b*x**3)*appellf1(2/3, 1/2, 1, 5/3, -b*x**3/a, -b*x
**3/(2*a*(5 + 3*sqrt(3))))/(4*a**2*sqrt(1 + b*x**3/a)*(5 + 3*sqrt
(3)))
```

Mathematica [C] time = 0.549805, size = 252, normalized size = 0.76

$$-\frac{10\left(26+15\sqrt{3}\right)ax^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right)}{\left(5+3\sqrt{3}\right)\sqrt{-a-bx^3}\left(2\left(5+3\sqrt{3}\right)a+bx^3\right)\left(10\left(5+3\sqrt{3}\right)aF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},-\frac{bx^3}{6\sqrt{3}a+10a}\right)-3bx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{bx^3}{a},\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[-a - b*x^3]*(-2*(5 + 3*Sqrt[3])*a - b*x^3)),x]
```

```
[Out] (-10*(26 + 15*Sqrt[3])*a*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((b*x^3)
/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))])/((5 + 3*Sqrt[3])*Sqrt[-a -
 b*x^3]*(2*(5 + 3*Sqrt[3])*a + b*x^3)*(10*(5 + 3*Sqrt[3])*a*Appel
lF1[2/3, 1/2, 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a
))] - 3*b*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((b*x^3)/a), -((b*x^3)
/(10*a + 6*Sqrt[3]*a))] + (5 + 3*Sqrt[3])*AppellF1[5/3, 3/2, 1, 8
/3, -((b*x^3)/a), -((b*x^3)/(10*a + 6*Sqrt[3]*a))])))
```

Maple [C] time = 0.123, size = 541, normalized size = 1.6

$$\frac{\frac{i}{27}\sqrt{2}}{ab^3}\sum_{\_alpha=RootOf\left(b\_Z^3+6a\sqrt{3}+10a\right)}\frac{1}{\_alpha}\sqrt[3]{-ab^2}\sqrt{\frac{i}{2}b\left(2x+\frac{1}{b}\left(\sqrt[3]{-ab^2}-i\sqrt{3}\sqrt[3]{-ab^2}\right)\right)\frac{1}{\sqrt[3]{-ab^2}}}\sqrt{b\left(x-\frac{1}{b}\sqrt[3]{-ab^2}\right)\left(-3\sqrt[3]{-}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-b*x^3-2*a*(5+3*3^(1/2)))/(-b*x^3-a)^(1/2),x)
```

```
[Out] 1/27*I/b^3/a*2^(1/2)*sum(1/_alpha*(-a*b^2)^(1/3)*(1/2*I*b*(2*x+1/
b*((-a*b^2)^(1/3)-I*3^(1/2)*(-a*b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2
)*(b*(x-1/b*(-a*b^2)^(1/3))/(-3*(-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)
^(1/3)))^(1/2)*(-1/2*I*b*(2*x+1/b*((-a*b^2)^(1/3)+I*3^(1/2)*(-a*b
^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)/(-b*x^3-a)^(1/2)*(-3*I*(-a*b^2)
^(1/3)*_alpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)+3*I*(-a*b^2)^(2/3)
*3^(1/2)-2*3^(1/2)*(-a*b^2)^(1/3)*_alpha*b+6*I*(-a*b^2)^(1/3)*_al
pha*b-6*b^2*_alpha^2-2*3^(1/2)*(-a*b^2)^(2/3)-6*I*(-a*b^2)^(2/3)+
3*(-a*b^2)^(1/3)*_alpha*b+3*(-a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2
)*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1
/2)*b/(-a*b^2)^(1/3))^(1/2),-1/6/b*(2*I*3^(1/2)*(-a*b^2)^(1/3)*_a
lpha^2*b-I*3^(1/2)*(-a*b^2)^(2/3)*_alpha-4*I*(-a*b^2)^(1/3)*_alph
a^2*b+I*3^(1/2)*a*b+2*3^(1/2)*(-a*b^2)^(2/3)*_alpha+2*I*(-a*b^2)^
(2/3)*_alpha+2*3^(1/2)*a*b-2*I*a*b-3*(-a*b^2)^(2/3)*_alpha-3*a*b)
/a,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3)))^(1/2)),_alpha=RootOf(b*_Z^3+6*a*3^(1/2)+10*
a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{x}{\left(bx^3+2a\left(3\sqrt{3}+5\right)\right)\sqrt{-bx^3-a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) + 5))*sqrt(-b*x^3 - a)),x, algorithm="maxi
```

```
[Out] -integrate(x/((b*x^3 + 2*((3*sqrt(3)) + 5)*a)*sqrt(-b*x^3 - a)),
x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) + 5))*sqrt(-b*x^3 - a)),x, algorithm="fric
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x}{10a\sqrt{-a-bx^3}+6\sqrt{3}a\sqrt{-a-bx^3}+bx^3\sqrt{-a-bx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-b*x**3-2*a*(5+3*3**(1/2)))/(-b*x**3-a)**(1/2),x)
```

```
[Out] -Integral(x/(10*a*sqrt(-a - b*x**3) + 6*sqrt(3)*a*sqrt(-a - b*x**
3) + b*x**3*sqrt(-a - b*x**3)), x)
```

GIAC/XCAS [A] time = 0.5656, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) + 5))*sqrt(-b*x^3 - a)),x, algorithm="giac
```

```
[Out] sage0*x
```

3.354 $\int \frac{x}{\sqrt{a+bx^3}\left(2\left(5-3\sqrt{3}\right)a+bx^3\right)}\,dx$

Optimal. Leaf size=310

$$-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}+\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{a+bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}$$

```
[Out] -((2 + Sqrt[3])*ArcTan[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3) -
2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(3*Sqrt[2]*3^(1/4)*a^(5
/6)*b^(2/3)) - ((2 + Sqrt[3])*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/
6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(6*Sqrt[2]*
3^(1/4)*a^(5/6)*b^(2/3)) + ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*(1 - S
qrt[3])*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])]
)/(2*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)) + ((2 + Sqrt[3])*ArcTanh[((
1 + Sqrt[3])*Sqrt[a + b*x^3])/(Sqrt[2]*3^(3/4)*Sqrt[a])])/(3*Sqrt
[2]*3^(3/4)*a^(5/6)*b^(2/3))
```

Rubi [A] time = 0.197663, antiderivative size = 310, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.03

$$-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a+bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}+\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{a+bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[a + b*x^3]*(2*(5 - 3*Sqrt[3])*a + b*x^3)),x]
```


```
[Out] -((2 + Sqrt[3])*ArcTan[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3) -
2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(3*Sqrt[2]*3^(1/4)*a^(5
/6)*b^(2/3)) - ((2 + Sqrt[3])*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/
6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])])/(6*Sqrt[2]*
3^(1/4)*a^(5/6)*b^(2/3)) + ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*(1 - S
qrt[3])*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[a + b*x^3])]
)/(2*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)) + ((2 + Sqrt[3])*ArcTanh[((
1 + Sqrt[3])*Sqrt[a + b*x^3])/(Sqrt[2]*3^(3/4)*Sqrt[a])])/(3*Sqrt
[2]*3^(3/4)*a^(5/6)*b^(2/3))
```

Rubi in Sympy [A] time = 33.469, size = 70, normalized size = 0.23

$$\frac{x^2\sqrt{a+bx^3}\,\mathrm{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},-\frac{bx^3}{a},-\frac{bx^3}{2a\left(-3\sqrt{3}+5\right)}\right)}{4a^2\sqrt{1+\frac{bx^3}{a}}\left(-3\sqrt{3}+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+2*a*(5-3*3**(1/2)))/(b*x**3+a)**(1/2),x)
```

```
[Out] x**2*sqrt(a + b*x**3)*appellf1(2/3, 1/2, 1, 5/3, -b*x**3/a, -b*x*
*3/(2*a*(-3*sqrt(3) + 5)))/(4*a**2*sqrt(1 + b*x**3/a)*(-3*sqrt(3)
 + 5))
```

Mathematica [C] time = 0.711557, size = 249, normalized size = 0.8

$$-\frac{10\left(26-15\sqrt{3}\right)ax^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a-10a}\right)}{\left(3\sqrt{3}-5\right)\left(2\left(3\sqrt{3}-5\right)a-bx^3\right)\sqrt{a+bx^3}\left(3bx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{bx^3}{a},-\frac{bx^3}{10a-6\sqrt{3}a}\right)+\left(5-3\sqrt{3}\right)F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{bx^3}{a},-\frac{}{10a}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[a + b*x^3]*(2*(5 - 3*Sqrt[3])*a + b*x^3)),x]
```

```
[Out] (-10*(26 - 15*Sqrt[3])*a*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((b*x^3)
/a), (b*x^3)/(-10*a + 6*Sqrt[3]*a)])/((-5 + 3*Sqrt[3])*(2*(-5 + 3
*Sqrt[3])*a - b*x^3)*Sqrt[a + b*x^3]*(10*(-5 + 3*Sqrt[3])*a*Appel
lF1[2/3, 1/2, 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[3]*a
))] + 3*b*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((b*x^3)/a), -((b*x^3)
/(10*a - 6*Sqrt[3]*a))] + (5 - 3*Sqrt[3])*AppellF1[5/3, 3/2, 1, 8
/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[3]*a))])))
```

Maple [C] time = 0.1, size = 538, normalized size = 1.7

$$\frac{\frac{i}{27}\sqrt{2}}{ab^3}\sum_{\_alpha=RootOf\left(b\_Z^3-6\,a\sqrt{3}+10\,a\right)}\frac{1}{\_alpha}\sqrt[3]{-ab^2}\sqrt{\frac{i}{2}b\left(2\,x+\frac{1}{b}\left(\sqrt[3]{-ab^2}-i\sqrt{3}\sqrt[3]{-ab^2}\right)\right)\frac{1}{\sqrt[3]{-ab^2}}}\sqrt{b\left(x-\frac{1}{b}\sqrt[3]{-ab^2}\right)\left(-3\sqrt[3]{-}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+2*a*(5-3*3^(1/2)))/(b*x^3+a)^(1/2),x)
```

```
[Out] 1/27*I/b^3/a*2^(1/2)*sum(1/_alpha*(-a*b^2)^(1/3)*(1/2*I*b*(2*x+1/
b*((-a*b^2)^(1/3)-I*3^(1/2)*(-a*b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2
)*(b*(x-1/b*(-a*b^2)^(1/3))/(-3*(-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)
^(1/3)))^(1/2)*(-1/2*I*b*(2*x+1/b*((-a*b^2)^(1/3)+I*3^(1/2)*(-a*b
^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)/(b*x^3+a)^(1/2)*(3*I*(-a*b^2)^(
1/3)*_alpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)-3*I*(-a*b^2)^(2/3)*3
^(1/2)-2*3^(1/2)*(-a*b^2)^(1/3)*_alpha*b+6*I*(-a*b^2)^(1/3)*_alph
a*b+6*b^2*_alpha^2-2*3^(1/2)*(-a*b^2)^(2/3)-6*I*(-a*b^2)^(2/3)-3*
(-a*b^2)^(1/3)*_alpha*b-3*(-a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*
(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/2
)*b/(-a*b^2)^(1/3))^(1/2),-1/6/b*(2*I*3^(1/2)*(-a*b^2)^(1/3)*_alp
ha^2*b-I*3^(1/2)*(-a*b^2)^(2/3)*_alpha+4*I*(-a*b^2)^(1/3)*_alpha^
2*b-2*3^(1/2)*(-a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-2*I*(-a*b^2)^(2
/3)*_alpha-2*3^(1/2)*a*b-3*(-a*b^2)^(2/3)*_alpha+2*I*a*b-3*a*b)/a
,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3)))^(1/2)),_alpha=RootOf(b*_Z^3-6*a*3^(1/2)+10*a)
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{\left(bx^3-2\,a\left(3\,\sqrt{3}-5\right)\right)\sqrt{bx^3+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 - 2*a*(3*sqrt(3) - 5))*sqrt(b*x^3 + a)),x, algorithm="maxima
```

```
[Out] integrate(x/((b*x^3 - 2*((3*sqrt(3)) - 5)*a)*sqrt(b*x^3 + a)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 - 2*a*(3*sqrt(3) - 5))*sqrt(b*x^3 + a)),x, algorithm="fricas
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{a+bx^3}\left(-6\sqrt{3}a+10a+bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+2*a*(5-3*3**(1/2)))/(b*x**3+a)**(1/2),x)
```

```
[Out] Integral(x/(sqrt(a + b*x**3)*(-6*sqrt(3)*a + 10*a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.549646, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 - 2*a*(3*sqrt(3) - 5))*sqrt(b*x^3 + a)),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.355 $\int \frac{x}{\sqrt{a-bx^3}\left(2\left(5-3\sqrt{3}\right)a-bx^3\right)}\,dx$

Optimal. Leaf size=316

$$-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}+\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}$$

```
[Out] -((2 + Sqrt[3])*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) -
b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(6*Sqrt[2]*3^(1/4)*a^(5/6
)*b^(2/3)) - ((2 + Sqrt[3])*ArcTan[(3^(1/4)*a^(1/6)*((1 - Sqrt[3]
)*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(3*Sqrt[2]*
3^(1/4)*a^(5/6)*b^(2/3)) + ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*(1 - S
qrt[3])*a^(1/6)*(a^(1/3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]
)/(2*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)) + ((2 + Sqrt[3])*ArcTanh[((
1 + Sqrt[3])*Sqrt[a - b*x^3])/(Sqrt[2]*3^(3/4)*Sqrt[a])]])/(3*Sqrt
[2]*3^(3/4)*a^(5/6)*b^(2/3))
```

Rubi [A] time = 0.187975, antiderivative size = 316, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029

$$-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}+\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{a-bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}+\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[a - b*x^3]*(2*(5 - 3*Sqrt[3])*a - b*x^3)),x]
```


```
[Out] -((2 + Sqrt[3])*ArcTan[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3) -
b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(6*Sqrt[2]*3^(1/4)*a^(5/6
)*b^(2/3)) - ((2 + Sqrt[3])*ArcTan[(3^(1/4)*a^(1/6)*((1 - Sqrt[3]
)*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]])/(3*Sqrt[2]*
3^(1/4)*a^(5/6)*b^(2/3)) + ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*(1 - S
qrt[3])*a^(1/6)*(a^(1/3) - b^(1/3)*x))/(Sqrt[2]*Sqrt[a - b*x^3])]
)/(2*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)) + ((2 + Sqrt[3])*ArcTanh[((
1 + Sqrt[3])*Sqrt[a - b*x^3])/(Sqrt[2]*3^(3/4)*Sqrt[a])]])/(3*Sqrt
[2]*3^(3/4)*a^(5/6)*b^(2/3))
```

Rubi in Sympy [A] time = 35.999, size = 66, normalized size = 0.21

$$\frac{x^2\sqrt{a-bx^3}\operatorname{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},\frac{bx^3}{a},\frac{bx^3}{2a\left(-3\sqrt{3}+5\right)}\right)}{4a^2\sqrt{1-\frac{bx^3}{a}}\left(-3\sqrt{3}+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-b*x**3+2*a*(5-3*3**(1/2)))/(-b*x**3+a)**(1/2),x)
```

```
[Out] x**2*sqrt(a - b*x**3)*appellf1(2/3, 1/2, 1, 5/3, b*x**3/a, b*x**3
/(2*a*(-3*sqrt(3) + 5)))/(4*a**2*sqrt(1 - b*x**3/a)*(-3*sqrt(3) +
 5))
```

Mathematica [C] time = 0.669713, size = 242, normalized size = 0.77

$$-\frac{10\left(26-15\sqrt{3}\right)ax^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)}{\left(3\sqrt{3}-5\right)\sqrt{a-bx^3}\left(2\left(3\sqrt{3}-5\right)a+bx^3\right)\left(10\left(3\sqrt{3}-5\right)aF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)-3bx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[a - b*x^3]*(2*(5 - 3*Sqrt[3])*a - b*x^3)),x]
```

```
[Out] (-10*(26 - 15*Sqrt[3])*a*x^2*AppellF1[2/3, 1/2, 1, 5/3, (b*x^3)/a
, (b*x^3)/(10*a - 6*Sqrt[3]*a)])/((-5 + 3*Sqrt[3])*Sqrt[a - b*x^3
]*(2*(-5 + 3*Sqrt[3])*a + b*x^3)*(10*(-5 + 3*Sqrt[3])*a*AppellF1[
2/3, 1/2, 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a - 6*Sqrt[3]*a)] - 3*b*
x^3*(AppellF1[5/3, 1/2, 2, 8/3, (b*x^3)/a, (b*x^3)/(10*a - 6*Sqrt
[3]*a)] + (5 - 3*Sqrt[3])*AppellF1[5/3, 3/2, 1, 8/3, (b*x^3)/a, (
b*x^3)/(10*a - 6*Sqrt[3]*a)])))
```

Maple [C] time = 0.097, size = 509, normalized size = 1.6

$$\frac{-\frac{i}{27}\sqrt{2}}{ab^3}\sum_{\_alpha=RootOf\left(b\_Z^3+6a\sqrt{3}-10a\right)}\frac{1}{\_alpha}\sqrt[3]{ab^2}\sqrt{-\frac{i}{2}b\left(2x+\frac{1}{b}\left(i\sqrt{3}\sqrt[3]{ab^2}+\sqrt[3]{ab^2}\right)\right)\frac{1}{\sqrt[3]{ab^2}}}\sqrt{b\left(x-\frac{1}{b}\sqrt[3]{ab^2}\right)\left(-3\sqrt[3]{ab^2}-\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-b*x^3+2*a*(5-3*3^(1/2)))/(-b*x^3+a)^(1/2),x)
```

```
[Out] -1/27*I/b^3/a*2^(1/2)*sum(1/_alpha*(a*b^2)^(1/3)*(-1/2*I*b*(2*x+1
/b*(I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3)))/(a*b^2)^(1/3))^(1/2)*
(b*(x-1/b*(a*b^2)^(1/3))/(-3*(a*b^2)^(1/3)-I*3^(1/2)*(a*b^2)^(1/3
)))^(1/2)*(1/2*I*b*(2*x+1/b*(-I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/
3)))/(a*b^2)^(1/3))^(1/2)/(-b*x^3+a)^(1/2)*(-3*I*(a*b^2)^(1/3)*_a
lpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)+3*I*(a*b^2)^(2/3)*3^(1/2)-2
*(a*b^2)^(1/3)*_alpha*3^(1/2)*b-6*I*(a*b^2)^(1/3)*_alpha*b+6*b^2*
_alpha^2-2*(a*b^2)^(2/3)*3^(1/2)+6*I*(a*b^2)^(2/3)-3*(a*b^2)^(1/3
)*_alpha*b-3*(a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(-I*(x+1/2/b*(
a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^2)^(1/
3))^(1/2),1/6/b*(-2*I*(a*b^2)^(1/3)*_alpha^2*3^(1/2)*b+I*(a*b^2)^
(2/3)*_alpha*3^(1/2)-4*I*(a*b^2)^(1/3)*_alpha^2*b-2*(a*b^2)^(2/3)
*_alpha*3^(1/2)+2*I*(a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-3*(a*b^2)^
(2/3)*_alpha+2*3^(1/2)*a*b+2*I*a*b+3*a*b)/a,(-I*3^(1/2)/b*(a*b^2)
^(1/3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2
)),_alpha=RootOf(b*_Z^3+6*a*3^(1/2)-10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{x}{\left(bx^3+2a\left(3\sqrt{3}-5\right)\right)\sqrt{-bx^3+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) - 5))*sqrt(-b*x^3 + a)),x, algorithm="maxi
```

```
[Out] -integrate(x/((b*x^3 + 2*((3*sqrt(3)) - 5)*a)*sqrt(-b*x^3 + a)),
x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) - 5))*sqrt(-b*x^3 + a)),x, algorithm="fric
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-b*x**3+2*a*(5-3*3**(1/2)))/(-b*x**3+a)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.576027, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) - 5))*sqrt(-b*x^3 + a)),x, algorithm="giac
```

```
[Out] sage0*x
```

3.356 $\int \frac{x}{\left(2\left(5-3\sqrt{3}\right)a-bx^3\right)\sqrt{-a+bx^3}}\,dx$

Optimal. Leaf size=320

$$\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{bx^3-a}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}$$

```
[Out] ((2 + Sqrt[3])*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) - b
^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(2*Sqrt[2]*3^(3/4)*a^(5/6
)*b^(2/3)) - ((2 + Sqrt[3])*ArcTan[((1 + Sqrt[3])*Sqrt[-a + b*x^3
])/(Sqrt[2]*3^(3/4)*Sqrt[a])])/(3*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)
) - ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3
) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(6*Sqrt[2]*3^(1/4)*a
^(5/6)*b^(2/3)) - ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*a^(1/6)*((1 - S
qrt[3])*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(3*S
qrt[2]*3^(1/4)*a^(5/6)*b^(2/3))
```

Rubi [A] time = 0.189017, antiderivative size = 320, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.028

$$\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{bx^3-a}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}-\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}+2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{bx^3-a}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((2*(5 - 3*Sqrt[3])*a - b*x^3)*Sqrt[-a + b*x^3]),x]
```

```
[Out] ((2 + Sqrt[3])*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) - b
^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(2*Sqrt[2]*3^(3/4)*a^(5/6
)*b^(2/3)) - ((2 + Sqrt[3])*ArcTan[((1 + Sqrt[3])*Sqrt[-a + b*x^3
])/(Sqrt[2]*3^(3/4)*Sqrt[a])])/(3*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)
) - ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*(1 + Sqrt[3])*a^(1/6)*(a^(1/3
) - b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(6*Sqrt[2]*3^(1/4)*a
^(5/6)*b^(2/3)) - ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*a^(1/6)*((1 - S
qrt[3])*a^(1/3) + 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a + b*x^3])])/(3*S
qrt[2]*3^(1/4)*a^(5/6)*b^(2/3))
```

Rubi in Sympy [A] time = 35.9728, size = 68, normalized size = 0.21

$$-\frac{x^2\sqrt{-a+bx^3}\operatorname{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},\frac{bx^3}{a},\frac{bx^3}{2a\left(-3\sqrt{3}+5\right)}\right)}{4a^2\sqrt{1-\frac{bx^3}{a}}\left(-3\sqrt{3}+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-b*x**3+2*a*(5-3*3**(1/2)))/(b*x**3-a)**(1/2),x)
```

```
[Out] -x**2*sqrt(-a + b*x**3)*appellf1(2/3, 1/2, 1, 5/3, b*x**3/a, b*x*
*3/(2*a*(-3*sqrt(3) + 5)))/(4*a**2*sqrt(1 - b*x**3/a)*(-3*sqrt(3)
 + 5))
```

Mathematica [C] time = 0.684906, size = 243, normalized size = 0.76

$$-\frac{10\left(26-15\sqrt{3}\right)ax^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)}{\left(3\sqrt{3}-5\right)\sqrt{bx^3-a}\left(2\left(3\sqrt{3}-5\right)a+bx^3\right)\left(10\left(3\sqrt{3}-5\right)aF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\sqrt{3}a}\right)-3bx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};\frac{bx^3}{a},\frac{bx^3}{10a-6\ldots}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((2*(5 - 3*Sqrt[3])*a - b*x^3)*Sqrt[-a + b*x^3]),x]
```

```
[Out] (-10*(26 - 15*Sqrt[3])*a*x^2*AppellF1[2/3, 1/2, 1, 5/3, (b*x^3)/a
, (b*x^3)/(10*a - 6*Sqrt[3]*a)])/((-5 + 3*Sqrt[3])*Sqrt[-a + b*x^
3]*(2*(-5 + 3*Sqrt[3])*a + b*x^3)*(10*(-5 + 3*Sqrt[3])*a*AppellF1
[2/3, 1/2, 1, 5/3, (b*x^3)/a, (b*x^3)/(10*a - 6*Sqrt[3]*a)] - 3*b
*x^3*(AppellF1[5/3, 1/2, 2, 8/3, (b*x^3)/a, (b*x^3)/(10*a - 6*Sqr
t[3]*a)] + (5 - 3*Sqrt[3])*AppellF1[5/3, 3/2, 1, 8/3, (b*x^3)/a,
(b*x^3)/(10*a - 6*Sqrt[3]*a)])))
```

Maple [C] time = 0.097, size = 510, normalized size = 1.6

$$\frac{-\frac{i}{27}\sqrt{2}}{ab^3}\sum_{\_alpha=RootOf\left(b\_Z^3+6a\sqrt{3}-10a\right)}\frac{1}{\_alpha}\sqrt[3]{ab^2}\sqrt{-\frac{i}{2}b\left(2x+\frac{1}{b}\left(i\sqrt{3}\sqrt[3]{ab^2}+\sqrt[3]{ab^2}\right)\right)\frac{1}{\sqrt[3]{ab^2}}}\sqrt{b\left(x-\frac{1}{b}\sqrt[3]{ab^2}\right)\left(-3\sqrt[3]{ab^2}-\ldots\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-b*x^3+2*a*(5-3*3^(1/2)))/(b*x^3-a)^(1/2),x)
```

```
[Out] -1/27*I/b^3/a*2^(1/2)*sum(1/_alpha*(a*b^2)^(1/3)*(-1/2*I*b*(2*x+1
/b*(I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/3)))/(a*b^2)^(1/3))^(1/2)*
(b*(x-1/b*(a*b^2)^(1/3))/(-3*(a*b^2)^(1/3)-I*3^(1/2)*(a*b^2)^(1/3
)))^(1/2)*(1/2*I*b*(2*x+1/b*(-I*3^(1/2)*(a*b^2)^(1/3)+(a*b^2)^(1/
3)))/(a*b^2)^(1/3))^(1/2)/(b*x^3-a)^(1/2)*(-3*I*(a*b^2)^(1/3)*_al
pha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)+3*I*(a*b^2)^(2/3)*3^(1/2)-2*
(a*b^2)^(1/3)*_alpha*3^(1/2)*b-6*I*(a*b^2)^(1/3)*_alpha*b+6*b^2*_
alpha^2-2*(a*b^2)^(2/3)*3^(1/2)+6*I*(a*b^2)^(2/3)-3*(a*b^2)^(1/3)
*_alpha*b-3*(a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(-I*(x+1/2/b*(a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(a*b^2)^(1/3))*3^(1/2)*b/(a*b^2)^(1/3
))^(1/2),1/6/b*(-2*I*(a*b^2)^(1/3)*_alpha^2*3^(1/2)*b+I*(a*b^2)^(
2/3)*_alpha*3^(1/2)-4*I*(a*b^2)^(1/3)*_alpha^2*b-2*(a*b^2)^(2/3)*
_alpha*3^(1/2)+2*I*(a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-3*(a*b^2)^(
2/3)*_alpha+2*3^(1/2)*a*b+2*I*a*b+3*a*b)/a,(-I*3^(1/2)/b*(a*b^2)^
(1/3)/(-3/2/b*(a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(a*b^2)^(1/3)))^(1/2)
),_alpha=RootOf(b*_Z^3+6*a*3^(1/2)-10*a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int\frac{x}{\left(bx^3+2a\left(3\sqrt{3}-5\right)\right)\sqrt{bx^3-a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) - 5))*sqrt(b*x^3 - a)),x, algorithm="maxim
```

```
[Out] -integrate(x/((b*x^3 + 2*((3*sqrt(3)) - 5)*a)*sqrt(b*x^3 - a)), x
)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) - 5))*sqrt(b*x^3 - a)),x, algorithm="frica
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(-b*x**3+2*a*(5-3*3**(1/2)))/(b*x**3-a)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.575117, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-x/((b*x^3 + 2*a*(3*sqrt(3) - 5))*sqrt(b*x^3 - a)),x, algorithm="giac"
```

```
[Out] sage0*x
```

3.357 $\int \frac{x}{\sqrt{-a-bx^3}\left(2\left(5-3\sqrt{3}\right)a+bx^3\right)}\,dx$

Optimal. Leaf size=322

$$\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{-a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}$$

```
[Out] ((2 + Sqrt[3])*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) + b
^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*3^(3/4)*a^(5/6
)*b^(2/3)) - ((2 + Sqrt[3])*ArcTan[((1 + Sqrt[3])*Sqrt[-a - b*x^3
])/(Sqrt[2]*3^(3/4)*Sqrt[a])])/(3*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)
) - ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3
) - 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(3*Sqrt[2]*3^(1/4)
*a^(5/6)*b^(2/3)) - ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*(1 + Sqrt[3])
*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(6*S
qrt[2]*3^(1/4)*a^(5/6)*b^(2/3))
```

Rubi [A] time = 0.191645, antiderivative size = 322, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.028

$$\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\sqrt[4]{3}\left(1-\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{2\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tan^{-1}\left(\frac{\left(1+\sqrt{3}\right)\sqrt{-a-bx^3}}{\sqrt{2}3^{3/4}\sqrt{a}}\right)}{3\sqrt{2}3^{3/4}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\sqrt[6]{a}\left(\left(1-\sqrt{3}\right)\sqrt[3]{a}-2\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{3\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}-\frac{\left(2+\sqrt{3}\right)\tanh^{-1}\left(\frac{\sqrt[4]{3}\left(1+\sqrt{3}\right)\sqrt[6]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\sqrt{2}\sqrt{-a-bx^3}}\right)}{6\sqrt{2}\sqrt[4]{3}a^{5/6}b^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[-a - b*x^3]*(2*(5 - 3*Sqrt[3])*a + b*x^3)),x]
```


```
[Out] ((2 + Sqrt[3])*ArcTan[(3^(1/4)*(1 - Sqrt[3])*a^(1/6)*(a^(1/3) + b
^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(2*Sqrt[2]*3^(3/4)*a^(5/6
)*b^(2/3)) - ((2 + Sqrt[3])*ArcTan[((1 + Sqrt[3])*Sqrt[-a - b*x^3
])/(Sqrt[2]*3^(3/4)*Sqrt[a])])/(3*Sqrt[2]*3^(3/4)*a^(5/6)*b^(2/3)
) - ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*a^(1/6)*((1 - Sqrt[3])*a^(1/3
) - 2*b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(3*Sqrt[2]*3^(1/4)
*a^(5/6)*b^(2/3)) - ((2 + Sqrt[3])*ArcTanh[(3^(1/4)*(1 + Sqrt[3])
*a^(1/6)*(a^(1/3) + b^(1/3)*x))/(Sqrt[2]*Sqrt[-a - b*x^3])])/(6*S
qrt[2]*3^(1/4)*a^(5/6)*b^(2/3))
```

Rubi in Sympy [A] time = 34.7465, size = 73, normalized size = 0.23

$$-\frac{x^2\sqrt{-a-bx^3}\operatorname{appellf_1}\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},-\frac{bx^3}{a},-\frac{bx^3}{2a\left(-3\sqrt{3}+5\right)}\right)}{4a^2\sqrt{1+\frac{bx^3}{a}}\left(-3\sqrt{3}+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+2*a*(5-3*3**(1/2)))/(-b*x**3-a)**(1/2),x)
```

```
[Out] -x**2*sqrt(-a - b*x**3)*appellf1(2/3, 1/2, 1, 5/3, -b*x**3/a, -b*
x**3/(2*a*(-3*sqrt(3) + 5)))/(4*a**2*sqrt(1 + b*x**3/a)*(-3*sqrt(
3) + 5))
```

Mathematica [C] time = 0.688283, size = 252, normalized size = 0.78

$$-\frac{10\left(26-15\sqrt{3}\right)ax^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{bx^3}{a},\frac{bx^3}{6\sqrt{3}a-10a}\right)}{\left(3\sqrt{3}-5\right)\sqrt{-a-bx^3}\left(2\left(3\sqrt{3}-5\right)a-bx^3\right)\left(3bx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{bx^3}{a},-\frac{bx^3}{10a-6\sqrt{3}a}\right)+\left(5-3\sqrt{3}\right)F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{bx^3}{a},-\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[-a - b*x^3]*(2*(5 - 3*Sqrt[3])*a + b*x^3)),x]
```

```
[Out] (-10*(26 - 15*Sqrt[3])*a*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((b*x^3)
/a), (b*x^3)/(-10*a + 6*Sqrt[3]*a)])/((-5 + 3*Sqrt[3])*Sqrt[-a -
b*x^3]*(2*(-5 + 3*Sqrt[3])*a - b*x^3)*(10*(-5 + 3*Sqrt[3])*a*Appe
llF1[2/3, 1/2, 1, 5/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[3]*
a))] + 3*b*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((b*x^3)/a), -((b*x^3
)/(10*a - 6*Sqrt[3]*a))] + (5 - 3*Sqrt[3])*AppellF1[5/3, 3/2, 1,
8/3, -((b*x^3)/a), -((b*x^3)/(10*a - 6*Sqrt[3]*a))])))
```

Maple [C] time = 0.096, size = 541, normalized size = 1.7

$$\frac{\frac{i}{27}\sqrt{2}}{ab^3}\sum_{\_alpha=RootOf\left(b\_Z^3-6a\sqrt{3}+10a\right)}\frac{1}{\_alpha}\sqrt[3]{-ab^2}\sqrt{\frac{i}{2}b\left(2x+\frac{1}{b}\left(\sqrt[3]{-ab^2}-i\sqrt{3}\sqrt[3]{-ab^2}\right)\right)\frac{1}{\sqrt[3]{-ab^2}}}\sqrt{b\left(x-\frac{1}{b}\sqrt[3]{-ab^2}\right)\left(-3\sqrt[3]{-}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+2*a*(5-3*3^(1/2)))/(-b*x^3-a)^(1/2),x)
```

```
[Out] 1/27*I/b^3/a*2^(1/2)*sum(1/_alpha*(-a*b^2)^(1/3)*(1/2*I*b*(2*x+1/
b*((-a*b^2)^(1/3)-I*3^(1/2)*(-a*b^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2
)*(b*(x-1/b*(-a*b^2)^(1/3))/(-3*(-a*b^2)^(1/3)+I*3^(1/2)*(-a*b^2)
^(1/3)))^(1/2)*(-1/2*I*b*(2*x+1/b*((-a*b^2)^(1/3)+I*3^(1/2)*(-a*b
^2)^(1/3)))/(-a*b^2)^(1/3))^(1/2)/(-b*x^3-a)^(1/2)*(3*I*(-a*b^2)^
(1/3)*_alpha*3^(1/2)*b+4*b^2*_alpha^2*3^(1/2)-3*I*(-a*b^2)^(2/3)*
3^(1/2)-2*3^(1/2)*(-a*b^2)^(1/3)*_alpha*b+6*I*(-a*b^2)^(1/3)*_alp
ha*b+6*b^2*_alpha^2-2*3^(1/2)*(-a*b^2)^(2/3)-6*I*(-a*b^2)^(2/3)-3
*(-a*b^2)^(1/3)*_alpha*b-3*(-a*b^2)^(2/3))*EllipticPi(1/3*3^(1/2)
*(I*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*3^(1/
2)*b/(-a*b^2)^(1/3))^(1/2),-1/6/b*(2*I*3^(1/2)*(-a*b^2)^(1/3)*_al
pha^2*b-I*3^(1/2)*(-a*b^2)^(2/3)*_alpha+4*I*(-a*b^2)^(1/3)*_alpha
^2*b-2*3^(1/2)*(-a*b^2)^(2/3)*_alpha+I*3^(1/2)*a*b-2*I*(-a*b^2)^(
2/3)*_alpha-2*3^(1/2)*a*b-3*(-a*b^2)^(2/3)*_alpha+2*I*a*b-3*a*b)/
a,(I*3^(1/2)/b*(-a*b^2)^(1/3)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3)))^(1/2)),_alpha=RootOf(b*_Z^3-6*a*3^(1/2)+10*a
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(bx^3-2a\left(3\sqrt{3}-5\right)\right)\sqrt{-bx^3-a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 - 2*a*(3*sqrt(3) - 5))*sqrt(-b*x^3 - a)),x, algorithm="maxima
```

```
[Out] integrate(x/((b*x^3 - 2*((3*sqrt(3)) - 5)*a)*sqrt(-b*x^3 - a)), x
)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 - 2*a*(3*sqrt(3) - 5))*sqrt(-b*x^3 - a)),x, algorithm="frica
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{-a - bx^3}\left(-6\sqrt{3}a + 10a + bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(b*x**3+2*a*(5-3*3**(1/2)))/(-b*x**3-a)**(1/2),x)
```

```
[Out] Integral(x/(sqrt(-a - b*x**3)*(-6*sqrt(3)*a + 10*a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.560302, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 - 2*a*(3*sqrt(3) - 5))*sqrt(-b*x^3 - a)),x, algorithm="giac"
```

```
[Out] sage0*x
```

3.358 $\int \frac{x^8\sqrt{c+dx^3}}{a+bx^3}\,dx$

Optimal. Leaf size=125

$$-\frac{2a^2\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}+\frac{2a^2\sqrt{c+dx^3}}{3b^3}-\frac{2\left(c+dx^3\right)^{3/2}(ad+bc)}{9b^2d^2}+\frac{2\left(c+dx^3\right)^{5/2}}{15bd^2}$$

```
[Out] (2*a^2*Sqrt[c + d*x^3])/(3*b^3) - (2*(b*c + a*d)*(c + d*x^3)^(3/2
))/(9*b^2*d^2) + (2*(c + d*x^3)^(5/2))/(15*b*d^2) - (2*a^2*Sqrt[b
*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*
b^(7/2))
```

Rubi [A] time = 0.331587, antiderivative size = 125, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{2a^2\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}+\frac{2a^2\sqrt{c+dx^3}}{3b^3}-\frac{2\left(c+dx^3\right)^{3/2}(ad+bc)}{9b^2d^2}+\frac{2\left(c+dx^3\right)^{5/2}}{15bd^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (2*a^2*Sqrt[c + d*x^3])/(3*b^3) - (2*(b*c + a*d)*(c + d*x^3)^(3/2
))/(9*b^2*d^2) + (2*(c + d*x^3)^(5/2))/(15*b*d^2) - (2*a^2*Sqrt[b
*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*
b^(7/2))
```

Rubi in Sympy [A] time = 37.3367, size = 114, normalized size = 0.91

$$\frac{2a^2\sqrt{c+dx^3}}{3b^3}-\frac{2a^2\sqrt{ad-bc}\,\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{7}{2}}}+\frac{2\left(c+dx^3\right)^{\frac{5}{2}}}{15bd^2}-\frac{2\left(c+dx^3\right)^{\frac{3}{2}}(ad+bc)}{9b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] 2*a**2*sqrt(c + d*x**3)/(3*b**3) - 2*a**2*sqrt(a*d - b*c)*atan(sq
rt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(7/2)) + 2*(c + d*x
**3)**(5/2)/(15*b*d**2) - 2*(c + d*x**3)**(3/2)*(a*d + b*c)/(9*b*
*2*d**2)
```

Mathematica [A] time = 0.296563, size = 121, normalized size = 0.97

$$\frac{2\sqrt{c+dx^3}\left(15a^2d^2-5abd\left(c+dx^3\right)+b^2\left(-2c^2+cdx^3+3d^2x^6\right)\right)}{45b^3d^2}-\frac{2a^2\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3]*(15*a^2*d^2 - 5*a*b*d*(c + d*x^3) + b^2*(-2*c^
2 + c*d*x^3 + 3*d^2*x^6)))/(45*b^3*d^2) - (2*a^2*Sqrt[b*c - a*d]*
ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/2))
```

Maple [C] time = 0.082, size = 514, normalized size = 4.1

$$\frac{1}{b^2}\left(b\left(\frac{2\,x^6}{15}\sqrt{dx^3+c}+\frac{2\,cx^3}{45\,d}\sqrt{dx^3+c}-\frac{4\,c^2}{45\,d^2}\sqrt{dx^3+c}\right)-\frac{2\,a}{9\,d}\left(dx^3+c\right)^{\frac{3}{2}}\right)$$
$$+\frac{a^2}{b^2}\left(\frac{2}{3\,b}\sqrt{dx^3+c}+\frac{\frac{i}{3}\sqrt{2}}{bd^2}\sum_{\_alpha=RootOf\left(b\_Z^3+a\right)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(1/2)/(b*x^3+a),x)
```

```
[Out] 1/b^2*(b*(2/15*x^6*(d*x^3+c)^(1/2)+2/45*c/d*x^3*(d*x^3+c)^(1/2)-4
/45*c^2*(d*x^3+c)^(1/2)/d^2)-2/9*a/d*(d*x^3+c)^(3/2))+a^2/b^2*(2/
3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I
*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^
(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/
2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^
(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(
-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^
(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3
)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alph
a*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alph
a=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.2232, size = 1, normalized size = 0.01

$$\left[\frac{15\,a^2d^2\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad-2\,\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)+2\left(3\,b^2d^2x^6-2\,b^2c^2-5\,abcd+15\,a^2d^2+\left(b^2cd-5\,abd^2\right)x^3\right)\sqrt{dx^3+}}{45\,b^3d^2}\right.$$
$$\left.-\frac{2\left(15\,a^2d^2\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)-\left(3\,b^2d^2x^6-2\,b^2c^2-5\,abcd+15\,a^2d^2+\left(b^2cd-5\,abd^2\right)x^3\right)\sqrt{dx^3+c}\right)}{45\,b^3d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [1/45*(15*a^2*d^2*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c - a*d
- 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) + 2*(3*b^
2*d^2*x^6 - 2*b^2*c^2 - 5*a*b*c*d + 15*a^2*d^2 + (b^2*c*d - 5*a*b
```

```
*d^2)*x^3)*sqrt(d*x^3 + c))/(b^3*d^2), -2/45*(15*a^2*d^2*sqrt(-(b
*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)) - (3*b^
2*d^2*x^6 - 2*b^2*c^2 - 5*a*b*c*d + 15*a^2*d^2 + (b^2*c*d - 5*a*b
*d^2)*x^3)*sqrt(d*x^3 + c))/(b^3*d^2)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8\sqrt{c+dx^3}}{a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] Integral(x**8*sqrt(c + d*x**3)/(a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.217309, size = 188, normalized size = 1.5

$$\frac{2\left(a^2bc-a^3d\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\sqrt{-b^2c+abd}b^3}+\frac{2\left(3\left(dx^3+c\right)^{\frac{5}{2}}b^4d^8-5\left(dx^3+c\right)^{\frac{3}{2}}b^4cd^8-5\left(dx^3+c\right)^{\frac{3}{2}}ab^3d^9+15\sqrt{dx^3+c}a^2b^2d^{10}\right)}{45\,b^5d^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 2/3*(a^2*b*c - a^3*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*
d))/(sqrt(-b^2*c + a*b*d)*b^3) + 2/45*(3*(d*x^3 + c)^(5/2)*b^4*d^
8 - 5*(d*x^3 + c)^(3/2)*b^4*c*d^8 - 5*(d*x^3 + c)^(3/2)*a*b^3*d^9
 + 15*sqrt(d*x^3 + c)*a^2*b^2*d^10)/(b^5*d^10)
```

3.359 $\int \frac{x^5\sqrt{c+dx^3}}{a+bx^3}\,dx$

Optimal. Leaf size=93

$$\frac{2a\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}}-\frac{2a\sqrt{c+dx^3}}{3b^2}+\frac{2\left(c+dx^3\right)^{3/2}}{9bd}$$

```
[Out] (-2*a*Sqrt[c + d*x^3])/(3*b^2) + (2*(c + d*x^3)^(3/2))/(9*b*d) +
(2*a*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c -
 a*d]])/(3*b^(5/2))
```

Rubi [A] time = 0.210128, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{2a\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}}-\frac{2a\sqrt{c+dx^3}}{3b^2}+\frac{2\left(c+dx^3\right)^{3/2}}{9bd}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (-2*a*Sqrt[c + d*x^3])/(3*b^2) + (2*(c + d*x^3)^(3/2))/(9*b*d) +
(2*a*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c -
 a*d]])/(3*b^(5/2))
```

Rubi in Sympy [A] time = 25.8656, size = 82, normalized size = 0.88

$$-\frac{2a\sqrt{c+dx^3}}{3b^2}+\frac{2a\sqrt{ad-bc}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{5}{2}}}+\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] -2*a*sqrt(c + d*x**3)/(3*b**2) + 2*a*sqrt(a*d - b*c)*atan(sqrt(b)
*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(5/2)) + 2*(c + d*x**3)*
*(3/2)/(9*b*d)
```

Mathematica [A] time = 0.299215, size = 88, normalized size = 0.95

$$\frac{2a\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}}+\frac{2\sqrt{c+dx^3}\left(b\left(c+dx^3\right)-3ad\right)}{9b^2d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3]*(-3*a*d + b*(c + d*x^3)))/(9*b^2*d) + (2*a*Sqr
t[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/
(3*b^(5/2))
```

Maple [C] time = 0.012, size = 458, normalized size = 4.9

$$\frac{2}{9bd}\left(dx^{3}+c\right)^{\frac{3}{2}} -\frac{a}{b}\left(\frac{2}{3b}\sqrt{dx^{3}+c}+\frac{\frac{i}{3}\sqrt{2}}{bd^{2}}\sum_{\_alpha=RootOf\left(b\_Z^{3}+a\right)} 1\sqrt[3]{-cd^{2}}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^{2}}+\sqrt[3]{-cd^{2}}\right)\right)\frac{1}{\sqrt[3]{-cd^{2}}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^{2}}\right)\left(-\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^3+c)^(1/2)/(b*x^3+a),x)
```

```
[Out] 2/9*(d*x^3+c)^(3/2)/b/d-a/b*(2/3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^
(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1
/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*
d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_
alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*
d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*
b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3
)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.222713, size = 1, normalized size = 0.01

$$\left[\frac{3\,ad\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^{3}+2\,bc-ad+2\,\sqrt{dx^{3}+c}b\sqrt{\frac{bc-ad}{b}}}{bx^{3}+a}\right)+2\left(bdx^{3}+bc-3\,ad\right)\sqrt{dx^{3}+c}}{9\,b^{2}d}, \frac{2\left(3\,ad\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^{3}+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)+\left(b\right.\right.}{9\,b^{2}d}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [1/9*(3*a*d*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c - a*d + 2*sq
rt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) + 2*(b*d*x^3 +
b*c - 3*a*d)*sqrt(d*x^3 + c))/(b^2*d), 2/9*(3*a*d*sqrt(-(b*c - a*
d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)) + (b*d*x^3 + b
*c - 3*a*d)*sqrt(d*x^3 + c))/(b^2*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{5}\sqrt{c+dx^{3}}}{a+bx^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] Integral(x**5*sqrt(c + d*x**3)/(a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.216413, size = 130, normalized size = 1.4

$$-\frac{2\left(\frac{3\left(abcd-a^2d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}\,b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}\,b^2}-\frac{\left(dx^3+c\right)^{\frac{3}{2}}b^2-3\sqrt{dx^3+c}\,abd}{b^3}\right)}{9\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] -2/9*(3*(a*b*c*d - a^2*d^2)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c
+ a*b*d))/(sqrt(-b^2*c + a*b*d)*b^2) - ((d*x^3 + c)^(3/2)*b^2 - 3
*sqrt(d*x^3 + c)*a*b*d)/b^3)/d
```

3.360 $\int \frac{x^2\sqrt{c+dx^3}}{a+bx^3}\,dx$

Optimal. Leaf size=70

$$\frac{2\sqrt{c+dx^3}}{3b}-\frac{2\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}}$$

```
[Out] (2*Sqrt[c + d*x^3])/(3*b) - (2*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*S
qrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2))
```

Rubi [A] time = 0.155274, antiderivative size = 70, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{2\sqrt{c+dx^3}}{3b}-\frac{2\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(3*b) - (2*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*S
qrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2))
```

Rubi in Sympy [A] time = 21.5399, size = 60, normalized size = 0.86

$$\frac{2\sqrt{c+dx^3}}{3b}-\frac{2\sqrt{ad-bc}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] 2*sqrt(c + d*x**3)/(3*b) - 2*sqrt(a*d - b*c)*atan(sqrt(b)*sqrt(c
+ d*x**3)/sqrt(a*d - b*c))/(3*b**(3/2))
```

Mathematica [A] time = 0.0603837, size = 70, normalized size = 1.

$$\frac{2\sqrt{c+dx^3}}{3b}-\frac{2\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(3*b) - (2*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*S
qrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2))
```

Maple [C] time = 0.01, size = 434, normalized size = 6.2

$$\frac{2}{3\,b}\sqrt{dx^3+c}$$

$$+\frac{\frac{i}{3}\sqrt{2}}{bd^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\sqrt[3]{-\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2*(d*x^3+c)^(1/2)/(b*x^3+a),x)
```

```
[Out] 2/3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2
*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(
1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2
)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I
*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2
)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1
/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_al
pha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_al
pha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(d*x^3 + c)*x^2/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.225844, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad-2\,\sqrt{dx^3+c}\,b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)+2\,\sqrt{dx^3+c}}{3\,b},\ -\frac{2\left(\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)-\sqrt{dx^3+c}\right)}{3\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(d*x^3 + c)*x^2/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [1/3*(sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c - a*d - 2*sqrt(d*x
^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) + 2*sqrt(d*x^3 + c))/
b, -2/3*(sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c -
 a*d)/b)) - sqrt(d*x^3 + c))/b]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2\sqrt{c+dx^3}}{a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**2*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] Integral(x**2*sqrt(c + d*x**3)/(a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.213094, size = 89, normalized size = 1.27

$$\frac{2\,(bc-ad)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\,\sqrt{-b^2c+abd}b}+\frac{2\,\sqrt{dx^3+c}}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 2/3*(b*c - a*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(s
qrt(-b^2*c + a*b*d)*b) + 2/3*sqrt(d*x^3 + c)/b
```

3.361 $\int \frac{\sqrt{c+dx^3}}{x(a+bx^3)}\,dx$

Optimal. Leaf size=85

$$\frac{2\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a\sqrt{b}}-\frac{2\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a}$$

```
[Out] (-2*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a) + (2*Sqrt[b*c
 - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a*
Sqrt[b])
```

Rubi [A] time = 0.199697, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{2\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a\sqrt{b}}-\frac{2\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x*(a + b*x^3)),x]
```

```
[Out] (-2*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a) + (2*Sqrt[b*c
 - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a*
Sqrt[b])
```

Rubi in Sympy [A] time = 24.577, size = 73, normalized size = 0.86

$$-\frac{2\sqrt{c}\,\text{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a}+\frac{2\sqrt{ad-bc}\,\text{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x/(b*x**3+a),x)
```

```
[Out] -2*sqrt(c)*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a) + 2*sqrt(a*d - b
*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a*sqrt(b))
```

Mathematica [C] time = 0.290656, size = 160, normalized size = 1.88

$$-\frac{2bdx^3\sqrt{c+dx^3}F_1\left(\frac{1}{2};-\frac{1}{2},1;\frac{3}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}{(a+bx^3)\left(3bdx^3F_1\left(\frac{1}{2};-\frac{1}{2},1;\frac{3}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)-2adF_1\left(\frac{3}{2};-\frac{1}{2},2;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x*(a + b*x^3)),x]
```

```
[Out] (-2*b*d*x^3*Sqrt[c + d*x^3]*AppellF1[1/2, -1/2, 1, 3/2, -(c/(d*x^
3)), -(a/(b*x^3))])/((a + b*x^3)*(3*b*d*x^3*AppellF1[1/2, -1/2, 1
, 3/2, -(c/(d*x^3)), -(a/(b*x^3))] - 2*a*d*AppellF1[3/2, -1/2, 2,
 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[3/2, 1/2, 1, 5/2
, -(c/(d*x^3)), -(a/(b*x^3))]))
```

Maple [C] time = 0.014, size = 476, normalized size = 5.6

$$\frac{1}{a}\left(\frac{2}{3}\sqrt{dx^3+c}-\frac{2}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\sqrt{c}\right)$$
$$-\frac{b}{a}\left(\frac{2}{3b}\sqrt{dx^3+c}+\frac{\frac{i}{3}\sqrt{2}}{bd^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x/(b*x^3+a),x)
```

```
[Out] 1/a*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))*c^(
1/2))-b/a*(2/3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^(1/2)*sum((-c*d^2)
^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^
(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1
/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+
c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1
/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipt
icPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*
(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2
)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{dx^3+c}}{(bx^3+a)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x), x)
```

Fricas [A] time = 0.234462, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}\,b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)+\sqrt{c}\log\left(\frac{dx^3-2\,\sqrt{dx^3+c}\sqrt{c}+2\,c}{x^3}\right)}{3\,a},\ \frac{2\,\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)+\sqrt{c}\log\left(\frac{dx^3-2\right.}{}\right.}{3\,a}\right.$$
$$-\frac{2\,\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)-\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}\,b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)}{3\,a},$$
$$\left.-\frac{2\left(\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)-\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)\right)}{3\,a}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x),x, algorithm="fricas")
```

```
[Out] [1/3*(sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x
^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) + sqrt(c)*log((d*x^3
```

```
- 2*sqrt(d*x^3 + c)*sqrt(c) + 2*c)/x^3))/a, 1/3*(2*sqrt(-(b*c - a
*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)) + sqrt(c)*log
((d*x^3 - 2*sqrt(d*x^3 + c)*sqrt(c) + 2*c)/x^3))/a, -1/3*(2*sqrt(
-c)*arctan(sqrt(d*x^3 + c)/sqrt(-c)) - sqrt((b*c - a*d)/b)*log((b
*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(
b*x^3 + a)))/a, -2/3*(sqrt(-c)*arctan(sqrt(d*x^3 + c)/sqrt(-c)) -
 sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)
))/a]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c + dx^3}}{x\left(a + bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x/(b*x**3+a),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(x*(a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.218453, size = 117, normalized size = 1.38

$$-\frac{2}{3}\,d\left(\frac{(bc-ad)\arctan\left(\frac{\sqrt{dx^3+c}\,b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}\,ad}-\frac{c\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a\sqrt{-c}\,d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x),x, algorithm="giac")
```

```
[Out] -2/3*d*((b*c - a*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d)
)/(sqrt(-b^2*c + a*b*d)*a*d) - c*arctan(sqrt(d*x^3 + c)/sqrt(-c))
/(a*sqrt(-c)*d))
```

3.362 $\int \frac{\sqrt{c+dx^3}}{x^4(a+bx^3)}\,dx$

Optimal. Leaf size=115

$$\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}-\frac{2\sqrt{b}\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2}-\frac{\sqrt{c+dx^3}}{3ax^3}$$

```
[Out] -Sqrt[c + d*x^3]/(3*a*x^3) + ((2*b*c - a*d)*ArcTanh[Sqrt[c + d*x^
3]/Sqrt[c]])/(3*a^2*Sqrt[c]) - (2*Sqrt[b]*Sqrt[b*c - a*d]*ArcTanh
[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2)
```

Rubi [A] time = 0.350573, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}-\frac{2\sqrt{b}\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2}-\frac{\sqrt{c+dx^3}}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^4*(a + b*x^3)),x]
```

```
[Out] -Sqrt[c + d*x^3]/(3*a*x^3) + ((2*b*c - a*d)*ArcTanh[Sqrt[c + d*x^
3]/Sqrt[c]])/(3*a^2*Sqrt[c]) - (2*Sqrt[b]*Sqrt[b*c - a*d]*ArcTanh
[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2)
```

Rubi in Sympy [A] time = 47.2553, size = 104, normalized size = 0.9

$$-\frac{\sqrt{c+dx^3}}{3ax^3}-\frac{2\sqrt{b}\sqrt{ad-bc}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^2}-\frac{2\left(\frac{ad}{2}-bc\right)\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**4/(b*x**3+a),x)
```

```
[Out] -sqrt(c + d*x**3)/(3*a*x**3) - 2*sqrt(b)*sqrt(a*d - b*c)*atan(sqr
t(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a**2) - 2*(a*d/2 - b*c)
*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a**2*sqrt(c))
```

Mathematica [C] time = 0.991399, size = 407, normalized size = 3.54

$$\frac{\frac{6bcdx^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{5bdx^3\left(3ac+4adx^3+bcx^3+3bdx^6\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)-}{a\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2a\right.}}{9x^3\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^4*(a + b*x^3)),x]
```

```
[Out] ((6*b*c*d*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)])
/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)] + x^3
*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*
AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)])) + (5*b*d*x^3
*(3*a*c + b*c*x^3 + 4*a*d*x^3 + 3*b*d*x^6)*AppellF1[3/2, 1/2, 1,
5/2, -(c/(d*x^3)), -(a/(b*x^3))] - 3*(a + b*x^3)*(c + d*x^3)*(2*a
```

```
*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*A
ppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(a*(-5*b*
d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*
a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*
AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))])))/(9*x^3*
(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.016, size = 518, normalized size = 4.5

$$\frac{1}{a}\left(-\frac{1}{3x^3}\sqrt{dx^3+c}-\frac{d}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\frac{1}{\sqrt{c}}\right)+\frac{b^2}{a^2}\left(\frac{2}{3b}\sqrt{dx^3+c}+\frac{\frac{i}{3}\sqrt{2}}{bd^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(\cdots\right.}\right.$$
$$-\frac{b}{a^2}\left(\frac{2}{3}\sqrt{dx^3+c}-\frac{2}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\sqrt{c}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^4/(b*x^3+a),x)
```

```
[Out] 1/a*(-1/3*(d*x^3+c)^(1/2)/x^3-1/3*d*arctanh((d*x^3+c)^(1/2)/c^(1/
2))/c^(1/2))+1/a^2*b^2*(2/3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^(1/2)
*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/
(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*
x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha
^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^
(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(
2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(
1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a^2*(2/3*(d*x^3+
c)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))*c^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{dx^3+c}}{(bx^3+a)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^4), x)
```

Fricas [A] time = 0.242917, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{b^2c-abd}\sqrt{c}x^3\log\left(\frac{bdx^3+2bc-ad-2\sqrt{dx^3+c}\sqrt{b^2c-abd}}{bx^3+a}\right)-(2bc-ad)x^3\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)-2\sqrt{dx^3+c}a\sqrt{c}}{6a^2\sqrt{c}x^3},\ \frac{4\sqrt{\cdots}}{\cdots}\right.$$
$$-\frac{(2bc-ad)x^3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-\sqrt{b^2c-abd}\sqrt{-c}x^3\log\left(\frac{bdx^3+2bc-ad-2\sqrt{dx^3+c}\sqrt{b^2c-abd}}{bx^3+a}\right)+\sqrt{dx^3+c}a\sqrt{-c}}{3a^2\sqrt{-c}x^3},$$
$$\left.-\frac{(2bc-ad)x^3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-2\sqrt{-b^2c+abd}\sqrt{-c}x^3\arctan\left(\frac{\sqrt{-b^2c+abd}}{\sqrt{dx^3+c}b}\right)+\sqrt{dx^3+c}a\sqrt{-c}}{3a^2\sqrt{-c}x^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^4),x, algorithm="fricas")
```

```
[Out] [1/6*(2*sqrt(b^2*c - a*b*d)*sqrt(c)*x^3*log((b*d*x^3 + 2*b*c - a*
d - 2*sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d))/(b*x^3 + a)) - (2*b*c
- a*d)*x^3*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3)
 - 2*sqrt(d*x^3 + c)*a*sqrt(c))/(a^2*sqrt(c)*x^3), 1/6*(4*sqrt(-b
^2*c + a*b*d)*sqrt(c)*x^3*arctan(sqrt(-b^2*c + a*b*d)/(sqrt(d*x^3
 + c)*b)) - (2*b*c - a*d)*x^3*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt
(d*x^3 + c)*c)/x^3) - 2*sqrt(d*x^3 + c)*a*sqrt(c))/(a^2*sqrt(c)*x
^3), -1/3*((2*b*c - a*d)*x^3*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c)))
 - sqrt(b^2*c - a*b*d)*sqrt(-c)*x^3*log((b*d*x^3 + 2*b*c - a*d -
2*sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d))/(b*x^3 + a)) + sqrt(d*x^3
+ c)*a*sqrt(-c))/(a^2*sqrt(-c)*x^3), -1/3*((2*b*c - a*d)*x^3*arct
an(c/(sqrt(d*x^3 + c)*sqrt(-c))) - 2*sqrt(-b^2*c + a*b*d)*sqrt(-c
)*x^3*arctan(sqrt(-b^2*c + a*b*d)/(sqrt(d*x^3 + c)*b)) + sqrt(d*x
^3 + c)*a*sqrt(-c))/(a^2*sqrt(-c)*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c + dx^3}}{x^4 \left(a + bx^3\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**4/(b*x**3+a),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(x**4*(a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.221047, size = 163, normalized size = 1.42

$$\frac{1}{3}\, d^2 \left(\frac{2\left(b^2c - abd\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c + abd}a^2d^2} - \frac{\left(2\,bc - ad\right)\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2} - \frac{\sqrt{dx^3 + c}}{ad^2x^3} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*d^2*(2*(b^2*c - a*b*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c +
 a*b*d))/(sqrt(-b^2*c + a*b*d)*a^2*d^2) - (2*b*c - a*d)*arctan(sq
rt(d*x^3 + c)/sqrt(-c))/(a^2*sqrt(-c)*d^2) - sqrt(d*x^3 + c)/(a*d
^2*x^3))
```

3.363 $\int \frac{x^3\sqrt{c+dx^3}}{a+bx^3}\,dx$

Optimal. Leaf size=64

$$\frac{x^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};1,-\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 1, -1/2, 7/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(4*a*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.180133, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};1,-\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 1, -1/2, 7/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(4*a*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 28.714, size = 51, normalized size = 0.8

$$\frac{x^4\sqrt{c+dx^3}\,\mathrm{appellf_1}\left(\frac{4}{3},-\frac{1}{2},1,\frac{7}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{4a\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, -1/2, 1, 7/3, -d*x**3/c, -b*x
**3/a)/(4*a*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.977187, size = 426, normalized size = 6.66

$$\frac{x\left(\frac{32a^2c^2F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{12x^3(a+bx^3)(c+dx^3)\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\cdots}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\cdots}\right)}{10b(a+bx^3)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^3*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (x*((32*a^2*c^2*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3
)/a)])/(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)
/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((b
*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^3
)/a)])) + (-7*a*c*(8*a*c + 11*b*c*x^3 + 3*a*d*x^3 + 8*b*d*x^6)*Ap
pellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 12*x^3*(a
+ b*x^3)*(c + d*x^3)*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)
```

```
/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c)
, -((b*x^3)/a)]))/(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c
), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*
x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3
)/c), -((b*x^3)/a)]))))/(10*b*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.064, size = 1012, normalized size = 15.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(d*x^3+c)^(1/2)/(b*x^3+a),x)
```

```
[Out] 1/b*(2/5*x*(d*x^3+c)^(1/2)-2/5*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)))-a/b*(-2/3*I/b*3^(1/2)*(-c*d^2)^(1/3
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/b/d^2*2^(1/2)*sum(1/_al
pha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)
+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))
/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2
*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alph
a^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)
^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*
(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^
(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x^3}{bx^3 + a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3\sqrt{c+dx^3}}{a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] Integral(x**3*sqrt(c + d*x**3)/(a + b*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}x^3}{bx^3+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a), x)
```

3.364 $\int \frac{x\sqrt{c+dx^3}}{a+bx^3}\,dx$

Optimal. Leaf size=64

$$\frac{x^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};1,-\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (x^2*Sqrt[c + d*x^3]*AppellF1[2/3, 1, -1/2, 5/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(2*a*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.137211, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{x^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};1,-\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (x^2*Sqrt[c + d*x^3]*AppellF1[2/3, 1, -1/2, 5/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(2*a*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 19.9724, size = 51, normalized size = 0.8

$$\frac{x^2\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{2}{3},-\frac{1}{2},1,\frac{5}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, -1/2, 1, 5/3, -d*x**3/c, -b*x
**3/a)/(2*a*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.249392, size = 163, normalized size = 2.55

$$\frac{5acx^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\left(3x^3\left(adF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-2bcF_1\left(\frac{5}{3};-\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)+10acF_1\left(\frac{2}{3};-\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[c + d*x^3])/(a + b*x^3),x]
```

```
[Out] (5*a*c*x^2*Sqrt[c + d*x^3]*AppellF1[2/3, -1/2, 1, 5/3, -((d*x^3)/
c), -((b*x^3)/a)])/((a + b*x^3)*(10*a*c*AppellF1[2/3, -1/2, 1, 5/
3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(-2*b*c*AppellF1[5/3, -1/2
, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 1/2, 1,
 8/3, -((d*x^3)/c), -((b*x^3)/a)])))
```

Maple [C] time = 0.045, size = 857, normalized size = 13.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(1/2)/(b*x^3+a),x)
```

```
[Out] -2/3*I/b*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d
*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*
d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)))+1/3*I/b/d^2*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1
/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/
3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)
*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticP
i(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c
*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c
*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + cx}}{bx^3 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\sqrt{c + dx^3}}{a + bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] Integral(x*sqrt(c + d*x**3)/(a + b*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x}{bx^3 + a} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a), x)
```

3.365 $\int \frac{\sqrt{c+dx^3}}{a+bx^3}\,dx$

Optimal. Leaf size=59

$$\frac{x\sqrt{c+dx^3}F_1\left(\frac{1}{3};1,-\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (x*Sqrt[c + d*x^3]*AppellF1[1/3, 1, -1/2, 4/3, -((b*x^3)/a), -((d
*x^3)/c)])/(a*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.0860633, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{c+dx^3}F_1\left(\frac{1}{3};1,-\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[c + d*x^3]/(a + b*x^3),x]
```

```
[Out] (x*Sqrt[c + d*x^3]*AppellF1[1/3, 1, -1/2, 4/3, -((b*x^3)/a), -((d
*x^3)/c)])/(a*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 20.6002, size = 48, normalized size = 0.81

$$\frac{x\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{1}{3},-\frac{1}{2},1,\frac{4}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, -1/2, 1, 4/3, -d*x**3/c, -b*x**3
/a)/(a*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.249256, size = 161, normalized size = 2.73

$$\frac{8acx\sqrt{c+dx^3}F_1\left(\frac{1}{3};-\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\left(3x^3\left(adF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-2bcF_1\left(\frac{4}{3};-\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)+8acF_1\left(\frac{1}{3};-\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[c + d*x^3]/(a + b*x^3),x]
```

```
[Out] (8*a*c*x*Sqrt[c + d*x^3]*AppellF1[1/3, -1/2, 1, 4/3, -((d*x^3)/c)
, -((b*x^3)/a)])/((a + b*x^3)*(8*a*c*AppellF1[1/3, -1/2, 1, 4/3,
-((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(-2*b*c*AppellF1[4/3, -1/2, 2
, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 1/2, 1, 7/
3, -((d*x^3)/c), -((b*x^3)/a)])))
```

Maple [C] time = 0.008, size = 705, normalized size = 12.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/(b*x^3+a),x)
```

```
[Out] -2/3*I/b*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d
*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Elliptic
F(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/
3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))
+1/3*I/b/d^2*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+
1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d
^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^
(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-
c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2
)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^
2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf
(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{bx^3+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/(b*x^3 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/(b*x**3+a),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(a + b*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{bx^3 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/(b*x^3 + a), x)
```

3.366 $\int \frac{\sqrt{c+dx^3}}{x^2(a+bx^3)}\,dx$

Optimal. Leaf size=62

$$-\frac{\sqrt{c+dx^3}F_1\left(-\frac{1}{3};1,-\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ax\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -((Sqrt[c + d*x^3]*AppellF1[-1/3, 1, -1/2, 2/3, -((b*x^3)/a), -((
d*x^3)/c)])/(a*x*Sqrt[1 + (d*x^3)/c]))
```

Rubi [A] time = 0.184608, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{c+dx^3}F_1\left(-\frac{1}{3};1,-\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ax\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^2*(a + b*x^3)),x]
```

```
[Out] -((Sqrt[c + d*x^3]*AppellF1[-1/3, 1, -1/2, 2/3, -((b*x^3)/a), -((
d*x^3)/c)])/(a*x*Sqrt[1 + (d*x^3)/c]))
```

Rubi in Sympy [A] time = 24.5923, size = 51, normalized size = 0.82

$$-\frac{\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{1}{3},-\frac{1}{2},1,\frac{2}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{ax\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**2/(b*x**3+a),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, -1/2, 1, 2/3, -d*x**3/c, -b*x**3
/a)/(a*x*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 1.01524, size = 344, normalized size = 5.55

$$\frac{\frac{25cx^3(2bc-3ad)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}-\frac{16bcdx^6 \cdots}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+\cdots\right.\right.}}{10x\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^2*(a + b*x^3)),x]
```

```
[Out] ((-10*(c + d*x^3))/a + (25*c*(2*b*c - 3*a*d)*x^3*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)])/((a + b*x^3)*(-10*a*c*App
ellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*
c*AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Ap
pellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)]))) - (16*b*c
*d*x^6*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])/((
a + b*x^3)*(-16*a*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b
```

```
*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c)
, -((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -
((b*x^3)/a)]))))/(10*x*Sqrt[c + d*x^3])
```

Maple [C] time = 0.016, size = 1314, normalized size = 21.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^2/(b*x^3+a),x)
```

```
[Out] 1/a*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+
c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*
d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-b/a*(-2/3*I/b*3^(1/2)*(-c*
d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+
1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+
1/3*I/b/d^2*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d
*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2
)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)
^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/
3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d
^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d
-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^
(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z
^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(bx^3 + a)x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^2),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{x^2\left(a+bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**2/(b*x**3+a),x)

[Out] Integral(sqrt(c + d*x**3)/(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{(bx^3+a)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^2),x, algorithm="giac")

[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^2), x)
```

3.367 $\int \frac{\sqrt{c+dx^3}}{x^3(a+bx^3)}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{c+dx^3}F_1\left(-\frac{2}{3};1,-\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ax^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -(Sqrt[c + d*x^3]*AppellF1[-2/3, 1, -1/2, 1/3, -((b*x^3)/a), -((d
*x^3)/c)])/(2*a*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.18204, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{c+dx^3}F_1\left(-\frac{2}{3};1,-\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ax^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^3*(a + b*x^3)),x]
```

```
[Out] -(Sqrt[c + d*x^3]*AppellF1[-2/3, 1, -1/2, 1/3, -((b*x^3)/a), -((d
*x^3)/c)])/(2*a*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 24.6666, size = 54, normalized size = 0.84

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf_1}\left(-\frac{2}{3},-\frac{1}{2},1,\frac{1}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2ax^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**3/(b*x**3+a),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, -1/2, 1, 1/3, -d*x**3/c, -b*x**3
/a)/(2*a*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.466658, size = 344, normalized size = 5.38

$$\frac{\frac{16cx^3(4bc-3ad)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{7bcdx^6F}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+a\right.\right.}}{8x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^3*(a + b*x^3)),x]
```

```
[Out] ((-4*(c + d*x^3))/a + (16*c*(4*b*c - 3*a*d)*x^3*AppellF1[1/3, 1/2
, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])/((a + b*x^3)*(-8*a*c*Appel
lF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*
AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Appe
llF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)]))) + (7*b*c*d*
x^6*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])/((a +
 b*x^3)*(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^
```

```
3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -
((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b
*x^3)/a)]))))/(8*x^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.013, size = 1010, normalized size = 15.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x^3+c)^(1/2)/x^3/(b*x^3+a),x)
```

```
[Out] 1/a*(-1/2/x^2*(d*x^3+c)^(1/2)-1/2*I*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2)))-b/a*(-2/3*I/b*3^(1/2)*(-c*d^2)^(1/3)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/b/d^2*2^(1/2)*sum(1/_alp
ha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/
(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*
x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha
^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^
(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(
2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(
1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(bx^3 + a)x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^3), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^3),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{x^3\left(a+bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**3/(b*x**3+a),x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(x**3*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{(bx^3+a)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^3),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)*x^3), x)
```

3.368 $\int \frac{x^8(c+dx^3)^{3/2}}{a+bx^3}\,dx$

Optimal. Leaf size=154

$$-\frac{2a^2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{9/2}}+\frac{2a^2\sqrt{c+dx^3}(bc-ad)}{3b^4}+\frac{2a^2\left(c+dx^3\right)^{3/2}}{9b^3}-\frac{2\left(c+dx^3\right)^{5/2}(ad+bc)}{15b^2d^2}+\frac{2\left(c+dx^3\right)^{7/2}}{21bd^2}$$

```
[Out] (2*a^2*(b*c - a*d)*Sqrt[c + d*x^3])/(3*b^4) + (2*a^2*(c + d*x^3)^
(3/2))/(9*b^3) - (2*(b*c + a*d)*(c + d*x^3)^(5/2))/(15*b^2*d^2) +
 (2*(c + d*x^3)^(7/2))/(21*b*d^2) - (2*a^2*(b*c - a*d)^(3/2)*ArcT
anh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(9/2))
```

Rubi [A] time = 0.41926, antiderivative size = 154, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{2a^2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{9/2}}+\frac{2a^2\sqrt{c+dx^3}(bc-ad)}{3b^4}+\frac{2a^2\left(c+dx^3\right)^{3/2}}{9b^3}-\frac{2\left(c+dx^3\right)^{5/2}(ad+bc)}{15b^2d^2}+\frac{2\left(c+dx^3\right)^{7/2}}{21bd^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (2*a^2*(b*c - a*d)*Sqrt[c + d*x^3])/(3*b^4) + (2*a^2*(c + d*x^3)^
(3/2))/(9*b^3) - (2*(b*c + a*d)*(c + d*x^3)^(5/2))/(15*b^2*d^2) +
 (2*(c + d*x^3)^(7/2))/(21*b*d^2) - (2*a^2*(b*c - a*d)^(3/2)*ArcT
anh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(9/2))
```

Rubi in Sympy [A] time = 45.8148, size = 141, normalized size = 0.92

$$\frac{2a^2\left(c+dx^3\right)^{\frac{3}{2}}}{9b^3}-\frac{2a^2\sqrt{c+dx^3}\,(ad-bc)}{3b^4}+\frac{2a^2\,(ad-bc)^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{9}{2}}}+\frac{2\left(c+dx^3\right)^{\frac{7}{2}}}{21bd^2}-\frac{2\left(c+dx^3\right)^{\frac{5}{2}}(ad+bc)}{15b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] 2*a**2*(c + d*x**3)**(3/2)/(9*b**3) - 2*a**2*sqrt(c + d*x**3)*(a*
d - b*c)/(3*b**4) + 2*a**2*(a*d - b*c)**(3/2)*atan(sqrt(b)*sqrt(c
 + d*x**3)/sqrt(a*d - b*c))/(3*b**(9/2)) + 2*(c + d*x**3)**(7/2)/
(21*b*d**2) - 2*(c + d*x**3)**(5/2)*(a*d + b*c)/(15*b**2*d**2)
```

Mathematica [A] time = 0.376429, size = 143, normalized size = 0.93

$$\frac{2\sqrt{c+dx^3}\left(-105a^3d^3+35a^2bd^2\left(4c+dx^3\right)-21ab^2d\left(c+dx^3\right)^2-3b^3\left(2c-5dx^3\right)\left(c+dx^3\right)^2\right)}{315b^4d^2}-\frac{2a^2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3]*(-105*a^3*d^3 - 21*a*b^2*d*(c + d*x^3)^2 - 3*b
^3*(2*c - 5*d*x^3)*(c + d*x^3)^2 + 35*a^2*b*d^2*(4*c + d*x^3)))/(
315*b^4*d^2) - (2*a^2*(b*c - a*d)^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c +
 d*x^3])/Sqrt[b*c - a*d]])/(3*b^(9/2))
```

Maple [C] time = 0.052, size = 605, normalized size = 3.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(3/2)/(b*x^3+a),x)
```

```
[Out] 1/b^2*(b*(2/21*d*x^9*(d*x^3+c)^(1/2)+16/105*c*x^6*(d*x^3+c)^(1/2)
+2/105*c^2/d*x^3*(d*x^3+c)^(1/2)-4/105*c^3/d^2*(d*x^3+c)^(1/2))-2
/15*a/d*(d*x^3+c)^(5/2))+a^2/b^2*(2/9/b*d*x^3*(d*x^3+c)^(1/2)+2/3
*(-d*(a*d-2*b*c)/b^2-2/3/b*d*c)/d*(d*x^3+c)^(1/2)+1/3*I/b^2/d^2*2
^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/(a*d-b*c)*(-c*d^2)^(1/3)*
(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c
*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I
*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c
*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2
)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c
*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2
)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3
*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/
3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))
,_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^8/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240937, size = 1, normalized size = 0.01

$$\left[-\frac{105\left(a^2bcd^2-a^3d^3\right)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)-2\left(15\,b^3d^3x^9+3\left(8\,b^3cd^2-7\,ab^2d^3\right)x^6-6\,b^3c^3-21\,\cdots}{315\,b^4d^2}\right.$$

$$-\frac{2\left(105\left(a^2bcd^2-a^3d^3\right)\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)-\left(15\,b^3d^3x^9+3\left(8\,b^3cd^2-7\,ab^2d^3\right)x^6-6\,b^3c^3-21\,ab^2c^2d+140\,a^2\cdots\right.}{315\,b^4d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^8/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [-1/315*(105*(a^2*b*c*d^2 - a^3*d^3)*sqrt((b*c - a*d)/b)*log((b*d
*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*
x^3 + a)) - 2*(15*b^3*d^3*x^9 + 3*(8*b^3*c*d^2 - 7*a*b^2*d^3)*x^6
 - 6*b^3*c^3 - 21*a*b^2*c^2*d + 140*a^2*b*c*d^2 - 105*a^3*d^3 + (
3*b^3*c^2*d - 42*a*b^2*c*d^2 + 35*a^2*b*d^3)*x^3)*sqrt(d*x^3 + c)
)/(b^4*d^2), -2/315*(105*(a^2*b*c*d^2 - a^3*d^3)*sqrt(-(b*c - a*d
)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)) - (15*b^3*d^3*x
^9 + 3*(8*b^3*c*d^2 - 7*a*b^2*d^3)*x^6 - 6*b^3*c^3 - 21*a*b^2*c^2
*d + 140*a^2*b*c*d^2 - 105*a^3*d^3 + (3*b^3*c^2*d - 42*a*b^2*c*d^
2 + 35*a^2*b*d^3)*x^3)*sqrt(d*x^3 + c))/(b^4*d^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220906, size = 261, normalized size = 1.69

$$\frac{2\left(a^2b^2c^2 - 2\,a^3bcd + a^4d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\sqrt{-b^2c+abd}b^4} + \frac{2\left(15\left(dx^3+c\right)^{\frac{7}{2}}b^6d^{12} - 21\left(dx^3+c\right)^{\frac{5}{2}}b^6cd^{12} - 21\left(dx^3+c\right)^{\frac{5}{2}}ab^5d^{13} + 35\left(dx^3+c\right)^{\frac{3}{2}}a^2b^4d^{14} + 105\sqrt{dx^3+c}a^2b^4cd^{14} - 105\right.}{315\,b^7d^{14}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^8/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 2/3*(a^2*b^2*c^2 - 2*a^3*b*c*d + a^4*d^2)*arctan(sqrt(d*x^3 + c)*
b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^4) + 2/315*(15*(d
*x^3 + c)^(7/2)*b^6*d^12 - 21*(d*x^3 + c)^(5/2)*b^6*c*d^12 - 21*(
d*x^3 + c)^(5/2)*a*b^5*d^13 + 35*(d*x^3 + c)^(3/2)*a^2*b^4*d^14 +
 105*sqrt(d*x^3 + c)*a^2*b^4*c*d^14 - 105*sqrt(d*x^3 + c)*a^3*b^3
*d^15)/(b^7*d^14)
```

3.369 $\int \frac{x^5(c+dx^3)^{3/2}}{a+bx^3}\,dx$

Optimal. Leaf size=120

$$\frac{2a(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}-\frac{2a\sqrt{c+dx^3}(bc-ad)}{3b^3}-\frac{2a\left(c+dx^3\right)^{3/2}}{9b^2}+\frac{2\left(c+dx^3\right)^{5/2}}{15bd}$$

```
[Out] (-2*a*(b*c - a*d)*Sqrt[c + d*x^3])/(3*b^3) - (2*a*(c + d*x^3)^(3/
2))/(9*b^2) + (2*(c + d*x^3)^(5/2))/(15*b*d) + (2*a*(b*c - a*d)^(
3/2)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/
2))
```

Rubi [A] time = 0.271359, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{2a(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}-\frac{2a\sqrt{c+dx^3}(bc-ad)}{3b^3}-\frac{2a\left(c+dx^3\right)^{3/2}}{9b^2}+\frac{2\left(c+dx^3\right)^{5/2}}{15bd}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (-2*a*(b*c - a*d)*Sqrt[c + d*x^3])/(3*b^3) - (2*a*(c + d*x^3)^(3/
2))/(9*b^2) + (2*(c + d*x^3)^(5/2))/(15*b*d) + (2*a*(b*c - a*d)^(
3/2)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/
2))
```

Rubi in Sympy [A] time = 31.1517, size = 107, normalized size = 0.89

$$-\frac{2a\left(c+dx^3\right)^{\frac{3}{2}}}{9b^2}+\frac{2a\sqrt{c+dx^3}\,(ad-bc)}{3b^3}-\frac{2a\,(ad-bc)^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{7}{2}}}+\frac{2\left(c+dx^3\right)^{\frac{5}{2}}}{15bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] -2*a*(c + d*x**3)**(3/2)/(9*b**2) + 2*a*sqrt(c + d*x**3)*(a*d - b
*c)/(3*b**3) - 2*a*(a*d - b*c)**(3/2)*atan(sqrt(b)*sqrt(c + d*x**
3)/sqrt(a*d - b*c))/(3*b**(7/2)) + 2*(c + d*x**3)**(5/2)/(15*b*d)
```

Mathematica [A] time = 0.283332, size = 111, normalized size = 0.92

$$\frac{2\sqrt{c+dx^3}\left(15a^2d^2-5abd\left(4c+dx^3\right)+3b^2\left(c+dx^3\right)^2\right)}{45b^3d}+\frac{2a(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3]*(15*a^2*d^2 + 3*b^2*(c + d*x^3)^2 - 5*a*b*d*(4
*c + d*x^3)))/(45*b^3*d) + (2*a*(b*c - a*d)^(3/2)*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/2))
```

Maple [C] time = 0.012, size = 531, normalized size = 4.4

$$\frac{2}{15\,bd}\left(dx^{3}+c\right)^{\frac{5}{2}} -\frac{a}{b}\left(\frac{2\,dx^{3}}{9\,b}\sqrt{dx^{3}+c}+\frac{2}{3\,d}\left(-\frac{d\,(ad-2\,bc)}{b^{2}}-\frac{2\,cd}{3\,b}\right)\sqrt{dx^{3}+c}+\frac{\frac{i}{3}\sqrt{2}}{b^{2}d^{2}}\sum_{\_alpha=RootOf\left(b\_Z^{3}+a\right)}\frac{-a^{2}d^{2}+2\,cabd-b^{2}c^{2}}{ad-bc}\sqrt[3]{-cd^{2}}\sqrt{\frac{i}{2}d\cdots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^3+c)^(3/2)/(b*x^3+a),x)
```

```
[Out] 2/15*(d*x^3+c)^(5/2)/b/d-a/b*(2/9/b*d*x^3*(d*x^3+c)^(1/2)+2/3*(-d
*(a*d-2*b*c)/b^2-2/3/b*d*c)/d*(d*x^3+c)^(1/2)+1/3*I/b^2/d^2*2^(1/
2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2
*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(
1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2
)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I
*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2
)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1
/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_al
pha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_al
pha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^5/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.24541, size = 1, normalized size = 0.01

$$\left[-\frac{15\left(abcd-a^{2}d^{2}\right)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^{3}+2\,bc-ad-2\,\sqrt{dx^{3}+c}\,b\sqrt{\frac{bc-ad}{b}}}{bx^{3}+a}\right)-2\left(3\,b^{2}d^{2}x^{6}+3\,b^{2}c^{2}-20\,abcd+15\,a^{2}d^{2}+\left(6\,b^{2}cd-5\,ab\cdots\right.\right.}{45\,b^{3}d}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^5/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [-1/45*(15*(a*b*c*d - a^2*d^2)*sqrt((b*c - a*d)/b)*log((b*d*x^3 +
 2*b*c - a*d - 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 +
a)) - 2*(3*b^2*d^2*x^6 + 3*b^2*c^2 - 20*a*b*c*d + 15*a^2*d^2 + (6
*b^2*c*d - 5*a*b*d^2)*x^3)*sqrt(d*x^3 + c))/(b^3*d), 2/45*(15*(a*
b*c*d - a^2*d^2)*sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt
(-(b*c - a*d)/b)) + (3*b^2*d^2*x^6 + 3*b^2*c^2 - 20*a*b*c*d + 15*
a^2*d^2 + (6*b^2*c*d - 5*a*b*d^2)*x^3)*sqrt(d*x^3 + c))/(b^3*d)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217445, size = 204, normalized size = 1.7

$$-\frac{2\left(ab^{2}c^{2}-2\,a^{2}bcd+a^{3}d^{2}\right)\arctan\left(\frac{\sqrt{dx^{3}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{3\,\sqrt{-b^{2}c+abd}b^{3}}+\frac{2\left(3\left(dx^{3}+c\right)^{\frac{5}{2}}b^{4}d^{4}-5\left(dx^{3}+c\right)^{\frac{3}{2}}ab^{3}d^{5}-15\,\sqrt{dx^{3}+c}ab^{3}cd^{5}+15\,\sqrt{dx^{3}+c}a^{2}b^{2}d^{6}\right)}{45\,b^{5}d^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^5/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] -2/3*(a*b^2*c^2 - 2*a^2*b*c*d + a^3*d^2)*arctan(sqrt(d*x^3 + c)*b
/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^3) + 2/45*(3*(d*x^
3 + c)^(5/2)*b^4*d^4 - 5*(d*x^3 + c)^(3/2)*a*b^3*d^5 - 15*sqrt(d*
x^3 + c)*a*b^3*c*d^5 + 15*sqrt(d*x^3 + c)*a^2*b^2*d^6)/(b^5*d^5)
```

3.370 $\int \frac{x^2(c+dx^3)^{3/2}}{a+bx^3}\,dx$

Optimal. Leaf size=96

$$-\frac{2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}}+\frac{2\sqrt{c+dx^3}(bc-ad)}{3b^2}+\frac{2\left(c+dx^3\right)^{3/2}}{9b}$$

```
[Out] (2*(b*c - a*d)*Sqrt[c + d*x^3])/(3*b^2) + (2*(c + d*x^3)^(3/2))/(
9*b) - (2*(b*c - a*d)^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqr
t[b*c - a*d]])/(3*b^(5/2))
```

Rubi [A] time = 0.21574, antiderivative size = 96, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}}+\frac{2\sqrt{c+dx^3}(bc-ad)}{3b^2}+\frac{2\left(c+dx^3\right)^{3/2}}{9b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (2*(b*c - a*d)*Sqrt[c + d*x^3])/(3*b^2) + (2*(c + d*x^3)^(3/2))/(
9*b) - (2*(b*c - a*d)^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqr
t[b*c - a*d]])/(3*b^(5/2))
```

Rubi in Sympy [A] time = 24.9038, size = 83, normalized size = 0.86

$$\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9b}-\frac{2\sqrt{c+dx^3}\,(ad-bc)}{3b^2}+\frac{2\,(ad-bc)^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] 2*(c + d*x**3)**(3/2)/(9*b) - 2*sqrt(c + d*x**3)*(a*d - b*c)/(3*b
**2) + 2*(a*d - b*c)**(3/2)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*
d - b*c))/(3*b**(5/2))
```

Mathematica [A] time = 0.141667, size = 85, normalized size = 0.89

$$\frac{2\sqrt{c+dx^3}\left(-3ad+4bc+bdx^3\right)}{9b^2}-\frac{2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (2*Sqrt[c + d*x^3]*(4*b*c - 3*a*d + b*d*x^3))/(9*b^2) - (2*(b*c -
 a*d)^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(
3*b^(5/2))
```

Maple [C] time = 0.01, size = 507, normalized size = 5.3

$$\frac{2\,dx^3}{9\,b}\sqrt{dx^3+c}+\frac{2}{3\,d}\left(-\frac{d\,(ad-2\,bc)}{b^2}-\frac{2\,cd}{3\,b}\right)\sqrt{dx^3+c}$$
$$+\frac{\frac{i}{3}\sqrt{2}}{b^2d^2}\sum_{\_alpha\,=RootOf(b\_Z^3+a)}\frac{-a^2d^2+2\,cabd-b^2c^2}{ad-bc}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(d*x^3+c)^(3/2)/(b*x^3+a),x)
```

```
[Out] 2/9/b*d*x^3*(d*x^3+c)^(1/2)+2/3*(-d*(a*d-2*b*c)/b^2-2/3/b*d*c)/d*
(d*x^3+c)^(1/2)+1/3*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2
*c^2)/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*
d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d
^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-
1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)
*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*
d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2
)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d
-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^2/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.249431, size = 1, normalized size = 0.01

$$\left[-\frac{3\,(bc-ad)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}\,b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)-2\left(bdx^3+4\,bc-3\,ad\right)\sqrt{dx^3+c}}{9\,b^2},\right.$$
$$\left.-\frac{2\left(3\,(bc-ad)\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)-\left(bdx^3+4\,bc-3\,ad\right)\sqrt{dx^3+c}\right)}{9\,b^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^2/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [-1/9*(3*(b*c - a*d)*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c - a
*d + 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) - 2*(b
*d*x^3 + 4*b*c - 3*a*d)*sqrt(d*x^3 + c))/b^2, -2/9*(3*(b*c - a*d)
*sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)
) - (b*d*x^3 + 4*b*c - 3*a*d)*sqrt(d*x^3 + c))/b^2]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2\left(c+dx^3\right)^{\frac{3}{2}}}{a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] Integral(x**2*(c + d*x**3)**(3/2)/(a + b*x**3), x)
```

GIAC/XCAS [A] time = 0.216488, size = 153, normalized size = 1.59

$$\frac{2\left(b^2c^2-2\,abcd+a^2d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\sqrt{-b^2c+abd}b^2}+\frac{2\left(\left(dx^3+c\right)^{\frac{3}{2}}b^2+3\sqrt{dx^3+c}b^2c-3\sqrt{dx^3+c}abd\right)}{9\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^2/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] 2/3*(b^2*c^2 - 2*a*b*c*d + a^2*d^2)*arctan(sqrt(d*x^3 + c)*b/sqrt
(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^2) + 2/9*((d*x^3 + c)^(
3/2)*b^2 + 3*sqrt(d*x^3 + c)*b^2*c - 3*sqrt(d*x^3 + c)*a*b*d)/b^3
```

3.371 $\int \frac{(c+dx^3)^{3/2}}{x(a+bx^3)}\,dx$

Optimal. Leaf size=104

$$\frac{2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3ab^{3/2}}-\frac{2c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a}+\frac{2d\sqrt{c+dx^3}}{3b}$$

```
[Out] (2*d*Sqrt[c + d*x^3])/(3*b) - (2*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/
Sqrt[c]])/(3*a) + (2*(b*c - a*d)^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c +
d*x^3])/Sqrt[b*c - a*d]])/(3*a*b^(3/2))
```

Rubi [A] time = 0.332113, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3ab^{3/2}}-\frac{2c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a}+\frac{2d\sqrt{c+dx^3}}{3b}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x*(a + b*x^3)),x]
```

```
[Out] (2*d*Sqrt[c + d*x^3])/(3*b) - (2*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/
Sqrt[c]])/(3*a) + (2*(b*c - a*d)^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c +
d*x^3])/Sqrt[b*c - a*d]])/(3*a*b^(3/2))
```

Rubi in Sympy [A] time = 38.6876, size = 90, normalized size = 0.87

$$\frac{2d\sqrt{c+dx^3}}{3b}-\frac{2c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a}-\frac{2\left(ad-bc\right)^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3ab^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x/(b*x**3+a),x)
```

```
[Out] 2*d*sqrt(c + d*x**3)/(3*b) - 2*c**(3/2)*atanh(sqrt(c + d*x**3)/sq
rt(c))/(3*a) - 2*(a*d - b*c)**(3/2)*atan(sqrt(b)*sqrt(c + d*x**3)
/sqrt(a*d - b*c))/(3*a*b**(3/2))
```

Mathematica [C] time = 0.535049, size = 325, normalized size = 3.12

$$\frac{2d\left(\frac{5b^2c^2x^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}{(a+bx^3)\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)\right)}+\frac{6acx^3(ad-2}{(a+bx^3)\left(x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+a\right.\right.}\right.}{9b\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x*(a + b*x^3)),x]
```

```
[Out] (2*d*(3*(c + d*x^3) + (6*a*c*(-2*b*c + a*d)*x^3*AppellF1[1, 1/2,
1, 2, -((d*x^3)/c), -((b*x^3)/a)])/((a + b*x^3)*(-4*a*c*AppellF1[
1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)] + x^3*(2*b*c*AppellF1[2
, 1/2, 2, 3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[2, 3/2, 1
, 3, -((d*x^3)/c), -((b*x^3)/a)]))) + (5*b^2*c^2*x^3*AppellF1[3/2
, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))])/((a + b*x^3)*(-5*b*d*
```

```
x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*
d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*Ap
pellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))))/(9*b*Sqr
t[c + d*x^3])
```

Maple [C] time = 0.014, size = 565, normalized size = 5.4

$$\frac{1}{a}\left(\frac{2\,dx^3}{9}\sqrt{dx^3+c}+\frac{8\,c}{9}\sqrt{dx^3+c}-\frac{2}{3}c^{\frac{3}{2}}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\right)$$
$$-\frac{b}{a}\left(\frac{2\,dx^3}{9\,b}\sqrt{dx^3+c}+\frac{2}{3\,d}\left(-\frac{d\,(ad-2\,bc)}{b^2}-\frac{2\,cd}{3\,b}\right)\sqrt{dx^3+c}+\frac{\frac{i}{3}\sqrt{2}}{b^2d^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}\frac{-a^2d^2+2\,cabd-b^2c^2}{ad-bc}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\ldots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x/(b*x^3+a),x)
```

```
[Out] 1/a*(2/9*d*x^3*(d*x^3+c)^(1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(3/2)*
arctanh((d*x^3+c)^(1/2)/c^(1/2)))-b/a*(2/9/b*d*x^3*(d*x^3+c)^(1/2
)+2/3*(-d*(a*d-2*b*c)/b^2-2/3/b*d*c)/d*(d*x^3+c)^(1/2)+1/3*I/b^2/
d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/(a*d-b*c)*(-c*d^2)^(
1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3))
)/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1
/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2
)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2
)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Elliptic
Pi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-
c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*
c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{(bx^3+a)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x), x)
```

Fricas [A] time = 0.275508, size = 1, normalized size = 0.01

$$\left[\frac{bc^{\frac{3}{2}}\log\left(\frac{dx^3-2\sqrt{dx^3+c}\sqrt{c}+2\,c}{x^3}\right)+2\sqrt{dx^3+c}ad-(bc-ad)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad-2\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)}{3\,ab},\ \frac{bc^{\frac{3}{2}}\log\left(\frac{dx^3-2\sqrt{dx^3+\ldots}}{x^3}\right.\ldots}{\ldots}\right.$$
$$-\frac{2\,b\sqrt{-c}c\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)-2\sqrt{dx^3+c}ad+(bc-ad)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad-2\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)}{3\,ab},$$
$$\left.-\frac{2\left(b\sqrt{-c}c\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)-\sqrt{dx^3+c}ad-(bc-ad)\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)\right)}{3\,ab}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x),x, algorithm="fricas")
```

```
[Out] [1/3*(b*c^(3/2)*log((d*x^3 - 2*sqrt(d*x^3 + c)*sqrt(c) + 2*c)/x^3
) + 2*sqrt(d*x^3 + c)*a*d - (b*c - a*d)*sqrt((b*c - a*d)/b)*log((
b*d*x^3 + 2*b*c - a*d - 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/
(b*x^3 + a)))/(a*b), 1/3*(b*c^(3/2)*log((d*x^3 - 2*sqrt(d*x^3 + c
)*sqrt(c) + 2*c)/x^3) + 2*sqrt(d*x^3 + c)*a*d + 2*(b*c - a*d)*sqr
t(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)))/(
a*b), -1/3*(2*b*sqrt(-c)*c*arctan(sqrt(d*x^3 + c)/sqrt(-c)) - 2*s
qrt(d*x^3 + c)*a*d + (b*c - a*d)*sqrt((b*c - a*d)/b)*log((b*d*x^3
 + 2*b*c - a*d - 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3
+ a)))/(a*b), -2/3*(b*sqrt(-c)*c*arctan(sqrt(d*x^3 + c)/sqrt(-c))
 - sqrt(d*x^3 + c)*a*d - (b*c - a*d)*sqrt(-(b*c - a*d)/b)*arctan(
sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)))/(a*b)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(c+dx^3\right)^{\frac{3}{2}}}{x\left(a+bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x/(b*x**3+a),x)
```

```
[Out] Integral((c + d*x**3)**(3/2)/(x*(a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.220977, size = 159, normalized size = 1.53

$$\frac{2}{3}\,d\left(\frac{c^2\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a\sqrt{-c}d}+\frac{\sqrt{dx^3+c}}{b}-\frac{\left(b^2c^2-2\,abcd+a^2d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}abd}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x),x, algorithm="giac")
```

```
[Out] 2/3*d*(c^2*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a*sqrt(-c)*d) + sqrt
(d*x^3 + c)/b - (b^2*c^2 - 2*a*b*c*d + a^2*d^2)*arctan(sqrt(d*x^3
 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*a*b*d))
```

3.372 $\int \frac{(c+dx^3)^{3/2}}{x^4(a+bx^3)}\,dx$

Optimal. Leaf size=116

$$-\frac{2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2\sqrt{b}}+\frac{\sqrt{c}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}-\frac{c\sqrt{c+dx^3}}{3ax^3}$$

```
[Out] -(c*Sqrt[c + d*x^3])/(3*a*x^3) + (Sqrt[c]*(2*b*c - 3*a*d)*ArcTanh
[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^2) - (2*(b*c - a*d)^(3/2)*ArcTanh
[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*Sqrt[b])
```

Rubi [A] time = 0.401954, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{2(bc-ad)^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2\sqrt{b}}+\frac{\sqrt{c}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}-\frac{c\sqrt{c+dx^3}}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^4*(a + b*x^3)),x]
```

```
[Out] -(c*Sqrt[c + d*x^3])/(3*a*x^3) + (Sqrt[c]*(2*b*c - 3*a*d)*ArcTanh
[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^2) - (2*(b*c - a*d)^(3/2)*ArcTanh
[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*Sqrt[b])
```

Rubi in Sympy [A] time = 43.1943, size = 104, normalized size = 0.9

$$-\frac{c\sqrt{c+dx^3}}{3ax^3}-\frac{\sqrt{c}\,(3ad-2bc)\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}+\frac{2\,(ad-bc)^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^2\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**4/(b*x**3+a),x)
```

```
[Out] -c*sqrt(c + d*x**3)/(3*a*x**3) - sqrt(c)*(3*a*d - 2*b*c)*atanh(sq
rt(c + d*x**3)/sqrt(c))/(3*a**2) + 2*(a*d - b*c)**(3/2)*atan(sqrt
(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a**2*sqrt(b))
```

Mathematica [C] time = 0.62109, size = 414, normalized size = 3.57

$$\frac{c\left(\frac{5bdx^3\left(3a\left(c+2dx^3\right)+bx^3\left(c+3dx^3\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)-3\left(a+bx^3\right)\left(c+dx^3\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)\right)}{a\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)\right)}+\frac{\quad}{x^3\left(2bc\cdots\right.}\right.}{9x^3\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^4*(a + b*x^3)),x]
```

```
[Out] (c*((6*d*(b*c - 2*a*d)*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -
((b*x^3)/a)])/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x
^3)/a)] + x^3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^
3)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)]))
 + (5*b*d*x^3*(3*a*(c + 2*d*x^3) + b*x^3*(c + 3*d*x^3))*AppellF1[
```

```
3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] - 3*(a + b*x^3)*(c
+ d*x^3)*(2*a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x
^3))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))
]))/(a*(-5*b*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(
b*x^3))] + 2*a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*
x^3))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3)
)]))))/(9*x^3*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.013, size = 620, normalized size = 5.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x^3+c)^(3/2)/x^4/(b*x^3+a),x)
```

```
[Out] 1/a*(-1/3*c*(d*x^3+c)^(1/2)/x^3+2/3*d*(d*x^3+c)^(1/2)-c^(1/2)*d*a
rctanh((d*x^3+c)^(1/2)/c^(1/2)))+1/a^2*b^2*(2/9/b*d*x^3*(d*x^3+c)
^(1/2)+2/3*(-d*(a*d-2*b*c)/b^2-2/3/b*d*c)/d*(d*x^3+c)^(1/2)+1/3*I
/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/(a*d-b*c)*(-c*d
^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(
1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^
2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x
^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3
^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ell
ipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha
^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(
1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a^2*(2/9*d*x^3*(d*x^3+c)^(
1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(3/2)*arctanh((d*x^3+c)^(1/2)/c^
(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx^3+c)^{\frac{3}{2}}}{(bx^3+a)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^4),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^4), x)
```

Fricas [A] time = 0.285111, size = 1, normalized size = 0.01

$$\left[-\frac{2\,(bc-ad)x^3\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)+(2\,bc-3\,ad)\sqrt{c}x^3\log\left(\frac{dx^3-2\,\sqrt{dx^3+c}\sqrt{c}+2\,c}{x^3}\right)+2\,\sqrt{dx^3+c}ac}{6\,a^2x^3},\right.$$
$$-\frac{4\,(bc-ad)x^3\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)+(2\,bc-3\,ad)\sqrt{c}x^3\log\left(\frac{dx^3-2\,\sqrt{dx^3+c}\sqrt{c}+2\,c}{x^3}\right)+2\,\sqrt{dx^3+c}ac}{6\,a^2x^3},\ \frac{(2\,bc-3\,ad)\sqrt{-cx}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/6*(2*(b*c - a*d)*x^3*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c
 - a*d + 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) +
(2*b*c - 3*a*d)*sqrt(c)*x^3*log((d*x^3 - 2*sqrt(d*x^3 + c)*sqrt(c
) + 2*c)/x^3) + 2*sqrt(d*x^3 + c)*a*c)/(a^2*x^3), -1/6*(4*(b*c -
a*d)*x^3*sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c -
 a*d)/b)) + (2*b*c - 3*a*d)*sqrt(c)*x^3*log((d*x^3 - 2*sqrt(d*x^3
 + c)*sqrt(c) + 2*c)/x^3) + 2*sqrt(d*x^3 + c)*a*c)/(a^2*x^3), 1/3
*((2*b*c - 3*a*d)*sqrt(-c)*x^3*arctan(sqrt(d*x^3 + c)/sqrt(-c)) -
 (b*c - a*d)*x^3*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c - a*d +
 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) - sqrt(d*x
^3 + c)*a*c)/(a^2*x^3), 1/3*((2*b*c - 3*a*d)*sqrt(-c)*x^3*arctan(
sqrt(d*x^3 + c)/sqrt(-c)) - 2*(b*c - a*d)*x^3*sqrt(-(b*c - a*d)/b
)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)) - sqrt(d*x^3 + c)*
a*c)/(a^2*x^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x**4/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219405, size = 182, normalized size = 1.57

$$\frac{1}{3}d^2\left(\frac{2\left(b^2c^2-2\,abcd+a^2d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}a^2d^2}-\frac{\left(2\,bc^2-3\,acd\right)\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2}-\frac{\sqrt{dx^3+c}c}{ad^2x^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*d^2*(2*(b^2*c^2 - 2*a*b*c*d + a^2*d^2)*arctan(sqrt(d*x^3 + c)
*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*a^2*d^2) - (2*b*c^
2 - 3*a*c*d)*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a^2*sqrt(-c)*d^2)
- sqrt(d*x^3 + c)*c/(a*d^2*x^3))
```

3.373 $\int \frac{x^3(c+dx^3)^{3/2}}{a+bx^3}\,dx$

Optimal. Leaf size=65

$$\frac{cx^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};1,-\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (c*x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 1, -3/2, 7/3, -((b*x^3)/a),
-((d*x^3)/c)])/(4*a*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.187155, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$

$$\frac{cx^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};1,-\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (c*x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 1, -3/2, 7/3, -((b*x^3)/a),
-((d*x^3)/c)])/(4*a*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 28.1699, size = 53, normalized size = 0.82

$$\frac{cx^4\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{4}{3},-\frac{3}{2},1,\frac{7}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{4a\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] c*x**4*sqrt(c + d*x**3)*appellf1(4/3, -3/2, 1, 7/3, -d*x**3/c, -b
*x**3/a)/(4*a*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 1.01815, size = 382, normalized size = 5.88

$$\frac{x\left(-\frac{7acx^3(55a^2d^2-88abcd+27b^2c^2)F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{32a^2c^2(\ldots}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\ldots\right.\right.\right.}\right.}{110b^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^3*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (x*(4*(c + d*x^3)*(14*b*c - 11*a*d + 5*b*d*x^3) + (32*a^2*c^2*(14
*b*c - 11*a*d)*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)
/a)])/((a + b*x^3)*(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c
), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x
^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/
c), -((b*x^3)/a)]))) - (7*a*c*(27*b^2*c^2 - 88*a*b*c*d + 55*a^2*d
^2)*x^3*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])/(
```

```
(a + b*x^3)*(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((
b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c
), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c),
-((b*x^3)/a)])))))/(110*b^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.06, size = 1101, normalized size = 16.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(d*x^3+c)^(3/2)/(b*x^3+a),x)
```

```
[Out] 1/b*(2/11*x^4*d*(d*x^3+c)^(1/2)+28/55*c*x*(d*x^3+c)^(1/2)-18/55*I
*c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(
-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-
a/b*(2/5/b*d*x*(d*x^3+c)^(1/2)-2/3*I*(-d*(a*d-2*b*c)/b^2-2/5/b*d*
c)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c
*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3
*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/_alpha^2/(a*d
-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)
+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))
/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2
*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alph
a^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)
^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*
(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^
(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx^3 + c)^{\frac{3}{2}} x^3}{bx^3 + a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(d*x**3+c)**(3/2)/(b*x**3+a),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}} x^3}{bx^3 + a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a),x, algorithm="giac")

[Out] integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a), x)
```

3.374 $\int \frac{x(c+dx^3)^{3/2}}{a+bx^3} \, dx$

Optimal. Leaf size=65

$$\frac{cx^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};1,-\frac{3}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (c*x^2*Sqrt[c + d*x^3]*AppellF1[2/3, 1, -3/2, 5/3, -((b*x^3)/a),
-((d*x^3)/c)])/(2*a*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.140085, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{cx^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};1,-\frac{3}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (c*x^2*Sqrt[c + d*x^3]*AppellF1[2/3, 1, -3/2, 5/3, -((b*x^3)/a),
-((d*x^3)/c)])/(2*a*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 20.3618, size = 53, normalized size = 0.82

$$\frac{cx^2\sqrt{c+dx^3}\operatorname{appellf}_1\left(\frac{2}{3},-\frac{3}{2},1,\frac{5}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] c*x**2*sqrt(c + d*x**3)*appellf1(2/3, -3/2, 1, 5/3, -d*x**3/c, -b
*x**3/a)/(2*a*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.698085, size = 437, normalized size = 6.72

$$\frac{x^2\left(\frac{25ac^2(4ad-7bc)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{2d\left(15x^3(a+bx^3)(c+dx^3)\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\right.\right.\right.}{3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\right.\right.}\right.}{35b(a+bx^3)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(x*(c + d*x^3)^(3/2))/(a + b*x^3),x]
```

```
[Out] (x^2*((25*a*c^2*(-7*b*c + 4*a*d)*AppellF1[2/3, 1/2, 1, 5/3, -((d*
x^3)/c), -((b*x^3)/a)])/(-10*a*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*
x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[5/3, 1/2, 2, 8/3,
-((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 3/2, 1, 8/3, -((d
*x^3)/c), -((b*x^3)/a)])) + (2*d*(-8*a*c*(10*a*c + 20*b*c*x^3 + 3
*a*d*x^3 + 10*b*d*x^6)*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -
((b*x^3)/a)] + 15*x^3*(a + b*x^3)*(c + d*x^3)*(2*b*c*AppellF1[8/3
```

```
, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8/3, 3
/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)])))/(-16*a*c*AppellF1[5/3
, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF
1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8
/3, 3/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)]))))/(35*b*(a + b*x^
3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.05, size = 930, normalized size = 14.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(3/2)/(b*x^3+a),x)
```

```
[Out] 2/7/b*d*x^2*(d*x^3+c)^(1/2)-2/3*I*(-d*(a*d-2*b*c)/b^2-4/7/b*d*c)*
3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^
2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1
/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)))+1/3*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c
^2)/_alpha/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}} x}{bx^3 + a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\left(c+dx^3\right)^{\frac{3}{2}}}{a+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] Integral(x*(c + d*x**3)**(3/2)/(a + b*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x}{bx^3+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a), x)
```

3.375 $\int \frac{\left(c+dx^3\right)^{3/2}}{a+bx^3}\,dx$

Optimal. Leaf size=60

$$\frac{cx\sqrt{c+dx^3}F_1\left(\frac{1}{3};1,-\frac{3}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (c*x*Sqrt[c + d*x^3]*AppellF1[1/3, 1, -3/2, 4/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(a*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.0884935, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{cx\sqrt{c+dx^3}F_1\left(\frac{1}{3};1,-\frac{3}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(a + b*x^3),x]
```

```
[Out] (c*x*Sqrt[c + d*x^3]*AppellF1[1/3, 1, -3/2, 4/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(a*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 21.7426, size = 49, normalized size = 0.82

$$\frac{cx\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{1}{3},-\frac{3}{2},1,\frac{4}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] c*x*sqrt(c + d*x**3)*appellf1(1/3, -3/2, 1, 4/3, -d*x**3/c, -b*x*
*3/a)/(a*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.704917, size = 434, normalized size = 7.23

$$\frac{x\left(\frac{16ac^2(2ad-5bc)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{d\left(12x^3\left(a+bx^3\right)\left(c+dx^3\right)\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right.\right.\right.}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\right.\right.}\right.}{10b\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(a + b*x^3),x]
```

```
[Out] (x*((16*a*c^2*(-5*b*c + 2*a*d)*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^
3)/c), -((b*x^3)/a)])/(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3
)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((
d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^
3)/c), -((b*x^3)/a)])) + (d*(-7*a*c*(8*a*c + 16*b*c*x^3 + 3*a*d*x
^3 + 8*b*d*x^6)*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3
)/a)] + 12*x^3*(a + b*x^3)*(c + d*x^3)*(2*b*c*AppellF1[7/3, 1/2,
```

```
2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1,
10/3, -((d*x^3)/c), -((b*x^3)/a)])))/(-14*a*c*AppellF1[4/3, 1/2,
1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3,
1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2
, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)]))))/(10*b*(a + b*x^3)*Sqrt
[c + d*x^3])
```

Maple [C] time = 0.007, size = 776, normalized size = 12.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/(b*x^3+a),x)
```

```
[Out] 2/5/b*d*x*(d*x^3+c)^(1/2)-2/3*I*(-d*(a*d-2*b*c)/b^2-2/5/b*d*c)*3^
(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)
^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/b^
2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/_alpha^2/(a*d-b*c)
*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*
(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/
d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2
)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d
^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3
))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*
_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)
+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx^3+c)^{\frac{3}{2}}}{bx^3+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/(b*x^3 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(c + dx^{3}\right)^{\frac{3}{2}}}{a + bx^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/(b*x**3+a),x)
```

```
[Out] Integral((c + d*x**3)**(3/2)/(a + b*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^{3} + c\right)^{\frac{3}{2}}}{bx^{3} + a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/(b*x^3 + a), x)
```

3.376 $\int \frac{(c+dx^3)^{3/2}}{x^2(a+bx^3)}\,dx$

Optimal. Leaf size=63

$$-\frac{c\sqrt{c+dx^3}\,F_1\left(-\frac{1}{3};1,-\frac{3}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ax\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -((c*Sqrt[c + d*x^3]*AppellF1[-1/3, 1, -3/2, 2/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a*x*Sqrt[1 + (d*x^3)/c]))
```

Rubi [A] time = 0.189284, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{c\sqrt{c+dx^3}\,F_1\left(-\frac{1}{3};1,-\frac{3}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ax\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^2*(a + b*x^3)),x]
```

```
[Out] -((c*Sqrt[c + d*x^3]*AppellF1[-1/3, 1, -3/2, 2/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a*x*Sqrt[1 + (d*x^3)/c]))
```

Rubi in Sympy [A] time = 25.8749, size = 53, normalized size = 0.84

$$-\frac{c\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{1}{3},-\frac{3}{2},1,\frac{2}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{ax\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**2/(b*x**3+a),x)
```

```
[Out] -c*sqrt(c + d*x**3)*appellf1(-1/3, -3/2, 1, 2/3, -d*x**3/c, -b*x*
*3/a)/(a*x*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.639435, size = 450, normalized size = 7.14

$$\frac{c\left(\frac{16a\left(2a\left(5c^2+5cdx^3-d^2x^6\right)+bcx^3\left(10c+9dx^3\right)\right)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-30x^3\left(a+bx^3\right)\left(c+dx^3\right)\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{b}{}\right.\right.}{a\left(3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-16acF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}}{10x\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^2*(a + b*x^3)),x]
```

```
[Out] (c*((25*c*(2*b*c - 5*a*d)*x^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3
)/c), -((b*x^3)/a)])/(-10*a*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3
)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[5/3, 1/2, 2, 8/3, -((
d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^
3)/c), -((b*x^3)/a)])) + (16*a*(b*c*x^3*(10*c + 9*d*x^3) + 2*a*(5
*c^2 + 5*c*d*x^3 - d^2*x^6))*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)
/c), -((b*x^3)/a)] - 30*x^3*(a + b*x^3)*(c + d*x^3)*(2*b*c*Appell
```

```
F1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[
8/3, 3/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)]))/(a*(-16*a*c*Appe
llF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c
*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Ap
pellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)])))))/(10*x*
(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.014, size = 1404, normalized size = 22.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^2/(b*x^3+a),x)
```

```
[Out] 1/a*(-c*(d*x^3+c)^(1/2)/x+2/7*d*x^2*(d*x^3+c)^(1/2)-9/7*I*c*3^(1/
2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3
))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*
(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Ell
ipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2))))-b/a*(2/7/b*d*x^2*(d*x^3+c)^(1/2)-2/3*I*(-d*(a*d-2*b*c)/b^
2-4/7/b*d*c)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*(
(x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/
d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*
a*b*c*d-b^2*c^2)/_alpha/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/
d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2
)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1
/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*
d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*
d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)
^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_
Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{(bx^3 + a)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^2),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(c + dx^3\right)^{\frac{3}{2}}}{x^2\left(a + bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x**2/(b*x**3+a),x)
```

```
[Out] Integral((c + d*x**3)**(3/2)/(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{(bx^3 + a)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^2),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^2), x)
```

3.377 $\int \frac{(c+dx^3)^{3/2}}{x^3(a+bx^3)}\,dx$

Optimal. Leaf size=65

$$-\frac{c\sqrt{c+dx^3}F_1\left(-\frac{2}{3};1,-\frac{3}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ax^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -(c*Sqrt[c + d*x^3]*AppellF1[-2/3, 1, -3/2, 1/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(2*a*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.185661, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{c\sqrt{c+dx^3}F_1\left(-\frac{2}{3};1,-\frac{3}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ax^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^3*(a + b*x^3)),x]
```

```
[Out] -(c*Sqrt[c + d*x^3]*AppellF1[-2/3, 1, -3/2, 1/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(2*a*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 25.2273, size = 56, normalized size = 0.86

$$-\frac{c\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{2}{3},-\frac{3}{2},1,\frac{1}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2ax^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**3/(b*x**3+a),x)
```

```
[Out] -c*sqrt(c + d*x**3)*appellf1(-2/3, -3/2, 1, 1/3, -d*x**3/c, -b*x*
*3/a)/(2*a*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.646839, size = 449, normalized size = 6.91

$$\frac{c\left(\frac{7a\left(a\left(8c^2+8cdx^3-4d^2x^6\right)+bcx^3\left(8c+9dx^3\right)\right)F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-12x^3\left(a+bx^3\right)\left(c+dx^3\right)\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right.\right.}{a\left(3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}\right.}{8x^2\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^3*(a + b*x^3)),x]
```

```
[Out] (c*((16*c*(4*b*c - 7*a*d)*x^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3
)/c), -((b*x^3)/a)])/(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)
/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d
*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3
)/c), -((b*x^3)/a)])) + (7*a*(b*c*x^3*(8*c + 9*d*x^3) + a*(8*c^2
+ 8*c*d*x^3 - 4*d^2*x^6))*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c)
, -((b*x^3)/a)] - 12*x^3*(a + b*x^3)*(c + d*x^3)*(2*b*c*AppellF1[
```

```
7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3
, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)]))/(a*(-14*a*c*AppellF
1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*Ap
pellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Appel
lF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)])))))/(8*x^2*(a
 + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.032, size = 1096, normalized size = 16.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^3/(b*x^3+a),x)
```

```
[Out] 1/a*(-1/2*c*(d*x^3+c)^(1/2)/x^2+2/5*d*x*(d*x^3+c)^(1/2)-9/10*I*c*
3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)
^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-b/a*(2/
5/b*d*x*(d*x^3+c)^(1/2)-2/3*I*(-d*(a*d-2*b*c)/b^2-2/5/b*d*c)*3^(1
/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(
1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/
2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/b^2/
d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/_alpha^2/(a*d-b*c)*(
-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-
c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*
(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/
(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2
-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))
*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_a
lpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I
*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{(bx^3 + a)x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^3),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^3), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^3),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x**3/(b*x**3+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{(bx^3 + a)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^3),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)*x^3), x)
```

3.378 $\int \frac{x^8}{(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=104

$$-\frac{2a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}\sqrt{bc-ad}}-\frac{2\sqrt{c+dx^3}(ad+bc)}{3b^2d^2}+\frac{2\left(c+dx^3\right)^{3/2}}{9bd^2}$$

```
[Out] (-2*(b*c + a*d)*Sqrt[c + d*x^3])/(3*b^2*d^2) + (2*(c + d*x^3)^(3/
2))/(9*b*d^2) - (2*a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c
 - a*d]])/(3*b^(5/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.298242, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{2a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}\sqrt{bc-ad}}-\frac{2\sqrt{c+dx^3}(ad+bc)}{3b^2d^2}+\frac{2\left(c+dx^3\right)^{3/2}}{9bd^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*(b*c + a*d)*Sqrt[c + d*x^3])/(3*b^2*d^2) + (2*(c + d*x^3)^(3/
2))/(9*b*d^2) - (2*a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c
 - a*d]])/(3*b^(5/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 30.7678, size = 94, normalized size = 0.9

$$\frac{2a^2\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{5}{2}}\sqrt{ad-bc}}+\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9bd^2}-\frac{2\sqrt{c+dx^3}\,(ad+bc)}{3b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] 2*a**2*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(5/2)
*sqrt(a*d - b*c)) + 2*(c + d*x**3)**(3/2)/(9*b*d**2) - 2*sqrt(c +
 d*x**3)*(a*d + b*c)/(3*b**2*d**2)
```

Mathematica [A] time = 0.226284, size = 91, normalized size = 0.88

$$\frac{2\sqrt{c+dx^3}\left(-3ad-2bc+bdx^3\right)}{9b^2d^2}-\frac{2a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*Sqrt[c + d*x^3]*(-2*b*c - 3*a*d + b*d*x^3))/(9*b^2*d^2) - (2*a
^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(5/2)
*Sqrt[b*c - a*d])
```

Maple [C] time = 0.049, size = 488, normalized size = 4.7

$$\frac{1}{b^2}\left(b\left(\frac{2x^3}{9d}\sqrt{dx^3+c}-\frac{4c}{9d^2}\sqrt{dx^3+c}\right)-\frac{2a}{3d}\sqrt{dx^3+c}\right)$$
$$-\frac{\frac{i}{3}a^2\sqrt{2}}{b^2d^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}\frac{1}{ad-bc}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/b^2*(b*(2/9/d*x^3*(d*x^3+c)^(1/2)-4/9*c*(d*x^3+c)^(1/2)/d^2)-2/
3*a/d*(d*x^3+c)^(1/2))-1/3*I*a^2/b^2/d^2*2^(1/2)*sum(1/(a*d-b*c)*
(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(
-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d
*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^
2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3)
)*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_
alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+
I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231595, size = 1, normalized size = 0.01

$$\left[\frac{3a^2d^2\log\left(\frac{(bdx^3+2bc-ad)\sqrt{b^2c-abd}-2\sqrt{dx^3+c}(b^2c-abd)}{bx^3+a}\right)+2\left(bdx^3-2bc-3ad\right)\sqrt{dx^3+c}\sqrt{b^2c-abd}}{9\sqrt{b^2c-abd}b^2d^2},\right.$$
$$\left.-\frac{2\left(3a^2d^2\arctan\left(-\frac{bc-ad}{\sqrt{dx^3+c}\sqrt{-b^2c+abd}}\right)-\left(bdx^3-2bc-3ad\right)\sqrt{dx^3+c}\sqrt{-b^2c+abd}\right)}{9\sqrt{-b^2c+abd}b^2d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [1/9*(3*a^2*d^2*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d)
- 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a)) + 2*(b*d*x^3 -
2*b*c - 3*a*d)*sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d))/(sqrt(b^2*c -
 a*b*d)*b^2*d^2), -2/9*(3*a^2*d^2*arctan(-(b*c - a*d)/(sqrt(d*x^3
 + c)*sqrt(-b^2*c + a*b*d))) - (b*d*x^3 - 2*b*c - 3*a*d)*sqrt(d*x
^3 + c)*sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^2*d^2)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{(a+bx^3)\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**8/((a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.215293, size = 143, normalized size = 1.38

$$\frac{2\,a^2\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\sqrt{-b^2c+abd}b^2}+\frac{2\left(\left(dx^3+c\right)^{\frac{3}{2}}b^2d^4-3\sqrt{dx^3+c}b^2cd^4-3\sqrt{dx^3+c}abd^5\right)}{9\,b^3d^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 2/3*a^2*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2
*c + a*b*d)*b^2) + 2/9*((d*x^3 + c)^(3/2)*b^2*d^4 - 3*sqrt(d*x^3
+ c)*b^2*c*d^4 - 3*sqrt(d*x^3 + c)*a*b*d^5)/(b^3*d^6)
```

3.379 $\int \frac{x^5}{(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=74

$$\frac{2a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}+\frac{2\sqrt{c+dx^3}}{3bd}$$

```
[Out] (2*Sqrt[c + d*x^3])/(3*b*d) + (2*a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^
3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.185228, antiderivative size = 74, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{2a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}+\frac{2\sqrt{c+dx^3}}{3bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(3*b*d) + (2*a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^
3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 19.3726, size = 63, normalized size = 0.85

$$-\frac{2a\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{3}{2}}\sqrt{ad-bc}}+\frac{2\sqrt{c+dx^3}}{3bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] -2*a*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(3/2)*s
qrt(a*d - b*c)) + 2*sqrt(c + d*x**3)/(3*b*d)
```

Mathematica [A] time = 0.0837437, size = 74, normalized size = 1.

$$\frac{2a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}+\frac{2\sqrt{c+dx^3}}{3bd}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(3*b*d) + (2*a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^
3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Maple [C] time = 0.013, size = 448, normalized size = 6.1

$$\frac{2}{3\,bd}\sqrt{dx^3+c} + \frac{\frac{i}{3}a\sqrt{2}}{bd^2}\sum_{\_alpha=RootOf\left(b\_Z^3+a\right)} \frac{1}{ad-bc}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^5/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] 2/3*(d*x^3+c)^(1/2)/b/d+1/3*I*a/b/d^2*2^(1/2)*sum(1/(a*d-b*c)*(-c
*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)
^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*
d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I
*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*E
llipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alp
ha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3
^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^5/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.223631, size = 1, normalized size = 0.01

$$\left[\frac{ad\log\left(\frac{(bdx^3+2\,bc-ad)\sqrt{b^2c-abd}+2\sqrt{dx^3+c}(b^2c-abd)}{bx^3+a}\right)+2\sqrt{dx^3+c}\sqrt{b^2c-abd}}{3\sqrt{b^2c-abd}bd}, \frac{2\left(ad\arctan\left(-\frac{bc-ad}{\sqrt{dx^3+c}\sqrt{-b^2c+abd}}\right)+\sqrt{dx^3+c}\right.}{3\sqrt{-b^2c+abd}bd}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^5/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [1/3*(a*d*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) + 2*sq
rt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a)) + 2*sqrt(d*x^3 + c)*s
qrt(b^2*c - a*b*d))/(sqrt(b^2*c - a*b*d)*b*d), 2/3*(a*d*arctan(-(
b*c - a*d)/(sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d))) + sqrt(d*x^3 +
 c)*sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{(a+bx^3)\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**5/((a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.218461, size = 86, normalized size = 1.16

$$-\frac{2\left(\frac{ad\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}b}-\frac{\sqrt{dx^3+c}}{b}\right)}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] -2/3*(a*d*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*b) - sqrt(d*x^3 + c)/b)/d
```

3.380 $\int \frac{x^2}{(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=51

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}\sqrt{bc-ad}}$$

```
[Out] (-2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b
]*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.133045, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b
]*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 15.1725, size = 44, normalized size = 0.86

$$\frac{2\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3\sqrt{b}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] 2*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*sqrt(b)*sqrt(
a*d - b*c))
```

Mathematica [A] time = 0.0370188, size = 51, normalized size = 1.

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b
]*Sqrt[b*c - a*d])
```

Maple [C] time = 0.009, size = 426, normalized size = 8.4

$$\frac{-\frac{i}{3}\sqrt{2}}{d^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}\frac{1}{ad-bc}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/3*I/d^2*2^(1/2)*sum(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1
/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^
2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c
*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(
1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c
*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)
*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2
)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(
_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.224262, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(\frac{(bdx^3+2\,bc-ad)\,\sqrt{b^2c-abd}-2\,\sqrt{dx^3+c}\,(b^2c-abd)}{bx^3+a}\right)}{3\,\sqrt{b^2c-abd}},\,-\frac{2\,\arctan\left(-\frac{bc-ad}{\sqrt{dx^3+c}\,\sqrt{-b^2c+abd}}\right)}{3\,\sqrt{-b^2c+abd}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [1/3*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*
x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a))/sqrt(b^2*c - a*b*d), -2/3*
arctan(-(b*c - a*d)/(sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d)))/sqrt(
-b^2*c + a*b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+bx^3)\,\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**2/((a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.214637, size = 54, normalized size = 1.06

$$\frac{2 \arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3 \sqrt{-b^2c + abd}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 2/3*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/sqrt(-b^2*c +
a*b*d)
```

3.381 $\int \frac{1}{x(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=85

$$\frac{2\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a\sqrt{bc-ad}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a\sqrt{c}}$$

```
[Out] (-2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a*Sqrt[c]) + (2*Sqrt[b]*
ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a*Sqrt[b*c
 - a*d])
```

Rubi [A] time = 0.211521, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{2\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a\sqrt{bc-ad}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a*Sqrt[c]) + (2*Sqrt[b]*
ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a*Sqrt[b*c
 - a*d])
```

Rubi in Sympy [A] time = 22.6021, size = 75, normalized size = 0.88

$$-\frac{2\sqrt{b}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a\sqrt{ad-bc}}-\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] -2*sqrt(b)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a*sq
rt(a*d - b*c)) - 2*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a*sqrt(c))
```

Mathematica [C] time = 0.0747723, size = 162, normalized size = 1.91

$$\frac{10bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}{9\left(a+bx^3\right)\sqrt{c+dx^3}\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (10*b*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))
])/(9*(a + b*x^3)*Sqrt[c + d*x^3]*(-5*b*d*x^3*AppellF1[3/2, 1/2,
1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*d*AppellF1[5/2, 1/2, 2,
 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1, 7/2
, -(c/(d*x^3)), -(a/(b*x^3))]))
```

Maple [C] time = 0.015, size = 453, normalized size = 5.3

$$-\frac{2}{3a}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)\frac{1}{\sqrt{c}}$$
$$+\frac{\frac{i}{3}b\sqrt{2}}{ad^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}\frac{1}{ad-bc}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] -2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))/a/c^(1/2)+1/3*I*b/a/d^2*2^(
1/2)*sum(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{(bx^3+a)\sqrt{dx^3+c}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x), x)
```

Fricas [A] time = 0.247647, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{c}\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^3+2bc-ad+2\sqrt{dx^3+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^3+a}\right)+\log\left(\frac{(dx^3+2c)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)}{3a\sqrt{c}},\frac{2\sqrt{c}\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^3+c}b}\right.}{3a\sqrt{c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/3*(sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*c - a*d + 2*
sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) + l
og(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3))/(a*sqrt(c)
), 1/3*(2*sqrt(c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-
b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) + log(((d*x^3 + 2*c)*sqrt(c)
- 2*sqrt(d*x^3 + c)*c)/x^3))/(a*sqrt(c)), 1/3*(sqrt(-c)*sqrt(b/(b
*c - a*d))*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*(b*c -
a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) + 2*arctan(c/(sqrt(d*x^3 +
 c)*sqrt(-c))))/(a*sqrt(-c)), 2/3*(sqrt(-c)*sqrt(-b/(b*c - a*d))*
arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) + a
rctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/(a*sqrt(-c))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+bx^3\right)\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x*(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.216099, size = 107, normalized size = 1.26

$$-\frac{2}{3}\,d\left(\frac{b\arctan\left(\frac{\sqrt{dx^3+c}\,b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}\,ad}-\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a\sqrt{-c}\,d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x),x, algorithm="giac")
```

```
[Out] -2/3*d*(b*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*a*d) - arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a*sqrt(-c)
*d))
```

3.382 $\int \frac{1}{x^4(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=117

$$-\frac{2b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2\sqrt{bc-ad}}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{3/2}}-\frac{\sqrt{c+dx^3}}{3acx^3}$$

```
[Out] -Sqrt[c + d*x^3]/(3*a*c*x^3) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d*
x^3]/Sqrt[c]])/(3*a^2*c^(3/2)) - (2*b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt
[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.361898, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$-\frac{2b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2\sqrt{bc-ad}}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{3/2}}-\frac{\sqrt{c+dx^3}}{3acx^3}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^4*(a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -Sqrt[c + d*x^3]/(3*a*c*x^3) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d*
x^3]/Sqrt[c]])/(3*a^2*c^(3/2)) - (2*b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt
[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 44.4273, size = 104, normalized size = 0.89

$$-\frac{\sqrt{c+dx^3}}{3acx^3}+\frac{2b^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^2\sqrt{ad-bc}}+\frac{2\left(\frac{ad}{2}+bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**4/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)/(3*a*c*x**3) + 2*b**(3/2)*atan(sqrt(b)*sqrt(c +
 d*x**3)/sqrt(a*d - b*c))/(3*a**2*sqrt(a*d - b*c)) + 2*(a*d/2 + b
*c)*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a**2*c**(3/2))
```

Mathematica [C] time = 0.584755, size = 409, normalized size = 3.5

$$\frac{\frac{6bdx^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{5bdx^3\left(3ac+2adx^3+bcx^3+3bdx^6\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)-}{ac\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2\right.}}{9x^3\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/(x^4*(a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] ((6*b*d*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)])/(
-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)] + x^3*(
2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Ap
pellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)])) + (5*b*d*x^3*(
3*a*c + b*c*x^3 + 2*a*d*x^3 + 3*b*d*x^6)*AppellF1[3/2, 1/2, 1, 5/
2, -(c/(d*x^3)), -(a/(b*x^3))] - 3*(a + b*x^3)*(c + d*x^3)*(2*a*d
```

```
*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*App
ellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(a*c*(-5*b*
d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*
a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*
AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))])))/(9*x^3*
(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.014, size = 498, normalized size = 4.3

$$\frac{1}{a}\left(-\frac{1}{3\,cx^{3}}\sqrt{dx^{3}+c}+\frac{d}{3}Artanh\left(1\sqrt{dx^{3}+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{3}{2}}\right)$$
$$-\frac{\frac{i}{3}b^{2}\sqrt{2}}{a^{2}d^{2}}\sum_{\_alpha=RootOf\left(b\_Z^{3}+a\right)}\frac{1}{ad-bc}\sqrt[3]{-cd^{2}}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^{2}}+\sqrt[3]{-cd^{2}}\right)\right)\frac{1}{\sqrt[3]{-cd^{2}}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^{2}}\right)\left(-3\sqrt[3]{-cd^{2}}\right.}$$
$$+\frac{2\,b}{3\,a^{2}}Artanh\left(1\sqrt{dx^{3}+c}\frac{1}{\sqrt{c}}\right)\frac{1}{\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/a*(-1/3*(d*x^3+c)^(1/2)/c/x^3+1/3*d*arctanh((d*x^3+c)^(1/2)/c^(
1/2))/c^(3/2))-1/3*I/a^2*b^2/d^2*2^(1/2)*sum(1/(a*d-b*c)*(-c*d^2)
^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^
(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1
/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+
c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1
/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipt
icPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*
(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2
)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)),_alpha=RootOf(_Z^3*b+a))+2/3*b/a^2*arctanh((d*x^3+c)^(1/2
)/c^(1/2))/c^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^{3}+a)\sqrt{dx^{3}+c}x^{4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^4), x)
```

Fricas [A] time = 0.256909, size = 1, normalized size = 0.01

$$\left[\frac{2\,bc^{\frac{3}{2}}x^3\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^3+2\,bc-ad-2\,\sqrt{dx^3+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^3+a}\right)+(2\,bc+ad)x^3\log\left(\frac{(dx^3+2\,c)\sqrt{c}+2\,\sqrt{dx^3+c}c}{x^3}\right)-2\,\sqrt{dx^3+c}a\sqrt{c}}{6\,a^2c^{\frac{3}{2}}x^3},\right.$$

$$-\frac{4\,bc^{\frac{3}{2}}x^3\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^3+c}b}\right)-(2\,bc+ad)x^3\log\left(\frac{(dx^3+2\,c)\sqrt{c}+2\,\sqrt{dx^3+c}c}{x^3}\right)+2\,\sqrt{dx^3+c}a\sqrt{c}}{6\,a^2c^{\frac{3}{2}}x^3},\ \frac{b\sqrt{-c}cx^3\sqrt{\frac{b}{bc-\cdots}}\cdots}{\cdots}$$

$$\left.-\frac{2\,b\sqrt{-c}cx^3\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^3+c}b}\right)+(2\,bc+ad)x^3\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+\sqrt{dx^3+c}a\sqrt{-c}}{3\,a^2\sqrt{-c}cx^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/6*(2*b*c^(3/2)*x^3*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*c -
a*d - 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 +
 a)) + (2*b*c + a*d)*x^3*log(((d*x^3 + 2*c)*sqrt(c) + 2*sqrt(d*x^
3 + c)*c)/x^3) - 2*sqrt(d*x^3 + c)*a*sqrt(c))/(a^2*c^(3/2)*x^3),
-1/6*(4*b*c^(3/2)*x^3*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sq
rt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) - (2*b*c + a*d)*x^3*log((
(d*x^3 + 2*c)*sqrt(c) + 2*sqrt(d*x^3 + c)*c)/x^3) + 2*sqrt(d*x^3
+ c)*a*sqrt(c))/(a^2*c^(3/2)*x^3), 1/3*(b*sqrt(-c)*c*x^3*sqrt(b/(
b*c - a*d))*log((b*d*x^3 + 2*b*c - a*d - 2*sqrt(d*x^3 + c)*(b*c -
 a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) - (2*b*c + a*d)*x^3*arcta
n(c/(sqrt(d*x^3 + c)*sqrt(-c))) - sqrt(d*x^3 + c)*a*sqrt(-c))/(a^
2*sqrt(-c)*c*x^3), -1/3*(2*b*sqrt(-c)*c*x^3*sqrt(-b/(b*c - a*d))*
arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) + (
2*b*c + a*d)*x^3*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))) + sqrt(d*x^
3 + c)*a*sqrt(-c))/(a^2*sqrt(-c)*c*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^4\,(a+bx^3)\,\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**4*(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.218076, size = 159, normalized size = 1.36

$$\frac{1}{3}\,d^2\left(\frac{2\,b^2\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}a^2d^2}-\frac{(2\,bc+ad)\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}cd^2}-\frac{\sqrt{dx^3+c}}{acd^2x^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*d^2*(2*b^2*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sq
rt(-b^2*c + a*b*d)*a^2*d^2) - (2*b*c + a*d)*arctan(sqrt(d*x^3 + c
)/sqrt(-c))/(a^2*sqrt(-c)*c*d^2) - sqrt(d*x^3 + c)/(a*c*d^2*x^3))
```

3.383 $\int \frac{x^3}{(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=64

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 1/2, 7/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(4*a*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.195315, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 1/2, 7/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(4*a*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 28.9006, size = 51, normalized size = 0.8

$$\frac{x^4\sqrt{c+dx^3}\operatorname{appellf}_1\left(\frac{4}{3},\frac{1}{2},1,\frac{7}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{4ac\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 1/2, 1, 7/3, -d*x**3/c, -b*x*
*3/a)/(4*a*c*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.087596, size = 165, normalized size = 2.58

$$-\frac{7acx^4F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2\left(a+bx^3\right)\sqrt{c+dx^3}\left(3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{b}{}\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-7*a*c*x^4*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)
])/(2*(a + b*x^3)*Sqrt[c + d*x^3]*(-14*a*c*AppellF1[4/3, 1/2, 1,
7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2
, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1
, 10/3, -((d*x^3)/c), -((b*x^3)/a)])))
```

Maple [C] time = 0.046, size = 719, normalized size = 11.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] -2/3*I/b*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
))+1/3*I*a/b/d^2*2^(1/2)*sum(1/_alpha^2/(a*d-b*c)*(-c*d^2)^(1/3)*
(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c
*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I
*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c
*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2
)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c
*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2
)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3
*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/
3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))
,_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3+a)\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(a+bx^3)\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**3/((a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3 + a)\sqrt{dx^3 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^3/((b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

3.384 $\int \frac{x}{(a+bx^3)\sqrt{c+dx^3}} dx$

Optimal. Leaf size=64

$$\frac{x^2\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};1,\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a\sqrt{c+dx^3}}$$

```
[Out] (x^2*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 1, 1/2, 5/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(2*a*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.146185, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{x^2\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};1,\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^2*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 1, 1/2, 5/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(2*a*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 20.8848, size = 51, normalized size = 0.8

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2ac\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, 1/2, 1, 5/3, -d*x**3/c, -b*x*
*3/a)/(2*a*c*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.0846115, size = 163, normalized size = 2.55

$$-\frac{5acx^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\sqrt{c+dx^3}\left(3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-5*a*c*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)
])/((a + b*x^3)*Sqrt[c + d*x^3]*(-10*a*c*AppellF1[2/3, 1/2, 1, 5/
3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[5/3, 1/2,
2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 3/2, 1, 8
/3, -((d*x^3)/c), -((b*x^3)/a)])))
```

Maple [C] time = 0.041, size = 429, normalized size = 6.7

$$\frac{-\frac{i}{3}\sqrt{2}}{d^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}\frac{1}{\_alpha\,(ad-bc)}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/3*I/d^2*2^(1/2)*sum(1/_alpha/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d
*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)
*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c
*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2
/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*
3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*
(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=
RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{(bx^3+a)\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{(a+bx^3)\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x/((a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^3 + a)\sqrt{dx^3 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x/((b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

3.385 $\int \frac{1}{(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=59

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 1/2, 4/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.0886491, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 1/2, 4/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 21.3533, size = 48, normalized size = 0.81

$$\frac{x\sqrt{c+dx^3}\,\operatorname{appellf_1}\left(\frac{1}{3},\frac{1}{2},1,\frac{4}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{ac\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 1/2, 1, 4/3, -d*x**3/c, -b*x**3/
a)/(a*c*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.0794166, size = 161, normalized size = 2.73

$$-\frac{8acxF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\sqrt{c+dx^3}\left(3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] (-8*a*c*x*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])
/((a + b*x^3)*Sqrt[c + d*x^3]*(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3,
-((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2,
7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3,
 -((d*x^3)/c), -((b*x^3)/a)])))
```

Maple [C] time = 0.007, size = 429, normalized size = 7.3

$$\frac{-\frac{i}{3}\sqrt{2}}{d^2} \sum_{\_alpha=RootOf(b\_Z^3+a)} \frac{1}{\_alpha^2(ad-bc)} \sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/3*I/d^2*2^(1/2)*sum(1/_alpha^2/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I
*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^
(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/
2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^
(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(
-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^
(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3
)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alph
a*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alph
a=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(a+bx^3)\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/((a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)\sqrt{dx^3 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

3.386 $\int \frac{1}{x^2(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=62

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};1,\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ax\sqrt{c+dx^3}}$$

```
[Out] -((Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 1, 1/2, 2/3, -((b*x^3)/a),
-((d*x^3)/c)])/(a*x*Sqrt[c + d*x^3]))
```

Rubi [A] time = 0.193735, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};1,\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ax\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -((Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 1, 1/2, 2/3, -((b*x^3)/a),
-((d*x^3)/c)])/(a*x*Sqrt[c + d*x^3]))
```

Rubi in Sympy [A] time = 25.9642, size = 51, normalized size = 0.82

$$-\frac{\sqrt{c+dx^3}\operatorname{appellf_1}\left(-\frac{1}{3},\frac{1}{2},1,\frac{2}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{acx\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, 1/2, 1, 2/3, -d*x**3/c, -b*x**3/
a)/(a*c*x*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.587509, size = 345, normalized size = 5.56

$$\frac{\frac{25x^3(2bc-ad)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}-\frac{16bdx^6 \cdots}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+\cdots\right.\right.}}{10x\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] ((-10*(c + d*x^3))/(a*c) + (25*(2*b*c - a*d)*x^3*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)])/((a + b*x^3)*(-10*a*c*App
ellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*
c*AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Ap
pellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)]))) - (16*b*d
*x^6*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])/((a
+ b*x^3)*(-16*a*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x
^3)/a)] + 3*x^3*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c),
-((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -((
```

```
b*x^3)/a)])))))/(10*x*Sqrt[c + d*x^3])
```

Maple [C] time = 0.014, size = 890, normalized size = 14.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/a*(-(d*x^3+c)^(1/2)/c/x-1/3*I/c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/3*I*b/a/d^2*2^(1
/2)*sum(1/_alpha/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)\sqrt{dx^3 + c}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 (a + bx^3) \sqrt{c + dx^3}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**2*(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)\sqrt{dx^3 + c}x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^2), x)
```

3.387 $\int \frac{1}{x^3(a+bx^3)\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ax^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 1/2, 1/3, -((b*x^3)/a), -
((d*x^3)/c)])/(2*a*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.187475, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ax^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 1/2, 1/3, -((b*x^3)/a), -
((d*x^3)/c)])/(2*a*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.9254, size = 54, normalized size = 0.84

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf_1}\left(-\frac{2}{3},\frac{1}{2},1,\frac{1}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2acx^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 1/2, 1, 1/3, -d*x**3/c, -b*x**3/
a)/(2*a*c*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.527269, size = 344, normalized size = 5.38

$$\frac{\frac{16x^3(ad+4bc)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{7bdx^6F_1\cdots}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+a\cdots\right.\right.}}{8x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(a + b*x^3)*Sqrt[c + d*x^3]),x]
```

```
[Out] ((-4*(c + d*x^3))/(a*c) + (16*(4*b*c + a*d)*x^3*AppellF1[1/3, 1/2
, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])/((a + b*x^3)*(-8*a*c*Appel
lF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*
AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Appe
llF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)]))) + (7*b*d*x^
6*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])/((a + b
*x^3)*(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)
/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((
b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x
```

```
^3)/a)]))))/(8*x^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.013, size = 738, normalized size = 11.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a)/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/a*(-1/2/c/x^2*(d*x^3+c)^(1/2)+1/6*I/c*3^(1/2)*(-c*d^2)^(1/3)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I*b/a/d^2*2^(1/2)*sum(1/_alp
ha^2/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^
2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1
/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*
d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d
-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)
^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-
b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)\sqrt{dx^3+c}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^3), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^3),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\left(a+bx^3\right)\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**3+a)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**3*(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)\sqrt{dx^3 + c}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)*sqrt(d*x^3 + c)*x^3), x)
```

3.388 $\int \frac{x^8}{(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=107

$$-\frac{2a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}(bc-ad)^{3/2}}+\frac{2c^2}{3d^2\sqrt{c+dx^3}(bc-ad)}+\frac{2\sqrt{c+dx^3}}{3bd^2}$$

```
[Out] (2*c^2)/(3*d^2*(b*c - a*d)*Sqrt[c + d*x^3]) + (2*Sqrt[c + d*x^3])
/(3*b*d^2) - (2*a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c -
a*d]])/(3*b^(3/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.346043, antiderivative size = 107, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{2a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}(bc-ad)^{3/2}}+\frac{2c^2}{3d^2\sqrt{c+dx^3}(bc-ad)}+\frac{2\sqrt{c+dx^3}}{3bd^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*c^2)/(3*d^2*(b*c - a*d)*Sqrt[c + d*x^3]) + (2*Sqrt[c + d*x^3])
/(3*b*d^2) - (2*a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c -
a*d]])/(3*b^(3/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 50.2725, size = 138, normalized size = 1.29

$$\frac{2a^2\sqrt{c+dx^3}}{3b\,(ad-bc)^2}-\frac{2a^2\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{3}{2}}\,(ad-bc)^{\frac{3}{2}}}-\frac{2c^2}{3d^2\sqrt{c+dx^3}\,(ad-bc)}-\frac{2c\sqrt{c+dx^3}\,(2ad-bc)}{3d^2\,(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] 2*a**2*sqrt(c + d*x**3)/(3*b*(a*d - b*c)**2) - 2*a**2*atan(sqrt(b
)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(3/2)*(a*d - b*c)**(3/2
)) - 2*c**2/(3*d**2*sqrt(c + d*x**3)*(a*d - b*c)) - 2*c*sqrt(c +
d*x**3)*(2*a*d - b*c)/(3*d**2*(a*d - b*c)**2)
```

Mathematica [A] time = 0.492404, size = 99, normalized size = 0.93

$$\frac{1}{3}\left(\frac{2\left(\frac{c^2}{bc-ad}+\frac{c+dx^3}{b}\right)}{d^2\sqrt{c+dx^3}}-\frac{2a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{b^{3/2}(bc-ad)^{3/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((2*(c^2/(b*c - a*d) + (c + d*x^3)/b))/(d^2*Sqrt[c + d*x^3]) - (2
*a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(b^(3/2)
*(b*c - a*d)^(3/2)))/3
```

Maple [C] time = 0.055, size = 527, normalized size = 4.9

$$\frac{1}{b^2}\left(b\left(\frac{2c}{3d^2}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}+\frac{2}{3d^2}\sqrt{dx^3+c}\right)+\frac{2a}{3d}\frac{1}{\sqrt{dx^3+c}}\right)$$
$$+\frac{a^2}{b^2}\left(-\frac{2}{3ad-3bc}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}-\frac{\frac{i}{3}b\sqrt{2}}{d^2}\sum_{\_alpha=RootOf(b\_Z^3+a)}\frac{1}{(-ad+bc)(ad-bc)}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-c\right.\right.}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/b^2*(b*(2/3/d^2*c/((x^3+c/d)*d)^(1/2)+2/3*(d*x^3+c)^(1/2)/d^2)+
2/3*a/d/(d*x^3+c)^(1/2))+a^2/b^2*(-2/3/(a*d-b*c)/((x^3+c/d)*d)^(1
/2)-1/3*I/d^2*b*2^(1/2)*sum(1/(-a*d+b*c)/(a*d-b*c)*(-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229162, size = 1, normalized size = 0.01

$$\left[-\frac{\sqrt{dx^3+c}a^2d^2\log\left(\frac{(bdx^3+2bc-ad)\sqrt{b^2c-abd}+2\sqrt{dx^3+c}(b^2c-abd)}{bx^3+a}\right)-2\left(\left(bcd-ad^2\right)x^3+2bc^2-acd\right)\sqrt{b^2c-abd}}{3(b^2cd^2-abd^3)\sqrt{dx^3+c}\sqrt{b^2c-abd}},\right.$$
$$\left.-\frac{2\left(\sqrt{dx^3+c}a^2d^2\arctan\left(-\frac{bc-ad}{\sqrt{dx^3+c}\sqrt{-b^2c+abd}}\right)-\left(\left(bcd-ad^2\right)x^3+2bc^2-acd\right)\sqrt{-b^2c+abd}\right)}{3(b^2cd^2-abd^3)\sqrt{dx^3+c}\sqrt{-b^2c+abd}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] [-1/3*(sqrt(d*x^3 + c)*a^2*d^2*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(
b^2*c - a*b*d) + 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a))
- 2*((b*c*d - a*d^2)*x^3 + 2*b*c^2 - a*c*d)*sqrt(b^2*c - a*b*d))/
((b^2*c*d^2 - a*b*d^3)*sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d)), -2/3
```

```
*(sqrt(d*x^3 + c)*a^2*d^2*arctan(-(b*c - a*d)/(sqrt(d*x^3 + c)*sq
rt(-b^2*c + a*b*d))) - ((b*c*d - a*d^2)*x^3 + 2*b*c^2 - a*c*d)*sq
rt(-b^2*c + a*b*d))/((b^2*c*d^2 - a*b*d^3)*sqrt(d*x^3 + c)*sqrt(-
b^2*c + a*b*d))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{(a+bx^3)\,(c+dx^3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(x**8/((a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [A] time = 0.217434, size = 139, normalized size = 1.3

$$\frac{2\,a^2\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\,(b^2c-abd)\sqrt{-b^2c+abd}}+\frac{2\,c^2}{3\,(bcd^2-ad^3)\sqrt{dx^3+c}}+\frac{2\,\sqrt{dx^3+c}}{3\,bd^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] 2/3*a^2*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/((b^2*c -
a*b*d)*sqrt(-b^2*c + a*b*d)) + 2/3*c^2/((b*c*d^2 - a*d^3)*sqrt(d*
x^3 + c)) + 2/3*sqrt(d*x^3 + c)/(b*d^2)
```

3.389 $\int \frac{x^5}{(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=82

$$\frac{2a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}(bc-ad)^{3/2}}-\frac{2c}{3d\sqrt{c+dx^3}(bc-ad)}$$

```
[Out] (-2*c)/(3*d*(b*c - a*d)*Sqrt[c + d*x^3]) + (2*a*ArcTanh[(Sqrt[b]*
Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b]*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.200105, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$\frac{2a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}(bc-ad)^{3/2}}-\frac{2c}{3d\sqrt{c+dx^3}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-2*c)/(3*d*(b*c - a*d)*Sqrt[c + d*x^3]) + (2*a*ArcTanh[(Sqrt[b]*
Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b]*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 21.9324, size = 70, normalized size = 0.85

$$\frac{2a\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3\sqrt{b}\,(ad-bc)^{\frac{3}{2}}}+\frac{2c}{3d\sqrt{c+dx^3}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] 2*a*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*sqrt(b)*(a*
d - b*c)**(3/2)) + 2*c/(3*d*sqrt(c + d*x**3)*(a*d - b*c))
```

Mathematica [A] time = 0.145534, size = 80, normalized size = 0.98

$$\frac{\frac{2c}{d\sqrt{c+dx^3}}-\frac{2a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{\sqrt{b}\sqrt{bc-ad}}}{3ad-3bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((2*c)/(d*Sqrt[c + d*x^3]) - (2*a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3
])/Sqrt[b*c - a*d]])/(Sqrt[b]*Sqrt[b*c - a*d]))/(-3*b*c + 3*a*d)
```

Maple [C] time = 0.013, size = 487, normalized size = 5.9

$$-\frac{2}{3\,bd}\frac{1}{\sqrt{dx^3+c}}-\frac{a}{b}\left(-\frac{2}{3\,ad-3\,bc}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}-\frac{\frac{i}{3}b\sqrt{2}}{d^2}\sum_{\_alpha=RootOf\left(b\_Z^3+a\right)}\frac{1}{\left(-ad+bc\right)\left(ad-bc\right)}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-c\right.\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] -2/3/b/d/(d*x^3+c)^(1/2)-a/b*(-2/3/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-
1/3*I/d^2*b*2^(1/2)*sum(1/(-a*d+b*c)/(a*d-b*c)*(-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
lpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_a
lpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.227296, size = 1, normalized size = 0.01

$$\left[-\frac{\sqrt{dx^3+c}ad\log\left(\frac{(bdx^3+2\,bc-ad)\sqrt{b^2c-abd}-2\sqrt{dx^3+c}(b^2c-abd)}{bx^3+a}\right)+2\sqrt{b^2c-abd}c}{3\sqrt{dx^3+c}\sqrt{b^2c-abd}(bcd-ad^2)},\frac{2\left(\sqrt{dx^3+c}ad\arctan\left(-\frac{bc-ad}{\sqrt{dx^3+c}\sqrt{-b^2c+abd}}\right)\right.}{3\sqrt{dx^3+c}\sqrt{-b^2c+abd}(bcd-}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] [-1/3*(sqrt(d*x^3 + c)*a*d*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*
c - a*b*d) - 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a)) + 2*
sqrt(b^2*c - a*b*d)*c)/(sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d)*(b*c*
d - a*d^2)), 2/3*(sqrt(d*x^3 + c)*a*d*arctan(-(b*c - a*d)/(sqrt(d
*x^3 + c)*sqrt(-b^2*c + a*b*d))) - sqrt(-b^2*c + a*b*d)*c)/(sqrt(
d*x^3 + c)*sqrt(-b^2*c + a*b*d)*(b*c*d - a*d^2))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^5}{\left(a+bx^3\right)\left(c+dx^3\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(x**5/((a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [A] time = 0.216982, size = 105, normalized size = 1.28

$$-\frac{2\left(\frac{ad\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}(bc-ad)}+\frac{c}{\sqrt{dx^3+c}(bc-ad)}\right)}{3\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] -2/3*(a*d*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*(b*c - a*d)) + c/(sqrt(d*x^3 + c)*(b*c - a*d)))/d
```

3.390 $\int \frac{x^2}{(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=77

$$\frac{2}{3\sqrt{c+dx^3}(bc-ad)}-\frac{2\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3(bc-ad)^{3/2}}$$

```
[Out] 2/(3*(b*c - a*d)*Sqrt[c + d*x^3]) - (2*Sqrt[b]*ArcTanh[(Sqrt[b]*S
qrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.178045, antiderivative size = 77, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{2}{3\sqrt{c+dx^3}(bc-ad)}-\frac{2\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] 2/(3*(b*c - a*d)*Sqrt[c + d*x^3]) - (2*Sqrt[b]*ArcTanh[(Sqrt[b]*S
qrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 20.3179, size = 66, normalized size = 0.86

$$-\frac{2\sqrt{b}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3\,(ad-bc)^{\frac{3}{2}}}-\frac{2}{3\sqrt{c+dx^3}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] -2*sqrt(b)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*(a*d
 - b*c)**(3/2)) - 2/(3*sqrt(c + d*x**3)*(a*d - b*c))
```

Mathematica [A] time = 0.118141, size = 76, normalized size = 0.99

$$\frac{2}{3}\left(\frac{1}{\sqrt{c+dx^3}(bc-ad)}-\frac{\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{(bc-ad)^{3/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*(1/((b*c - a*d)*Sqrt[c + d*x^3]) - (Sqrt[b]*ArcTanh[(Sqrt[b]*S
qrt[c + d*x^3])/Sqrt[b*c - a*d]])/(b*c - a*d)^(3/2)))/3
```

Maple [C] time = 0.011, size = 463, normalized size = 6.

$$-\frac{2}{3\,ad-3\,bc}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}$$
$$-\frac{\frac{i}{3}b\sqrt{2}}{d^2}\sum_{\_alpha=RootOf\left(b\_Z^3+a\right)}\frac{1}{(-ad+bc)(ad-bc)}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] -2/3/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-1/3*I/d^2*b*2^(1/2)*sum(1/(-a*
d+b*c)/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c
*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*
d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(
-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*
d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2
)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha
*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^
2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*
d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.232035, size = 1, normalized size = 0.01

$$\left[-\frac{\sqrt{dx^3+c}\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^3+a}\right)-2}{3\,\sqrt{dx^3+c}(bc-ad)},\right.$$
$$\left.-\frac{2\left(\sqrt{dx^3+c}\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^3+c}b}\right)-1\right)}{3\,\sqrt{dx^3+c}(bc-ad)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] [-1/3*(sqrt(d*x^3 + c)*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*c -
 a*d + 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^3
+ a)) - 2)/(sqrt(d*x^3 + c)*(b*c - a*d)), -2/3*(sqrt(d*x^3 + c)*s
qrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqr
t(d*x^3 + c)*b)) - 1)/(sqrt(d*x^3 + c)*(b*c - a*d))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+bx^3)\,(c+dx^3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(x**2/((a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [A] time = 0.21638, size = 99, normalized size = 1.29

$$\frac{2\,b\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\,\sqrt{-b^2c+abd}(bc-ad)}+\frac{2}{3\,\sqrt{dx^3+c}(bc-ad)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] 2/3*b*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c
 + a*b*d)*(b*c - a*d)) + 2/3/(sqrt(d*x^3 + c)*(b*c - a*d))
```

3.391 $\int \frac{1}{x(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=114

$$\frac{2b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a(bc-ad)^{3/2}}-\frac{2d}{3c\sqrt{c+dx^3}(bc-ad)}-\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3ac^{3/2}}$$

```
[Out] (-2*d)/(3*c*(b*c - a*d)*Sqrt[c + d*x^3]) - (2*ArcTanh[Sqrt[c + d*
x^3]/Sqrt[c]])/(3*a*c^(3/2)) + (2*b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^3])/Sqrt[b*c - a*d]])/(3*a*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.349047, antiderivative size = 114, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{2b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a(bc-ad)^{3/2}}-\frac{2d}{3c\sqrt{c+dx^3}(bc-ad)}-\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3ac^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-2*d)/(3*c*(b*c - a*d)*Sqrt[c + d*x^3]) - (2*ArcTanh[Sqrt[c + d*
x^3]/Sqrt[c]])/(3*a*c^(3/2)) + (2*b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^3])/Sqrt[b*c - a*d]])/(3*a*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 44.6775, size = 97, normalized size = 0.85

$$\frac{2d}{3c\sqrt{c+dx^3}\,(ad-bc)}+\frac{2b^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a\,(ad-bc)^{\frac{3}{2}}}-\frac{2\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3ac^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] 2*d/(3*c*sqrt(c + d*x**3)*(a*d - b*c)) + 2*b**(3/2)*atan(sqrt(b)*
sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a*(a*d - b*c)**(3/2)) - 2*at
anh(sqrt(c + d*x**3)/sqrt(c))/(3*a*c**(3/2))
```

Mathematica [C] time = 0.804994, size = 396, normalized size = 3.47

$$\frac{2d\left(\frac{6abx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{5bx^3(2ad+b(c+3dx^3))F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)-3(a+b}{c\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\right.}\right.}{9(a+bx^3)\sqrt{c+dx^3}(bc-ad)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*d*((6*a*b*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a
)])/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)] +
x^3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^3)/a)] + a
*d*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)])) + (5*b*x^
3*(2*a*d + b*(c + 3*d*x^3))*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3
```

```
)), -(a/(b*x^3))] - 3*(a + b*x^3)*(2*a*d*AppellF1[5/2, 1/2, 2, 7/
2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -
(c/(d*x^3)), -(a/(b*x^3))]))/(c*(-5*b*d*x^3*AppellF1[3/2, 1/2, 1,
 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*d*AppellF1[5/2, 1/2, 2, 7
/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1, 7/2,
-(c/(d*x^3)), -(a/(b*x^3))]))))/(9*(b*c - a*d)*(a + b*x^3)*Sqrt[c
 + d*x^3])
```

Maple [C] time = 0.013, size = 512, normalized size = 4.5

$$\frac{1}{a}\left(\frac{2}{3c}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}-\frac{2}{3}Artanh\left(1\sqrt{dx^3+c}\frac{1}{\sqrt{c}}\right)c^{-\frac{3}{2}}\right)$$
$$-\frac{b}{a}\left(-\frac{2}{3\,ad-3\,bc}\frac{1}{\sqrt{\left(x^3+\frac{c}{d}\right)d}}-\frac{\frac{i}{3}b\sqrt{2}}{d^2}\sum_{\_alpha=RootOf\left(b\_Z^3+a\right)}\frac{1}{\left(-ad+bc\right)\left(ad-bc\right)}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-c\right.\right.}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/a*(2/3/c/((x^3+c/d)*d)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2
))/c^(3/2))-b/a*(-2/3/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-1/3*I/d^2*b*2
^(1/2)*sum(1/(-a*d+b*c)/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/
d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2
)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1
/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*
d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*
d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)
^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_
Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{(bx^3+a)(dx^3+c)^{\frac{3}{2}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x), x)
```

Fricas [A] time = 0.267099, size = 1, normalized size = 0.01

$$\left[-\frac{\sqrt{dx^3+c}bc^{\frac{3}{2}}\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^3+2\,bc-ad-2\,\sqrt{dx^3+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^3+a}\right)+2\,a\sqrt{c}d-\sqrt{dx^3+c}(bc-ad)\log\left(\frac{(dx^3+2\,c)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right)}{3\,(abc^2-a^2cd)\sqrt{dx^3+c}\sqrt{c}}\right.$$
$$-\frac{\sqrt{dx^3+c}b\sqrt{-c}c\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^3+2\,bc-ad-2\,\sqrt{dx^3+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^3+a}\right)+2\,a\sqrt{-c}d-2\,\sqrt{dx^3+c}(bc-ad)\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)}{3\,(abc^2-a^2cd)\sqrt{dx^3+c}\sqrt{-c}},$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x),x, algorithm="fricas")
```

```
[Out] [-1/3*(sqrt(d*x^3 + c)*b*c^(3/2)*sqrt(b/(b*c - a*d))*log((b*d*x^3
 + 2*b*c - a*d - 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)
))/(b*x^3 + a)) + 2*a*sqrt(c)*d - sqrt(d*x^3 + c)*(b*c - a*d)*log
(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3))/((a*b*c^2 -
a^2*c*d)*sqrt(d*x^3 + c)*sqrt(c)), 1/3*(2*sqrt(d*x^3 + c)*b*c^(3/
2)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/
(sqrt(d*x^3 + c)*b)) - 2*a*sqrt(c)*d + sqrt(d*x^3 + c)*(b*c - a*d
)*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3))/((a*b*c
^2 - a^2*c*d)*sqrt(d*x^3 + c)*sqrt(c)), -1/3*(sqrt(d*x^3 + c)*b*s
qrt(-c)*c*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*c - a*d - 2*sqrt
(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) + 2*a*s
qrt(-c)*d - 2*sqrt(d*x^3 + c)*(b*c - a*d)*arctan(c/(sqrt(d*x^3 +
c)*sqrt(-c))))/((a*b*c^2 - a^2*c*d)*sqrt(d*x^3 + c)*sqrt(-c)), 2/
3*(sqrt(d*x^3 + c)*b*sqrt(-c)*c*sqrt(-b/(b*c - a*d))*arctan(-(b*c
 - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) - a*sqrt(-c)*d
+ sqrt(d*x^3 + c)*(b*c - a*d)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))
))/((a*b*c^2 - a^2*c*d)*sqrt(d*x^3 + c)*sqrt(-c))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\,(a+bx^3)\,(c+dx^3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(1/(x*(a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [A] time = 0.217764, size = 158, normalized size = 1.39

$$-\frac{2}{3}\left(\frac{b^2\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{(abcd-a^2d^2)\sqrt{-b^2c+abd}}+\frac{1}{\sqrt{dx^3+c}(bc^2-acd)}-\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a\sqrt{-c}cd}\right)d$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x),x, algorithm="giac")
```

```
[Out] -2/3*(b^2*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/((a*b*c*
d - a^2*d^2)*sqrt(-b^2*c + a*b*d)) + 1/(sqrt(d*x^3 + c)*(b*c^2 -
a*c*d)) - arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a*sqrt(-c)*c*d))*d
```

3.392 $\int \frac{1}{x^4(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=158

$$-\frac{2b^{5/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2(bc-ad)^{3/2}}+\frac{(3ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{5/2}}-\frac{d(bc-3ad)}{3ac^2\sqrt{c+dx^3}(bc-ad)}-\frac{1}{3acx^3\sqrt{c+dx^3}}$$

```
[Out] -(d*(b*c - 3*a*d))/(3*a*c^2*(b*c - a*d)*Sqrt[c + d*x^3]) - 1/(3*a
*c*x^3*Sqrt[c + d*x^3]) + ((2*b*c + 3*a*d)*ArcTanh[Sqrt[c + d*x^3
]/Sqrt[c]])/(3*a^2*c^(5/2)) - (2*b^(5/2)*ArcTanh[(Sqrt[b]*Sqrt[c
+ d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.640556, antiderivative size = 158, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{2b^{5/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2(bc-ad)^{3/2}}+\frac{(3ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{5/2}}-\frac{d(bc-3ad)}{3ac^2\sqrt{c+dx^3}(bc-ad)}-\frac{1}{3acx^3\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(d*(b*c - 3*a*d))/(3*a*c^2*(b*c - a*d)*Sqrt[c + d*x^3]) - 1/(3*a
*c*x^3*Sqrt[c + d*x^3]) + ((2*b*c + 3*a*d)*ArcTanh[Sqrt[c + d*x^3
]/Sqrt[c]])/(3*a^2*c^(5/2)) - (2*b^(5/2)*ArcTanh[(Sqrt[b]*Sqrt[c
+ d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 72.9312, size = 139, normalized size = 0.88

$$-\frac{1}{3acx^3\sqrt{c+dx^3}}-\frac{d\,(3ad-bc)}{3ac^2\sqrt{c+dx^3}\,(ad-bc)}-\frac{2b^{\frac{5}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^2\,(ad-bc)^{\frac{3}{2}}}+\frac{(3ad+2bc)\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] -1/(3*a*c*x**3*sqrt(c + d*x**3)) - d*(3*a*d - b*c)/(3*a*c**2*sqrt
(c + d*x**3)*(a*d - b*c)) - 2*b**(5/2)*atan(sqrt(b)*sqrt(c + d*x*
*3)/sqrt(a*d - b*c))/(3*a**2*(a*d - b*c)**(3/2)) + (3*a*d + 2*b*c
)*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a**2*c**(5/2))
```

Mathematica [C] time = 1.23161, size = 501, normalized size = 3.17

$$\frac{\frac{6bcdx^6(bc-3ad)F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(bc-ad)\left(x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}-\frac{5bdx^3\left(-3a^2d\left(c+2dx^3\right)+ab\left(3c^2-cdx^3-9d^2x^6\right)+b}{a}}{9c^2x^3\left(a+bx^3\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((6*b*c*d*(b*c - 3*a*d)*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c),
-((b*x^3)/a)])/((b*c - a*d)*(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x
```

```
^3)/c), -((b*x^3)/a)] + x^3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^
3)/c), -((b*x^3)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -
((b*x^3)/a)]))) - (5*b*d*x^3*(-3*a^2*d*(c + 2*d*x^3) + b^2*c*x^3*
(c + 3*d*x^3) + a*b*(3*c^2 - c*d*x^3 - 9*d^2*x^6))*AppellF1[3/2,
1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 3*(-(b^2*c*x^3*(c + d*
x^3)) + a^2*d*(c + 3*d*x^3) - a*b*(c^2 - 3*d^2*x^6))*(2*a*d*Appel
lF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[
5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(a*(-(b*c) + a*d)
*(-5*b*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3)
)] + 2*a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]
 + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))))/
(9*c^2*x^3*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.014, size = 575, normalized size = 3.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/a*(-1/3*(d*x^3+c)^(1/2)/c^2/x^3-2/3*d/c^2/((x^3+c/d)*d)^(1/2)+d
*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2))+1/a^2*b^2*(-2/3/(a*d-b
*c)/((x^3+c/d)*d)^(1/2)-1/3*I/d^2*b*2^(1/2)*sum(1/(-a*d+b*c)/(a*d
-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)
+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))
/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2
*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alph
a^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)
^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*
(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^
(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))-b/a^2*(2/3/c/((x^
3+c/d)*d)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)(dx^3 + c)^{\frac{3}{2}}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^4), x)
```

Fricas [A] time = 0.364694, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/6*(2*sqrt(d*x^3 + c)*b^2*c^(5/2)*x^3*sqrt(b/(b*c - a*d))*log(
(b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*
c - a*d)))/(b*x^3 + a)) - (2*b^2*c^2 + a*b*c*d - 3*a^2*d^2)*sqrt(
```

```
d*x^3 + c)*x^3*log(((d*x^3 + 2*c)*sqrt(c) + 2*sqrt(d*x^3 + c)*c)/
x^3) + 2*(a*b*c^2 - a^2*c*d + (a*b*c*d - 3*a^2*d^2)*x^3)*sqrt(c))
/((a^2*b*c^3 - a^3*c^2*d)*sqrt(d*x^3 + c)*sqrt(c)*x^3), -1/6*(4*s
qrt(d*x^3 + c)*b^2*c^(5/2)*x^3*sqrt(-b/(b*c - a*d))*arctan(-(b*c
 - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) - (2*b^2*c^2 + a
*b*c*d - 3*a^2*d^2)*sqrt(d*x^3 + c)*x^3*log(((d*x^3 + 2*c)*sqrt(c
) + 2*sqrt(d*x^3 + c)*c)/x^3) + 2*(a*b*c^2 - a^2*c*d + (a*b*c*d -
 3*a^2*d^2)*x^3)*sqrt(c))/((a^2*b*c^3 - a^3*c^2*d)*sqrt(d*x^3 + c
)*sqrt(c)*x^3), -1/3*(sqrt(d*x^3 + c)*b^2*sqrt(-c)*c^2*x^3*sqrt(b
/(b*c - a*d))*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*(b*c
 - a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) + (2*b^2*c^2 + a*b*c*d
 - 3*a^2*d^2)*sqrt(d*x^3 + c)*x^3*arctan(c/(sqrt(d*x^3 + c)*sqrt(-
c))) + (a*b*c^2 - a^2*c*d + (a*b*c*d - 3*a^2*d^2)*x^3)*sqrt(-c))/
((a^2*b*c^3 - a^3*c^2*d)*sqrt(d*x^3 + c)*sqrt(-c)*x^3), -1/3*(2*s
qrt(d*x^3 + c)*b^2*sqrt(-c)*c^2*x^3*sqrt(-b/(b*c - a*d))*arctan(-
(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) + (2*b^2*c^
2 + a*b*c*d - 3*a^2*d^2)*sqrt(d*x^3 + c)*x^3*arctan(c/(sqrt(d*x^3
 + c)*sqrt(-c))) + (a*b*c^2 - a^2*c*d + (a*b*c*d - 3*a^2*d^2)*x^3
)*sqrt(-c))/((a^2*b*c^3 - a^3*c^2*d)*sqrt(d*x^3 + c)*sqrt(-c)*x^3
)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.2194, size = 248, normalized size = 1.57

$$\frac{1}{3}\left(\frac{2\,b^3\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{(a^2bcd^2-a^3d^3)\sqrt{-b^2c+abd}}-\frac{\left(dx^3+c\right)bc-3\left(dx^3+c\right)ad+2\,acd}{(abc^3d-a^2c^2d^2)\left(\left(dx^3+c\right)^{\frac{3}{2}}-\sqrt{dx^3+c}c\right)}-\frac{(2\,bc+3\,ad)\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}c^2d^2}\right)d^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*(2*b^3*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/((a^2*b
*c*d^2 - a^3*d^3)*sqrt(-b^2*c + a*b*d)) - ((d*x^3 + c)*b*c - 3*(d
*x^3 + c)*a*d + 2*a*c*d)/((a*b*c^3*d - a^2*c^2*d^2)*((d*x^3 + c)^
(3/2) - sqrt(d*x^3 + c)*c)) - (2*b*c + 3*a*d)*arctan(sqrt(d*x^3 +
 c)/sqrt(-c))/(a^2*sqrt(-c)*c^2*d^2))*d^2
```

3.393 $\int \frac{x^3}{(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=67

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4ac\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 3/2, 7/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(4*a*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.194262, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};1,\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4ac\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1, 3/2, 7/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(4*a*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 28.5982, size = 53, normalized size = 0.79

$$\frac{x^4\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{4}{3},1,\frac{3}{2},\frac{7}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4ac^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**3/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 1, 3/2, 7/3, -b*x**3/a, -d*x*
*3/c)/(4*a*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.363293, size = 332, normalized size = 4.96

$$\frac{x\left(-\frac{32a^2cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{7ab\cdots}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\cdots\right.\right.\right.}\right.}{6\sqrt{c+dx^3}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*(-4 - (32*a^2*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*
x^3)/a)])/((a + b*x^3)*(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^
3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -(
(d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x
^3)/c), -((b*x^3)/a)]))) + (7*a*b*c*x^3*AppellF1[4/3, 1/2, 1, 7/3
, -((d*x^3)/c), -((b*x^3)/a)])/((a + b*x^3)*(-14*a*c*AppellF1[4/3
, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF
1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7
```

```
/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)]))))))/(6*(-(b*c) + a
*d)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.05, size = 1069, normalized size = 16.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/b*(2/3/c*x/((x^3+c/d)*d)^(1/2)-2/9*I/c*3^(1/2)/d*(-c*d^2)^(1/3)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-a/b*(2/3*d/c*x/(a*d-b*c)/((x^
3+c/d)*d)^(1/2)-2/9*I/c/(a*d-b*c)*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/d^2*b*2^(1/2)*sum(1/(a*d-b*c)^2/_
alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3+a)(dx^3+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((b*x^3 + a)*(d*x^3 + c)^(3/2)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(a+bx^3)\,(c+dx^3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(x**3/((a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3+a)(dx^3+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate(x^3/((b*x^3 + a)*(d*x^3 + c)^(3/2)), x)
```

3.394 $\int \frac{x}{(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=67

$$\frac{x^2\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};1,\frac{3}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ac\sqrt{c+dx^3}}$$

```
[Out] (x^2*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 1, 3/2, 5/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(2*a*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.146823, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{x^2\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};1,\frac{3}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ac\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In] Int[x/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^2*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 1, 3/2, 5/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(2*a*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 20.4665, size = 53, normalized size = 0.79

$$\frac{x^2\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{2}{3},1,\frac{3}{2},\frac{5}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ac^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, 1, 3/2, 5/3, -b*x**3/a, -d*x*
*3/c)/(2*a*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.99289, size = 366, normalized size = 5.46

$$\frac{x^2\left(2d\left(\frac{8abx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)(ad-bc)\left(3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-16acF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}-\frac{5}{bc^2-acd}\right)+\frac{\ldots}{(a+bx^3)(a\ldots}}{15\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^2*((25*a*(3*b*c + a*d)*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c)
, -((b*x^3)/a)])/((-(b*c) + a*d)*(a + b*x^3)*(-10*a*c*AppellF1[2/
3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*Appell
F1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5
/3, 3/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)]))) + 2*d*(-5/(b*c^2
- a*c*d) + (8*a*b*x^3*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -(
(b*x^3)/a)])/((-(b*c) + a*d)*(a + b*x^3)*(-16*a*c*AppellF1[5/3, 1
/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[8
/3, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8/3,
```

```
 3/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)])))))/(15*Sqrt[c + d*x
^3])
```

Maple [C] time = 0.052, size = 907, normalized size = 13.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] 2/3*d/c*x^2/(a*d-b*c)/((x^3+c/d)*d)^(1/2)+2/9*I/c/(a*d-b*c)*3^(1/
2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3
))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*
(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Ell
ipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)))+1/3*I/d^2*b*2^(1/2)*sum(1/(a*d-b*c)^2/_alpha*(-c*d^2)^(1/3
)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)
+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(
-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1
/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(
-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d
^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d
-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^3 + a)(dx^3 + c)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^3 + a)*(d*x^3 + c)^(3/2)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(a+bx^3)\,(c+dx^3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(x/((a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^3+a)(dx^3+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate(x/((b*x^3 + a)*(d*x^3 + c)^(3/2)), x)
```

3.395 $\int \frac{1}{(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=62

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{3}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ac\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 3/2, 4/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.0890238, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};1,\frac{3}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ac\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1, 3/2, 4/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 20.9828, size = 49, normalized size = 0.79

$$\frac{x\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{1}{3},1,\frac{3}{2},\frac{4}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ac^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 1, 3/2, 4/3, -b*x**3/a, -d*x**3/
c)/(a*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.978024, size = 362, normalized size = 5.84

$$\frac{x\left(-\frac{7abdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)(ad-bc)\left(3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{}{(a+bx^3)(bc-ad)\left(3x^3\left(2bcF_1\right.\right.}\right.}{6\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*((-4*d)/(b*c^2 - a*c*d) + (16*a*(-3*b*c + a*d)*AppellF1[1/3, 1
/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])/((b*c - a*d)*(a + b*x^3)
*(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)] +
 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3)/
a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])
)) - (7*a*b*d*x^3*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x
^3)/a)])/((-(b*c) + a*d)*(a + b*x^3)*(-14*a*c*AppellF1[4/3, 1/2,
1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3,
1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2
```

```
, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)])))))/(6*Sqrt[c + d*x^3])
```

Maple [C] time = 0.008, size = 753, normalized size = 12.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] 2/3*d/c*x/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-2/9*I/c/(a*d-b*c)*3^(1/2)
*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-
I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/d^2*b*2^(
1/2)*sum(1/(a*d-b*c)^2/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*
(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^
(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3
)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^
2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^
3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)(dx^3 + c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(a + bx^3)\,(c + dx^3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(1/((a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)(dx^3 + c)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)), x)
```

3.396 $\int \frac{1}{x^2(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=65

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};1,\frac{3}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{acx\sqrt{c+dx^3}}$$

```
[Out] -((Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 1, 3/2, 2/3, -((b*x^3)/a),
-((d*x^3)/c)])/(a*c*x*Sqrt[c + d*x^3]))
```

Rubi [A] time = 0.19782, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};1,\frac{3}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{acx\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] -((Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 1, 3/2, 2/3, -((b*x^3)/a),
-((d*x^3)/c)])/(a*c*x*Sqrt[c + d*x^3]))
```

Rubi in Sympy [A] time = 25.4055, size = 53, normalized size = 0.82

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{1}{3},1,\frac{3}{2},\frac{2}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ac^2x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, 1, 3/2, 2/3, -b*x**3/a, -d*x**3/
c)/(a*c**2*x*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 1.34421, size = 408, normalized size = 6.28

$$\frac{\frac{25cx^3\left(5a^2d^2-3abcd+6b^2c^2\right)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)(bc-ad)\left(3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+2\left(\frac{8bcdx}{(a+bx^3)\left(3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\right.\right.\right.}\right.}{30c^2x\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((25*c*(6*b^2*c^2 - 3*a*b*c*d + 5*a^2*d^2)*x^3*AppellF1[2/3, 1/2,
 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)])/((b*c - a*d)*(a + b*x^3)*(-
10*a*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)] + 3
*x^3*(2*b*c*AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)
] + a*d*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])))
 + (2*((15*b*c*(c + d*x^3))/a - 5*d*(3*c + 5*d*x^3) + (8*b*c*d*(3
*b*c - 5*a*d)*x^6*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x
```

```
^3)/a)])/((a + b*x^3)*(-16*a*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^
3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -
((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d
*x^3)/c), -((b*x^3)/a)])))))/(-(b*c) + a*d))/(30*c^2*x*Sqrt[c + d
*x^3])
```

Maple [C] time = 0.013, size = 1392, normalized size = 21.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/a*(-2/3*d*x^2/c^2/((x^3+c/d)*d)^(1/2)-(d*x^3+c)^(1/2)/c^2/x-5/9
*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(
-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/
2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^
2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/
2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2))))-b/a*(2/3*d/c*x^2/(a*d-b*c)/((x^3+c/d)*d)^(1/2
)+2/9*I/c/(a*d-b*c)*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Ellipt
icE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/d^2*b*2^(1/2)*sum(1/(a*d-b*
c)^2/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^
(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*
I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^
(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2
*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-
c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/
2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2
/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c
),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)(dx^3 + c)^{\frac{3}{2}} x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\left(a+bx^3\right)\left(c+dx^3\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(1/(x**2*(a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)(dx^3+c)^{\frac{3}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^2), x)
```

3.397 $\int \frac{1}{x^3(a+bx^3)(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=67

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{3}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2acx^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 3/2, 1/3, -((b*x^3)/a), -
((d*x^3)/c)])/(2*a*c*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.194013, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};1,\frac{3}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2acx^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1, 3/2, 1/3, -((b*x^3)/a), -
((d*x^3)/c)])/(2*a*c*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.2349, size = 56, normalized size = 0.84

$$-\frac{\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{2}{3},1,\frac{3}{2},\frac{1}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ac^2x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 1, 3/2, 1/3, -b*x**3/a, -d*x**3/
c)/(2*a*c**2*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 1.37267, size = 418, normalized size = 6.24

$$\frac{\frac{16cx^3(-7a^2d^2+3abcd+12b^2c^2)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{(a+bx^3)(bc-ad)\left(3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{7b}{(a+bx^3)(bc-ad)\left(3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};\right.\right.\right.}}{24c^2x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(a + b*x^3)*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((12*b*c*(c + d*x^3) - 4*a*d*(3*c + 7*d*x^3))/(a*(-(b*c) + a*d))
+ (16*c*(12*b^2*c^2 + 3*a*b*c*d - 7*a^2*d^2)*x^3*AppellF1[1/3, 1/
2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])/((b*c - a*d)*(a + b*x^3)*
(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)] +
3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3)/a
)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)]))
) + (7*b*c*d*(3*b*c - 7*a*d)*x^6*AppellF1[4/3, 1/2, 1, 7/3, -((d*
x^3)/c), -((b*x^3)/a)])/((b*c - a*d)*(a + b*x^3)*(-14*a*c*AppellF
1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*Ap
```

```
pellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Appel
lF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)])))/(24*c^2*x^
2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.014, size = 1084, normalized size = 16.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a)/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/a*(-1/2/c^2*(d*x^3+c)^(1/2)/x^2-2/3*d/c^2*x/((x^3+c/d)*d)^(1/2)
+7/18*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-
1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ellip
ticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^
(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2)))-b/a*(2/3*d/c*x/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-2/9*I/c/(a*d-b*
c)*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d
^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I
/d^2*b*2^(1/2)*sum(1/(a*d-b*c)^2/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d
*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)
*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c
*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2
/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*
3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*
(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=
RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)(dx^3 + c)^{\frac{3}{2}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^3), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^3),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3 (a + bx^3) (c + dx^3)^{\frac{3}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/(b*x**3+a)/(d*x**3+c)**(3/2),x)
```

```
[Out] Integral(1/(x**3*(a + b*x**3)*(c + d*x**3)**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)(dx^3 + c)^{\frac{3}{2}} x^3} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)*(d*x^3 + c)^(3/2)*x^3), x)
```

3.398 $\int \frac{x^{11}\sqrt{c+dx^3}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=117

$$-\frac{3968c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^4}+\frac{2c\sqrt{c+dx^3}\,(1146c+47dx^3)}{15d^4}+\frac{7x^6\sqrt{c+dx^3}}{15d^2}+\frac{x^9\sqrt{c+dx^3}}{3d\,(8c-dx^3)}$$

```
[Out] (7*x^6*Sqrt[c + d*x^3])/(15*d^2) + (x^9*Sqrt[c + d*x^3])/(3*d*(8*
c - d*x^3)) + (2*c*Sqrt[c + d*x^3]*(1146*c + 47*d*x^3))/(15*d^4)
- (3968*c^(5/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^4)
```

Rubi [A] time = 0.348105, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$-\frac{3968c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^4}+\frac{2c\sqrt{c+dx^3}\,(1146c+47dx^3)}{15d^4}+\frac{7x^6\sqrt{c+dx^3}}{15d^2}+\frac{x^9\sqrt{c+dx^3}}{3d\,(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^11*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (7*x^6*Sqrt[c + d*x^3])/(15*d^2) + (x^9*Sqrt[c + d*x^3])/(3*d*(8*
c - d*x^3)) + (2*c*Sqrt[c + d*x^3]*(1146*c + 47*d*x^3))/(15*d^4)
- (3968*c^(5/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^4)
```

Rubi in Sympy [A] time = 43.6136, size = 107, normalized size = 0.91

$$-\frac{3968c^{\frac{5}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^4}+\frac{8c\sqrt{c+dx^3}\left(\frac{1719c}{2}+\frac{141dx^3}{4}\right)}{45d^4}+\frac{x^9\sqrt{c+dx^3}}{3d\,(8c-dx^3)}+\frac{7x^6\sqrt{c+dx^3}}{15d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] -3968*c**(5/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(9*d**4) + 8*c
*sqrt(c + d*x**3)*(1719*c/2 + 141*d*x**3/4)/(45*d**4) + x**9*sqrt
(c + d*x**3)/(3*d*(8*c - d*x**3)) + 7*x**6*sqrt(c + d*x**3)/(15*d
**2)
```

Mathematica [A] time = 0.149321, size = 100, normalized size = 0.85

$$\frac{1}{3}\sqrt{c+dx^3}\left(-\frac{512c^3}{d^4\,(dx^3-8c)}+\frac{1972c^2}{5d^4}+\frac{54cx^3}{5d^3}+\frac{2x^6}{5d^2}\right)-\frac{3968c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^11*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (Sqrt[c + d*x^3]*((1972*c^2)/(5*d^4) + (54*c*x^3)/(5*d^3) + (2*x^
6)/(5*d^2) - (512*c^3)/(d^4*(-8*c + d*x^3))))/3 - (3968*c^(5/2)*A
rcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^4)
```

Maple [C] time = 0.058, size = 952, normalized size = 8.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11*(d*x^3+c)^(1/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/d^3*(d*(2/15*x^6*(d*x^3+c)^(1/2)+2/45*c/d*x^3*(d*x^3+c)^(1/2)-4
/45*c^2*(d*x^3+c)^(1/2)/d^2)+32/9*c/d*(d*x^3+c)^(3/2))+192*c^2/d^
3*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
tOf(_Z^3*d-8*c))+512*c^3/d^3*(-1/3/d*(d*x^3+c)^(1/2)/(d*x^3-8*c)
+1/54*I/d^3/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^
(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x
-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3))
)^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/
3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alp
ha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/
3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alp
ha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3
*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^11/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.221446, size = 1, normalized size = 0.01

$$\left[\frac{2\left(4960\left(c^{2}dx^{3}-8\,c^{3}\right)\sqrt{c}\log\left(\frac{dx^{3}-6\sqrt{dx^{3}+c}\sqrt{c}+10\,c}{dx^{3}-8\,c}\right)+3\left(d^{3}x^{9}+19\,cd^{2}x^{6}+770\,c^{2}dx^{3}-9168\,c^{3}\right)\sqrt{dx^{3}+c}\right)}{45\left(d^{5}x^{3}-8\,cd^{4}\right)},\right.$$
$$\left.-\frac{2\left(9920\left(c^{2}dx^{3}-8\,c^{3}\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\sqrt{-c}}\right)-3\left(d^{3}x^{9}+19\,cd^{2}x^{6}+770\,c^{2}dx^{3}-9168\,c^{3}\right)\sqrt{dx^{3}+c}\right)}{45\left(d^{5}x^{3}-8\,cd^{4}\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^11/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] [2/45*(4960*(c^2*d*x^3 - 8*c^3)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3
 + c)*sqrt(c) + 10*c)/(d*x^3 - 8*c)) + 3*(d^3*x^9 + 19*c*d^2*x^6
```

```
+ 770*c^2*d*x^3 - 9168*c^3)*sqrt(d*x^3 + c))/(d^5*x^3 - 8*c*d^4),
 -2/45*(9920*(c^2*d*x^3 - 8*c^3)*sqrt(-c)*arctan(1/3*sqrt(d*x^3 +
 c)/sqrt(-c)) - 3*(d^3*x^9 + 19*c*d^2*x^6 + 770*c^2*d*x^3 - 9168*
c^3)*sqrt(d*x^3 + c))/(d^5*x^3 - 8*c*d^4)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216151, size = 149, normalized size = 1.27

$$\frac{3968\,c^3\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{9\sqrt{-c}d^4}-\frac{512\sqrt{dx^3+c}c^3}{3\,(dx^3-8\,c)d^4}+\frac{2\left(\left(dx^3+c\right)^{\frac{5}{2}}d^{16}+25\left(dx^3+c\right)^{\frac{3}{2}}cd^{16}+960\sqrt{dx^3+c}c^2d^{16}\right)}{15\,d^{20}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^11/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] 3968/9*c^3*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^4) -
512/3*sqrt(d*x^3 + c)*c^3/((d*x^3 - 8*c)*d^4) + 2/15*((d*x^3 + c)
^(5/2)*d^16 + 25*(d*x^3 + c)^(3/2)*c*d^16 + 960*sqrt(d*x^3 + c)*c
^2*d^16)/d^20
```

3.399 $\int \frac{x^8\sqrt{c+dx^3}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=102

$$-\frac{352c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^3}+\frac{64c\left(c+dx^3\right)^{3/2}}{27d^3\left(8c-dx^3\right)}+\frac{352c\sqrt{c+dx^3}}{27d^3}+\frac{2\left(c+dx^3\right)^{3/2}}{9d^3}$$

```
[Out] (352*c*Sqrt[c + d*x^3])/(27*d^3) + (2*(c + d*x^3)^(3/2))/(9*d^3)
+ (64*c*(c + d*x^3)^(3/2))/(27*d^3*(8*c - d*x^3)) - (352*c^(3/2)*
ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^3)
```

Rubi [A] time = 0.256414, antiderivative size = 102, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$-\frac{352c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^3}+\frac{64c\left(c+dx^3\right)^{3/2}}{27d^3\left(8c-dx^3\right)}+\frac{352c\sqrt{c+dx^3}}{27d^3}+\frac{2\left(c+dx^3\right)^{3/2}}{9d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (352*c*Sqrt[c + d*x^3])/(27*d^3) + (2*(c + d*x^3)^(3/2))/(9*d^3)
+ (64*c*(c + d*x^3)^(3/2))/(27*d^3*(8*c - d*x^3)) - (352*c^(3/2)*
ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9*d^3)
```

Rubi in Sympy [A] time = 30.5617, size = 92, normalized size = 0.9

$$-\frac{352c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^3}+\frac{64c\left(c+dx^3\right)^{\frac{3}{2}}}{27d^3\left(8c-dx^3\right)}+\frac{352c\sqrt{c+dx^3}}{27d^3}+\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] -352*c**(3/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(9*d**3) + 64*c
*(c + d*x**3)**(3/2)/(27*d**3*(8*c - d*x**3)) + 352*c*sqrt(c + d*
x**3)/(27*d**3) + 2*(c + d*x**3)**(3/2)/(9*d**3)
```

Mathematica [A] time = 0.154123, size = 79, normalized size = 0.77

$$\frac{2\left(\frac{\sqrt{c+dx^3}\left(-488c^2+41cdx^3+d^2x^6\right)}{dx^3-8c}-176c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{9d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (2*((Sqrt[c + d*x^3]*(-488*c^2 + 41*c*d*x^3 + d^2*x^6))/(-8*c + d
*x^3) - 176*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))/(9*d^3
)
```

Maple [C] time = 0.019, size = 892, normalized size = 8.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(1/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 2/9*(d*x^3+c)^(3/2)/d^3+64*c^2/d^2*(-1/3/d*(d*x^3+c)^(1/2)/(d*x^3
-8*c)+1/54*I/d^3/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(
-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*
(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(
1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2
)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)
*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2
)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I
*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2
/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
)+16*c/d^2*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*d^2)^
(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)
))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(
1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/
2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c
)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/
2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipti
cPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(
-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)
*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_
alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.221799, size = 1, normalized size = 0.01

$$\left[\frac{2\left(88\left(cdx^3-8c^2\right)\sqrt{c}\log\left(\frac{dx^3-6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)+\left(d^2x^6+41cdx^3-488c^2\right)\sqrt{dx^3+c}\right)}{9\left(d^4x^3-8cd^3\right)},\right.$$
$$\left.-\frac{2\left(176\left(cdx^3-8c^2\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-\left(d^2x^6+41cdx^3-488c^2\right)\sqrt{dx^3+c}\right)}{9\left(d^4x^3-8cd^3\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] [2/9*(88*(c*d*x^3 - 8*c^2)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3 + c)
*sqrt(c) + 10*c)/(d*x^3 - 8*c)) + (d^2*x^6 + 41*c*d*x^3 - 488*c^2
)*sqrt(d*x^3 + c))/(d^4*x^3 - 8*c*d^3), -2/9*(176*(c*d*x^3 - 8*c^
```

```
2)*sqrt(-c)*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (d^2*x^6 + 41*
c*d*x^3 - 488*c^2)*sqrt(d*x^3 + c))/(d^4*x^3 - 8*c*d^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216427, size = 126, normalized size = 1.24

$$\frac{352\,c^2\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{9\,\sqrt{-c}d^3}-\frac{64\,\sqrt{dx^3+c}c^2}{3\,(dx^3-8\,c)d^3}+\frac{2\left(\left(dx^3+c\right)^{\frac{3}{2}}d^6+48\,\sqrt{dx^3+c}cd^6\right)}{9\,d^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] 352/9*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^3) - 6
4/3*sqrt(d*x^3 + c)*c^2/((d*x^3 - 8*c)*d^3) + 2/9*((d*x^3 + c)^(3
/2)*d^6 + 48*sqrt(d*x^3 + c)*c*d^6)/d^9
```

3.400 $\int \frac{x^5\sqrt{c+dx^3}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=82

$$\frac{8\left(c+dx^3\right)^{3/2}}{27d^2\left(8c-dx^3\right)}+\frac{26\sqrt{c+dx^3}}{27d^2}-\frac{26\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^2}$$

```
[Out] (26*Sqrt[c + d*x^3])/(27*d^2) + (8*(c + d*x^3)^(3/2))/(27*d^2*(8*
c - d*x^3)) - (26*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
9*d^2)
```

Rubi [A] time = 0.18679, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{8\left(c+dx^3\right)^{3/2}}{27d^2\left(8c-dx^3\right)}+\frac{26\sqrt{c+dx^3}}{27d^2}-\frac{26\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (26*Sqrt[c + d*x^3])/(27*d^2) + (8*(c + d*x^3)^(3/2))/(27*d^2*(8*
c - d*x^3)) - (26*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
9*d^2)
```

Rubi in Sympy [A] time = 21.3165, size = 71, normalized size = 0.87

$$-\frac{26\sqrt{c}\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^2}+\frac{8\left(c+dx^3\right)^{\frac{3}{2}}}{27d^2\left(8c-dx^3\right)}+\frac{26\sqrt{c+dx^3}}{27d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] -26*sqrt(c)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(9*d**2) + 8*(c +
 d*x**3)**(3/2)/(27*d**2*(8*c - d*x**3)) + 26*sqrt(c + d*x**3)/(2
7*d**2)
```

Mathematica [A] time = 0.140842, size = 66, normalized size = 0.8

$$\frac{2\left(3\sqrt{c+dx^3}\left(\frac{4c}{8c-dx^3}+1\right)-13\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{9d^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (2*(3*Sqrt[c + d*x^3]*(1 + (4*c)/(8*c - d*x^3)) - 13*Sqrt[c]*ArcT
anh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))/(9*d^2)
```

Maple [C] time = 0.016, size = 874, normalized size = 10.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^3+c)^(1/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/d*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(
1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*
d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*
3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*
d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)
*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*
d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)
^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*
_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=R
ootOf(_Z^3*d-8*c))+8*c/d*(-1/3/d*(d*x^3+c)^(1/2)/(d*x^3-8*c)+1/5
4*I/d^3/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2
)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d
*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1
/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3
^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_
alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(
-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d
)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.222271, size = 1, normalized size = 0.01

$$\left[\frac{13\,\left(dx^3-8\,c\right)\sqrt{c}\log\left(\frac{dx^3-6\,\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)+6\,\sqrt{dx^3+c}\left(dx^3-12\,c\right)}{9\,(d^3x^3-8\,cd^2)},\right.$$
$$\left.-\frac{2\left(13\,\left(dx^3-8\,c\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)-3\,\sqrt{dx^3+c}\left(dx^3-12\,c\right)\right)}{9\,(d^3x^3-8\,cd^2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] [1/9*(13*(d*x^3 - 8*c)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3 + c)*sqr
t(c) + 10*c)/(d*x^3 - 8*c)) + 6*sqrt(d*x^3 + c)*(d*x^3 - 12*c))/(
d^3*x^3 - 8*c*d^2), -2/9*(13*(d*x^3 - 8*c)*sqrt(-c)*arctan(1/3*sq
rt(d*x^3 + c)/sqrt(-c)) - 3*sqrt(d*x^3 + c)*(d*x^3 - 12*c))/(d^3*
x^3 - 8*c*d^2)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5\sqrt{c + dx^3}}{(-8c + dx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Integral(x**5*sqrt(c + d*x**3)/(-8*c + d*x**3)**2, x)
```

GIAC/XCAS [A] time = 0.216678, size = 100, normalized size = 1.22

$$\frac{2\left(\frac{13\,c\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}d} + \frac{3\sqrt{dx^3+c}}{d} - \frac{12\sqrt{dx^3+c}c}{(dx^3-8\,c)d}\right)}{9\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] 2/9*(13*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) + 3*s
qrt(d*x^3 + c)/d - 12*sqrt(d*x^3 + c)*c/((d*x^3 - 8*c)*d))/d
```

3.401 $\int \frac{x^2\sqrt{c+dx^3}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=64

$$\frac{\sqrt{c+dx^3}}{3d\,(8c-dx^3)}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}\,d}$$

```
[Out] Sqrt[c + d*x^3]/(3*d*(8*c - d*x^3)) - ArcTanh[Sqrt[c + d*x^3]/(3*
Sqrt[c])]/(9*Sqrt[c]*d)
```

Rubi [A] time = 0.143758, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{\sqrt{c+dx^3}}{3d\,(8c-dx^3)}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}\,d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] Sqrt[c + d*x^3]/(3*d*(8*c - d*x^3)) - ArcTanh[Sqrt[c + d*x^3]/(3*
Sqrt[c])]/(9*Sqrt[c]*d)
```

Rubi in Sympy [A] time = 17.8675, size = 48, normalized size = 0.75

$$\frac{\sqrt{c+dx^3}}{3d\,(8c-dx^3)}-\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] sqrt(c + d*x**3)/(3*d*(8*c - d*x**3)) - atanh(sqrt(c + d*x**3)/(3
*sqrt(c)))/(9*sqrt(c)*d)
```

Mathematica [A] time = 0.102514, size = 63, normalized size = 0.98

$$-\frac{\sqrt{c+dx^3}}{3d\,(dx^3-8c)}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9\sqrt{c}\,d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] -Sqrt[c + d*x^3]/(3*d*(-8*c + d*x^3)) - ArcTanh[Sqrt[c + d*x^3]/(
3*Sqrt[c])]/(9*Sqrt[c]*d)
```

Maple [C] time = 0.012, size = 439, normalized size = 6.9

$$-\frac{1}{3\,d\,(dx^3-8\,c)}\sqrt{dx^3+c}+\frac{\frac{i}{54}\sqrt{2}}{d^3c}\sum_{\_alpha=RootOf(\_Z^3d-8\,c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(d*x^3+c)^(1/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] -1/3/d*(d*x^3+c)^(1/2)/(d*x^3-8*c)+1/54*I/d^3/c*2^(1/2)*sum((-c*d
^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(
1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^
2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x
^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3
^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ell
ipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha
^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(
1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.221441, size = 1, normalized size = 0.02

$$\left[\frac{(dx^3-8\,c)\log\left(\frac{(dx^3+10\,c)\sqrt{c}-6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)-6\,\sqrt{dx^3+c}\sqrt{c}}{18\,(d^2x^3-8\,cd)\sqrt{c}},\ \frac{(dx^3-8\,c)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-3\,\sqrt{dx^3+c}\sqrt{-c}}{9\,(d^2x^3-8\,cd)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] [1/18*((d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(c) - 6*sqrt(d*x^3 +
 c)*c)/(d*x^3 - 8*c)) - 6*sqrt(d*x^3 + c)*sqrt(c))/((d^2*x^3 - 8*
c*d)*sqrt(c)), 1/9*((d*x^3 - 8*c)*arctan(3*c/(sqrt(d*x^3 + c)*sqr
t(-c))) - 3*sqrt(d*x^3 + c)*sqrt(-c))/((d^2*x^3 - 8*c*d)*sqrt(-c)
)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^2\sqrt{c+dx^3}}{(-8c+dx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Integral(x**2*sqrt(c + d*x**3)/(-8*c + d*x**3)**2, x)
```

GIAC/XCAS [A] time = 0.215357, size = 72, normalized size = 1.12

$$\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{9\sqrt{-c}d} - \frac{\sqrt{dx^3+c}}{3\,(dx^3-8\,c)d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] 1/9*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) - 1/3*sqrt(
d*x^3 + c)/((d*x^3 - 8*c)*d)
```

3.402 $\int \frac{\sqrt{c+dx^3}}{x(8c-dx^3)^2}\,dx$

Optimal. Leaf size=88

$$\frac{5\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{288c^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{3/2}}+\frac{\sqrt{c+dx^3}}{24c\,(8c-dx^3)}$$

```
[Out] Sqrt[c + d*x^3]/(24*c*(8*c - d*x^3)) + (5*ArcTanh[Sqrt[c + d*x^3]
/(3*Sqrt[c])])/(288*c^(3/2)) - ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(
96*c^(3/2))
```

Rubi [A] time = 0.257922, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$\frac{5\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{288c^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{3/2}}+\frac{\sqrt{c+dx^3}}{24c\,(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x*(8*c - d*x^3)^2),x]
```

```
[Out] Sqrt[c + d*x^3]/(24*c*(8*c - d*x^3)) + (5*ArcTanh[Sqrt[c + d*x^3]
/(3*Sqrt[c])])/(288*c^(3/2)) - ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(
96*c^(3/2))
```

Rubi in Sympy [A] time = 31.3735, size = 71, normalized size = 0.81

$$\frac{\sqrt{c+dx^3}}{24c\,(8c-dx^3)}+\frac{5\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{288c^{\frac{3}{2}}}-\frac{\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x/(-d*x**3+8*c)**2,x)
```

```
[Out] sqrt(c + d*x**3)/(24*c*(8*c - d*x**3)) + 5*atanh(sqrt(c + d*x**3)
/(3*sqrt(c)))/(288*c**(3/2)) - atanh(sqrt(c + d*x**3)/sqrt(c))/(9
6*c**(3/2))
```

Mathematica [C] time = 0.324974, size = 316, normalized size = 3.59

$$\frac{\frac{24dx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{\frac{10dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1(}}{dx^3-8c}}{72\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x*(8*c - d*x^3)^2),x]
```

```
[Out] ((24*d*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])/(
(8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/
(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8*c
)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (
-3 - (3*d*x^3)/c + (10*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^
```

```
3)), (8*c)/(d*x^3)])/(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x
^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3
)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (
8*c)/(d*x^3)]))/(-8*c + d*x^3))/(72*Sqrt[c + d*x^3])
```

Maple [C] time = 0.021, size = 912, normalized size = 10.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x^3+c)^(1/2)/x/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2)
)*c^(1/2))+1/8*d/c*(-1/3/d*(d*x^3+c)^(1/2)/(d*x^3-8*c)+1/54*I/d^3
/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^
2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1
/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*
d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d
-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)
^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))-1/64*d/c^2*(2/
3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d
*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)
*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c
*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2
/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*
3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*
(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_
Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{\left(dx^3-8\,c\right)^2 x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x), x)
```

Fricas [A] time = 0.231063, size = 1, normalized size = 0.01

$$\left[\frac{5\left(dx^3-8\,c\right)\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+3\left(dx^3-8\,c\right)\log\left(\frac{\left(dx^3+2\,c\right)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right)-24\,\sqrt{dx^3+c}\sqrt{c}}{576\left(cdx^3-8\,c^2\right)\sqrt{c}},\right.$$
$$\left.-\frac{5\left(dx^3-8\,c\right)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-3\left(dx^3-8\,c\right)\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+12\,\sqrt{dx^3+c}\sqrt{-c}}{288\left(cdx^3-8\,c^2\right)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x),x, algorithm="fricas")
```

```
[Out] [1/576*(5*(d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^
3 + c)*c)/(d*x^3 - 8*c)) + 3*(d*x^3 - 8*c)*log(((d*x^3 + 2*c)*sqr
t(c) - 2*sqrt(d*x^3 + c)*c)/x^3) - 24*sqrt(d*x^3 + c)*sqrt(c))/((
c*d*x^3 - 8*c^2)*sqrt(c)), -1/288*(5*(d*x^3 - 8*c)*arctan(3*c/(sq
rt(d*x^3 + c)*sqrt(-c))) - 3*(d*x^3 - 8*c)*arctan(c/(sqrt(d*x^3 +
 c)*sqrt(-c))) + 12*sqrt(d*x^3 + c)*sqrt(-c))/((c*d*x^3 - 8*c^2)*
sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223063, size = 107, normalized size = 1.22

$$\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{96\sqrt{-c}c} - \frac{5\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{288\sqrt{-c}c} - \frac{\sqrt{dx^3+c}}{24\,(dx^3-8\,c)c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x),x, algorithm="giac")
```

```
[Out] 1/96*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 5/288*arctan
(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 1/24*sqrt(d*x^3 + c
)/((d*x^3 - 8*c)*c)
```

3.403 $\int \frac{\sqrt{c+dx^3}}{x^4(8c-dx^3)^2}\,dx$

Optimal. Leaf size=124

$$\frac{7d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1152c^{5/2}}-\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{128c^{5/2}}+\frac{d\sqrt{c+dx^3}}{96c^2(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{24cx^3(8c-dx^3)}$$

```
[Out] (d*Sqrt[c + d*x^3])/(96*c^2*(8*c - d*x^3)) - Sqrt[c + d*x^3]/(24*
c*x^3*(8*c - d*x^3)) + (7*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])
/(1152*c^(5/2)) - (d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(128*c^(5/
2))
```

Rubi [A] time = 0.379592, antiderivative size = 124, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{7d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1152c^{5/2}}-\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{128c^{5/2}}+\frac{d\sqrt{c+dx^3}}{96c^2(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{24cx^3(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^4*(8*c - d*x^3)^2),x]
```

```
[Out] (d*Sqrt[c + d*x^3])/(96*c^2*(8*c - d*x^3)) - Sqrt[c + d*x^3]/(24*
c*x^3*(8*c - d*x^3)) + (7*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])
/(1152*c^(5/2)) - (d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(128*c^(5/
2))
```

Rubi in Sympy [A] time = 46.1118, size = 97, normalized size = 0.78

$$\frac{\sqrt{c+dx^3}}{24cx^3(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{96c^2x^3}+\frac{7d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1152c^{\frac{5}{2}}}-\frac{d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{128c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**4/(-d*x**3+8*c)**2,x)
```

```
[Out] sqrt(c + d*x**3)/(24*c*x**3*(8*c - d*x**3)) - sqrt(c + d*x**3)/(9
6*c**2*x**3) + 7*d*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(1152*c**(
5/2)) - d*atanh(sqrt(c + d*x**3)/sqrt(c))/(128*c**(5/2))
```

Mathematica [C] time = 0.431641, size = 338, normalized size = 2.73

$$\frac{\frac{\frac{10cd^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}+4c^2+3cdx^3-d^2x^6}{dx^3-8c}+\frac{8cd^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\right.}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c}\right.\right.\right.}}{96c^2x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^4*(8*c - d*x^3)^2),x]
```

```
[Out] ((8*c*d^2*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)]
)/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^
3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(
```

```
8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)])))
+ (4*c^2 + 3*c*d*x^3 - d^2*x^6 + (10*c*d^2*x^6*AppellF1[3/2, 1/2,
 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/(5*d*x^3*AppellF1[3/2, 1/2
, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2,
2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7/
2, -(c/(d*x^3)), (8*c)/(d*x^3)]))/(-8*c + d*x^3))/(96*c^2*x^3*Sqr
t[c + d*x^3])
```

Maple [C] time = 0.019, size = 957, normalized size = 7.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^4/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-1/3*(d*x^3+c)^(1/2)/x^3-1/3*d*arctanh((d*x^3+c)^(1/2)/
c^(1/2))/c^(1/2))+1/256/c^3*d*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d
*x^3+c)^(1/2)/c^(1/2))*c^(1/2))+1/64*d^2/c^2*(-1/3/d*(d*x^3+c)^(1
/2)/(d*x^3-8*c)+1/54*I/d^3/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*
(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*
(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*
d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/
3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3
^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(
-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z
^3*d-8*c)))-1/256*d^2/c^3*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2
)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)
+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))
/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2
*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alph
a^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)
^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*
(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^
(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(dx^3 - 8\,c)^2 x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^4),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^4), x)
```

Fricas [A] time = 0.231498, size = 1, normalized size = 0.01

$$\left[-\frac{24\sqrt{dx^3+c}\left(dx^3-4c\right)\sqrt{c}-7\left(d^2x^6-8cdx^3\right)\log\left(\frac{\left(dx^3+10c\right)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8c}\right)-9\left(d^2x^6-8cdx^3\right)\log\left(\frac{\left(dx^3+2c\right)\sqrt{c}-2\sqrt{dx^3+c}c}{x^3}\right)}{2304\left(c^2dx^6-8c^3x^3\right)\sqrt{c}}, -\frac{12\sqrt{dx^3+c}\left(dx^3-4c\right)\sqrt{-c}+7\left(d^2x^6-8cdx^3\right)\arctan\left(\frac{3c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-9\left(d^2x^6-8cdx^3\right)\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)}{1152\left(c^2dx^6-8c^3x^3\right)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^4),x, algorithm="fricas")
```

```
[Out] [-1/2304*(24*sqrt(d*x^3 + c)*(d*x^3 - 4*c)*sqrt(c) - 7*(d^2*x^6 -
 8*c*d*x^3)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c)/(d
*x^3 - 8*c)) - 9*(d^2*x^6 - 8*c*d*x^3)*log(((d*x^3 + 2*c)*sqrt(c)
 - 2*sqrt(d*x^3 + c)*c)/x^3))/((c^2*d*x^6 - 8*c^3*x^3)*sqrt(c)),
-1/1152*(12*sqrt(d*x^3 + c)*(d*x^3 - 4*c)*sqrt(-c) + 7*(d^2*x^6 -
 8*c*d*x^3)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 9*(d^2*x^6 -
 8*c*d*x^3)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((c^2*d*x^6 - 8
*c^3*x^3)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(1/2)/x**4/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.229742, size = 150, normalized size = 1.21

$$\frac{1}{1152}d\left(\frac{9\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^2}-\frac{7\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}c^2}-\frac{12\left(\left(dx^3+c\right)^{\frac{3}{2}}-5\sqrt{dx^3+c}c\right)}{\left(\left(dx^3+c\right)^2-10\left(dx^3+c\right)c+9c^2\right)c^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^4),x, algorithm="giac")
```

```
[Out] 1/1152*d*(9*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) - 7*a
rctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) - 12*((d*x^3 +
 c)^(3/2) - 5*sqrt(d*x^3 + c)*c)/(((d*x^3 + c)^2 - 10*(d*x^3 + c)
*c + 9*c^2)*c^2))
```

3.404 $\int \frac{\sqrt{c+dx^3}}{x^7(8c-dx^3)^2}\,dx$

Optimal. Leaf size=164

$$\frac{23d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{18432c^{7/2}}-\frac{d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{7/2}}+\frac{5d^2\sqrt{c+dx^3}}{1536c^3(8c-dx^3)}-\frac{7d\sqrt{c+dx^3}}{384c^2x^3(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{48cx^6(8c-dx^3)}$$

```
[Out] (5*d^2*Sqrt[c + d*x^3])/(1536*c^3*(8*c - d*x^3)) - Sqrt[c + d*x^3
]/(48*c*x^6*(8*c - d*x^3)) - (7*d*Sqrt[c + d*x^3])/(384*c^2*x^3*(
8*c - d*x^3)) + (23*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(18
432*c^(7/2)) - (d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(2048*c^(7/
2))
```

Rubi [A] time = 0.502961, antiderivative size = 164, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.259$

$$\frac{23d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{18432c^{7/2}}-\frac{d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{7/2}}+\frac{5d^2\sqrt{c+dx^3}}{1536c^3(8c-dx^3)}-\frac{7d\sqrt{c+dx^3}}{384c^2x^3(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{48cx^6(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^7*(8*c - d*x^3)^2),x]
```

```
[Out] (5*d^2*Sqrt[c + d*x^3])/(1536*c^3*(8*c - d*x^3)) - Sqrt[c + d*x^3
]/(48*c*x^6*(8*c - d*x^3)) - (7*d*Sqrt[c + d*x^3])/(384*c^2*x^3*(
8*c - d*x^3)) + (23*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(18
432*c^(7/2)) - (d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(2048*c^(7/
2))
```

Rubi in Sympy [A] time = 70.0886, size = 122, normalized size = 0.74

$$\frac{\sqrt{c+dx^3}}{24cx^6(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{128c^2x^6}-\frac{5d\sqrt{c+dx^3}}{1536c^3x^3}+\frac{23d^2\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{18432c^{\frac{7}{2}}}-\frac{d^2\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**7/(-d*x**3+8*c)**2,x)
```

```
[Out] sqrt(c + d*x**3)/(24*c*x**6*(8*c - d*x**3)) - sqrt(c + d*x**3)/(1
28*c**2*x**6) - 5*d*sqrt(c + d*x**3)/(1536*c**3*x**3) + 23*d**2*a
tanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(18432*c**(7/2)) - d**2*atanh(
sqrt(c + d*x**3)/sqrt(c))/(2048*c**(7/2))
```

Mathematica [C] time = 0.460603, size = 349, normalized size = 2.13

$$\frac{\frac{\frac{10cd^3x^9F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}+32c^3+60c^2dx^3+23cd^2x^6-5d^3x^9}{dx^3-8c}+\frac{40cd^3x^9F_1\left(\cdots\right.}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\cdots\right.\right.}}{1536c^3x^6\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^7*(8*c - d*x^3)^2),x]
```

```
[Out] ((40*c*d^3*x^9*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)
])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x
^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/
(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)])))
 + (32*c^3 + 60*c^2*d*x^3 + 23*c*d^2*x^6 - 5*d^3*x^9 + (10*c*d^3*
x^9*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/(5*d
*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16
*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*Ap
pellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]))/(-8*c + d
*x^3))/(1536*c^3*x^6*Sqrt[c + d*x^3])
```

Maple [C] time = 0.02, size = 1020, normalized size = 6.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^7/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-1/6*(d*x^3+c)^(1/2)/x^6-1/12*d*(d*x^3+c)^(1/2)/c/x^3+1
/12*d^2*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2))+1/256/c^3*d*(-1
/3*(d*x^3+c)^(1/2)/x^3-1/3*d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(
1/2))+3/4096/c^4*d^2*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3+c)^(
1/2)/c^(1/2))*c^(1/2))+1/512*d^3/c^3*(-1/3/d*(d*x^3+c)^(1/2)/(d*x
^3-8*c)+1/54*I/d^3/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d
*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2
)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)
^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/
3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d
^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d
-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^
(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c
)))-3/4096*d^3/c^4*(2/3*(d*x^3+c)^(1/2)/d+1/3*I/d^3*2^(1/2)*sum((
-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-
c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*
(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/
(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2
-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))
*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_a
lpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I
*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^
2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(dx^3 - 8\,c)^2 x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^7),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^7), x)
```

Fricas [A] time = 0.232993, size = 1, normalized size = 0.01

$$\left[-\frac{24\,\left(5\,d^{2}x^{6}-28\,cdx^{3}-32\,c^{2}\right)\sqrt{dx^{3}+c}\sqrt{c}-23\,\left(d^{3}x^{9}-8\,cd^{2}x^{6}\right)\log\left(\frac{\left(dx^{3}+10\,c\right)\sqrt{c}+6\,\sqrt{dx^{3}+c}c}{dx^{3}-8\,c}\right)-9\,\left(d^{3}x^{9}-8\,cd^{2}x^{6}\right)\log\left(\frac{(a}{}\right.}{36864\,(c^{3}dx^{9}-8\,c^{4}x^{6})\sqrt{c}}\right.$$

$$-\frac{12\,\left(5\,d^{2}x^{6}-28\,cdx^{3}-32\,c^{2}\right)\sqrt{dx^{3}+c}\sqrt{-c}+23\,\left(d^{3}x^{9}-8\,cd^{2}x^{6}\right)\arctan\left(\frac{3\,c}{\sqrt{dx^{3}+c}\sqrt{-c}}\right)-9\,\left(d^{3}x^{9}-8\,cd^{2}x^{6}\right)\arctan\left(\frac{c}{\sqrt{dx^{3}+}}\right.}{18432\,(c^{3}dx^{9}-8\,c^{4}x^{6})\sqrt{-c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^7),x, algorithm="fricas")
```

```
[Out] [-1/36864*(24*(5*d^2*x^6 - 28*c*d*x^3 - 32*c^2)*sqrt(d*x^3 + c)*s
qrt(c) - 23*(d^3*x^9 - 8*c*d^2*x^6)*log(((d*x^3 + 10*c)*sqrt(c) +
 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) - 9*(d^3*x^9 - 8*c*d^2*x^6)*
log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3))/((c^3*d*x
^9 - 8*c^4*x^6)*sqrt(c)), -1/18432*(12*(5*d^2*x^6 - 28*c*d*x^3 -
32*c^2)*sqrt(d*x^3 + c)*sqrt(-c) + 23*(d^3*x^9 - 8*c*d^2*x^6)*arc
tan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 9*(d^3*x^9 - 8*c*d^2*x^6)*a
rctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((c^3*d*x^9 - 8*c^4*x^6)*sqr
t(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(1/2)/x**7/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.225429, size = 140, normalized size = 0.85

$$\frac{1}{18432}\,d^{2}\left(\frac{9\,\arctan\left(\frac{\sqrt{dx^{3}+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^{3}}-\frac{23\,\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c^{3}}-\frac{12\,\sqrt{dx^{3}+c}}{(dx^{3}-8\,c)c^{3}}-\frac{48\,\left(dx^{3}+c\right)^{\frac{3}{2}}}{c^{3}d^{2}x^{6}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^7),x, algorithm="giac")
```

```
[Out] 1/18432*d^2*(9*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) -
23*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) - 12*sqrt(
d*x^3 + c)/((d*x^3 - 8*c)*c^3) - 48*(d*x^3 + c)^(3/2)/(c^3*d^2*x^
6))
```

3.405 $\int \frac{x^7\sqrt{c+dx^3}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=663

$$\frac{76c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{8/3}}-\frac{76c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9d^{8/3}}+\frac{76c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^{8/3}}+\frac{746\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{21\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{373\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\,3^{3/4}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{746c\sqrt{c+dx^3}}{21d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{13x^2\sqrt{c+dx^3}}{21d^2}+\frac{x^5\sqrt{c+dx^3}}{3d\left(8c-dx^3\right)}$$

```
[Out] (13*x^2*Sqrt[c + d*x^3])/(21*d^2) + (746*c*Sqrt[c + d*x^3])/(21*d
^(8/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (x^5*Sqrt[c + d*x^3
])/(3*d*(8*c - d*x^3)) + (76*c^(7/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(
1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(3*Sqrt[3]*d^(8/3)) - (76*c^
(7/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])
])/(9*d^(8/3)) + (76*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
)/(9*d^(8/3)) - (373*Sqrt[2 - Sqrt[3]]*c^(4/3)*(c^(1/3) + d^(1/3)
*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3
) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[
3]])/(7*3^(3/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (746*Sqrt[2
]*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x
 + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[
ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(21*3^(1/4)*d^(8/3)*Sqrt[(c^(1/3
)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*S
qrt[c + d*x^3])
```

Rubi [A] time = 1.80251, antiderivative size = 663, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.518

$$\frac{76c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{8/3}}-\frac{76c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9d^{8/3}}+\frac{76c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^{8/3}}$$
$$+\frac{746\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{21\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{373\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\ 3^{3/4}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{746c\sqrt{c+dx^3}}{21d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{13x^2\sqrt{c+dx^3}}{21d^2}+\frac{x^5\sqrt{c+dx^3}}{3d\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^7*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (13*x^2*Sqrt[c + d*x^3])/(21*d^2) + (746*c*Sqrt[c + d*x^3])/(21*d
^(8/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (x^5*Sqrt[c + d*x^3
])/(3*d*(8*c - d*x^3)) + (76*c^(7/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(
1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(3*Sqrt[3]*d^(8/3)) - (76*c^
(7/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])
])/(9*d^(8/3)) + (76*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
)/(9*d^(8/3)) - (373*Sqrt[2 - Sqrt[3]]*c^(4/3)*(c^(1/3) + d^(1/3)
*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3
) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[
3]])/(7*3^(3/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (746*Sqrt[2
]*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x
 + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[
ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(21*3^(1/4)*d^(8/3)*Sqrt[(c^(1/3
)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*S
qrt[c + d*x^3])
```

Rubi in Sympy [A] time = 24.1318, size = 53, normalized size = 0.08

$$\frac{x^8\sqrt{c+dx^3}\operatorname{appellf}_1\left(\frac{8}{3},-\frac{1}{2},2,\frac{11}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{512c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] x**8*sqrt(c + d*x**3)*appellf1(8/3, -1/2, 2, 11/3, -d*x**3/c, d*x
**3/(8*c))/(512*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.332721, size = 344, normalized size = 0.52

$$\frac{2x^2\left(\frac{10400c^3F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}+\frac{11936c^2dx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx \cdots}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)\cdots}\cdots\right)}{105d^2\left(dx^3-8c\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^7*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (2*x^2*(5*(c + d*x^3)*(-52*c + 3*d*x^3) + (10400*c^3*AppellF1[2/3
, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(40*c*AppellF1[2/3,
1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3
, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2
, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])) + (11936*c^2*d*x^3*Appel
lF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(64*c*AppellF
1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(Appel
lF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[
8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(105*d^2*(-8*
c + d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.055, size = 2198, normalized size = 3.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(d*x^3+c)^(1/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/d^2*(2/7*x^2*(d*x^3+c)^(1/2)-2/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(
I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+16*c/d^2*(-
2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*
(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d
^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha
=RootOf(_Z^3*d-8*c))+64*c^2/d^2*(-1/24/c*x^2*(d*x^3+c)^(1/2)/(d*
```

```
x^3-8*c)-1/72*I/c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Ellipt
icE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/216*I/d^3/c*2^(1/2)*sum(1/_alph
a*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c
*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3
*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1
/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*
d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/
3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I
*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2
)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c
*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x^7}{(dx^3 - 8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c)^2, x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**7*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}\,x^7}{(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^7/(d*x^3 - 8*c)^2, x)
```

3.406 $\int \frac{x^4\sqrt{c+dx^3}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=641

$$\frac{7\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{3\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{7\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2\,3^{3/4}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} + \frac{7\sqrt{c+dx^3}}{3d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)} + \frac{5\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{5/3}} - \frac{5\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9d^{5/3}} + \frac{5\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^{5/3}} + \frac{x^2\sqrt{c+dx^3}}{3d\left(8c-dx^3\right)}$$

```
[Out] (7*Sqrt[c + d*x^3])/(3*d^(5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x
)) + (x^2*Sqrt[c + d*x^3])/(3*d*(8*c - d*x^3)) + (5*c^(1/6)*ArcTa
n[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(3*Sq
rt[3]*d^(5/3)) - (5*c^(1/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^
(1/6)*Sqrt[c + d*x^3])])/(9*d^(5/3)) + (5*c^(1/6)*ArcTanh[Sqrt[c
+ d*x^3]/(3*Sqrt[c])])/(9*d^(5/3)) - (7*Sqrt[2 - Sqrt[3]]*c^(1/3)
*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3
)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((
1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)], -7 - 4*Sqrt[3]])/(2*3^(3/4)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3)
 + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*
x^3]) + (7*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3*3^(1/4)*d^(5
/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.48782, antiderivative size = 641, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$\frac{7\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{3\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{7\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2\ 3^{3/4}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} + \frac{7\sqrt{c+dx^3}}{3d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)} + \frac{5\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3\sqrt{3}d^{5/3}} - \frac{5\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9d^{5/3}} + \frac{5\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9d^{5/3}} + \frac{x^2\sqrt{c+dx^3}}{3d\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (7*Sqrt[c + d*x^3])/(3*d^(5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x
)) + (x^2*Sqrt[c + d*x^3])/(3*d*(8*c - d*x^3)) + (5*c^(1/6)*ArcTa
n[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(3*Sq
rt[3]*d^(5/3)) - (5*c^(1/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^
(1/6)*Sqrt[c + d*x^3])])/(9*d^(5/3)) + (5*c^(1/6)*ArcTanh[Sqrt[c
+ d*x^3]/(3*Sqrt[c])])/(9*d^(5/3)) - (7*Sqrt[2 - Sqrt[3]]*c^(1/3)
*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3
)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((
1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)], -7 - 4*Sqrt[3]])/(2*3^(3/4)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3)
 + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*
x^3]) + (7*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3*3^(1/4)*d^(5
/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 24.1049, size = 53, normalized size = 0.08

$$\frac{x^5\sqrt{c+dx^3}\operatorname{appellf}_1\left(\frac{5}{3},-\frac{1}{2},2,\frac{8}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{320c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] x**5*sqrt(c + d*x**3)*appellf1(5/3, -1/2, 2, 8/3, -d*x**3/c, d*x*
*3/(8*c))/(320*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.368674, size = 357, normalized size = 0.56

$$\frac{x^2\left(\frac{200c^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{d(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{224cx^3F_1\left(\frac{5}{3};\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\right.\right.\right.}\right.}{15\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (x^2*((-5*(c + d*x^3))/(d*(-8*c + d*x^3)) + (200*c^2*AppellF1[2/3
, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(d*(-8*c + d*x^3)*(4
0*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d
*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4
*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) - (22
4*c*x^3*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/
((8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*
x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c),
(d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x
^3)/(8*c)])))))/(15*Sqrt[c + d*x^3])
```

Maple [C] time = 0.015, size = 1740, normalized size = 2.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(d*x^3+c)^(1/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/d*(-2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((
x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d
*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)
^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^
(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1
/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+
c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1
/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipt
icPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*
(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2
)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),
_alpha=RootOf(_Z^3*d-8*c))+8*c/d*(-1/24/c*x^2*(d*x^3+c)^(1/2)/(d
*x^3-8*c)-1/72*I/c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1
/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Ellip
ticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^
(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/216*I/d^3/c*2^(1/2)*sum(1/_alp
```

```
ha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-
3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+
1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2
*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2
/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*
I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/
2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + cx^4}}{(dx^3 - 8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c)^2, x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4\sqrt{c + dx^3}}{(-8c + dx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Integral(x**4*sqrt(c + d*x**3)/(-8*c + d*x**3)**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + cx^4}}{(dx^3 - 8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^4/(d*x^3 - 8*c)^2, x)
```

3.407 $\int \frac{x\sqrt{c+dx^3}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=644

$$\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{48\sqrt{3}c^{5/6}d^{2/3}}-\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{144c^{5/6}d^{2/3}}+\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{144c^{5/6}d^{2/3}}+\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{12\sqrt{2}\sqrt[4]{3}c^{2/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16\,3^{3/4}c^{2/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt{c+dx^3}}{24cd^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{x^2\sqrt{c+dx^3}}{24c\left(8c-dx^3\right)}$$

```
[Out] Sqrt[c + d*x^3]/(24*c*d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) + (x^2*Sqrt[c + d*x^3])/(24*c*(8*c - d*x^3)) + ArcTan[(Sqrt[3]*
c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]/(48*Sqrt[3]*c^(5/
6)*d^(2/3)) - ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c +
 d*x^3])]/(144*c^(5/6)*d^(2/3)) + ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt
[c])]/(144*c^(5/6)*d^(2/3)) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/
3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1
/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqr
t[3]])/(16*3^(3/4)*c^(2/3)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/
3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) +
((c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3
)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((
1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)], -7 - 4*Sqrt[3]])/(12*Sqrt[2]*3^(1/4)*c^(2/3)*d^(2/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.47356, antiderivative size = 644, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.52$

$$\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{48\sqrt{3}c^{5/6}d^{2/3}}-\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{144c^{5/6}d^{2/3}}+\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{144c^{5/6}d^{2/3}}+\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{12\sqrt{2}\sqrt[4]{3}c^{2/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16\ 3^{3/4}c^{2/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt{c+dx^3}}{24cd^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{x^2\sqrt{c+dx^3}}{24c\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] Sqrt[c + d*x^3]/(24*c*d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) + (x^2*Sqrt[c + d*x^3])/(24*c*(8*c - d*x^3)) + ArcTan[(Sqrt[3]*
c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]/(48*Sqrt[3]*c^(5/
6)*d^(2/3)) - ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c +
 d*x^3])]/(144*c^(5/6)*d^(2/3)) + ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt
[c])]/(144*c^(5/6)*d^(2/3)) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/
3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1
/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqr
t[3]])/(16*3^(3/4)*c^(2/3)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/
3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) +
((c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3
)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((
1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)], -7 - 4*Sqrt[3]])/(12*Sqrt[2]*3^(1/4)*c^(2/3)*d^(2/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 20.3916, size = 53, normalized size = 0.08

$$\frac{x^2\sqrt{c+dx^3}\operatorname{appellf}_1\left(\frac{2}{3},-\frac{1}{2},2,\frac{5}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{128c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, -1/2, 2, 5/3, -d*x**3/c, d*x*
*3/(8*c))/(128*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.375437, size = 353, normalized size = 0.55

$$\frac{x^2\left(\frac{32dx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{100cF_1\left(\frac{2}{3};\frac{1}{2},\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\right.\right.\right.}\right.}{120\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[c + d*x^3])/(8*c - d*x^3)^2,x]
```

```
[Out] (x^2*((5*(c + d*x^3))/(c*(8*c - d*x^3)) + (100*c*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*App
ellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(A
ppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*Appell
F1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (32*d*x^3*
AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((-8*c +
 d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8
*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)
/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*
c)])))))/(120*Sqrt[c + d*x^3])
```

Maple [C] time = 0.009, size = 882, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(1/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] -1/24/c*x^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/72*I/c*3^(1/2)/d*(-c*d^
2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/
216*I/d^3/c*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d
*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2
)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)
^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/
3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d
^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d
-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^
(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+cx}}{\left(dx^3-8\,c\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x/(d*x^3 - 8*c)^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx^3+cx}}{d^2x^6-16\,cdx^3+64\,c^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x^3 + c)*x/(d^2*x^6 - 16*c*d*x^3 + 64*c^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x\sqrt{c+dx^3}}{(-8c+dx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**3+c)**(1/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Integral(x*sqrt(c + d*x**3)/(-8*c + d*x**3)**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{dx^3+cx}}{(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x/(d*x^3 - 8*c)^2, x)
```

3.408 $\int \frac{\sqrt{c+dx^3}}{x^2(8c-dx^3)^2}\,dx$

Optimal. Leaf size=665

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{24\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32\ 3^{3/4}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{48\sqrt{3}c^{11/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{144c^{11/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{144c^{11/6}}-\frac{\sqrt{c+dx^3}}{48c^2x}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{48c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{\sqrt{c+dx^3}}{24cx\left(8c-dx^3\right)}$$

```
[Out] -Sqrt[c + d*x^3]/(48*c^2*x) + (d^(1/3)*Sqrt[c + d*x^3])/(48*c^2*(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + Sqrt[c + d*x^3]/(24*c*x*(8*
c - d*x^3)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)
*x))/Sqrt[c + d*x^3]])/(48*Sqrt[3]*c^(11/6)) + (d^(1/3)*ArcTanh[(
c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(144*c^(11/6
)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(144*c^(11/6)
) - (Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3
) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(
1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32*3^(3/4)
*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1
/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(1/3) + d^(1/3
)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/
3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt
[3]])/(24*Sqrt[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3
)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.76859, antiderivative size = 665, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{24\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32\ 3^{3/4}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{48\sqrt{3}c^{11/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{144c^{11/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{144c^{11/6}}$$
$$-\frac{\sqrt{c+dx^3}}{48c^2x}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{48c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{\sqrt{c+dx^3}}{24cx\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]   Int[Sqrt[c + d*x^3]/(x^2*(8*c - d*x^3)^2),x]
```

```
[Out] -Sqrt[c + d*x^3]/(48*c^2*x) + (d^(1/3)*Sqrt[c + d*x^3])/(48*c^2*(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + Sqrt[c + d*x^3]/(24*c*x*(8*
c - d*x^3)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)
*x))/Sqrt[c + d*x^3]])/(48*Sqrt[3]*c^(11/6)) + (d^(1/3)*ArcTanh[(
c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(144*c^(11/6
)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(144*c^(11/6)
) - (Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3
) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(
1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32*3^(3/4)
*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1
/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(1/3) + d^(1/3
)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/
3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt
[3]])/(24*Sqrt[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3
)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.8643, size = 54, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{1}{3},-\frac{1}{2},2,\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64c^2x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((d*x**3+c)**(1/2)/x**2/(-d*x**3+8*c)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, -1/2, 2, 2/3, -d*x**3/c, d*x**3/
(8*c))/(64*c**2*x*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.471944, size = 372, normalized size = 0.56

$$-\frac{\frac{4d^2x^5F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{c(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{125dx^2F_1\left(\frac{2}{3};\frac{1}{2},1\ldots\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\ldots\right.\right.\right.}}{30\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^2*(8*c - d*x^3)^2),x]
```

```
[Out] ((-5*(6*c - d*x^3)*(c + d*x^3))/(8*c^2*(8*c*x - d*x^4)) + (125*d*
x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*
c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)
/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^
3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8
*c)]))) - (4*d^2*x^5*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*
x^3)/(8*c)])/(c*(8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -(
(d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3,
 -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((
d*x^3)/c), (d*x^3)/(8*c)]))))/(30*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 2193, normalized size = 3.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^2/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/
d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^
2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/8*d/c*(-1/24/c*x^2*
(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/72*I/c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/216*I/d^3/c*
2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))-1/64*d/c
```

```
^2*(-2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x
-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*
(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)))+1/3*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^
(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)
))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(
1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/
2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c
)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/
2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipti
cPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(
-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)
*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_
alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{(dx^3-8\,c)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx^3+c}}{d^2x^8-16\,cdx^5+64\,c^2x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x^3 + c)/(d^2*x^8 - 16*c*d*x^5 + 64*c^2*x^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(1/2)/x**2/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{\left(dx^3-8\,c\right)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^2), x)
```

3.409 $\int \frac{\sqrt{c+dx^3}}{x^5(8c-dx^3)^2}\,dx$

Optimal. Leaf size=687

$$-\frac{17d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3072\sqrt{3}c^{17/6}}+\frac{17d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9216c^{17/6}}-\frac{17d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9216c^{17/6}}+\frac{d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{48\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{64\ 3^{3/4}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{d^{4/3}\sqrt{c+dx^3}}{96c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{d\sqrt{c+dx^3}}{96c^3x}-\frac{7\sqrt{c+dx^3}}{768c^2x^4}+\frac{\sqrt{c+dx^3}}{24cx^4\left(8c-dx^3\right)}$$

```
[Out] (-7*Sqrt[c + d*x^3])/(768*c^2*x^4) - (d*Sqrt[c + d*x^3])/(96*c^3*
x) + (d^(4/3)*Sqrt[c + d*x^3])/(96*c^3*((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)) + Sqrt[c + d*x^3]/(24*c*x^4*(8*c - d*x^3)) - (17*d^(4/
3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]
])/(3072*Sqrt[3]*c^(17/6)) + (17*d^(4/3)*ArcTanh[(c^(1/3) + d^(1/
3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(9216*c^(17/6)) - (17*d^(4/
3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9216*c^(17/6)) - (Sqrt[
2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3
)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(64*3^(3/4)*c^(8/3)*S
qrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[
(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3
) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/
3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(48*
Sqrt[2]*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.0697, antiderivative size = 687, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{17d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{3072\sqrt{3}c^{17/6}}+\frac{17d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{9216c^{17/6}}-\frac{17d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{9216c^{17/6}}$$
$$+\frac{d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{48\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{64\ 3^{3/4}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{d^{4/3}\sqrt{c+dx^3}}{96c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{d\sqrt{c+dx^3}}{96c^3x}-\frac{7\sqrt{c+dx^3}}{768c^2x^4}+\frac{\sqrt{c+dx^3}}{24cx^4\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^5*(8*c - d*x^3)^2),x]
```

```
[Out] (-7*Sqrt[c + d*x^3])/(768*c^2*x^4) - (d*Sqrt[c + d*x^3])/(96*c^3*
x) + (d^(4/3)*Sqrt[c + d*x^3])/(96*c^3*((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)) + Sqrt[c + d*x^3]/(24*c*x^4*(8*c - d*x^3)) - (17*d^(4/
3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]
])/(3072*Sqrt[3]*c^(17/6)) + (17*d^(4/3)*ArcTanh[(c^(1/3) + d^(1/
3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(9216*c^(17/6)) - (17*d^(4/
3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(9216*c^(17/6)) - (Sqrt[
2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3
)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(64*3^(3/4)*c^(8/3)*S
qrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[
(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3
) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/
3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(48*
Sqrt[2]*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 24.4068, size = 58, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{4}{3},-\frac{1}{2},2,-\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{256c^2x^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**5/(-d*x**3+8*c)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-4/3, -1/2, 2, -1/3, -d*x**3/c, d*x**3
/(8*c))/(256*c**2*x**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.38754, size = 362, normalized size = 0.53

$$\frac{\frac{5750c^2d^2x^6F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{256cd^3x^9F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF}}{3840c^3x^4\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^5*(8*c - d*x^3)^2),x]
```

```
[Out] (-5*(c + d*x^3)*(24*c^2 + 57*c*d*x^3 - 8*d^2*x^6) + (5750*c^2*d^2
*x^6*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(40
*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*
x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*
AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])) - (256*
c*d^3*x^9*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]
)/(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] +
 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)
] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])))
/(3840*c^3*x^4*(8*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 2671, normalized size = 3.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^5/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-1/4*(d*x^3+c)^(1/2)/x^4-3/8*d*(d*x^3+c)^(1/2)/c/x-1/8*
I*d/c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-
c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2
)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2))))+1/256/c^3*d*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*
d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+
1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))
+1/64*d^2/c^2*(-1/24/c*x^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/72*I/c*3
^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2
)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/
3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(
```

```
-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3)))^(1/2)))+1/216*I/d^3/c*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1
/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d
^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3
^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*
(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d
^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^
(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_
alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Ro
otOf(_Z^3*d-8*c)))-1/256*d^2/c^3*(-2/3*I*3^(1/2)/d*(-c*d^2)^(1/3)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/d^3*
2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{\left(dx^3-8\,c\right)^2 x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^5),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx^3+c}}{d^2x^{11}-16\,cdx^8+64\,c^2x^5}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^5),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x^3 + c)/(d^2*x^11 - 16*c*d*x^8 + 64*c^2*x^5), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**5/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{\left(dx^3 - 8\,c\right)^2 x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^5),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^5), x)
```

3.410 $\int \frac{\sqrt{c+dx^3}}{x^8(8c-dx^3)^2}\,dx$

Optimal. Leaf size=711

$$-\frac{13d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{12288\sqrt{3}c^{23/6}}+\frac{13d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{36864c^{23/6}}-\frac{13d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{36864c^{23/6}}+\frac{d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2688\sqrt{2}\sqrt[4]{3}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{3584\,3^{3/4}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{d^{7/3}\sqrt{c+dx^3}}{5376c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{d^2\sqrt{c+dx^3}}{5376c^4x}-\frac{53d\sqrt{c+dx^3}}{21504c^3x^4}-\frac{5\sqrt{c+dx^3}}{672c^2x^7}+\frac{\sqrt{c+dx^3}}{24cx^7\left(8c-dx^3\right)}$$

```
[Out] (-5*Sqrt[c + d*x^3])/(672*c^2*x^7) - (53*d*Sqrt[c + d*x^3])/(2150
4*c^3*x^4) - (d^2*Sqrt[c + d*x^3])/(5376*c^4*x) + (d^(7/3)*Sqrt[c
 + d*x^3])/(5376*c^4*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + Sqrt[
c + d*x^3]/(24*c*x^7*(8*c - d*x^3)) - (13*d^(7/3)*ArcTan[(Sqrt[3]
*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(12288*Sqrt[3]*
c^(23/6)) + (13*d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6
)*Sqrt[c + d*x^3])])/(36864*c^(23/6)) - (13*d^(7/3)*ArcTanh[Sqrt[
c + d*x^3]/(3*Sqrt[c])])/(36864*c^(23/6)) - (Sqrt[2 - Sqrt[3]]*d^
(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d
^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcS
in[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)], -7 - 4*Sqrt[3]])/(3584*3^(3/4)*c^(11/3)*Sqrt[(c^(1/3)
*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sq
rt[c + d*x^3]) + (d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(2688*Sqrt[2]*3^
(1/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3]
)*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.32045, antiderivative size = 711, normalized size of antiderivative = 1., number of

steps used = 17, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{13d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{12288\sqrt{3}c^{23/6}}+\frac{13d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{36864c^{23/6}}-\frac{13d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{36864c^{23/6}}+\frac{d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{2688\sqrt{2}\sqrt[4]{3}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{3584\ 3^{3/4}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{d^{7/3}\sqrt{c+dx^3}}{5376c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{d^2\sqrt{c+dx^3}}{5376c^4x}-\frac{53d\sqrt{c+dx^3}}{21504c^3x^4}-\frac{5\sqrt{c+dx^3}}{672c^2x^7}+\frac{\sqrt{c+dx^3}}{24cx^7\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^8*(8*c - d*x^3)^2),x]
```

```
[Out] (-5*Sqrt[c + d*x^3])/(672*c^2*x^7) - (53*d*Sqrt[c + d*x^3])/(2150
4*c^3*x^4) - (d^2*Sqrt[c + d*x^3])/(5376*c^4*x) + (d^(7/3)*Sqrt[c
 + d*x^3])/(5376*c^4*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + Sqrt[
c + d*x^3]/(24*c*x^7*(8*c - d*x^3)) - (13*d^(7/3)*ArcTan[(Sqrt[3]
*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(12288*Sqrt[3]*
c^(23/6)) + (13*d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6
)*Sqrt[c + d*x^3])])/(36864*c^(23/6)) - (13*d^(7/3)*ArcTanh[Sqrt[
c + d*x^3]/(3*Sqrt[c])])/(36864*c^(23/6)) - (Sqrt[2 - Sqrt[3]]*d^
(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d
^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcS
in[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d
^(1/3)*x)], -7 - 4*Sqrt[3]])/(3584*3^(3/4)*c^(11/3)*Sqrt[(c^(1/3)
*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sq
rt[c + d*x^3]) + (d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(2688*Sqrt[2]*3^
(1/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3]
)*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 28.7414, size = 58, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{7}{3},-\frac{1}{2},2,-\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{448c^2x^7\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**8/(-d*x**3+8*c)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-7/3, -1/2, 2, -4/3, -d*x**3/c, d*x**3
/(8*c))/(448*c**2*x**7*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.567227, size = 377, normalized size = 0.53

$$\frac{\frac{15250c^2d^3x^9F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{128cd^4x^{12}F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF}}{107520c^4x^7\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^8*(8*c - d*x^3)^2),x]
```

```
[Out] (-5*(384*c^4 + 648*c^3*d*x^3 + 243*c^2*d^2*x^6 - 25*c*d^3*x^9 - 4
*d^4*x^12) + (15250*c^2*d^3*x^9*AppellF1[2/3, 1/2, 1, 5/3, -((d*x
^3)/c), (d*x^3)/(8*c)])/(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3
)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x
^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c
), (d*x^3)/(8*c)])) - (128*c*d^4*x^12*AppellF1[5/3, 1/2, 1, 8/3,
-((d*x^3)/c), (d*x^3)/(8*c)])/(64*c*AppellF1[5/3, 1/2, 1, 8/3, -(
(d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3,
 -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((
d*x^3)/c), (d*x^3)/(8*c)])))/(107520*c^4*x^7*(8*c - d*x^3)*Sqrt[c
 + d*x^3])
```

Maple [C] time = 0.021, size = 3169, normalized size = 4.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^8/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-1/7*(d*x^3+c)^(1/2)/x^7-3/56*d*(d*x^3+c)^(1/2)/c/x^4+1
5/112*d^2*(d*x^3+c)^(1/2)/c^2/x+5/112*I*d^2/c^2*3^(1/2)*(-c*d^2)^
(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+3/40
96/c^4*d^2*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/
(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/256/c^3*d*(-1/4*(
d*x^3+c)^(1/2)/x^4-3/8*d*(d*x^3+c)^(1/2)/c/x-1/8*I*d/c*3^(1/2)*(-
c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(
x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Elliptic
```

```
F(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/
3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))
))+1/512*d^3/c^3*(-1/24/c*x^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/72*I/
c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*
d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^
(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)))+1/216*I/d^3/c*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha
=RootOf(_Z^3*d-8*c)))-3/4096*d^3/c^4*(-2/3*I*3^(1/2)/d*(-c*d^2)^(
1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/
d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(
1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-
1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))
^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alph
a*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3
)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alph
a*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*
c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(dx^3 - 8c)^2 x^8} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^8),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^8), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^8),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**8/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(dx^3 - 8c)^2 x^8} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^8),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((d*x^3 - 8*c)^2*x^8), x)
```

3.411 $\int \frac{x^{11}(c+dx^3)^{3/2}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=134

$$-\frac{4992c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}+\frac{1664c^3\sqrt{c+dx^3}}{d^4}+\frac{2c\left(c+dx^3\right)^{3/2}\left(694c+51dx^3\right)}{21d^4}+\frac{3x^6\left(c+dx^3\right)^{3/2}}{7d^2}+\frac{x^9\left(c+dx^3\right)^{3/2}}{3d\left(8c-dx^3\right)}$$

```
[Out] (1664*c^3*Sqrt[c + d*x^3])/d^4 + (3*x^6*(c + d*x^3)^(3/2))/(7*d^2
) + (x^9*(c + d*x^3)^(3/2))/(3*d*(8*c - d*x^3)) + (2*c*(c + d*x^3
)^(3/2)*(694*c + 51*d*x^3))/(21*d^4) - (4992*c^(7/2)*ArcTanh[Sqrt
[c + d*x^3]/(3*Sqrt[c])])/d^4
```

Rubi [A] time = 0.374853, antiderivative size = 134, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$-\frac{4992c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}+\frac{1664c^3\sqrt{c+dx^3}}{d^4}+\frac{2c\left(c+dx^3\right)^{3/2}\left(694c+51dx^3\right)}{21d^4}+\frac{3x^6\left(c+dx^3\right)^{3/2}}{7d^2}+\frac{x^9\left(c+dx^3\right)^{3/2}}{3d\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^11*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (1664*c^3*Sqrt[c + d*x^3])/d^4 + (3*x^6*(c + d*x^3)^(3/2))/(7*d^2
) + (x^9*(c + d*x^3)^(3/2))/(3*d*(8*c - d*x^3)) + (2*c*(c + d*x^3
)^(3/2)*(694*c + 51*d*x^3))/(21*d^4) - (4992*c^(7/2)*ArcTanh[Sqrt
[c + d*x^3]/(3*Sqrt[c])])/d^4
```

Rubi in Sympy [A] time = 51.7636, size = 124, normalized size = 0.93

$$-\frac{4992c^{\frac{7}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^4}+\frac{1664c^3\sqrt{c+dx^3}}{d^4}+\frac{8c\left(c+dx^3\right)^{\frac{3}{2}}\left(\frac{5205c}{2}+\frac{765dx^3}{4}\right)}{315d^4}+\frac{x^9\left(c+dx^3\right)^{\frac{3}{2}}}{3d\left(8c-dx^3\right)}+\frac{3x^6\left(c+dx^3\right)^{\frac{3}{2}}}{7d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] -4992*c**(7/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**4 + 1664*c*
*3*sqrt(c + d*x**3)/d**4 + 8*c*(c + d*x**3)**(3/2)*(5205*c/2 + 76
5*d*x**3/4)/(315*d**4) + x**9*(c + d*x**3)**(3/2)/(3*d*(8*c - d*x
**3)) + 3*x**6*(c + d*x**3)**(3/2)/(7*d**2)
```

Mathematica [A] time = 0.277794, size = 101, normalized size = 0.75

$$\frac{2\left(\frac{\sqrt{c+dx^3}\left(-145328c^4+12206c^3dx^3+301c^2d^2x^6+16cd^3x^9+d^4x^{12}\right)}{dx^3-8c}-52416c^{7/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{21d^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^11*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (2*((Sqrt[c + d*x^3]*(-145328*c^4 + 12206*c^3*d*x^3 + 301*c^2*d^2
*x^6 + 16*c*d^3*x^9 + d^4*x^12))/(-8*c + d*x^3) - 52416*c^(7/2)*A
rcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))/(21*d^4)
```

Maple [C] time = 0.059, size = 998, normalized size = 7.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11*(d*x^3+c)^(3/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/d^3*(d*(2/21*d*x^9*(d*x^3+c)^(1/2)+16/105*c*x^6*(d*x^3+c)^(1/2)
+2/105*c^2/d*x^3*(d*x^3+c)^(1/2)-4/105*c^3/d^2*(d*x^3+c)^(1/2))+3
2/15*c/d*(d*x^3+c)^(5/2))+192*c^2/d^3*(2/9*x^3*(d*x^3+c)^(1/2)+56
/9*c*(d*x^3+c)^(1/2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*
I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)
^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1
/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*
(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)
^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/
3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alp
ha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootO
f(_Z^3*d-8*c)))+512*c^3/d^3*(-3*c/d*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2
/3*(d*x^3+c)^(1/2)/d+1/2*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*
d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(
1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2
)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-
c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(
2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/
2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)
*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha
*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(
_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^11/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.227099, size = 1, normalized size = 0.01

$$\left[\frac{2\left(26208\left(c^{3}dx^{3}-8\,c^{4}\right)\sqrt{c}\log\left(\frac{dx^{3}-6\,\sqrt{dx^{3}+c}\sqrt{c}+10\,c}{dx^{3}-8\,c}\right)+\left(d^{4}x^{12}+16\,cd^{3}x^{9}+301\,c^{2}d^{2}x^{6}+12206\,c^{3}dx^{3}-145328\,c^{4}\right)\sqrt{dx^{3}+c}\right)}{21\left(d^{5}x^{3}-8\,cd^{4}\right)},\; -\frac{2\left(52416\left(c^{3}dx^{3}-8\,c^{4}\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\sqrt{-c}}\right)-\left(d^{4}x^{12}+16\,cd^{3}x^{9}+301\,c^{2}d^{2}x^{6}+12206\,c^{3}dx^{3}-145328\,c^{4}\right)\sqrt{dx^{3}+c}\right)}{21\left(d^{5}x^{3}-8\,cd^{4}\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^11/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] [2/21*(26208*(c^3*d*x^3 - 8*c^4)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^
3 + c)*sqrt(c) + 10*c)/(d*x^3 - 8*c)) + (d^4*x^12 + 16*c*d^3*x^9
+ 301*c^2*d^2*x^6 + 12206*c^3*d*x^3 - 145328*c^4)*sqrt(d*x^3 + c)
)/(d^5*x^3 - 8*c*d^4), -2/21*(52416*(c^3*d*x^3 - 8*c^4)*sqrt(-c)*
arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (d^4*x^12 + 16*c*d^3*x^9 +
 301*c^2*d^2*x^6 + 12206*c^3*d*x^3 - 145328*c^4)*sqrt(d*x^3 + c))
/(d^5*x^3 - 8*c*d^4)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**11*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219363, size = 171, normalized size = 1.28

$$\frac{4992\,c^{4}\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}d^{4}}-\frac{1536\,\sqrt{dx^{3}+c}c^{4}}{(dx^{3}-8\,c)d^{4}}+\frac{2\left(\left(dx^{3}+c\right)^{\frac{7}{2}}d^{24}+21\left(dx^{3}+c\right)^{\frac{5}{2}}cd^{24}+448\left(dx^{3}+c\right)^{\frac{3}{2}}c^{2}d^{24}+15680\,\sqrt{dx^{3}+c}c^{3}d^{24}\right)}{21\,d^{28}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^11/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] 4992*c^4*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^4) - 15
36*sqrt(d*x^3 + c)*c^4/((d*x^3 - 8*c)*d^4) + 2/21*((d*x^3 + c)^(7
/2)*d^24 + 21*(d*x^3 + c)^(5/2)*c*d^24 + 448*(d*x^3 + c)^(3/2)*c^
2*d^24 + 15680*sqrt(d*x^3 + c)*c^3*d^24)/d^28
```

3.412 $\int \frac{x^8(c+dx^3)^{3/2}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=119

$$-\frac{480c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}+\frac{160c^2\sqrt{c+dx^3}}{d^3}+\frac{64c\left(c+dx^3\right)^{5/2}}{27d^3\left(8c-dx^3\right)}+\frac{160c\left(c+dx^3\right)^{3/2}}{27d^3}+\frac{2\left(c+dx^3\right)^{5/2}}{15d^3}$$

```
[Out] (160*c^2*Sqrt[c + d*x^3])/d^3 + (160*c*(c + d*x^3)^(3/2))/(27*d^3
) + (2*(c + d*x^3)^(5/2))/(15*d^3) + (64*c*(c + d*x^3)^(5/2))/(27
*d^3*(8*c - d*x^3)) - (480*c^(5/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])])/d^3
```

Rubi [A] time = 0.290337, antiderivative size = 119, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$-\frac{480c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}+\frac{160c^2\sqrt{c+dx^3}}{d^3}+\frac{64c\left(c+dx^3\right)^{5/2}}{27d^3\left(8c-dx^3\right)}+\frac{160c\left(c+dx^3\right)^{3/2}}{27d^3}+\frac{2\left(c+dx^3\right)^{5/2}}{15d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (160*c^2*Sqrt[c + d*x^3])/d^3 + (160*c*(c + d*x^3)^(3/2))/(27*d^3
) + (2*(c + d*x^3)^(5/2))/(15*d^3) + (64*c*(c + d*x^3)^(5/2))/(27
*d^3*(8*c - d*x^3)) - (480*c^(5/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])])/d^3
```

Rubi in Sympy [A] time = 37.1209, size = 109, normalized size = 0.92

$$-\frac{480c^{\frac{5}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^3}+\frac{160c^2\sqrt{c+dx^3}}{d^3}+\frac{64c\left(c+dx^3\right)^{\frac{5}{2}}}{27d^3\left(8c-dx^3\right)}+\frac{160c\left(c+dx^3\right)^{\frac{3}{2}}}{27d^3}+\frac{2\left(c+dx^3\right)^{\frac{5}{2}}}{15d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] -480*c**(5/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**3 + 160*c**2
*sqrt(c + d*x**3)/d**3 + 64*c*(c + d*x**3)**(5/2)/(27*d**3*(8*c -
 d*x**3)) + 160*c*(c + d*x**3)**(3/2)/(27*d**3) + 2*(c + d*x**3)*
*(5/2)/(15*d**3)
```

Mathematica [A] time = 0.254843, size = 91, normalized size = 0.76

$$\frac{2\left(\frac{\sqrt{c+dx^3}\left(-29944c^3+2515c^2dx^3+62cd^2x^6+3d^3x^9\right)}{dx^3-8c}-10800c^{5/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{45d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (2*((Sqrt[c + d*x^3]*(-29944*c^3 + 2515*c^2*d*x^3 + 62*c*d^2*x^6
+ 3*d^3*x^9))/(-8*c + d*x^3) - 10800*c^(5/2)*ArcTanh[Sqrt[c + d*x
^3]/(3*Sqrt[c])]))/(45*d^3)
```

Maple [C] time = 0.019, size = 920, normalized size = 7.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(3/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 2/15*(d*x^3+c)^(5/2)/d^3+64*c^2/d^2*(-3*c/d*(d*x^3+c)^(1/2)/(d*x^
3-8*c)+2/3*(d*x^3+c)^(1/2)/d+1/2*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha
=RootOf(_Z^3*d-8*c))+16*c/d^2*(2/9*x^3*(d*x^3+c)^(1/2)+56/9*c*(d
*x^3+c)^(1/2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*
x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c
*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2
)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-
(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1
/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*
d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*
d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^8/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229451, size = 1, normalized size = 0.01

$$\left[\frac{2\left(5400\left(c^{2}dx^{3}-8\,c^{3}\right)\sqrt{c}\log\left(\frac{dx^{3}-6\,\sqrt{dx^{3}+c}\sqrt{c}+10\,c}{dx^{3}-8\,c}\right)+\left(3\,d^{3}x^{9}+62\,cd^{2}x^{6}+2515\,c^{2}dx^{3}-29944\,c^{3}\right)\sqrt{dx^{3}+c}\right)}{45\left(d^{4}x^{3}-8\,cd^{3}\right)},\right.$$
$$\left.-\frac{2\left(10800\left(c^{2}dx^{3}-8\,c^{3}\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\,\sqrt{-c}}\right)-\left(3\,d^{3}x^{9}+62\,cd^{2}x^{6}+2515\,c^{2}dx^{3}-29944\,c^{3}\right)\sqrt{dx^{3}+c}\right)}{45\left(d^{4}x^{3}-8\,cd^{3}\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^8/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] [2/45*(5400*(c^2*d*x^3 - 8*c^3)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3
 + c)*sqrt(c) + 10*c)/(d*x^3 - 8*c)) + (3*d^3*x^9 + 62*c*d^2*x^6
+ 2515*c^2*d*x^3 - 29944*c^3)*sqrt(d*x^3 + c))/(d^4*x^3 - 8*c*d^3
), -2/45*(10800*(c^2*d*x^3 - 8*c^3)*sqrt(-c)*arctan(1/3*sqrt(d*x^
3 + c)/sqrt(-c)) - (3*d^3*x^9 + 62*c*d^2*x^6 + 2515*c^2*d*x^3 - 2
9944*c^3)*sqrt(d*x^3 + c))/(d^4*x^3 - 8*c*d^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.218764, size = 150, normalized size = 1.26

$$\frac{480\,c^3\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}d^3}-\frac{192\sqrt{dx^3+c}c^3}{(dx^3-8\,c)d^3}+\frac{2\left(3\left(dx^3+c\right)^{\frac{5}{2}}d^{12}+80\left(dx^3+c\right)^{\frac{3}{2}}cd^{12}+3120\sqrt{dx^3+c}c^2d^{12}\right)}{45\,d^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^8/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] 480*c^3*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^3) - 192
*sqrt(d*x^3 + c)*c^3/((d*x^3 - 8*c)*d^3) + 2/45*(3*(d*x^3 + c)^(5
/2)*d^12 + 80*(d*x^3 + c)^(3/2)*c*d^12 + 3120*sqrt(d*x^3 + c)*c^2
*d^12)/d^15
```

3.413 $\int \frac{x^5\left(c+dx^3\right)^{3/2}}{\left(8c-dx^3\right)^2}\,dx$

Optimal. Leaf size=97

$$-\frac{42c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}+\frac{8\left(c+dx^3\right)^{5/2}}{27d^2\left(8c-dx^3\right)}+\frac{14\left(c+dx^3\right)^{3/2}}{27d^2}+\frac{14c\sqrt{c+dx^3}}{d^2}$$

```
[Out] (14*c*Sqrt[c + d*x^3])/d^2 + (14*(c + d*x^3)^(3/2))/(27*d^2) + (8
*(c + d*x^3)^(5/2))/(27*d^2*(8*c - d*x^3)) - (42*c^(3/2)*ArcTanh[
Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^2
```

Rubi [A] time = 0.218082, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$-\frac{42c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}+\frac{8\left(c+dx^3\right)^{5/2}}{27d^2\left(8c-dx^3\right)}+\frac{14\left(c+dx^3\right)^{3/2}}{27d^2}+\frac{14c\sqrt{c+dx^3}}{d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (14*c*Sqrt[c + d*x^3])/d^2 + (14*(c + d*x^3)^(3/2))/(27*d^2) + (8
*(c + d*x^3)^(5/2))/(27*d^2*(8*c - d*x^3)) - (42*c^(3/2)*ArcTanh[
Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^2
```

Rubi in Sympy [A] time = 24.8618, size = 87, normalized size = 0.9

$$-\frac{42c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^2}+\frac{14c\sqrt{c+dx^3}}{d^2}+\frac{8\left(c+dx^3\right)^{\frac{5}{2}}}{27d^2\left(8c-dx^3\right)}+\frac{14\left(c+dx^3\right)^{\frac{3}{2}}}{27d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] -42*c**(3/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d**2 + 14*c*sqrt
(c + d*x**3)/d**2 + 8*(c + d*x**3)**(5/2)/(27*d**2*(8*c - d*x**3)
) + 14*(c + d*x**3)**(3/2)/(27*d**2)
```

Mathematica [A] time = 0.194774, size = 79, normalized size = 0.81

$$\frac{2\left(\frac{\sqrt{c+dx^3}\left(-524c^2+44cdx^3+d^2x^6\right)}{dx^3-8c}-189c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{9d^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (2*((Sqrt[c + d*x^3]*(-524*c^2 + 44*c*d*x^3 + d^2*x^6))/(-8*c + d
*x^3) - 189*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))/(9*d^2
)
```

Maple [C] time = 0.016, size = 902, normalized size = 9.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^3+c)^(3/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/d*(2/9*x^3*(d*x^3+c)^(1/2)+56/9*c*(d*x^3+c)^(1/2)/d+3*I*c/d^3*2
^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^
(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(
1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I
*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(
1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*
_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c
*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/
18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/
3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))+8*c/d*(-3*c/d*(d*x
^3+c)^(1/2)/(d*x^3-8*c)+2/3*(d*x^3+c)^(1/2)/d+1/2*I/d^3*2^(1/2)*s
um((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-
3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+
1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2
*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2
/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*
I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/
2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^5/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.227724, size = 1, normalized size = 0.01

$$\left[\frac{189\,\left(cdx^3-8\,c^2\right)\sqrt{c}\log\left(\frac{dx^3-6\,\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right)+2\,\left(d^2x^6+44\,cdx^3-524\,c^2\right)\sqrt{dx^3+c}}{9\,(d^3x^3-8\,cd^2)},\right.$$
$$\left.-\frac{2\left(189\,\left(cdx^3-8\,c^2\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)-\left(d^2x^6+44\,cdx^3-524\,c^2\right)\sqrt{dx^3+c}\right)}{9\,(d^3x^3-8\,cd^2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^5/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] [1/9*(189*(c*d*x^3 - 8*c^2)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3 + c
)*sqrt(c) + 10*c)/(d*x^3 - 8*c)) + 2*(d^2*x^6 + 44*c*d*x^3 - 524*
c^2)*sqrt(d*x^3 + c))/(d^3*x^3 - 8*c*d^2), -2/9*(189*(c*d*x^3 - 8
```

```
*c^2)*sqrt(-c)*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - (d^2*x^6 +
44*c*d*x^3 - 524*c^2)*sqrt(d*x^3 + c))/(d^3*x^3 - 8*c*d^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217198, size = 126, normalized size = 1.3

$$\frac{42\,c^2\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}d^2}-\frac{24\,\sqrt{dx^3+c}c^2}{(dx^3-8\,c)d^2}+\frac{2\left(\left(dx^3+c\right)^{\frac{3}{2}}d^4+51\,\sqrt{dx^3+c}cd^4\right)}{9\,d^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^5/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] 42*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^2) - 24*s
qrt(d*x^3 + c)*c^2/((d*x^3 - 8*c)*d^2) + 2/9*((d*x^3 + c)^(3/2)*d
^4 + 51*sqrt(d*x^3 + c)*c*d^4)/d^6
```

3.414 $\int \frac{x^2\left(c+dx^3\right)^{3/2}}{\left(8c-dx^3\right)^2}\,dx$

Optimal. Leaf size=77

$$\frac{\left(c+dx^3\right)^{3/2}}{3d\left(8c-dx^3\right)}+\frac{\sqrt{c+dx^3}}{d}-\frac{3\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}$$

```
[Out] Sqrt[c + d*x^3]/d + (c + d*x^3)^(3/2)/(3*d*(8*c - d*x^3)) - (3*Sq
rt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d
```

Rubi [A] time = 0.167287, antiderivative size = 77, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{\left(c+dx^3\right)^{3/2}}{3d\left(8c-dx^3\right)}+\frac{\sqrt{c+dx^3}}{d}-\frac{3\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] Sqrt[c + d*x^3]/d + (c + d*x^3)^(3/2)/(3*d*(8*c - d*x^3)) - (3*Sq
rt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d
```

Rubi in Sympy [A] time = 21.4598, size = 60, normalized size = 0.78

$$-\frac{3\sqrt{c}\,\text{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d}+\frac{\left(c+dx^3\right)^{\frac{3}{2}}}{3d\left(8c-dx^3\right)}+\frac{\sqrt{c+dx^3}}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] -3*sqrt(c)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/d + (c + d*x**3)**
(3/2)/(3*d*(8*c - d*x**3)) + sqrt(c + d*x**3)/d
```

Mathematica [A] time = 0.141368, size = 65, normalized size = 0.84

$$\frac{\sqrt{c+dx^3}\left(\frac{9c}{8c-dx^3}+2\right)-9\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{3d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (Sqrt[c + d*x^3]*(2 + (9*c)/(8*c - d*x^3)) - 9*Sqrt[c]*ArcTanh[Sq
rt[c + d*x^3]/(3*Sqrt[c])])/(3*d)
```

Maple [C] time = 0.01, size = 451, normalized size = 5.9

$$-3\frac{c\sqrt{dx^3+c}}{d(dx^3-8c)}+\frac{2}{3d}\sqrt{dx^3+c}$$
$$+\frac{\frac{i}{2}\sqrt{2}}{d^3}\sum_{\_alpha=RootOf(\_Z^3d-8c)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\sqrt[3]{\ldots}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2*(d*x^3+c)^(3/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] -3*c/d*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/3*(d*x^3+c)^(1/2)/d+1/2*I/d^
3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2
)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/
2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d
+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-
(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^
(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^2/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.226297, size = 1, normalized size = 0.01

$$\left[\frac{9\left(dx^3-8c\right)\sqrt{c}\log\left(\frac{dx^3-6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)+2\left(2dx^3-25c\right)\sqrt{dx^3+c}}{6\left(d^2x^3-8cd\right)},\right.$$
$$\left.-\frac{9\left(dx^3-8c\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-\left(2dx^3-25c\right)\sqrt{dx^3+c}}{3\left(d^2x^3-8cd\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^2/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] [1/6*(9*(d*x^3 - 8*c)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3 + c)*sqrt
(c) + 10*c)/(d*x^3 - 8*c)) + 2*(2*d*x^3 - 25*c)*sqrt(d*x^3 + c))/
(d^2*x^3 - 8*c*d), -1/3*(9*(d*x^3 - 8*c)*sqrt(-c)*arctan(1/3*sqrt
(d*x^3 + c)/sqrt(-c)) - (2*d*x^3 - 25*c)*sqrt(d*x^3 + c))/(d^2*x^
3 - 8*c*d)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.215647, size = 93, normalized size = 1.21

$$\frac{3\,c\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}d}+\frac{2\,\sqrt{dx^3+c}}{3\,d}-\frac{3\,\sqrt{dx^3+c}c}{(dx^3-8\,c)d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^2/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] 3*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) + 2/3*sqrt(
d*x^3 + c)/d - 3*sqrt(d*x^3 + c)*c/((d*x^3 - 8*c)*d)
```

3.415 $\int \frac{\left(c+dx^3\right)^{3/2}}{x\left(8c-dx^3\right)^2}\,dx$

Optimal. Leaf size=85

$$\frac{3\sqrt{c+dx^3}}{8\left(8c-dx^3\right)}-\frac{3\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32\sqrt{c}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96\sqrt{c}}$$

```
[Out] (3*Sqrt[c + d*x^3])/(8*(8*c - d*x^3)) - (3*ArcTanh[Sqrt[c + d*x^3
]/(3*Sqrt[c])])/(32*Sqrt[c]) - ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(
96*Sqrt[c])
```

Rubi [A] time = 0.256793, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$\frac{3\sqrt{c+dx^3}}{8\left(8c-dx^3\right)}-\frac{3\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32\sqrt{c}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x*(8*c - d*x^3)^2),x]
```

```
[Out] (3*Sqrt[c + d*x^3])/(8*(8*c - d*x^3)) - (3*ArcTanh[Sqrt[c + d*x^3
]/(3*Sqrt[c])])/(32*Sqrt[c]) - ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(
96*Sqrt[c])
```

Rubi in Sympy [A] time = 38.9959, size = 71, normalized size = 0.84

$$\frac{3\sqrt{c+dx^3}}{8\left(8c-dx^3\right)}-\frac{3\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{32\sqrt{c}}-\frac{\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x/(-d*x**3+8*c)**2,x)
```

```
[Out] 3*sqrt(c + d*x**3)/(8*(8*c - d*x**3)) - 3*atanh(sqrt(c + d*x**3)/
(3*sqrt(c)))/(32*sqrt(c)) - atanh(sqrt(c + d*x**3)/sqrt(c))/(96*s
qrt(c))
```

Mathematica [C] time = 0.382845, size = 317, normalized size = 3.73

$$\frac{\frac{\frac{10cdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}-27\left(c+dx^3\right)}{dx^3-8c}-\frac{168cdx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{\left(8c-dx^3\right)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right.\right.\right.}}{72\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x*(8*c - d*x^3)^2),x]
```

```
[Out] ((-168*c*d*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)
])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x
^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/
(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)])))
```

```
 + (-27*(c + d*x^3) + (10*c*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/
(d*x^3)), (8*c)/(d*x^3)])/(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c
/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(
d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3
)), (8*c)/(d*x^3)]))/(-8*c + d*x^3))/(72*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 956, normalized size = 11.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(2/9*d*x^3*(d*x^3+c)^(1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(
3/2)*arctanh((d*x^3+c)^(1/2)/c^(1/2)))+1/8*d/c*(-3*c/d*(d*x^3+c)^
(1/2)/(d*x^3-8*c)+2/3*(d*x^3+c)^(1/2)/d+1/2*I/d^3*2^(1/2)*sum((-c
*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)
^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*
d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I
*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*E
llipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alp
ha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3
^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)),_alpha=RootOf(_Z^3*d-8*c))-1/64*d/c^2*(2/9*x^3*(d*x^3+c)^(1
/2)+56/9*c*(d*x^3+c)^(1/2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha
=RootOf(_Z^3*d-8*c)))
```

MaximA [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(dx^3-8\,c\right)^2 x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x), x)
```

Fricas [A] time = 0.234004, size = 1, normalized size = 0.01

$$\left[\frac{9\left(dx^3-8\,c\right)\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}-6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+\left(dx^3-8\,c\right)\log\left(\frac{\left(dx^3+2\,c\right)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right)-72\,\sqrt{dx^3+c}\sqrt{c}}{192\left(dx^3-8\,c\right)\sqrt{c}},\ \frac{9\left(dx^3-8\,c\right)\arctan\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x),x, algorithm="fricas")
```

```
[Out] [1/192*(9*(d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(c) - 6*sqrt(d*x^
3 + c)*c)/(d*x^3 - 8*c)) + (d*x^3 - 8*c)*log(((d*x^3 + 2*c)*sqrt(
c) - 2*sqrt(d*x^3 + c)*c)/x^3) - 72*sqrt(d*x^3 + c)*sqrt(c))/((d*
x^3 - 8*c)*sqrt(c)), 1/96*(9*(d*x^3 - 8*c)*arctan(3*c/(sqrt(d*x^3
 + c)*sqrt(-c))) + (d*x^3 - 8*c)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-
c))) - 36*sqrt(d*x^3 + c)*sqrt(-c))/((d*x^3 - 8*c)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217021, size = 95, normalized size = 1.12

$$\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{96\sqrt{-c}} + \frac{3\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{32\sqrt{-c}} - \frac{3\sqrt{dx^3+c}}{8\,(dx^3-8\,c)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x),x, algorithm="giac")
```

```
[Out] 1/96*arctan(sqrt(d*x^3 + c)/sqrt(-c))/sqrt(-c) + 3/32*arctan(1/3*
sqrt(d*x^3 + c)/sqrt(-c))/sqrt(-c) - 3/8*sqrt(d*x^3 + c)/(d*x^3 -
 8*c)
```

3.416 $\int \frac{(c+dx^3)^{3/2}}{x^4(8c-dx^3)^2} \, dx$

Optimal. Leaf size=121

$$\frac{3d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{128c^{3/2}}-\frac{7d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{3/2}}+\frac{5d\sqrt{c+dx^3}}{96c\left(8c-dx^3\right)}-\frac{\sqrt{c+dx^3}}{24x^3\left(8c-dx^3\right)}$$

```
[Out] (5*d*Sqrt[c + d*x^3])/(96*c*(8*c - d*x^3)) - Sqrt[c + d*x^3]/(24*
x^3*(8*c - d*x^3)) + (3*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
128*c^(3/2)) - (7*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(384*c^(3/2
))
```

Rubi [A] time = 0.378754, antiderivative size = 121, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.259$

$$\frac{3d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{128c^{3/2}}-\frac{7d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{3/2}}+\frac{5d\sqrt{c+dx^3}}{96c\left(8c-dx^3\right)}-\frac{\sqrt{c+dx^3}}{24x^3\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^4*(8*c - d*x^3)^2),x]
```

```
[Out] (5*d*Sqrt[c + d*x^3])/(96*c*(8*c - d*x^3)) - Sqrt[c + d*x^3]/(24*
x^3*(8*c - d*x^3)) + (3*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
128*c^(3/2)) - (7*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(384*c^(3/2
))
```

Rubi in Sympy [A] time = 56.0711, size = 99, normalized size = 0.82

$$\frac{3\sqrt{c+dx^3}}{8x^3\left(8c-dx^3\right)}-\frac{5\sqrt{c+dx^3}}{96cx^3}+\frac{3d\,\text{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{128c^{\frac{3}{2}}}-\frac{7d\,\text{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**4/(-d*x**3+8*c)**2,x)
```

```
[Out] 3*sqrt(c + d*x**3)/(8*x**3*(8*c - d*x**3)) - 5*sqrt(c + d*x**3)/(
96*c*x**3) + 3*d*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(128*c**(3/2
)) - 7*d*atanh(sqrt(c + d*x**3)/sqrt(c))/(384*c**(3/2))
```

Mathematica [C] time = 0.374014, size = 333, normalized size = 2.75

$$\frac{\frac{60d^2x^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{\left(8c-dx^3\right)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{\frac{70d^2x^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1(\ldots}}{2(dx^3-8c)}}{144\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^4*(8*c - d*x^3)^2),x]
```

```
[Out] ((60*d^2*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])
/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3
)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8
```

```
*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))) +
 (-3*d + (12*c)/x^3 - (15*d^2*x^3)/c + (70*d^2*x^3*AppellF1[3/2,
1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/(5*d*x^3*AppellF1[3/2,
 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1
/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1
, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]))/(2*(-8*c + d*x^3)))/(144*Sq
rt[c + d*x^3])
```

Maple [C] time = 0.02, size = 1014, normalized size = 8.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^4/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-1/3*c*(d*x^3+c)^(1/2)/x^3+2/3*d*(d*x^3+c)^(1/2)-c^(1/2
)*d*arctanh((d*x^3+c)^(1/2)/c^(1/2)))+1/256/c^3*d*(2/9*d*x^3*(d*x
^3+c)^(1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(3/2)*arctanh((d*x^3+c)^(
1/2)/c^(1/2)))+1/64*d^2/c^2*(-3*c/d*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2
/3*(d*x^3+c)^(1/2)/d+1/2*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*
d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(
1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2
)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-
c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(
2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/
2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)
*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha
*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(
_Z^3*d-8*c))-1/256*d^2/c^3*(2/9*x^3*(d*x^3+c)^(1/2)+56/9*c*(d*x^
3+c)^(1/2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1
/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^
2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c
*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(
1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c
*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)
*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2
)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8
*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx^3+c)^{\frac{3}{2}}}{(dx^3-8c)^2x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^4),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^4), x)
```

Fricas [A] time = 0.240089, size = 1, normalized size = 0.01

$$\left[-\frac{8\left(5\,dx^3-4\,c\right)\sqrt{dx^3+c}\sqrt{c}-9\left(d^2x^6-8\,cdx^3\right)\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)-7\left(d^2x^6-8\,cdx^3\right)\log\left(\frac{\left(dx^3+2\,c\right)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right)}{768\left(cdx^6-8\,c^2x^3\right)\sqrt{c}}, -\frac{4\left(5\,dx^3-4\,c\right)\sqrt{dx^3+c}\sqrt{-c}+9\left(d^2x^6-8\,cdx^3\right)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-7\left(d^2x^6-8\,cdx^3\right)\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)}{384\left(cdx^6-8\,c^2x^3\right)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^4),x, algorithm="fricas")
```

```
[Out] [-1/768*(8*(5*d*x^3 - 4*c)*sqrt(d*x^3 + c)*sqrt(c) - 9*(d^2*x^6 -
 8*c*d*x^3)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c)/(d
*x^3 - 8*c)) - 7*(d^2*x^6 - 8*c*d*x^3)*log(((d*x^3 + 2*c)*sqrt(c)
 - 2*sqrt(d*x^3 + c)*c)/x^3))/((c*d*x^6 - 8*c^2*x^3)*sqrt(c)), -1
/384*(4*(5*d*x^3 - 4*c)*sqrt(d*x^3 + c)*sqrt(-c) + 9*(d^2*x^6 - 8
*c*d*x^3)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 7*(d^2*x^6 - 8
*c*d*x^3)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((c*d*x^6 - 8*c^2
*x^3)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x**4/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220367, size = 153, normalized size = 1.26

$$\frac{1}{384}\,d\left(\frac{7\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c}-\frac{9\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c}-\frac{4\left(5\left(dx^3+c\right)^{\frac{3}{2}}-9\,\sqrt{dx^3+c}c\right)}{\left(\left(dx^3+c\right)^2-10\left(dx^3+c\right)c+9\,c^2\right)c}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^4),x, algorithm="giac")
```

```
[Out] 1/384*d*(7*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 9*arct
an(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c) - 4*(5*(d*x^3 + c)^
(3/2) - 9*sqrt(d*x^3 + c)*c)/(((d*x^3 + c)^2 - 10*(d*x^3 + c)*c +
 9*c^2)*c))
```

3.417 $\int \frac{(c+dx^3)^{3/2}}{x^7(8c-dx^3)^2}\,dx$

Optimal. Leaf size=161

$$\frac{15d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2048c^{5/2}}-\frac{17d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{5/2}}+\frac{7d^2\sqrt{c+dx^3}}{512c^2(8c-dx^3)}-\frac{23d\sqrt{c+dx^3}}{384cx^3(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{48x^6(8c-dx^3)}$$

```
[Out] (7*d^2*Sqrt[c + d*x^3])/(512*c^2*(8*c - d*x^3)) - Sqrt[c + d*x^3]
/(48*x^6*(8*c - d*x^3)) - (23*d*Sqrt[c + d*x^3])/(384*c*x^3*(8*c
- d*x^3)) + (15*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(2048*c
^(5/2)) - (17*d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(2048*c^(5/2)
)
```

Rubi [A] time = 0.498108, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{15d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2048c^{5/2}}-\frac{17d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{5/2}}+\frac{7d^2\sqrt{c+dx^3}}{512c^2(8c-dx^3)}-\frac{23d\sqrt{c+dx^3}}{384cx^3(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{48x^6(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^7*(8*c - d*x^3)^2),x]
```

```
[Out] (7*d^2*Sqrt[c + d*x^3])/(512*c^2*(8*c - d*x^3)) - Sqrt[c + d*x^3]
/(48*x^6*(8*c - d*x^3)) - (23*d*Sqrt[c + d*x^3])/(384*c*x^3*(8*c
- d*x^3)) + (15*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(2048*c
^(5/2)) - (17*d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(2048*c^(5/2)
)
```

Rubi in Sympy [A] time = 76.5204, size = 124, normalized size = 0.77

$$\frac{3\sqrt{c+dx^3}}{8x^6(8c-dx^3)}-\frac{19\sqrt{c+dx^3}}{384cx^6}-\frac{7d\sqrt{c+dx^3}}{512c^2x^3}+\frac{15d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2048c^{\frac{5}{2}}}-\frac{17d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**7/(-d*x**3+8*c)**2,x)
```

```
[Out] 3*sqrt(c + d*x**3)/(8*x**6*(8*c - d*x**3)) - 19*sqrt(c + d*x**3)/
(384*c*x**6) - 7*d*sqrt(c + d*x**3)/(512*c**2*x**3) + 15*d**2*ata
nh(sqrt(c + d*x**3)/(3*sqrt(c)))/(2048*c**(5/2)) - 17*d**2*atanh(
sqrt(c + d*x**3)/sqrt(c))/(2048*c**(5/2))
```

Mathematica [C] time = 0.498654, size = 349, normalized size = 2.17

$$\frac{\frac{\frac{170cd^3x^9F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}+32c^3+124c^2dx^3+71cd^2x^6-21d^3x^9}{dx^3-8c}+\frac{168cd^3x^9\ldots}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4\ldots}}{1536c^2x^6\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^7*(8*c - d*x^3)^2),x]
```

```
[Out] ((168*c*d^3*x^9*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c
)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*
x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)
/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))
) + (32*c^3 + 124*c^2*d*x^3 + 71*c*d^2*x^6 - 21*d^3*x^9 + (170*c*
d^3*x^9*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/
(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)]
+ 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] -
c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]))/(-8*c
 + d*x^3))/(1536*c^2*x^6*Sqrt[c + d*x^3])
```

Maple [C] time = 0.02, size = 1075, normalized size = 6.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^7/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-1/6*c*(d*x^3+c)^(1/2)/x^6-5/12*d*(d*x^3+c)^(1/2)/x^3-1
/4*d^2*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(1/2))+3/4096/c^4*d^2*(
2/9*d*x^3*(d*x^3+c)^(1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(3/2)*arcta
nh((d*x^3+c)^(1/2)/c^(1/2)))+1/256/c^3*d*(-1/3*c*(d*x^3+c)^(1/2)/
x^3+2/3*d*(d*x^3+c)^(1/2)-c^(1/2)*d*arctanh((d*x^3+c)^(1/2)/c^(1/
2)))+1/512*d^3/c^3*(-3*c/d*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/3*(d*x^3
+c)^(1/2)/d+1/2*I/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/
d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2
)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1
/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*
d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*
d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)
^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*
c))-3/4096*d^3/c^4*(2/9*x^3*(d*x^3+c)^(1/2)+56/9*c*(d*x^3+c)^(1/
2)/d+3*I*c/d^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{\left(dx^3 - 8\,c\right)^2 x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^7),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^7), x)
```

Fricas [A] time = 0.237815, size = 1, normalized size = 0.01

$$\left[-\frac{8\left(21\,d^2x^6-92\,cdx^3-32\,c^2\right)\sqrt{dx^3+c}\sqrt{c}-45\left(d^3x^9-8\,cd^2x^6\right)\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)-51\left(d^3x^9-8\,cd^2x^6\right)\log\left(\cdots\right.}{12288\left(c^2dx^9-8\,c^3x^6\right)\sqrt{c}}\right.$$

$$-\frac{4\left(21\,d^2x^6-92\,cdx^3-32\,c^2\right)\sqrt{dx^3+c}\sqrt{-c}+45\left(d^3x^9-8\,cd^2x^6\right)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-51\left(d^3x^9-8\,cd^2x^6\right)\arctan\left(\frac{\cdots}{\sqrt{dx^3\cdots}}\right.}{6144\left(c^2dx^9-8\,c^3x^6\right)\sqrt{-c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^7),x, algorithm="fricas")
```

```
[Out] [-1/12288*(8*(21*d^2*x^6 - 92*c*d*x^3 - 32*c^2)*sqrt(d*x^3 + c)*s
qrt(c) - 45*(d^3*x^9 - 8*c*d^2*x^6)*log(((d*x^3 + 10*c)*sqrt(c) +
 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) - 51*(d^3*x^9 - 8*c*d^2*x^6)
*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3))/((c^2*d*
x^9 - 8*c^3*x^6)*sqrt(c)), -1/6144*(4*(21*d^2*x^6 - 92*c*d*x^3 -
32*c^2)*sqrt(d*x^3 + c)*sqrt(-c) + 45*(d^3*x^9 - 8*c*d^2*x^6)*arc
tan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 51*(d^3*x^9 - 8*c*d^2*x^6)*
arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((c^2*d*x^9 - 8*c^3*x^6)*sq
rt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x**7/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220481, size = 161, normalized size = 1.

$$\frac{1}{6144}\,d^2\left(\frac{51\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^2}-\frac{45\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c^2}-\frac{36\,\sqrt{dx^3+c}}{(dx^3-8\,c)c^2}-\frac{16\left(3\left(dx^3+c\right)^{\frac{3}{2}}-2\,\sqrt{dx^3+c}c\right)}{c^2d^2x^6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^7),x, algorithm="giac")
```

```
[Out] 1/6144*d^2*(51*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) -
45*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) - 36*sqrt(
d*x^3 + c)/((d*x^3 - 8*c)*c^2) - 16*(3*(d*x^3 + c)^(3/2) - 2*sqrt
(d*x^3 + c)*c)/(c^2*d^2*x^6))
```

3.418 $\int \frac{x^7(c+dx^3)^{3/2}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=681

$$\frac{108\sqrt{3}c^{13/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{8/3}}-\frac{108c^{13/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{8/3}}+\frac{108c^{13/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{8/3}}+\frac{5906\sqrt{2}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{13\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{2953\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{13d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{5906c^2\sqrt{c+dx^3}}{13d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{103cx^2\sqrt{c+dx^3}}{13d^2}+\frac{x^5\left(c+dx^3\right)^{3/2}}{3d\left(8c-dx^3\right)}+\frac{19x^5\sqrt{c+dx^3}}{39d}$$

```
[Out] (103*c*x^2*Sqrt[c + d*x^3])/(13*d^2) + (19*x^5*Sqrt[c + d*x^3])/(
39*d) + (5906*c^2*Sqrt[c + d*x^3])/(13*d^(8/3)*((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)) + (x^5*(c + d*x^3)^(3/2))/(3*d*(8*c - d*x^3))
+ (108*Sqrt[3]*c^(13/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3
)*x))/Sqrt[c + d*x^3]])/d^(8/3) - (108*c^(13/6)*ArcTanh[(c^(1/3)
+ d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/d^(8/3) + (108*c^(13
/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(8/3) - (2953*3^(1/4)
*Sqrt[2 - Sqrt[3]]*c^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(13*d^(8/3)*Sqr
t[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*Sqrt[c + d*x^3]) + (5906*Sqrt[2]*c^(7/3)*(c^(1/3) + d^(1/
3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1
/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqr
t[3]])/(13*3^(1/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.0212, antiderivative size = 681, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 15, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.556$

$$\frac{108\sqrt{3}c^{13/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{8/3}} - \frac{108c^{13/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{8/3}} + \frac{108c^{13/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{8/3}} + \frac{5906\sqrt{2}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{13\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{2953\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{13d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} + \frac{5906c^2\sqrt{c+dx^3}}{13d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)} + \frac{103cx^2\sqrt{c+dx^3}}{13d^2} + \frac{x^5\left(c+dx^3\right)^{3/2}}{3d\left(8c-dx^3\right)} + \frac{19x^5\sqrt{c+dx^3}}{39d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^7*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (103*c*x^2*Sqrt[c + d*x^3])/(13*d^2) + (19*x^5*Sqrt[c + d*x^3])/(
39*d) + (5906*c^2*Sqrt[c + d*x^3])/(13*d^(8/3)*((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)) + (x^5*(c + d*x^3)^(3/2))/(3*d*(8*c - d*x^3))
+ (108*Sqrt[3]*c^(13/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3
)*x))/Sqrt[c + d*x^3]])/d^(8/3) - (108*c^(13/6)*ArcTanh[(c^(1/3)
+ d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/d^(8/3) + (108*c^(13
/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(8/3) - (2953*3^(1/4)
*Sqrt[2 - Sqrt[3]]*c^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) -
c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(13*d^(8/3)*Sqr
t[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*Sqrt[c + d*x^3]) + (5906*Sqrt[2]*c^(7/3)*(c^(1/3) + d^(1/
3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1
/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqr
t[3]])/(13*3^(1/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 24.1229, size = 51, normalized size = 0.07

$$\frac{x^8\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{8}{3},-\frac{3}{2},2,\frac{11}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{512c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] x**8*sqrt(c + d*x**3)*appellf1(8/3, -3/2, 2, 11/3, -d*x**3/c, d*x
**3/(8*c))/(512*c*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.362557, size = 357, normalized size = 0.52

$$\frac{2\left(\frac{82400c^4x^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}+\frac{94496c^3dx^5F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+6}\right.}{65d^2\left(dx^3-8c\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^7*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (2*(5*(c + d*x^3)*(-412*c^2*x^2 + 24*c*d*x^5 + d^2*x^8) + (82400*
c^4*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/
(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3
*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] -
 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])) + (9
4496*c^3*d*x^5*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(
8*c)])/(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*
c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/
(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c
)]))))/(65*d^2*(-8*c + d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.055, size = 2223, normalized size = 3.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(d*x^3+c)^(3/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/d^2*(2/13*x^5*d*(d*x^3+c)^(1/2)+32/91*c*x^2*(d*x^3+c)^(1/2)-18/
91*I*c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-
c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2))))+16*c/d^2*(2/7*x^2*(d*x^3+c)^(1/2)-44/7*I*
c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*
d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^
(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)))+3*I*c/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
```

```
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
tOf(_Z^3*d-8*c)))+64*c^2/d^2*(-3/8*x^2/(d*x^3-8*c)*(d*x^3+c)^(1/2
)-19/24*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-
1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(
-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)))+3/8*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(
1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3))
)/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1
/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2
)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2
)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Elliptic
Pi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-
c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*
c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_a
lpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx^3 + c)^{\frac{3}{2}} x^7}{(dx^3 - 8c)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c)^2, x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}} x^7}{\left(dx^3-8\,c\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x^7/(d*x^3 - 8*c)^2, x)
```

3.419 $\int \frac{x^4(c+dx^3)^{3/2}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=657

$$\frac{9\sqrt{3}c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{5/3}}-\frac{9c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{5/3}}+\frac{9c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{5/3}}+\frac{265\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{265\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{14d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{265c\sqrt{c+dx^3}}{7d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{x^2\left(c+dx^3\right)^{3/2}}{3d\left(8c-dx^3\right)}+\frac{13x^2\sqrt{c+dx^3}}{21d}$$

```
[Out] (13*x^2*Sqrt[c + d*x^3])/(21*d) + (265*c*Sqrt[c + d*x^3])/(7*d^(5
/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (x^2*(c + d*x^3)^(3/2)
)/(3*d*(8*c - d*x^3)) + (9*Sqrt[3]*c^(7/6)*ArcTan[(Sqrt[3]*c^(1/6
)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(5/3) - (9*c^(7/6)*A
rcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/d^(5
/3) + (9*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(5/3) -
(265*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt
[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1
/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(14
*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1
/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (265*Sqrt[2]*c^(4/3)*(c^(1
/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)
/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sq
rt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)],
 -7 - 4*Sqrt[3]])/(7*3^(1/4)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(
1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.71476, antiderivative size = 657, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.518

$$\frac{9\sqrt{3}c^{7/6}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{d^{5/3}}-\frac{9c^{7/6}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{d^{5/3}}+\frac{9c^{7/6}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{d^{5/3}}$$
$$+\frac{265\sqrt{2}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{265\sqrt[4]{3}\sqrt{2-\sqrt{3}}c^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{14d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{265c\sqrt{c+dx^3}}{7d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{x^2\left(c+dx^3\right)^{3/2}}{3d\left(8c-dx^3\right)}+\frac{13x^2\sqrt{c+dx^3}}{21d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^4*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (13*x^2*Sqrt[c + d*x^3])/(21*d) + (265*c*Sqrt[c + d*x^3])/(7*d^(5
/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (x^2*(c + d*x^3)^(3/2)
)/(3*d*(8*c - d*x^3)) + (9*Sqrt[3]*c^(7/6)*ArcTan[(Sqrt[3]*c^(1/6
)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/d^(5/3) - (9*c^(7/6)*A
rcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/d^(5
/3) + (9*c^(7/6)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/d^(5/3) -
(265*3^(1/4)*Sqrt[2 - Sqrt[3]]*c^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt
[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1
/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(14
*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1
/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (265*Sqrt[2]*c^(4/3)*(c^(1
/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)
/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sq
rt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)],
 -7 - 4*Sqrt[3]])/(7*3^(1/4)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(
1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 27.0416, size = 51, normalized size = 0.08

$$\frac{x^5\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{5}{3},-\frac{3}{2},2,\frac{8}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{320c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] x**5*sqrt(c + d*x**3)*appellf1(5/3, -3/2, 2, 8/3, -d*x**3/c, d*x*
*3/(8*c))/(320*c*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.39624, size = 368, normalized size = 0.56

$$\frac{x^2\left(\frac{1480c^3F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{d(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{1696c^2x^3F_1\left(\frac{5}{3}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\right.\right.\right.}\right.}{7\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (x^2*(((c + d*x^3)*(-37*c + 2*d*x^3))/(d*(-8*c + d*x^3)) + (1480*
c^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(d*(
-8*c + d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x
^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d
*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)
/(8*c)]))) - (1696*c^2*x^3*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c
), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3
, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 1
1/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3,
 -((d*x^3)/c), (d*x^3)/(8*c)])))))/(7*Sqrt[c + d*x^3])
```

Maple [C] time = 0.016, size = 1747, normalized size = 2.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(d*x^3+c)^(3/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/d*(2/7*x^2*(d*x^3+c)^(1/2)-44/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(
I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+3*I*c/d^3*2^(
1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c
*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*
(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c
*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/
2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alph
a*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d
^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))+8*c/d*(-3/8
*x^2/(d*x^3-8*c)*(d*x^3+c)^(1/2)-19/24*I*3^(1/2)/d*(-c*d^2)^(1/3)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+3/8*I/d^3*
```

```
2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x^4}{\left(dx^3-8\,c\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c)^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(dx^7+cx^4\right)\sqrt{dx^3+c}}{d^2x^6-16\,cdx^3+64\,c^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] integral((d*x^7 + c*x^4)*sqrt(d*x^3 + c)/(d^2*x^6 - 16*c*d*x^3 +
64*c^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x^4}{\left(dx^3-8\,c\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x^4/(d*x^3 - 8*c)^2, x)
```

3.420 $\int \frac{x(c+dx^3)^{3/2}}{(8c-dx^3)^2}\,dx$

Optimal. Leaf size=638

$$\frac{19\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt[4]{3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{19\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{19\sqrt{c+dx^3}}{8d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{9\sqrt{3}\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{16d^{2/3}}-\frac{9\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{16d^{2/3}}+\frac{9\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{16d^{2/3}}+\frac{3x^2\sqrt{c+dx^3}}{8\left(8c-dx^3\right)}$$

```
[Out] (19*Sqrt[c + d*x^3])/(8*d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)) + (3*x^2*Sqrt[c + d*x^3])/(8*(8*c - d*x^3)) + (9*Sqrt[3]*c^(1
/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3
]])/(16*d^(2/3)) - (9*c^(1/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*
c^(1/6)*Sqrt[c + d*x^3])])/(16*d^(2/3)) + (9*c^(1/6)*ArcTanh[Sqrt
[c + d*x^3]/(3*Sqrt[c])])/(16*d^(2/3)) - (19*3^(1/4)*Sqrt[2 - Sqr
t[3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/
3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellipt
icE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(16*d^(2/3)*Sqrt[(c^(1/3)*(c
^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[
c + d*x^3]) + (19*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(4*Sqrt[2]*3^(1/
4)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.51111, antiderivative size = 638, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.52$

$$\frac{19\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{4\sqrt{2}\sqrt[4]{3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{19\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} + \frac{19\sqrt{c+dx^3}}{8d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)} + \frac{9\sqrt{3}\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{16d^{2/3}} - \frac{9\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{16d^{2/3}} + \frac{9\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{16d^{2/3}} + \frac{3x^2\sqrt{c+dx^3}}{8(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]   Int[(x*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (19*Sqrt[c + d*x^3])/(8*d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)) + (3*x^2*Sqrt[c + d*x^3])/(8*(8*c - d*x^3)) + (9*Sqrt[3]*c^(1
/6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3
]])/(16*d^(2/3)) - (9*c^(1/6)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*
c^(1/6)*Sqrt[c + d*x^3])])/(16*d^(2/3)) + (9*c^(1/6)*ArcTanh[Sqrt
[c + d*x^3]/(3*Sqrt[c])])/(16*d^(2/3)) - (19*3^(1/4)*Sqrt[2 - Sqr
t[3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/
3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellipt
icE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(16*d^(2/3)*Sqrt[(c^(1/3)*(c
^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[
c + d*x^3]) + (19*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(4*Sqrt[2]*3^(1/
4)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 21.3283, size = 51, normalized size = 0.08

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},-\frac{3}{2},2,\frac{5}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{128c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, -3/2, 2, 5/3, -d*x**3/c, d*x*
*3/(8*c))/(128*c*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.342555, size = 330, normalized size = 0.52

$$\frac{x^2\left(-\frac{500c^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{608cdx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)\ldots}\right.}{40\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*(c + d*x^3)^(3/2))/(8*c - d*x^3)^2,x]
```

```
[Out] (x^2*(15*(c + d*x^3) - (500*c^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x
^3)/c), (d*x^3)/(8*c)])/(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3
)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x
^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c
), (d*x^3)/(8*c)])) - (608*c*d*x^3*AppellF1[5/3, 1/2, 1, 8/3, -((
d*x^3)/c), (d*x^3)/(8*c)])/(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*
x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -(
(d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x
^3)/c), (d*x^3)/(8*c)]))))/(40*(8*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.01, size = 873, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(3/2)/(-d*x^3+8*c)^2,x)
```

```
[Out] -3/8*x^2/(d*x^3-8*c)*(d*x^3+c)^(1/2)-19/24*I*3^(1/2)/d*(-c*d^2)^(
1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+3/8*I/
d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(
1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-
1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))
^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alph
a*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3
)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alph
a*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*
c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x}{\left(dx^3-8\,c\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c)^2,x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c)^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(dx^4+cx\right)\sqrt{dx^3+c}}{d^2x^6-16\,cdx^3+64\,c^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c)^2,x, algorithm="fricas")
```

```
[Out] integral((d*x^4 + c*x)*sqrt(d*x^3 + c)/(d^2*x^6 - 16*c*d*x^3 + 64
*c^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d*x**3+c)**(3/2)/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x}{\left(dx^3-8\,c\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c)^2,x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x/(d*x^3 - 8*c)^2, x)
```

3.421 $\int \frac{(c+dx^3)^{3/2}}{x^2(8c-dx^3)^2}\,dx$

Optimal. Leaf size=522

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8\sqrt{2}\sqrt[4]{3}c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{c+dx^3}}{16cx}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{16c\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{3\sqrt{c+dx^3}}{8x\left(8c-dx^3\right)}$$

```
[Out] -Sqrt[c + d*x^3]/(16*c*x) + (d^(1/3)*Sqrt[c + d*x^3])/(16*c*((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (3*Sqrt[c + d*x^3])/(8*x*(8*c -
 d*x^3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*
x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3]
)*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3)
 + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3
]])/(32*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(1/3) +
 d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3]
)*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 -
 4*Sqrt[3]])/(8*Sqrt[2]*3^(1/4)*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) +
d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3
])
```

Rubi [A] time = 0.575686, antiderivative size = 522, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$\frac{\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{8\sqrt{2}\sqrt[4]{3}c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32c^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{c+dx^3}}{16cx}+\frac{\sqrt[3]{d}\sqrt{c+dx^3}}{16c\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{3\sqrt{c+dx^3}}{8x\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^2*(8*c - d*x^3)^2),x]
```

```
[Out] -Sqrt[c + d*x^3]/(16*c*x) + (d^(1/3)*Sqrt[c + d*x^3])/(16*c*((1 +
 Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (3*Sqrt[c + d*x^3])/(8*x*(8*c -
```

```
d*x^3)) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*
x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3]
)*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3)
 + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3
]])/(32*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3
])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (d^(1/3)*(c^(1/3) +
 d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3]
)*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 -
 4*Sqrt[3]])/(8*Sqrt[2]*3^(1/4)*c^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) +
d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3
])
```

Rubi in Sympy [A] time = 25.2597, size = 53, normalized size = 0.1

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{1}{3},-\frac{3}{2},2,\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64cx\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**2/(-d*x**3+8*c)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, -3/2, 2, 2/3, -d*x**3/c, d*x**3/
(8*c))/(64*c*x*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 1.0303, size = 242, normalized size = 0.46

$$\frac{(2c-dx^3)\sqrt{c+dx^3}}{16cx(dx^3-8c)} - \frac{\sqrt[6]{-1}\sqrt[3]{-d}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-d}x}{\sqrt[3]{c}}-1\right)}\sqrt{\frac{(-d)^{2/3}x^2}{c^{2/3}}+\frac{\sqrt[3]{-d}x}{\sqrt[3]{c}}+1}\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-d}x}{\sqrt[3]{c}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-d}x}{\sqrt[3]{c}} \cdots}}{\cdots}\right)\cdots\right)\right)}{16\sqrt[4]{3}\sqrt[3]{c}\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^2*(8*c - d*x^3)^2),x]
```

```
[Out] ((2*c - d*x^3)*Sqrt[c + d*x^3])/(16*c*x*(-8*c + d*x^3)) - ((-1)^(
1/6)*(-d)^(1/3)*Sqrt[(-1)^(5/6)*(-1 + ((-d)^(1/3)*x)/c^(1/3))]*Sq
rt[1 + ((-d)^(1/3)*x)/c^(1/3) + ((-d)^(2/3)*x^2)/c^(2/3)]*((-I)*S
qrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-d)^(1/3)*x)/c^(1/
3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1
)^(5/6) - (I*(-d)^(1/3)*x)/c^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(16*3
^(1/4)*c^(1/3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 2217, normalized size = 4.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^2/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-c*(d*x^3+c)^(1/2)/x+2/7*d*x^2*(d*x^3+c)^(1/2)-9/7*I*c*
3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
```

```
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)
^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3
)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2))))+1/8*d/c*(-3/8*x^2/(d*x^3-8*c)*(d*x^3+c)^(1/2)-19/24*
I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*
d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^
(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)))+3/8*I/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
tOf(_Z^3*d-8*c)))-1/64*d/c^2*(2/7*x^2*(d*x^3+c)^(1/2)-44/7*I*c*3^
(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)
^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3
)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)))+3*I*c/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*
d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(
1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2
)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-
c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(
2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/
2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)
*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha
*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(
_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(dx^3-8\,c\right)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^2),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{d^2x^8 - 16\,cdx^5 + 64\,c^2x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^2),x, algorithm="fricas")
```

```
[Out] integral((d*x^3 + c)^(3/2)/(d^2*x^8 - 16*c*d*x^5 + 64*c^2*x^2), x
)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x**2/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{\left(dx^3 - 8\,c\right)^2 x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^2),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^2), x)
```

3.422 $\int \frac{(c+dx^3)^{3/2}}{x^5(8c-dx^3)^2}\,dx$

Optimal. Leaf size=684

$$-\frac{9\sqrt{3}d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1024c^{11/6}}+\frac{9d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1024c^{11/6}}-\frac{9d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1024c^{11/6}}+\frac{d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{64c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{d^{4/3}\sqrt{c+dx^3}}{32c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{d\sqrt{c+dx^3}}{32c^2x}+\frac{3\sqrt{c+dx^3}}{8x^4\left(8c-dx^3\right)}-\frac{13\sqrt{c+dx^3}}{256cx^4}$$

```
[Out] (-13*Sqrt[c + d*x^3])/(256*c*x^4) - (d*Sqrt[c + d*x^3])/(32*c^2*x
) + (d^(4/3)*Sqrt[c + d*x^3])/(32*c^2*((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)) + (3*Sqrt[c + d*x^3])/(8*x^4*(8*c - d*x^3)) - (9*Sqrt[3
]*d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c +
 d*x^3]])/(1024*c^(11/6)) + (9*d^(4/3)*ArcTanh[(c^(1/3) + d^(1/3)
*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(1024*c^(11/6)) - (9*d^(4/3)*
ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(1024*c^(11/6)) - (3^(1/4)*
Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(64*c^(5/3)*Sqrt
[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*Sqrt[c + d*x^3]) + (d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^
(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*
x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(16*Sqr
t[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.0744, antiderivative size = 684, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.518

$$-\frac{9\sqrt{3}d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1024c^{11/6}}+\frac{9d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1024c^{11/6}}-\frac{9d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1024c^{11/6}}+\frac{d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{16\sqrt{2}\sqrt[4]{3}c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{64c^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{d^{4/3}\sqrt{c+dx^3}}{32c^2\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{d\sqrt{c+dx^3}}{32c^2x}+\frac{3\sqrt{c+dx^3}}{8x^4\left(8c-dx^3\right)}-\frac{13\sqrt{c+dx^3}}{256cx^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^5*(8*c - d*x^3)^2),x]
```

```
[Out] (-13*Sqrt[c + d*x^3])/(256*c*x^4) - (d*Sqrt[c + d*x^3])/(32*c^2*x
) + (d^(4/3)*Sqrt[c + d*x^3])/(32*c^2*((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)) + (3*Sqrt[c + d*x^3])/(8*x^4*(8*c - d*x^3)) - (9*Sqrt[3
]*d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c +
 d*x^3]])/(1024*c^(11/6)) + (9*d^(4/3)*ArcTanh[(c^(1/3) + d^(1/3)
*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(1024*c^(11/6)) - (9*d^(4/3)*
ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(1024*c^(11/6)) - (3^(1/4)*
Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(64*c^(5/3)*Sqrt
[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)^2]*Sqrt[c + d*x^3]) + (d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^
(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*
x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(16*Sqr
t[2]*3^(1/4)*c^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 24.1948, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{4}{3},-\frac{3}{2},2,-\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{256cx^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**5/(-d*x**3+8*c)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-4/3, -3/2, 2, -1/3, -d*x**3/c, d*x**3
/(8*c))/(256*c*x**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.377625, size = 361, normalized size = 0.53

$$\frac{-\frac{256d^3x^9F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{c\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{7250d^2x^6F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)\cdots}}{1280x^4\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^5*(8*c - d*x^3)^2),x]
```

```
[Out] ((-5*(c + d*x^3)*(8*c^2 + 51*c*d*x^3 - 8*d^2*x^6))/c^2 + (7250*d^
2*x^6*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(4
0*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d
*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4
*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])) - (256
*d^3*x^9*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])
/(c*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]
 + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*
c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])
)))/(1280*x^4*(8*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.021, size = 2690, normalized size = 3.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^5/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-1/4*c*(d*x^3+c)^(1/2)/x^4-11/8*d*(d*x^3+c)^(1/2)/x-9/8
*I*d*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c
*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)
^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2))))+1/256/c^3*d*(-c*(d*x^3+c)^(1/2)/x+2/7*d*x^2*(d*
x^3+c)^(1/2)-9/7*I*c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1
/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Ellip
ticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^
(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/64*d^2/c^2*(-3/8*x^2/(d*x^3-8
*c)*(d*x^3+c)^(1/2)-19/24*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
```

```
)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+3/8*I/d^3*2^(1/2)*sum(1
/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))-1/256*d^2/c^3*(2/7*x^
2*(d*x^3+c)^(1/2)-44/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x
^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(
-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+3*I*c/d^3*2^(1/2)*sum(1/
_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3
)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3)
)/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(
2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3)
)^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alp
ha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2
)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d
*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3
^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx^3+c)^{\frac{3}{2}}}{(dx^3-8c)^2x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^5),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(dx^3+c)^{\frac{3}{2}}}{d^2x^{11}-16\,cdx^8+64\,c^2x^5},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^5),x, algorithm="fricas")
```

```
[Out] integral((d*x^3 + c)^(3/2)/(d^2*x^11 - 16*c*d*x^8 + 64*c^2*x^5),
x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x**5/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{\left(dx^3 - 8\,c\right)^2 x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^5),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^5), x)
```

3.423 $\int \frac{\left(c+dx^3\right)^{3/2}}{x^8\left(8c-dx^3\right)^2}\,dx$

Optimal. Leaf size=708

$$-\frac{9\sqrt{3}d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{4096c^{17/6}}+\frac{9d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{4096c^{17/6}}-\frac{9d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{4096c^{17/6}}$$
$$+\frac{19d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{896\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{19\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{3584c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{19d^{7/3}\sqrt{c+dx^3}}{1792c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{19d^2\sqrt{c+dx^3}}{1792c^3x}-\frac{83d\sqrt{c+dx^3}}{7168c^2x^4}+\frac{3\sqrt{c+dx^3}}{8x^7\left(8c-dx^3\right)}-\frac{11\sqrt{c+dx^3}}{224cx^7}$$

```
[Out] (-11*Sqrt[c + d*x^3])/(224*c*x^7) - (83*d*Sqrt[c + d*x^3])/(7168*
c^2*x^4) - (19*d^2*Sqrt[c + d*x^3])/(1792*c^3*x) + (19*d^(7/3)*Sq
rt[c + d*x^3])/(1792*c^3*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (
3*Sqrt[c + d*x^3])/(8*x^7*(8*c - d*x^3)) - (9*Sqrt[3]*d^(7/3)*Arc
Tan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(40
96*c^(17/6)) + (9*d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1
/6)*Sqrt[c + d*x^3])])/(4096*c^(17/6)) - (9*d^(7/3)*ArcTanh[Sqrt[
c + d*x^3]/(3*Sqrt[c])])/(4096*c^(17/6)) - (19*3^(1/4)*Sqrt[2 - S
qrt[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(
1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Elli
pticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3584*c^(8/3)*Sqrt[(c^(1/3
)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*S
qrt[c + d*x^3]) + (19*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3)
 - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(896*Sqrt[2]
*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.38297, antiderivative size = 708, normalized size of antiderivative = 1., number of

steps used = 17, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.518

$$-\frac{9\sqrt{3}d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{4096c^{17/6}}+\frac{9d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{4096c^{17/6}}-\frac{9d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{4096c^{17/6}}+\frac{19d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{896\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{19\sqrt[4]{3}\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{3584c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{19d^{7/3}\sqrt{c+dx^3}}{1792c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{19d^2\sqrt{c+dx^3}}{1792c^3x}-\frac{83d\sqrt{c+dx^3}}{7168c^2x^4}+\frac{3\sqrt{c+dx^3}}{8x^7\left(8c-dx^3\right)}-\frac{11\sqrt{c+dx^3}}{224cx^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^8*(8*c - d*x^3)^2),x]
```

```
[Out] (-11*Sqrt[c + d*x^3])/(224*c*x^7) - (83*d*Sqrt[c + d*x^3])/(7168*
c^2*x^4) - (19*d^2*Sqrt[c + d*x^3])/(1792*c^3*x) + (19*d^(7/3)*Sq
rt[c + d*x^3])/(1792*c^3*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + (
3*Sqrt[c + d*x^3])/(8*x^7*(8*c - d*x^3)) - (9*Sqrt[3]*d^(7/3)*Arc
Tan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(40
96*c^(17/6)) + (9*d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1
/6)*Sqrt[c + d*x^3])])/(4096*c^(17/6)) - (9*d^(7/3)*ArcTanh[Sqrt[
c + d*x^3]/(3*Sqrt[c])])/(4096*c^(17/6)) - (19*3^(1/4)*Sqrt[2 - S
qrt[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(
1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Elli
pticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(3584*c^(8/3)*Sqrt[(c^(1/3
)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*S
qrt[c + d*x^3]) + (19*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3)
 - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(896*Sqrt[2]
*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.7289, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{7}{3},-\frac{3}{2},2,-\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{448cx^7\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**8/(-d*x**3+8*c)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-7/3, -3/2, 2, -4/3, -d*x**3/c, d*x**3
/(8*c))/(448*c*x**7*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.333057, size = 373, normalized size = 0.53

$$\frac{\frac{58750c^2d^3x^9F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{2432cd^4x^{12}F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF}}{35840c^3x^7\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^8*(8*c - d*x^3)^2),x]
```

```
[Out] (-5*(c + d*x^3)*(128*c^3 + 312*c^2*d*x^3 + 525*c*d^2*x^6 - 76*d^3
*x^9) + (58750*c^2*d^3*x^9*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c
), (d*x^3)/(8*c)])/(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c),
 (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c
), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d
*x^3)/(8*c)])) - (2432*c*d^4*x^12*AppellF1[5/3, 1/2, 1, 8/3, -((d
*x^3)/c), (d*x^3)/(8*c)])/(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x
^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((
d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^
3)/c), (d*x^3)/(8*c)])))/(35840*c^3*x^7*(8*c - d*x^3)*Sqrt[c + d*
x^3])
```

Maple [C] time = 0.018, size = 3186, normalized size = 4.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^8/(-d*x^3+8*c)^2,x)
```

```
[Out] 1/64/c^2*(-1/7*c*(d*x^3+c)^(1/2)/x^7-17/56*d*(d*x^3+c)^(1/2)/x^4-
27/112*d^2/c*(d*x^3+c)^(1/2)/x-9/112*I/c*d^2*3^(1/2)*(-c*d^2)^(1/
3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+3/4096/
c^4*d^2*(-c*(d*x^3+c)^(1/2)/x+2/7*d*x^2*(d*x^3+c)^(1/2)-9/7*I*c*3
^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^
(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)
*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c
*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2))))+1/256/c^3*d*(-1/4*c*(d*x^3+c)^(1/2)/x^4-11/8*d*(d*x^3
+c)^(1/2)/x-9/8*I*d*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Ellipt
icE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
```

```
))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/512*d^3/c^3*(-3/8*x^2/(d*x^3-8
*c)*(d*x^3+c)^(1/2)-19/24*I*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+3/8*I/d^3*2^(1/2)*sum(1
/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))-3/4096*d^3/c^4*(2/7*x
^2*(d*x^3+c)^(1/2)-44/7*I*c*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+3*I*c/d^3*2^(1/2)*sum(1
/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(dx^3-8\,c\right)^2 x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^8),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^8), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^8),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x**8/(-d*x**3+8*c)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(dx^3-8\,c\right)^2x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^8),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((d*x^3 - 8*c)^2*x^8), x)
```

3.424 $\int \frac{x^{11}}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=95

$$-\frac{2944c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^4}+\frac{2\sqrt{c+dx^3}\,(170c+7dx^3)}{27d^4}+\frac{8x^6\sqrt{c+dx^3}}{27d^2\,(8c-dx^3)}$$

```
[Out] (8*x^6*Sqrt[c + d*x^3])/(27*d^2*(8*c - d*x^3)) + (2*Sqrt[c + d*x^
3]*(170*c + 7*d*x^3))/(27*d^4) - (2944*c^(3/2)*ArcTanh[Sqrt[c + d
*x^3]/(3*Sqrt[c])])/(81*d^4)
```

Rubi [A] time = 0.25669, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$-\frac{2944c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^4}+\frac{2\sqrt{c+dx^3}\,(170c+7dx^3)}{27d^4}+\frac{8x^6\sqrt{c+dx^3}}{27d^2\,(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In] Int[x^11/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (8*x^6*Sqrt[c + d*x^3])/(27*d^2*(8*c - d*x^3)) + (2*Sqrt[c + d*x^
3]*(170*c + 7*d*x^3))/(27*d^4) - (2944*c^(3/2)*ArcTanh[Sqrt[c + d
*x^3]/(3*Sqrt[c])])/(81*d^4)
```

Rubi in Sympy [A] time = 31.5259, size = 87, normalized size = 0.92

$$-\frac{2944c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^4}+\frac{8x^6\sqrt{c+dx^3}}{27d^2\,(8c-dx^3)}+\frac{4\sqrt{c+dx^3}\left(255c+\frac{21dx^3}{2}\right)}{81d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**11/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -2944*c**(3/2)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(81*d**4) + 8*
x**6*sqrt(c + d*x**3)/(27*d**2*(8*c - d*x**3)) + 4*sqrt(c + d*x**
3)*(255*c + 21*d*x**3/2)/(81*d**4)
```

Mathematica [A] time = 0.196845, size = 81, normalized size = 0.85

$$\frac{2\left(\frac{3\sqrt{c+dx^3}(-1360c^2+114cdx^3+3d^2x^6)}{dx^3-8c}-1472c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{81d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^11/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*((3*Sqrt[c + d*x^3]*(-1360*c^2 + 114*c*d*x^3 + 3*d^2*x^6))/(-8
*c + d*x^3) - 1472*c^(3/2)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))
/(81*d^4)
```

Maple [C] time = 0.057, size = 916, normalized size = 9.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/d^3*(d*(2/9/d*x^3*(d*x^3+c)^(1/2)-4/9*c*(d*x^3+c)^(1/2)/d^2)+32
/3*c*(d*x^3+c)^(1/2)/d)+64/9*I*c/d^6*2^(1/2)*sum((-c*d^2)^(1/3)*(
1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*
d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*
3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*
d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)
*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*
d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)
^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*
_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=R
ootOf(_Z^3*d-8*c))+512*c^3/d^3*(-1/27/d/c*(d*x^3+c)^(1/2)/(d*x^3-
8*c)-1/486*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d
*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2
)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)
^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/
3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d
^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d
-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^
(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c
)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229596, size = 1, normalized size = 0.01

$$\left[\frac{2\left(736\left(cdx^3-8c^2\right)\sqrt{c}\log\left(\frac{dx^3-6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)+3\left(3d^2x^6+114cdx^3-1360c^2\right)\sqrt{dx^3+c}\right)}{81\left(d^5x^3-8cd^4\right)},\ -\frac{2\left(1472\left(cdx^3-8c^2\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-3\left(3d^2x^6+114cdx^3-1360c^2\right)\sqrt{dx^3+c}\right)}{81\left(d^5x^3-8cd^4\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] [2/81*(736*(c*d*x^3 - 8*c^2)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3 +
c)*sqrt(c) + 10*c)/(d*x^3 - 8*c)) + 3*(3*d^2*x^6 + 114*c*d*x^3 -
```

```
1360*c^2)*sqrt(d*x^3 + c))/(d^5*x^3 - 8*c*d^4), -2/81*(1472*(c*d*
x^3 - 8*c^2)*sqrt(-c)*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - 3*(3
*d^2*x^6 + 114*c*d*x^3 - 1360*c^2)*sqrt(d*x^3 + c))/(d^5*x^3 - 8*
c*d^4)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217293, size = 126, normalized size = 1.33

$$\frac{2944\,c^2\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{81\,\sqrt{-c}d^4}-\frac{512\,\sqrt{dx^3+c}c^2}{27\,(dx^3-8\,c)d^4}+\frac{2\left(\left(dx^3+c\right)^{\frac{3}{2}}d^8+45\,\sqrt{dx^3+c}cd^8\right)}{9\,d^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] 2944/81*c^2*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^4) -
 512/27*sqrt(d*x^3 + c)*c^2/((d*x^3 - 8*c)*d^4) + 2/9*((d*x^3 + c
)^(3/2)*d^8 + 45*sqrt(d*x^3 + c)*c*d^8)/d^12
```

3.425 $\int \frac{x^8}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=83

$$\frac{64c\sqrt{c+dx^3}}{27d^3(8c-dx^3)}+\frac{2\sqrt{c+dx^3}}{3d^3}-\frac{224\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^3}$$

```
[Out] (2*Sqrt[c + d*x^3])/(3*d^3) + (64*c*Sqrt[c + d*x^3])/(27*d^3*(8*c
 - d*x^3)) - (224*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
81*d^3)
```

Rubi [A] time = 0.228534, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{64c\sqrt{c+dx^3}}{27d^3(8c-dx^3)}+\frac{2\sqrt{c+dx^3}}{3d^3}-\frac{224\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(3*d^3) + (64*c*Sqrt[c + d*x^3])/(27*d^3*(8*c
 - d*x^3)) - (224*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
81*d^3)
```

Rubi in Sympy [A] time = 26.1207, size = 73, normalized size = 0.88

$$-\frac{224\sqrt{c}\,\text{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^3}+\frac{64c\sqrt{c+dx^3}}{27d^3(8c-dx^3)}+\frac{2\sqrt{c+dx^3}}{3d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -224*sqrt(c)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(81*d**3) + 64*c
*sqrt(c + d*x**3)/(27*d**3*(8*c - d*x**3)) + 2*sqrt(c + d*x**3)/(
3*d**3)
```

Mathematica [A] time = 0.152742, size = 66, normalized size = 0.8

$$\frac{2\left(3\sqrt{c+dx^3}\left(\frac{32c}{8c-dx^3}+9\right)-112\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{81d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*(3*Sqrt[c + d*x^3]*(9 + (32*c)/(8*c - d*x^3)) - 112*Sqrt[c]*Ar
cTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))/(81*d^3)
```

Maple [C] time = 0.017, size = 874, normalized size = 10.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 2/3*(d*x^3+c)^(1/2)/d^3+64*c^2/d^2*(-1/27/d/c*(d*x^3+c)^(1/2)/(d*
x^3-8*c)-1/486*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d
-8*c)))+16/27*I/d^5*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*
(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^
(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3
)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^
2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.227659, size = 1, normalized size = 0.01

$$\left[\frac{2\left(56\left(dx^3-8c\right)\sqrt{c}\log\left(\frac{dx^3-6\sqrt{dx^3+c}\sqrt{c}+10c}{dx^3-8c}\right)+3\left(9dx^3-104c\right)\sqrt{dx^3+c}\right)}{81\left(d^4x^3-8cd^3\right)},\right.$$
$$\left.-\frac{2\left(112\left(dx^3-8c\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)-3\left(9dx^3-104c\right)\sqrt{dx^3+c}\right)}{81\left(d^4x^3-8cd^3\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] [2/81*(56*(d*x^3 - 8*c)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3 + c)*sq
rt(c) + 10*c)/(d*x^3 - 8*c)) + 3*(9*d*x^3 - 104*c)*sqrt(d*x^3 + c
))/(d^4*x^3 - 8*c*d^3), -2/81*(112*(d*x^3 - 8*c)*sqrt(-c)*arctan(
1/3*sqrt(d*x^3 + c)/sqrt(-c)) - 3*(9*d*x^3 - 104*c)*sqrt(d*x^3 +
c))/(d^4*x^3 - 8*c*d^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.215078, size = 93, normalized size = 1.12

$$\frac{224\, c \arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{81\,\sqrt{-c}d^3} + \frac{2\,\sqrt{dx^3+c}}{3\,d^3} - \frac{64\,\sqrt{dx^3+c}c}{27\,(dx^3-8\,c)d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] 224/81*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^3) + 2/
3*sqrt(d*x^3 + c)/d^3 - 64/27*sqrt(d*x^3 + c)*c/((d*x^3 - 8*c)*d^
3)
```

3.426 $\int \frac{x^5}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=64

$$\frac{8\sqrt{c+dx^3}}{27d^2(8c-dx^3)}-\frac{10\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81\sqrt{c}d^2}$$

```
[Out] (8*Sqrt[c + d*x^3])/(27*d^2*(8*c - d*x^3)) - (10*ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])])/(81*Sqrt[c]*d^2)
```

Rubi [A] time = 0.165489, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{8\sqrt{c+dx^3}}{27d^2(8c-dx^3)}-\frac{10\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81\sqrt{c}d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (8*Sqrt[c + d*x^3])/(27*d^2*(8*c - d*x^3)) - (10*ArcTanh[Sqrt[c +
 d*x^3]/(3*Sqrt[c])])/(81*Sqrt[c]*d^2)
```

Rubi in Sympy [A] time = 16.9277, size = 54, normalized size = 0.84

$$\frac{8\sqrt{c+dx^3}}{27d^2(8c-dx^3)}-\frac{10\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81\sqrt{c}d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] 8*sqrt(c + d*x**3)/(27*d**2*(8*c - d*x**3)) - 10*atanh(sqrt(c + d
*x**3)/(3*sqrt(c)))/(81*sqrt(c)*d**2)
```

Mathematica [A] time = 0.105544, size = 63, normalized size = 0.98

$$-\frac{8\sqrt{c+dx^3}}{27d^2(dx^3-8c)}-\frac{10\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81\sqrt{c}d^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (-8*Sqrt[c + d*x^3])/(27*d^2*(-8*c + d*x^3)) - (10*ArcTanh[Sqrt[c
 + d*x^3]/(3*Sqrt[c])])/(81*Sqrt[c]*d^2)
```

Maple [C] time = 0.019, size = 861, normalized size = 13.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/27*I/d^4/c*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(
1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-
1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))
^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alph
a*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3
)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alph
a*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*
c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))+8*c/d
*(-1/27/d/c*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/486*I/d^3/c^2*2^(1/2)*s
um((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-
3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+
1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2
*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2
/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*
I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/
2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229844, size = 1, normalized size = 0.02

$$\left[\frac{5\left(dx^3-8c\right)\log\left(\frac{\left(dx^3+10c\right)\sqrt{c}-6\sqrt{dx^3+c}c}{dx^3-8c}\right)-24\sqrt{dx^3+c}\sqrt{c}}{81\left(d^3x^3-8cd^2\right)\sqrt{c}},\ \frac{2\left(5\left(dx^3-8c\right)\arctan\left(\frac{3c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-12\sqrt{dx^3+c}\sqrt{-c}\right)}{81\left(d^3x^3-8cd^2\right)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] [1/81*(5*(d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(c) - 6*sqrt(d*x^3
 + c)*c)/(d*x^3 - 8*c)) - 24*sqrt(d*x^3 + c)*sqrt(c))/((d^3*x^3 -
 8*c*d^2)*sqrt(c)), 2/81*(5*(d*x^3 - 8*c)*arctan(3*c/(sqrt(d*x^3
+ c)*sqrt(-c))) - 12*sqrt(d*x^3 + c)*sqrt(-c))/((d^3*x^3 - 8*c*d^
2)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.214045, size = 78, normalized size = 1.22

$$\frac{2\left(\frac{5\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}d} - \frac{12\,\sqrt{dx^3+c}}{(dx^3-8\,c)d}\right)}{81\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] 2/81*(5*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d) - 12*sq
rt(d*x^3 + c)/((d*x^3 - 8*c)*d))/d
```

3.427 $\int \frac{x^2}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=67

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{3/2}d}+\frac{\sqrt{c+dx^3}}{27cd\,(8c-dx^3)}$$

```
[Out] Sqrt[c + d*x^3]/(27*c*d*(8*c - d*x^3)) + ArcTanh[Sqrt[c + d*x^3]/
(3*Sqrt[c])]/(81*c^(3/2)*d)
```

Rubi [A] time = 0.156216, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{3/2}d}+\frac{\sqrt{c+dx^3}}{27cd\,(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] Sqrt[c + d*x^3]/(27*c*d*(8*c - d*x^3)) + ArcTanh[Sqrt[c + d*x^3]/
(3*Sqrt[c])]/(81*c^(3/2)*d)
```

Rubi in Sympy [A] time = 18.4947, size = 49, normalized size = 0.73

$$\frac{\sqrt{c+dx^3}}{27cd\,(8c-dx^3)}+\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{\frac{3}{2}}d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] sqrt(c + d*x**3)/(27*c*d*(8*c - d*x**3)) + atanh(sqrt(c + d*x**3)
/(3*sqrt(c)))/(81*c**(3/2)*d)
```

Mathematica [A] time = 0.0738962, size = 66, normalized size = 0.99

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{3/2}d}-\frac{\sqrt{c+dx^3}}{27cd\,(dx^3-8c)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] -Sqrt[c + d*x^3]/(27*c*d*(-8*c + d*x^3)) + ArcTanh[Sqrt[c + d*x^3
]/(3*Sqrt[c])]/(81*c^(3/2)*d)
```

Maple [C] time = 0.01, size = 442, normalized size = 6.6

$$-\frac{1}{27\,cd\,(dx^3-8\,c)}\sqrt{dx^3+c}$$
$$-\frac{\frac{i}{486}\sqrt{2}}{d^3c^2}\sum_{\_alpha=RootOf(\_Z^3d-8\,c)} 1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/27/d/c*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/486*I/d^3/c^2*2^(1/2)*sum
((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*
(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/
d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2
)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d
^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3
))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*
_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)
+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*
d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.228882, size = 1, normalized size = 0.01

$$\left[\frac{\left(dx^3-8\,c\right)\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)-6\,\sqrt{dx^3+c}\sqrt{c}}{162\,(cd^2x^3-8\,c^2d)\sqrt{c}},-\frac{\left(dx^3-8\,c\right)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+3\,\sqrt{dx^3+c}\sqrt{-c}}{81\,(cd^2x^3-8\,c^2d)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] [1/162*((d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3
+ c)*c)/(d*x^3 - 8*c)) - 6*sqrt(d*x^3 + c)*sqrt(c))/((c*d^2*x^3 -
 8*c^2*d)*sqrt(c)), -1/81*((d*x^3 - 8*c)*arctan(3*c/(sqrt(d*x^3 +
 c)*sqrt(-c))) + 3*sqrt(d*x^3 + c)*sqrt(-c))/((c*d^2*x^3 - 8*c^2*
d)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.214626, size = 80, normalized size = 1.19

$$-\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{81\sqrt{-c}cd}-\frac{\sqrt{dx^3+c}}{27\,(dx^3-8\,c)cd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] -1/81*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c*d) - 1/27*
sqrt(d*x^3 + c)/((d*x^3 - 8*c)*c*d)
```

3.428 $\int \frac{1}{x(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=88

$$\frac{13\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2592c^{5/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{5/2}}+\frac{\sqrt{c+dx^3}}{216c^2\,(8c-dx^3)}$$

```
[Out] Sqrt[c + d*x^3]/(216*c^2*(8*c - d*x^3)) + (13*ArcTanh[Sqrt[c + d*
x^3]/(3*Sqrt[c])])/(2592*c^(5/2)) - ArcTanh[Sqrt[c + d*x^3]/Sqrt[
c]]/(96*c^(5/2))
```

Rubi [A] time = 0.269939, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$\frac{13\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2592c^{5/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{5/2}}+\frac{\sqrt{c+dx^3}}{216c^2\,(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] Sqrt[c + d*x^3]/(216*c^2*(8*c - d*x^3)) + (13*ArcTanh[Sqrt[c + d*
x^3]/(3*Sqrt[c])])/(2592*c^(5/2)) - ArcTanh[Sqrt[c + d*x^3]/Sqrt[
c]]/(96*c^(5/2))
```

Rubi in Sympy [A] time = 35.747, size = 73, normalized size = 0.83

$$\frac{\sqrt{c+dx^3}}{216c^2\,(8c-dx^3)}+\frac{13\,\text{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{2592c^{\frac{5}{2}}}-\frac{\text{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] sqrt(c + d*x**3)/(216*c**2*(8*c - d*x**3)) + 13*atanh(sqrt(c + d*
x**3)/(3*sqrt(c)))/(2592*c**(5/2)) - atanh(sqrt(c + d*x**3)/sqrt(
c))/(96*c**(5/2))
```

Mathematica [C] time = 0.311448, size = 329, normalized size = 3.74

$$\frac{\frac{8cdx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{30cdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\ldots\right.}{(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\ldots\right.}}{216c^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] ((c + d*x^3)/(8*c - d*x^3) + (8*c*d*x^3*AppellF1[1, 1/2, 1, 2, -(
(d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2,
 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2,
3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x
^3)/c), (d*x^3)/(8*c)]))) + (30*c*d*x^3*AppellF1[3/2, 1/2, 1, 5/2
, -(c/(d*x^3)), (8*c)/(d*x^3)])/((-8*c + d*x^3)*(5*d*x^3*AppellF1
```

```
[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)] + 16*c*AppellF1[5
/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)] - c*AppellF1[5/2, 3
/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)])))/(216*c^2*Sqrt[c + d*x
^3])
```

Maple [C] time = 0.02, size = 880, normalized size = 10.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/96*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2)+1/8*d/c*(-1/27/d/c
*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/486*I/d^3/c^2*2^(1/2)*sum((-c*d^2)
^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^
(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1
/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+
c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1
/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipt
icPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*
(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2
)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),
_alpha=RootOf(_Z^3*d-8*c))-1/1728*I/d^2/c^3*2^(1/2)*sum((-c*d^2)
^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^
(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1
/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+
c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1
/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipt
icPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*
(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2
)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),
_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)^2x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x), x)
```

Fricas [A] time = 0.238825, size = 1, normalized size = 0.01

$$\left[\frac{13\left(dx^3-8\,c\right)\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+27\left(dx^3-8\,c\right)\log\left(\frac{(dx^3+2\,c)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right)-24\,\sqrt{dx^3+c}\sqrt{c}}{5184\,(c^2dx^3-8\,c^3)\sqrt{c}},\right.$$
$$\left.-\frac{13\left(dx^3-8\,c\right)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)-27\left(dx^3-8\,c\right)\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+12\,\sqrt{dx^3+c}\sqrt{-c}}{2592\,(c^2dx^3-8\,c^3)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x),x, algorithm="fricas")
```

```
[Out] [1/5184*(13*(d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*
x^3 + c)*c)/(d*x^3 - 8*c)) + 27*(d*x^3 - 8*c)*log(((d*x^3 + 2*c)*
sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3) - 24*sqrt(d*x^3 + c)*sqrt(c))
/((c^2*d*x^3 - 8*c^3)*sqrt(c)), -1/2592*(13*(d*x^3 - 8*c)*arctan(
3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 27*(d*x^3 - 8*c)*arctan(c/(sqrt
(d*x^3 + c)*sqrt(-c))) + 12*sqrt(d*x^3 + c)*sqrt(-c))/((c^2*d*x^3
 - 8*c^3)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.2134, size = 107, normalized size = 1.22

$$\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{96\sqrt{-c}c^2} - \frac{13\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{2592\sqrt{-c}c^2} - \frac{\sqrt{dx^3+c}}{216\,(dx^3-8\,c)c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x),x, algorithm="giac")
```

```
[Out] 1/96*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) - 13/2592*ar
ctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2) - 1/216*sqrt(d*
x^3 + c)/((d*x^3 - 8*c)*c^2)
```

3.429 $\int \frac{1}{x^4(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=124

$$\frac{11d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{10368c^{7/2}}+\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{7/2}}+\frac{5d\sqrt{c+dx^3}}{864c^3\left(8c-dx^3\right)}-\frac{\sqrt{c+dx^3}}{24c^2x^3\left(8c-dx^3\right)}$$

```
[Out] (5*d*Sqrt[c + d*x^3])/(864*c^3*(8*c - d*x^3)) - Sqrt[c + d*x^3]/(
24*c^2*x^3*(8*c - d*x^3)) + (11*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt
[c])])/(10368*c^(7/2)) + (d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(38
4*c^(7/2))
```

Rubi [A] time = 0.385277, antiderivative size = 124, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{11d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{10368c^{7/2}}+\frac{d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{7/2}}+\frac{5d\sqrt{c+dx^3}}{864c^3\left(8c-dx^3\right)}-\frac{\sqrt{c+dx^3}}{24c^2x^3\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (5*d*Sqrt[c + d*x^3])/(864*c^3*(8*c - d*x^3)) - Sqrt[c + d*x^3]/(
24*c^2*x^3*(8*c - d*x^3)) + (11*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt
[c])])/(10368*c^(7/2)) + (d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(38
4*c^(7/2))
```

Rubi in Sympy [A] time = 54.5882, size = 107, normalized size = 0.86

$$-\frac{\sqrt{c+dx^3}}{24c^2x^3\left(8c-dx^3\right)}+\frac{5d\sqrt{c+dx^3}}{864c^3\left(8c-dx^3\right)}+\frac{11d\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{10368c^{\frac{7}{2}}}+\frac{d\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)/(24*c**2*x**3*(8*c - d*x**3)) + 5*d*sqrt(c + d*
x**3)/(864*c**3*(8*c - d*x**3)) + 11*d*atanh(sqrt(c + d*x**3)/(3*
sqrt(c)))/(10368*c**(7/2)) + d*atanh(sqrt(c + d*x**3)/sqrt(c))/(3
84*c**(7/2))
```

Mathematica [C] time = 0.407908, size = 347, normalized size = 2.8

$$\frac{\frac{40cd^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{30cd^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3}\right.}{(8c-dx^3)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\right.\right.}}{864c^3x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (-(((c + d*x^3)*(-36*c + 5*d*x^3))/(-8*c + d*x^3)) + (40*c*d^2*x^
6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*
x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)] +
```

```
d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*Ap
pellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (30*c*d^2*
x^6*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/((8*
c - d*x^3)*(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c
)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/
(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^
3)])))/(864*c^3*x^3*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 926, normalized size = 7.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/64/c^2*(-1/3*(d*x^3+c)^(1/2)/c/x^3+1/3*d*arctanh((d*x^3+c)^(1/2
)/c^(1/2))/c^(3/2))-1/384*d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(7
/2)+1/64*d^2/c^2*(-1/27/d/c*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/486*I/d
^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(
-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-
c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)
*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1
/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alp
ha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^
(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*
d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c
,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))-1/6912*I/d
/c^4*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c
*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*
d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(
-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*
d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2
)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha
*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^
2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)^2x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^4), x)
```

Fricas [A] time = 0.24074, size = 1, normalized size = 0.01

$$\left[-\frac{24\left(5\,dx^3-36\,c\right)\sqrt{dx^3+c}\sqrt{c}-11\left(d^2x^6-8\,cdx^3\right)\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}+6\sqrt{dx^3+c}c}{dx^3-8\,c}\right)-27\left(d^2x^6-8\,cdx^3\right)\log\left(\frac{\left(dx^3+2\,c\right)\sqrt{c}+2\sqrt{d}}{x^3}\right.}{20736\left(c^3dx^6-8\,c^4x^3\right)\sqrt{c}},\right.$$

$$\left.-\frac{12\left(5\,dx^3-36\,c\right)\sqrt{dx^3+c}\sqrt{-c}+11\left(d^2x^6-8\,cdx^3\right)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+27\left(d^2x^6-8\,cdx^3\right)\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)}{10368\left(c^3dx^6-8\,c^4x^3\right)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^4),x, algorithm="fricas")
```

```
[Out] [-1/20736*(24*(5*d*x^3 - 36*c)*sqrt(d*x^3 + c)*sqrt(c) - 11*(d^2*
x^6 - 8*c*d*x^3)*log(((d*x^3 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*
c)/(d*x^3 - 8*c)) - 27*(d^2*x^6 - 8*c*d*x^3)*log(((d*x^3 + 2*c)*s
qrt(c) + 2*sqrt(d*x^3 + c)*c)/x^3))/((c^3*d*x^6 - 8*c^4*x^3)*sqrt
(c)), -1/10368*(12*(5*d*x^3 - 36*c)*sqrt(d*x^3 + c)*sqrt(-c) + 11
*(d^2*x^6 - 8*c*d*x^3)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) + 2
7*(d^2*x^6 - 8*c*d*x^3)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((c
^3*d*x^6 - 8*c^4*x^3)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216024, size = 153, normalized size = 1.23

$$-\frac{1}{10368}\,d\left(\frac{27\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^3}+\frac{11\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}c^3}+\frac{12\left(5\left(dx^3+c\right)^{\frac{3}{2}}-41\sqrt{dx^3+c}c\right)}{\left(\left(dx^3+c\right)^2-10\left(dx^3+c\right)c+9\,c^2\right)c^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^4),x, algorithm="giac")
```

```
[Out] -1/10368*d*(27*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) +
11*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) + 12*(5*(d
*x^3 + c)^(3/2) - 41*sqrt(d*x^3 + c)*c)/(((d*x^3 + c)^2 - 10*(d*x
^3 + c)*c + 9*c^2)*c^3))
```

3.430 $\int \frac{1}{x^7(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=164

$$\frac{31d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{165888c^{9/2}}-\frac{19d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6144c^{9/2}}-\frac{35d^2\sqrt{c+dx^3}}{13824c^4(8c-dx^3)}+\frac{3d\sqrt{c+dx^3}}{128c^3x^3(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{48c^2x^6(8c-dx^3)}$$

```
[Out] (-35*d^2*Sqrt[c + d*x^3])/(13824*c^4*(8*c - d*x^3)) - Sqrt[c + d*
x^3]/(48*c^2*x^6*(8*c - d*x^3)) + (3*d*Sqrt[c + d*x^3])/(128*c^3*
x^3*(8*c - d*x^3)) + (31*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
)/(165888*c^(9/2)) - (19*d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(6
144*c^(9/2))
```

Rubi [A] time = 0.508699, antiderivative size = 164, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{31d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{165888c^{9/2}}-\frac{19d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6144c^{9/2}}-\frac{35d^2\sqrt{c+dx^3}}{13824c^4(8c-dx^3)}+\frac{3d\sqrt{c+dx^3}}{128c^3x^3(8c-dx^3)}-\frac{\sqrt{c+dx^3}}{48c^2x^6(8c-dx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (-35*d^2*Sqrt[c + d*x^3])/(13824*c^4*(8*c - d*x^3)) - Sqrt[c + d*
x^3]/(48*c^2*x^6*(8*c - d*x^3)) + (3*d*Sqrt[c + d*x^3])/(128*c^3*
x^3*(8*c - d*x^3)) + (31*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
)/(165888*c^(9/2)) - (19*d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(6
144*c^(9/2))
```

Rubi in Sympy [A] time = 75.0742, size = 138, normalized size = 0.84

$$-\frac{\sqrt{c+dx^3}}{48c^2x^6(8c-dx^3)}+\frac{11d\sqrt{c+dx^3}}{3456c^3x^3(8c-dx^3)}+\frac{35d\sqrt{c+dx^3}}{13824c^4x^3}+\frac{31d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{165888c^{\frac{9}{2}}}-\frac{19d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{6144c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)/(48*c**2*x**6*(8*c - d*x**3)) + 11*d*sqrt(c + d
*x**3)/(3456*c**3*x**3*(8*c - d*x**3)) + 35*d*sqrt(c + d*x**3)/(1
3824*c**4*x**3) + 31*d**2*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(16
5888*c**(9/2)) - 19*d**2*atanh(sqrt(c + d*x**3)/sqrt(c))/(6144*c*
*(9/2))
```

Mathematica [C] time = 0.416793, size = 349, normalized size = 2.13

$$\frac{\frac{\frac{570cd^3x^9F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}+288c^3-36c^2dx^3-289cd^2x^6+35d^3x^9}{dx^3-8c}-\frac{280cd^3x \cdots}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-\cdots\right.\right.}}{13824c^4x^6\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^7*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] ((-280*c*d^3*x^9*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*
c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d
*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3
)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)])
)) + (288*c^3 - 36*c^2*d*x^3 - 289*c*d^2*x^6 + 35*d^3*x^9 + (570*
c*d^3*x^9*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)]
)/(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)
] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]
- c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]))/(-8
*c + d*x^3))/(13824*c^4*x^6*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 989, normalized size = 6.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/64/c^2*(-1/6*(d*x^3+c)^(1/2)/c/x^6+1/4*d*(d*x^3+c)^(1/2)/c^2/x^
3-1/4*d^2*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2))-1/2048*d^2*ar
ctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(9/2)+1/256/c^3*d*(-1/3*(d*x^3+c
)^(1/2)/c/x^3+1/3*d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2))+1/5
12*d^3/c^3*(-1/27/d/c*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/486*I/d^3/c^2
*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2
)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)
^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2
*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)
^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+
2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(
-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-
1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(
2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))-1/36864*I/c^5*2^
(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1
/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*
d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_
alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*
d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/1
8/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3
)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/
2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)^2 x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^7),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^7), x)
```

Fricas [A] time = 0.243214, size = 1, normalized size = 0.01

$$\left[\frac{24\left(35\,d^2x^6-324\,cdx^3+288\,c^2\right)\sqrt{dx^3+c}\sqrt{c}+31\left(d^3x^9-8\,cd^2x^6\right)\log\left(\frac{(dx^3+10\,c)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+513\left(d^3x^9-8\,cd^2x^6\right)\log}{331776\,(c^4dx^9-8\,c^5x^6)\sqrt{c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^7),x, algorithm="fricas")
```

```
[Out] [1/331776*(24*(35*d^2*x^6 - 324*c*d*x^3 + 288*c^2)*sqrt(d*x^3 + c
)*sqrt(c) + 31*(d^3*x^9 - 8*c*d^2*x^6)*log(((d*x^3 + 10*c)*sqrt(c
) + 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) + 513*(d^3*x^9 - 8*c*d^2*
x^6)*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3))/((c^
4*d*x^9 - 8*c^5*x^6)*sqrt(c)), 1/165888*(12*(35*d^2*x^6 - 324*c*d
*x^3 + 288*c^2)*sqrt(d*x^3 + c)*sqrt(-c) - 31*(d^3*x^9 - 8*c*d^2*
x^6)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) + 513*(d^3*x^9 - 8*c*
d^2*x^6)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((c^4*d*x^9 - 8*c^
5*x^6)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220342, size = 158, normalized size = 0.96

$$\frac{1}{165888}\,d^2\left(\frac{513\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^4}-\frac{31\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}c^4}-\frac{12\sqrt{dx^3+c}}{(dx^3-8\,c)c^4}+\frac{432\left(\left(dx^3+c\right)^{\frac{3}{2}}-2\sqrt{dx^3+c}c\right)}{c^4d^2x^6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^7),x, algorithm="giac")
```

```
[Out] 1/165888*d^2*(513*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^4)
 - 31*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^4) - 12*sq
rt(d*x^3 + c)/((d*x^3 - 8*c)*c^4) + 432*((d*x^3 + c)^(3/2) - 2*sq
rt(d*x^3 + c)*c)/(c^4*d^2*x^6))
```

3.431 $\int \frac{x^7}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=641

$$\frac{62\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{31\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{9\ 3^{3/4}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{62\sqrt{c+dx^3}}{27d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{44\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27\sqrt{3}d^{8/3}}-\frac{44\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{81d^{8/3}}+\frac{44\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^{8/3}}+\frac{8x^2\sqrt{c+dx^3}}{27d^2\left(8c-dx^3\right)}$$

```
[Out] (62*Sqrt[c + d*x^3])/(27*d^(8/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)) + (8*x^2*Sqrt[c + d*x^3])/(27*d^2*(8*c - d*x^3)) + (44*c^(1/
6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]
])/(27*Sqrt[3]*d^(8/3)) - (44*c^(1/6)*ArcTanh[(c^(1/3) + d^(1/3)*
x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(81*d^(8/3)) + (44*c^(1/6)*Arc
Tanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(81*d^(8/3)) - (31*Sqrt[2 - Sq
rt[3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1
/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellip
ticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(9*3^(3/4)*d^(8/3)*Sqrt[(c^
(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^
2]*Sqrt[c + d*x^3]) + (62*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*S
qrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d
^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/
(27*3^(1/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sq
rt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.52946, antiderivative size = 641, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$\frac{62\sqrt{2}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{31\sqrt{2-\sqrt{3}}\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{9\ 3^{3/4}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{62\sqrt{c+dx^3}}{27d^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{44\sqrt[6]{c}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27\sqrt{3}d^{8/3}}-\frac{44\sqrt[6]{c}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{81d^{8/3}}+\frac{44\sqrt[6]{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81d^{8/3}}+\frac{8x^2\sqrt{c+dx^3}}{27d^2\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (62*Sqrt[c + d*x^3])/(27*d^(8/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)) + (8*x^2*Sqrt[c + d*x^3])/(27*d^2*(8*c - d*x^3)) + (44*c^(1/
6)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]
])/(27*Sqrt[3]*d^(8/3)) - (44*c^(1/6)*ArcTanh[(c^(1/3) + d^(1/3)*
x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(81*d^(8/3)) + (44*c^(1/6)*Arc
Tanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(81*d^(8/3)) - (31*Sqrt[2 - Sq
rt[3]]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1
/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Ellip
ticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(9*3^(3/4)*d^(8/3)*Sqrt[(c^
(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^
2]*Sqrt[c + d*x^3]) + (62*Sqrt[2]*c^(1/3)*(c^(1/3) + d^(1/3)*x)*S
qrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d
^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/
(27*3^(1/4)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sq
rt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.2763, size = 51, normalized size = 0.08

$$\frac{x^8\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{8}{3},\frac{1}{2},2,\frac{11}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{512c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x**8*sqrt(c + d*x**3)*appellf1(8/3, 1/2, 2, 11/3, -d*x**3/c, d*x*
*3/(8*c))/(512*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.3665, size = 333, normalized size = 0.52

$$\frac{8x^2\left(-\frac{200c^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{248cdx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{d\cdots}{8\cdots}\right.}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right.\cdots}\right.}{135d^2\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^7/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (8*x^2*(5*(c + d*x^3) - (200*c^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*
x^3)/c), (d*x^3)/(8*c)])/(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^
3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*
x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/
c), (d*x^3)/(8*c)])) - (248*c*d*x^3*AppellF1[5/3, 1/2, 1, 8/3, -(
(d*x^3)/c), (d*x^3)/(8*c)])/(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d
*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -
((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*
x^3)/c), (d*x^3)/(8*c)]))))/(135*d^2*(8*c - d*x^3)*Sqrt[c + d*x^3
])
```

Maple [C] time = 0.055, size = 1737, normalized size = 2.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -2/3*I/d^3*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-
c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)))+16/27*I/d^5*2^(1/2)*sum(1/_alpha*(-c*d^2)^
(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)
))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(
1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/
2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c
)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/
2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipti
cPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(
-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)
*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_
alpha=RootOf(_Z^3*d-8*c))+64*c^2/d^2*(-1/216*x^2/c^2*(d*x^3+c)^(1
/2)/(d*x^3-8*c)-1/648*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-7/1944*I/c^2/d^3*2^(1/2
```

```
)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^
2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1
/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*
d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d
-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)
^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7}{\sqrt{dx^3+c}(dx^3-8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**7/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7}{\sqrt{dx^3+c}(dx^3-8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x^7/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

3.432 $\int \frac{x^4}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=647

$$\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27\sqrt{3}c^{5/6}d^{5/3}}-\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{81c^{5/6}d^{5/3}}+\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{5/6}d^{5/3}}$$
$$+\frac{\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}c^{2/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{18\ 3^{3/4}c^{2/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{\sqrt{c+dx^3}}{27cd^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{x^2\sqrt{c+dx^3}}{27cd\left(8c-dx^3\right)}$$

```
[Out] Sqrt[c + d*x^3]/(27*c*d^(5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) + (x^2*Sqrt[c + d*x^3])/(27*c*d*(8*c - d*x^3)) + ArcTan[(Sqrt[3
]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]/(27*Sqrt[3]*c^(
5/6)*d^(5/3)) - ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c
 + d*x^3])]/(81*c^(5/6)*d^(5/3)) + ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])]/(81*c^(5/6)*d^(5/3)) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/
3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1
/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqr
t[3]])/(18*3^(3/4)*c^(2/3)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/
3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) +
(Sqrt[2]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x
+ d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[A
rcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*c^(2/3)*d^(5/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.52711, antiderivative size = 647, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.482$

$$\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27\sqrt{3}c^{5/6}d^{5/3}}-\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{81c^{5/6}d^{5/3}}+\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{81c^{5/6}d^{5/3}}+\frac{\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\sqrt[4]{3}c^{2/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{18\ 3^{3/4}c^{2/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt{c+dx^3}}{27cd^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{x^2\sqrt{c+dx^3}}{27cd\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] Sqrt[c + d*x^3]/(27*c*d^(5/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)
) + (x^2*Sqrt[c + d*x^3])/(27*c*d*(8*c - d*x^3)) + ArcTan[(Sqrt[3
]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]/(27*Sqrt[3]*c^(
5/6)*d^(5/3)) - ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c
 + d*x^3])]/(81*c^(5/6)*d^(5/3)) + ArcTanh[Sqrt[c + d*x^3]/(3*Sqr
t[c])]/(81*c^(5/6)*d^(5/3)) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/
3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1
/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqr
t[3]])/(18*3^(3/4)*c^(2/3)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/
3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) +
(Sqrt[2]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x
+ d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[A
rcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3)
+ d^(1/3)*x)], -7 - 4*Sqrt[3]])/(27*3^(1/4)*c^(2/3)*d^(5/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.4544, size = 51, normalized size = 0.08

$$\frac{x^5\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{5}{3},\frac{1}{2},2,\frac{8}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{320c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x**5*sqrt(c + d*x**3)*appellf1(5/3, 1/2, 2, 8/3, -d*x**3/c, d*x**
3/(8*c))/(320*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.444853, size = 360, normalized size = 0.56

$$\frac{x^2\left(-\frac{32x^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{200cF_1\left(\frac{2}{3}\cdots\right.}{d(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4\cdots\right.\right.}\right.}{135\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^2*((5*c + 5*d*x^3)/(8*c^2*d - c*d^2*x^3) + (200*c*AppellF1[2/3
, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(d*(-8*c + d*x^3)*(4
0*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d
*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4
*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) - (32
*x^3*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8
*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3
)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*
x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)
/(8*c)])))))/(135*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 1304, normalized size = 2.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/27*I/d^4/c*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/
d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2
)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1
/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*
d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*
d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)
^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*
c))+8*c/d*(-1/216*x^2/c^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/648*I/c^2
*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d
^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(
I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(
1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2)))-7/1944*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/
3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3
)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*
(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(
1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*
(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi
(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*
d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*
d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alp
```

```
ha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{dx^3+c}(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{(d^2x^6-16\,cdx^3+64\,c^2)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x^4/((d^2*x^6 - 16*c*d*x^3 + 64*c^2)*sqrt(d*x^3 + c)), x
)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{dx^3+c}(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x^4/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

3.433 $\int \frac{x}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=644

$$-\frac{7\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{432\sqrt{3}c^{11/6}d^{2/3}}+\frac{7\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1296c^{11/6}d^{2/3}}-\frac{7\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1296c^{11/6}d^{2/3}}+\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{108\sqrt{2}\sqrt[4]{3}c^{5/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{144\,3^{3/4}c^{5/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt{c+dx^3}}{216c^2d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{x^2\sqrt{c+dx^3}}{216c^2\left(8c-dx^3\right)}$$

```
[Out] Sqrt[c + d*x^3]/(216*c^2*d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)) + (x^2*Sqrt[c + d*x^3])/(216*c^2*(8*c - d*x^3)) - (7*ArcTan[
(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(432*Sq
rt[3]*c^(11/6)*d^(2/3)) + (7*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c
^(1/6)*Sqrt[c + d*x^3])])/(1296*c^(11/6)*d^(2/3)) - (7*ArcTanh[Sq
rt[c + d*x^3]/(3*Sqrt[c])])/(1296*c^(11/6)*d^(2/3)) - (Sqrt[2 - S
qrt[3]]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x +
 d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)], -7 - 4*Sqrt[3]])/(144*3^(3/4)*c^(5/3)*d^(2/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3]) + ((c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(108*Sqrt[2]*3^(
1/4)*c^(5/3)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.48114, antiderivative size = 644, normalized size of antiderivative = 1., number of

steps used = 14, number of rules used = 13, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.52$

$$-\frac{7\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{432\sqrt{3}c^{11/6}d^{2/3}}+\frac{7\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{1296c^{11/6}d^{2/3}}-\frac{7\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{1296c^{11/6}d^{2/3}}$$
$$+\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{108\sqrt{2}\sqrt[4]{3}c^{5/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{144\ 3^{3/4}c^{5/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{\sqrt{c+dx^3}}{216c^2d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{x^2\sqrt{c+dx^3}}{216c^2\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] Sqrt[c + d*x^3]/(216*c^2*d^(2/3)*((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)) + (x^2*Sqrt[c + d*x^3])/(216*c^2*(8*c - d*x^3)) - (7*ArcTan[
(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(432*Sq
rt[3]*c^(11/6)*d^(2/3)) + (7*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c
^(1/6)*Sqrt[c + d*x^3])])/(1296*c^(11/6)*d^(2/3)) - (7*ArcTanh[Sq
rt[c + d*x^3]/(3*Sqrt[c])])/(1296*c^(11/6)*d^(2/3)) - (Sqrt[2 - S
qrt[3]]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x +
 d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[Ar
cSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) +
 d^(1/3)*x)], -7 - 4*Sqrt[3]])/(144*3^(3/4)*c^(5/3)*d^(2/3)*Sqrt[
(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*Sqrt[c + d*x^3]) + ((c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c
^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*
x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 +
Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(108*Sqrt[2]*3^(
1/4)*c^(5/3)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 21.32, size = 51, normalized size = 0.08

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},\frac{1}{2},2,\frac{5}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{128c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, 1/2, 2, 5/3, -d*x**3/c, d*x**
3/(8*c))/(128*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.433018, size = 332, normalized size = 0.52

$$\frac{x^2\left(\frac{5(c+dx^3)-\frac{32cdx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}}{c^2}+\frac{2500F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\cdots\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\cdots\right)}\right)}{1080\,(8c-dx^3)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^2*((2500*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c
)])/(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)]
 + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c
)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))
+ (5*(c + d*x^3) - (32*c*d*x^3*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^
3)/c), (d*x^3)/(8*c)])/(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)
/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x
^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/
c), (d*x^3)/(8*c)])))/c^2))/(1080*(8*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.01, size = 882, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/216*x^2/c^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/648*I/c^2*3^(1/2)/d*
(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I
*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)))-7/1944*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d
*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)
*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c
*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2
/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*
3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*
(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_
Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{dx^3+c}(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\left(d^2x^6 - 16\,cdx^3 + 64\,c^2\right)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x/((d^2*x^6 - 16*c*d*x^3 + 64*c^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{dx^3 + c}\,(dx^3 - 8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

3.434 $\int \frac{1}{x^2(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=665

$$\frac{7\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{216\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{7\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{288\,3^{3/4}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{216\sqrt{3}c^{17/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{648c^{17/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{648c^{17/6}}-\frac{7\sqrt{c+dx^3}}{432c^3x}+\frac{7\sqrt[3]{d}\sqrt{c+dx^3}}{432c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{\sqrt{c+dx^3}}{216c^2x\left(8c-dx^3\right)}$$

```
[Out] (-7*Sqrt[c + d*x^3])/(432*c^3*x) + (7*d^(1/3)*Sqrt[c + d*x^3])/(4
32*c^3*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + Sqrt[c + d*x^3]/(21
6*c^2*x*(8*c - d*x^3)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3
) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(216*Sqrt[3]*c^(17/6)) + (d^(1/
3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/
(648*c^(17/6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
648*c^(17/6)) - (7*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x
)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3)
+ d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]
])/(288*3^(3/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (7*d^(1/3)*
(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)
*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1
 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)], -7 - 4*Sqrt[3]])/(216*Sqrt[2]*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)
*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sq
rt[c + d*x^3])
```

Rubi [A] time = 1.81427, antiderivative size = 665, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$\frac{7\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{216\sqrt{2}\sqrt[4]{3}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{7\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{288\ 3^{3/4}c^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{216\sqrt{3}c^{17/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{648c^{17/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{648c^{17/6}}$$
$$-\frac{7\sqrt{c+dx^3}}{432c^3x}+\frac{7\sqrt[3]{d}\sqrt{c+dx^3}}{432c^3\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{\sqrt{c+dx^3}}{216c^2x\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (-7*Sqrt[c + d*x^3])/(432*c^3*x) + (7*d^(1/3)*Sqrt[c + d*x^3])/(4
32*c^3*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) + Sqrt[c + d*x^3]/(21
6*c^2*x*(8*c - d*x^3)) - (d^(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3
) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(216*Sqrt[3]*c^(17/6)) + (d^(1/
3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/
(648*c^(17/6)) - (d^(1/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
648*c^(17/6)) - (7*Sqrt[2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x
)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])
*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3)
+ d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]
])/(288*3^(3/4)*c^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (7*d^(1/3)*
(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)
*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1
 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)
*x)], -7 - 4*Sqrt[3]])/(216*Sqrt[2]*3^(1/4)*c^(8/3)*Sqrt[(c^(1/3)
*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sq
rt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.5691, size = 53, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{1}{3},\frac{1}{2},2,\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64c^3x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, 1/2, 2, 2/3, -d*x**3/c, d*x**3/(
8*c))/(64*c**3*x*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.429853, size = 375, normalized size = 0.56

$$\frac{-\frac{14d^2x^5F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{c^2(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{250dx^2F_1\left(\frac{2}{3};\frac{1}{2}\right.}{c(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\right.\right.\right.}}{135\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] ((-5*(54*c - 7*d*x^3)*(c + d*x^3))/(16*c^3*(8*c*x - d*x^4)) + (25
0*d*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/
(c*(8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (
d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c),
 (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x
^3)/(8*c)]))) - (14*d^2*x^5*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/
c), (d*x^3)/(8*c)])/(c^2*(8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1
, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2,
 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1,
11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(135*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 1761, normalized size = 2.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/64/c^2*(-(d*x^3+c)^(1/2)/c/x-1/3*I/c*3^(1/2)*(-c*d^2)^(1/3)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/8*d/c*(-1/2
16*x^2/c^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-1/648*I/c^2*3^(1/2)/d*(-c*
d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+
1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-
7/1944*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*
x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c
*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2
)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-
(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1
/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*
d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*
```

```
d-8*c)))-1/1728*I/d^2/c^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
tOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(d^2x^8-16\,cdx^5+64\,c^2x^2)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/((d^2*x^8 - 16*c*d*x^5 + 64*c^2*x^2)*sqrt(d*x^3 + c)),
 x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^2), x)
```

3.435 $\int \frac{1}{x^5(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=687

$$-\frac{25d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27648\sqrt{3}c^{23/6}}+\frac{25d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{82944c^{23/6}}-\frac{25d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{82944c^{23/6}}-\frac{5d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{432\sqrt{2}\sqrt[4]{3}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{5\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{576\,3^{3/4}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{5d^{4/3}\sqrt{c+dx^3}}{864c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{5d\sqrt{c+dx^3}}{864c^4x}-\frac{31\sqrt{c+dx^3}}{6912c^3x^4}+\frac{\sqrt{c+dx^3}}{216c^2x^4\left(8c-dx^3\right)}$$

```
[Out] (-31*Sqrt[c + d*x^3])/(6912*c^3*x^4) + (5*d*Sqrt[c + d*x^3])/(864
*c^4*x) - (5*d^(4/3)*Sqrt[c + d*x^3])/(864*c^4*((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)) + Sqrt[c + d*x^3]/(216*c^2*x^4*(8*c - d*x^3))
- (25*d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt
[c + d*x^3]])/(27648*Sqrt[3]*c^(23/6)) + (25*d^(4/3)*ArcTanh[(c^(
1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(82944*c^(23/6)
) - (25*d^(4/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(82944*c^(2
3/6)) + (5*Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(
c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3
)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(576*
3^(3/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (5*d^(4/3)*(c^(1/3
) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt
[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -
7 - 4*Sqrt[3]])/(432*Sqrt[2]*3^(1/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1
/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c +
 d*x^3])
```

Rubi [A] time = 2.06486, antiderivative size = 687, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{25d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{27648\sqrt{3}c^{23/6}}+\frac{25d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{82944c^{23/6}}-\frac{25d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{82944c^{23/6}}$$

$$-\frac{5d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{432\sqrt{2}\sqrt[4]{3}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$

$$+\frac{5\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{576\ 3^{3/4}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$

$$-\frac{5d^{4/3}\sqrt{c+dx^3}}{864c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{5d\sqrt{c+dx^3}}{864c^4x}-\frac{31\sqrt{c+dx^3}}{6912c^3x^4}+\frac{\sqrt{c+dx^3}}{216c^2x^4\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (-31*Sqrt[c + d*x^3])/(6912*c^3*x^4) + (5*d*Sqrt[c + d*x^3])/(864
*c^4*x) - (5*d^(4/3)*Sqrt[c + d*x^3])/(864*c^4*((1 + Sqrt[3])*c^(
1/3) + d^(1/3)*x)) + Sqrt[c + d*x^3]/(216*c^2*x^4*(8*c - d*x^3))
- (25*d^(4/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt
[c + d*x^3]])/(27648*Sqrt[3]*c^(23/6)) + (25*d^(4/3)*ArcTanh[(c^(
1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(82944*c^(23/6)
) - (25*d^(4/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(82944*c^(2
3/6)) + (5*Sqrt[2 - Sqrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(
c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3)
 + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3
)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(576*
3^(3/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) - (5*d^(4/3)*(c^(1/3
) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt
[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -
7 - 4*Sqrt[3]])/(432*Sqrt[2]*3^(1/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1
/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c +
 d*x^3])
```

Rubi in Sympy [A] time = 25.5783, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{4}{3},\frac{1}{2},2,-\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{256c^3x^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-4/3, 1/2, 2, -1/3, -d*x**3/c, d*x**3/
(8*c))/(256*c**3*x**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.355415, size = 384, normalized size = 0.56

$$\frac{-\frac{2450c^2d^2x^6F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{256cd^3x^9F_1\left(\frac{5}{3};\frac{1}{2},1; \ldots\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2}, \ldots\right)\right)\right)}}{6912c^4x^4\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (((c + d*x^3)*(216*c^2 - 351*c*d*x^3 + 40*d^2*x^6))/(-8*c + d*x^3
) - (2450*c^2*d^2*x^6*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d
*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((
d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -
((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x
^3)/c), (d*x^3)/(8*c)]))) + (256*c*d^3*x^9*AppellF1[5/3, 1/2, 1,
8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[
5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF
1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/
3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(6912*c^4*x^4*S
qrt[c + d*x^3])
```

Maple [C] time = 0.02, size = 2240, normalized size = 3.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/64/c^2*(-1/4*(d*x^3+c)^(1/2)/c/x^4+5/8*d*(d*x^3+c)^(1/2)/c^2/x+
5/24*I*d/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x
-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*
(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2))))+1/256/c^3*d*(-(d*x^3+c)^(1/2)/c/x-1/3*I
/c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d
^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(
I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(
1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2))))+1/64*d^2/c^2*(-1/216*x^2/c^2*(d*x^3+c)^(1/2)/(d*x
^3-8*c)-1/648*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(
1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Elli
pticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
```

```
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-7/1944*I/c^2/d^3*2^(1/2)*sum(1/
_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3
)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3)
)/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(
2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3)
)^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alp
ha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2
)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d
*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3
^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))-1/6912*I/d/c^4*2^(1/2)
*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2
)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/
2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d
+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-
(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^
(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)^2 x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^5),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^5), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^5),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**5/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8c)^2 x^5}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^5),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^5), x)
```

3.436 $\int \frac{1}{x^8(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=711

$$-\frac{17d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{110592\sqrt{3}c^{29/6}}+\frac{17d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{331776c^{29/6}}-\frac{17d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{331776c^{29/6}}$$
$$+\frac{289d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{24192\sqrt{2}\sqrt[4]{3}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{289\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32256\ 3^{3/4}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{289d^{7/3}\sqrt{c+dx^3}}{48384c^5\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{289d^2\sqrt{c+dx^3}}{48384c^5x}$$
$$+\frac{391d\sqrt{c+dx^3}}{193536c^4x^4}-\frac{17\sqrt{c+dx^3}}{6048c^3x^7}+\frac{\sqrt{c+dx^3}}{216c^2x^7\left(8c-dx^3\right)}$$

```
[Out] (-17*Sqrt[c + d*x^3])/(6048*c^3*x^7) + (391*d*Sqrt[c + d*x^3])/(1
93536*c^4*x^4) - (289*d^2*Sqrt[c + d*x^3])/(48384*c^5*x) + (289*d
^(7/3)*Sqrt[c + d*x^3])/(48384*c^5*((1 + Sqrt[3])*c^(1/3) + d^(1/
3)*x)) + Sqrt[c + d*x^3]/(216*c^2*x^7*(8*c - d*x^3)) - (17*d^(7/3
)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]
)/(110592*Sqrt[3]*c^(29/6)) + (17*d^(7/3)*ArcTanh[(c^(1/3) + d^(1
/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(331776*c^(29/6)) - (17*d^
(7/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(331776*c^(29/6)) - (
289*Sqrt[2 - Sqrt[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3)
 - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32256*3^(3/
4)*c^(14/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (289*d^(7/3)*(c^(1/3) +
 d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3]
)*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 -
 4*Sqrt[3]])/(24192*Sqrt[2]*3^(1/4)*c^(14/3)*Sqrt[(c^(1/3)*(c^(1/
3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c +
d*x^3])
```

Rubi [A] time = 2.33052, antiderivative size = 711, normalized size of antiderivative = 1., number of

steps used = 17, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{17d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{110592\sqrt{3}c^{29/6}}+\frac{17d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{331776c^{29/6}}-\frac{17d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{331776c^{29/6}}$$
$$+\frac{289d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{24192\sqrt{2}\sqrt[4]{3}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{289\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{32256\ 3^{3/4}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{289d^{7/3}\sqrt{c+dx^3}}{48384c^5\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{289d^2\sqrt{c+dx^3}}{48384c^5x}$$
$$+\frac{391d\sqrt{c+dx^3}}{193536c^4x^4}-\frac{17\sqrt{c+dx^3}}{6048c^3x^7}+\frac{\sqrt{c+dx^3}}{216c^2x^7\left(8c-dx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^8*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (-17*Sqrt[c + d*x^3])/(6048*c^3*x^7) + (391*d*Sqrt[c + d*x^3])/(1
93536*c^4*x^4) - (289*d^2*Sqrt[c + d*x^3])/(48384*c^5*x) + (289*d
^(7/3)*Sqrt[c + d*x^3])/(48384*c^5*((1 + Sqrt[3])*c^(1/3) + d^(1/
3)*x)) + Sqrt[c + d*x^3]/(216*c^2*x^7*(8*c - d*x^3)) - (17*d^(7/3
)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]]
)/(110592*Sqrt[3]*c^(29/6)) + (17*d^(7/3)*ArcTanh[(c^(1/3) + d^(1
/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(331776*c^(29/6)) - (17*d^
(7/3)*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(331776*c^(29/6)) - (
289*Sqrt[2 - Sqrt[3]]*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3)
 - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((
1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(32256*3^(3/
4)*c^(14/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (289*d^(7/3)*(c^(1/3) +
 d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1
+ Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3]
)*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 -
 4*Sqrt[3]])/(24192*Sqrt[2]*3^(1/4)*c^(14/3)*Sqrt[(c^(1/3)*(c^(1/
3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c +
d*x^3])
```

Rubi in Sympy [A] time = 27.2834, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{7}{3},\frac{1}{2},2,-\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{448c^3x^7\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**8/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-7/3, 1/2, 2, -4/3, -d*x**3/c, d*x**3/
(8*c))/(448*c**3*x**7*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.527222, size = 377, normalized size = 0.53

$$\frac{\frac{480250c^2d^3x^9F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{36992cd^4x^{12}F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF}}{967680c^5x^7\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^8*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (-5*(3456*c^4 - 216*c^3*d*x^3 + 5967*c^2*d^2*x^6 + 8483*c*d^3*x^9
 - 1156*d^4*x^12) + (480250*c^2*d^3*x^9*AppellF1[2/3, 1/2, 1, 5/3
, -((d*x^3)/c), (d*x^3)/(8*c)])/(40*c*AppellF1[2/3, 1/2, 1, 5/3,
-((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3
, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((
d*x^3)/c), (d*x^3)/(8*c)])) - (36992*c*d^4*x^12*AppellF1[5/3, 1/2
, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(64*c*AppellF1[5/3, 1/2,
1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2
, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1,
 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])))/(967680*c^5*x^7*(8*c - d*x
^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 2738, normalized size = 3.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^8/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/64/c^2*(-1/7*(d*x^3+c)^(1/2)/c/x^7+11/56*d*(d*x^3+c)^(1/2)/c^2/
x^4-55/112*d^2*(d*x^3+c)^(1/2)/c^3/x-55/336*I*d^2/c^3*3^(1/2)*(-c
*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x
+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF
(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))
)+3/4096/c^4*d^2*(-(d*x^3+c)^(1/2)/c/x-1/3*I/c*3^(1/2)*(-c*d^2)^(
1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+1/256
/c^3*d*(-1/4*(d*x^3+c)^(1/2)/c/x^4+5/8*d*(d*x^3+c)^(1/2)/c^2/x+5/
24*I*d/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
```

```
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-
c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2))))+1/512*d^3/c^3*(-1/216*x^2/c^2*(d*x^3+c)^(
1/2)/(d*x^3-8*c)-1/648*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/
d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^
2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-7/1944*I/c^2/d^3*2^(1/
2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*
d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d
^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-
1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)
*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*
d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2
)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))-1/36864*I/c^5
*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2
)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d
*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1
/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3
^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_
alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(
-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d
)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)^2 x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^8),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^8), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^8),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**8/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3+c}(dx^3-8\,c)^2x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^8),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^8), x)
```

3.437 $\int \frac{x^6}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=66

$$\frac{x^7\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{7}{3};2,\frac{1}{2};\frac{10}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{448c^2\sqrt{c+dx^3}}$$

```
[Out] (x^7*Sqrt[1 + (d*x^3)/c]*AppellF1[7/3, 2, 1/2, 10/3, (d*x^3)/(8*c
), -((d*x^3)/c)])/(448*c^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.200049, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$\frac{x^7\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{7}{3};2,\frac{1}{2};\frac{10}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{448c^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^7*Sqrt[1 + (d*x^3)/c]*AppellF1[7/3, 2, 1/2, 10/3, (d*x^3)/(8*c
), -((d*x^3)/c)])/(448*c^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.556, size = 51, normalized size = 0.77

$$\frac{x^7\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{7}{3},\frac{1}{2},2,\frac{10}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{448c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x**7*sqrt(c + d*x**3)*appellf1(7/3, 1/2, 2, 10/3, -d*x**3/c, d*x*
*3/(8*c))/(448*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.822012, size = 331, normalized size = 5.02

$$\frac{2x\left(-\frac{128c^2F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{161cdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right.}\right.}{27d^2\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^6/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*x*(4*(c + d*x^3) - (128*c^2*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^
3)/c), (d*x^3)/(8*c)])/(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)
/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^
3)/c), (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c)
, (d*x^3)/(8*c)])) - (161*c*d*x^3*AppellF1[4/3, 1/2, 1, 7/3, -((d
*x^3)/c), (d*x^3)/(8*c)])/(56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x
^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((
d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^
```

```
3)/c), (d*x^3)/(8*c)])))))/(27*d^2*(8*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.052, size = 1431, normalized size = 21.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^6/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -2/3*I/d^3*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
))+16/27*I/d^5*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*
x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c
*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2
)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-
(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1
/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*
d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*
d-8*c))+64*c^2/d^2*(-1/216/c^2*x*(d*x^3+c)^(1/2)/(d*x^3-8*c)+1/64
8*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/
d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ellipti
cF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
)-5/972*I/c^2/d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*
(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*
(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*
d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/
3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3
^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(
-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z
^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\sqrt{dx^3 + c}(dx^3 - 8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x^6/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^{6}}{(d^{2}x^{6}-16\,cdx^{3}+64\,c^{2})\sqrt{dx^{3}+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x^6/((d^2*x^6 - 16*c*d*x^3 + 64*c^2)*sqrt(d*x^3 + c)), x
)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**6/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{6}}{\sqrt{dx^{3}+c}(dx^{3}-8\,c)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x^6/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

3.438 $\int \frac{x^3}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=66

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};2,\frac{1}{2};\frac{7}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{256c^2\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 2, 1/2, 7/3, (d*x^3)/(8*c)
, -((d*x^3)/c)])/(256*c^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.193345, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};2,\frac{1}{2};\frac{7}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{256c^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 2, 1/2, 7/3, (d*x^3)/(8*c)
, -((d*x^3)/c)])/(256*c^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 30.1666, size = 51, normalized size = 0.77

$$\frac{x^4\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{4}{3},\frac{1}{2},2,\frac{7}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{256c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 1/2, 2, 7/3, -d*x**3/c, d*x**
3/(8*c))/(256*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.414201, size = 355, normalized size = 5.38

$$\frac{x\left(\frac{7x^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+56cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{32cF_1\left(\frac{1}{3};\frac{1}{2},1\ldots\right.}{d(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\ldots\right.\right.\right.}\ldots\right.}{27\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*((c + d*x^3)/(8*c^2*d - c*d^2*x^3) + (32*c*AppellF1[1/3, 1/2,
1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(d*(-8*c + d*x^3)*(32*c*App
ellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(A
ppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*Appell
F1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])) + (7*x^3*App
ellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x
^3)*(56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)]
 + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), (d*x^3)/(8*
```

```
c)] - 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)])
))))/(27*Sqrt[c + d*x^3])
```

Maple [C] time = 0.016, size = 1150, normalized size = 17.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/27*I/d^4/c*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+
1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d
^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^
(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-
c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2
)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^
2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-
8*c))+8*c/d*(-1/216/c^2*x*(d*x^3+c)^(1/2)/(d*x^3-8*c)+1/648*I/c^2
*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d
^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))-5/972
*I/c^2/d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/
d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2
)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1
/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*
d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*
d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)
^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*
c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{dx^3+c}(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{(d^2x^6-16\,cdx^3+64\,c^2)\sqrt{dx^3+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x^3/((d^2*x^6 - 16*c*d*x^3 + 64*c^2)*sqrt(d*x^3 + c)), x
)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{dx^3 + c}(dx^3 - 8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x^3/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

3.439 $\int \frac{1}{(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=64

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};2,\frac{1}{2};\frac{4}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{64c^2\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 2, 1/2, 4/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(64*c^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.0887569, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};2,\frac{1}{2};\frac{4}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{64c^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 2, 1/2, 4/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(64*c^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.8349, size = 49, normalized size = 0.77

$$\frac{x\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{1}{3},\frac{1}{2},2,\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64c^3\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 1/2, 2, 4/3, -d*x**3/c, d*x**3/(
8*c))/(64*c**3*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.311371, size = 327, normalized size = 5.11

$$\frac{x\left(\frac{\frac{7cdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+56cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}+c+dx^3}{c^2}+\frac{832F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+3\cdots}\right)}{216\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*((832*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)])
/(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)] +
3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)]
- 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])) + (
c + d*x^3 + (7*c*d*x^3*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (
d*x^3)/(8*c)])/(56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*
```

```
x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c),
(d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), (d*x
^3)/(8*c)])))/c^2))/(216*(8*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.008, size = 728, normalized size = 11.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/216/c^2*x*(d*x^3+c)^(1/2)/(d*x^3-8*c)+1/648*I/c^2*3^(1/2)/d*(-
c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(
x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))-5/972*I/c^2/d^3*2^
(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(d^2x^6 - 16\,cdx^3 + 64\,c^2)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(1/((d^2*x^6 - 16*c*d*x^3 + 64*c^2)*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8c)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2), x)
```

3.440 $\int \frac{1}{x^3(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};2,\frac{1}{2};\frac{1}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{128c^2x^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 2, 1/2, 1/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(128*c^2*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.18105, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};2,\frac{1}{2};\frac{1}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{128c^2x^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 2, 1/2, 1/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(128*c^2*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 25.5051, size = 54, normalized size = 0.82

$$-\frac{\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{2}{3},\frac{1}{2},2,\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{128c^3x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 1/2, 2, 1/3, -d*x**3/c, d*x**3/(
8*c))/(128*c**3*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.37009, size = 372, normalized size = 5.64

$$\frac{-\frac{64c^2dx^3F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{203cd^2x^6F_1\left(\frac{4}{3};\frac{1}{2},1;\cdots\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},\cdots\right.\right.\right.}}{3456c^3x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (-(((c + d*x^3)*(-216*c + 29*d*x^3))/(-8*c + d*x^3)) - (64*c^2*d*
x^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*
c - d*x^3)*(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)
/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), (d*x^
3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8
*c)]))) + (203*c*d^2*x^6*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c),
 (d*x^3)/(8*c)])/((8*c - d*x^3)*(56*c*AppellF1[4/3, 1/2, 1, 7/3,
-((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10/
3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 10/3, -
```

```
((d*x^3)/c), (d*x^3)/(8*c)]))))/(3456*c^3*x^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 1455, normalized size = 22.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/64/c^2*(-1/2/c/x^2*(d*x^3+c)^(1/2)+1/6*I/c*3^(1/2)*(-c*d^2)^(1/
3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/8*d/c*(-1/216/c^2*x*(d*x^
3+c)^(1/2)/(d*x^3-8*c)+1/648*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2))-5/972*I/c^2/d^3*2^(1/2)*sum(1/_alpha
^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-
3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+
1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2
*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2
/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*
I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/
2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))-1/1728*I/d^2/c^3*2^(1/2)*s
um(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2
)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/
2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d
+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-
(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^
(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)^2 x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(d^2x^9 - 16\,cdx^6 + 64\,c^2x^3)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/((d^2*x^9 - 16*c*d*x^6 + 64*c^2*x^3)*sqrt(d*x^3 + c)),
 x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)^2x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^3), x)
```

3.441 $\int \frac{1}{x^6(8c-dx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{5}{3};2,\frac{1}{2};-\frac{2}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{320c^2x^5\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-5/3, 2, 1/2, -2/3, (d*x^3)/(8*c),
 -((d*x^3)/c)])/(320*c^2*x^5*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.190215, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{5}{3};2,\frac{1}{2};-\frac{2}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{320c^2x^5\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^6*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-5/3, 2, 1/2, -2/3, (d*x^3)/(8*c),
 -((d*x^3)/c)])/(320*c^2*x^5*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.5151, size = 56, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{5}{3},\frac{1}{2},2,-\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{320c^3x^5\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**6/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-5/3, 1/2, 2, -2/3, -d*x**3/c, d*x**3/
(8*c))/(320*c**3*x**5*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.35304, size = 384, normalized size = 5.82

$$\frac{\frac{21952c^2d^2x^6F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{833cd^3x^9F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\right.\right.\right.}}{34560c^4x^5\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^6*(8*c - d*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (((c + d*x^3)*(864*c^2 - 1080*c*d*x^3 + 119*d^2*x^6))/(-8*c + d*x
^3) + (21952*c^2*d^2*x^6*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c),
 (d*x^3)/(8*c)])/((8*c - d*x^3)*(32*c*AppellF1[1/3, 1/2, 1, 4/3,
-((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3
, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((
d*x^3)/c), (d*x^3)/(8*c)]))) - (833*c*d^3*x^9*AppellF1[4/3, 1/2,
1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(56*c*Appell
F1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(Appe
llF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1
```

```
[7/3, 3/2, 1, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(34560*c^4*x
^5*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 1782, normalized size = 27.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^6/(-d*x^3+8*c)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/64/c^2*(-1/5/c/x^5*(d*x^3+c)^(1/2)+7/20*d/c^2/x^2*(d*x^3+c)^(1/
2)-7/60*I*d/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*
((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*E
llipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)))+1/256/c^3*d*(-1/2/c/x^2*(d*x^3+c)^(1/2)+1/6*I/c*3^(1/2)*
(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I
*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/64*d^2/c^2*(-
1/216/c^2*x*(d*x^3+c)^(1/2)/(d*x^3-8*c)+1/648*I/c^2*3^(1/2)/d*(-c
*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x
+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))-5/972*I/c^2/d^3*2^(
1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*
(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(
-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2
)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(
1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_al
pha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c
*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/
c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))-1/6912*I/
d/c^4*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d
*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/
3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^
(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_
alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^
(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_
alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3
)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8\,c)^2x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^6),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^6), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^6),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**6/(-d*x**3+8*c)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx^3 + c}(dx^3 - 8c)^2 x^6} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^6),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(d*x^3 + c)*(d*x^3 - 8*c)^2*x^6), x)
```

3.442 $\int \frac{x^{11}}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=95

$$\frac{2\left(38c+39dx^3\right)}{81d^4\sqrt{c+dx^3}}-\frac{640\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243d^4}+\frac{8x^6}{27d^2\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] (8*x^6)/(27*d^2*(8*c - d*x^3)*Sqrt[c + d*x^3]) + (2*(38*c + 39*d*
x^3))/(81*d^4*Sqrt[c + d*x^3]) - (640*Sqrt[c]*ArcTanh[Sqrt[c + d*
x^3]/(3*Sqrt[c])])/(243*d^4)
```

Rubi [A] time = 0.270759, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{2\left(38c+39dx^3\right)}{81d^4\sqrt{c+dx^3}}-\frac{640\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243d^4}+\frac{8x^6}{27d^2\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (8*x^6)/(27*d^2*(8*c - d*x^3)*Sqrt[c + d*x^3]) + (2*(38*c + 39*d*
x^3))/(81*d^4*Sqrt[c + d*x^3]) - (640*Sqrt[c]*ArcTanh[Sqrt[c + d*
x^3]/(3*Sqrt[c])])/(243*d^4)
```

Rubi in Sympy [A] time = 33.2562, size = 83, normalized size = 0.87

$$-\frac{640\sqrt{c}\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243d^4}+\frac{8x^6}{27d^2\sqrt{c+dx^3}\left(8c-dx^3\right)}+\frac{4\left(57c+\frac{117dx^3}{2}\right)}{243d^4\sqrt{c+dx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -640*sqrt(c)*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(243*d**4) + 8*x
**6/(27*d**2*sqrt(c + d*x**3)*(8*c - d*x**3)) + 4*(57*c + 117*d*x
**3/2)/(243*d**4*sqrt(c + d*x**3))
```

Mathematica [A] time = 0.301883, size = 81, normalized size = 0.85

$$\frac{2\left(\frac{912c^2+822cdx^3-81d^2x^6}{\left(8c-dx^3\right)\sqrt{c+dx^3}}-320\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{243d^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*((912*c^2 + 822*c*d*x^3 - 81*d^2*x^6)/((8*c - d*x^3)*Sqrt[c +
d*x^3]) - 320*Sqrt[c]*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))/(243
*d^4)
```

Maple [C] time = 0.067, size = 970, normalized size = 10.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/d^3*(d*(2/3/d^2*c/((x^3+c/d)*d)^(1/2)+2/3*(d*x^3+c)^(1/2)/d^2)-
32/3*c/d/(d*x^3+c)^(1/2))+192*c^2/d^3*(2/27/d/c/((x^3+c/d)*d)^(1/
2)+1/243*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(
-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*
(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(
1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2
)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)
*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2
)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I
*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2
/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
)+512*c^3/d^3*(-1/243/d/c^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-2/243/d/c
^2/((x^3+c/d)*d)^(1/2)-1/1458*I/d^3/c^3*2^(1/2)*sum((-c*d^2)^(1/3
)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)
+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(
-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1
/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(
-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d
^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d
-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alph
a=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.223282, size = 1, normalized size = 0.01

$$\left[\frac{2\left(81\,d^2x^6 - 822\,cdx^3 + 160\,\sqrt{dx^3+c}\left(dx^3-8\,c\right)\sqrt{c}\log\left(\frac{dx^3-6\,\sqrt{dx^3+c}\sqrt{c}+10\,c}{dx^3-8\,c}\right) - 912\,c^2\right)}{243\,(d^5x^3 - 8\,cd^4)\sqrt{dx^3+c}}, \frac{2\left(81\,d^2x^6 - 822\,cdx^3 - 320\,\sqrt{dx\right.}{243\,(d\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] [2/243*(81*d^2*x^6 - 822*c*d*x^3 + 160*sqrt(d*x^3 + c)*(d*x^3 - 8
*c)*sqrt(c)*log((d*x^3 - 6*sqrt(d*x^3 + c)*sqrt(c) + 10*c)/(d*x^3
 - 8*c)) - 912*c^2)/((d^5*x^3 - 8*c*d^4)*sqrt(d*x^3 + c)), 2/243*
(81*d^2*x^6 - 822*c*d*x^3 - 320*sqrt(d*x^3 + c)*(d*x^3 - 8*c)*sqr
t(-c)*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c)) - 912*c^2)/((d^5*x^3 -
```

```
8*c*d^4)*sqrt(d*x^3 + c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.226763, size = 119, normalized size = 1.25

$$\frac{640\,c\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{243\,\sqrt{-c}d^4}+\frac{2\,\sqrt{dx^3+c}}{3\,d^4}-\frac{2\,\left(85\,\left(dx^3+c\right)c+3\,c^2\right)}{81\,\left(\left(dx^3+c\right)^{\frac{3}{2}}-9\,\sqrt{dx^3+c}c\right)d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] 640/243*c*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^4) + 2
/3*sqrt(d*x^3 + c)/d^4 - 2/81*(85*(d*x^3 + c)*c + 3*c^2)/(((d*x^3
 + c)^(3/2) - 9*sqrt(d*x^3 + c)*c)*d^4)
```

3.443 $\int \frac{x^8}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=83

$$\frac{64c}{27d^3(8c-dx^3)\sqrt{c+dx^3}}-\frac{22}{81d^3\sqrt{c+dx^3}}-\frac{32\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243\sqrt{c}d^3}$$

```
[Out] -22/(81*d^3*Sqrt[c + d*x^3]) + (64*c)/(27*d^3*(8*c - d*x^3)*Sqrt[
c + d*x^3]) - (32*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(243*Sqrt
[c]*d^3)
```

Rubi [A] time = 0.23491, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{64c}{27d^3(8c-dx^3)\sqrt{c+dx^3}}-\frac{22}{81d^3\sqrt{c+dx^3}}-\frac{32\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243\sqrt{c}d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -22/(81*d^3*Sqrt[c + d*x^3]) + (64*c)/(27*d^3*(8*c - d*x^3)*Sqrt[
c + d*x^3]) - (32*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(243*Sqrt
[c]*d^3)
```

Rubi in Sympy [A] time = 26.5674, size = 73, normalized size = 0.88

$$\frac{64c}{27d^3\sqrt{c+dx^3}(8c-dx^3)}-\frac{22}{81d^3\sqrt{c+dx^3}}-\frac{32\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243\sqrt{c}d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] 64*c/(27*d**3*sqrt(c + d*x**3)*(8*c - d*x**3)) - 22/(81*d**3*sqrt
(c + d*x**3)) - 32*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(243*sqrt(
c)*d**3)
```

Mathematica [A] time = 0.201241, size = 71, normalized size = 0.86

$$\frac{2\left(\frac{3(8c+11dx^3)}{(8c-dx^3)\sqrt{c+dx^3}}-\frac{16\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{\sqrt{c}}\right)}{243d^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*((3*(8*c + 11*d*x^3))/((8*c - d*x^3)*Sqrt[c + d*x^3]) - (16*Ar
cTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/Sqrt[c]))/(243*d^3)
```

Maple [C] time = 0.022, size = 926, normalized size = 11.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] -2/3/d^3/(d*x^3+c)^(1/2)+64*c^2/d^2*(-1/243/d/c^2*(d*x^3+c)^(1/2)
/(d*x^3-8*c)-2/243/d/c^2/((x^3+c/d)*d)^(1/2)-1/1458*I/d^3/c^3*2^(
1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/
3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d
*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_a
lpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d
^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18
/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)
*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))+16*c/d^2*(2/27/d/c/(
(x^3+c/d)*d)^(1/2)+1/243*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
tOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.223688, size = 1, normalized size = 0.01

$$\left[\frac{2\left(8\sqrt{dx^3+c}\left(dx^3-8c\right)\log\left(\frac{(dx^3+10c)\sqrt{c}-6\sqrt{dx^3+c}c}{dx^3-8c}\right)-3\left(11dx^3+8c\right)\sqrt{c}\right)}{243\left(d^4x^3-8cd^3\right)\sqrt{dx^3+c}\sqrt{c}}, \frac{2\left(16\sqrt{dx^3+c}\left(dx^3-8c\right)\arctan\left(\frac{3c}{\sqrt{dx^3+c}\sqrt{-c}}\right)\right.}{243\left(d^4x^3-8cd^3\right)\sqrt{dx^3+}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] [2/243*(8*sqrt(d*x^3 + c)*(d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(
c) - 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) - 3*(11*d*x^3 + 8*c)*sqr
t(c))/((d^4*x^3 - 8*c*d^3)*sqrt(d*x^3 + c)*sqrt(c)), 2/243*(16*sq
rt(d*x^3 + c)*(d*x^3 - 8*c)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))
) - 3*(11*d*x^3 + 8*c)*sqrt(-c))/((d^4*x^3 - 8*c*d^3)*sqrt(d*x^3
```

```
+ c)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.224799, size = 90, normalized size = 1.08

$$\frac{32 \arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{243\sqrt{-c}d^3} - \frac{2\left(11\,dx^3 + 8\,c\right)}{81\left(\left(dx^3 + c\right)^{\frac{3}{2}} - 9\sqrt{dx^3 + c}c\right)d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] 32/243*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*d^3) - 2/81
*(11*d*x^3 + 8*c)/(((d*x^3 + c)^(3/2) - 9*sqrt(d*x^3 + c)*c)*d^3)
```

3.444 $\int \frac{x^5}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=85

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{3/2}d^2}+\frac{8}{27d^2\left(8c-dx^3\right)\sqrt{c+dx^3}}-\frac{2}{81cd^2\sqrt{c+dx^3}}$$

```
[Out] -2/(81*c*d^2*Sqrt[c + d*x^3]) + 8/(27*d^2*(8*c - d*x^3)*Sqrt[c +
d*x^3]) + (2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(243*c^(3/2)*d
^2)
```

Rubi [A] time = 0.198891, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{3/2}d^2}+\frac{8}{27d^2\left(8c-dx^3\right)\sqrt{c+dx^3}}-\frac{2}{81cd^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In] Int[x^5/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -2/(81*c*d^2*Sqrt[c + d*x^3]) + 8/(27*d^2*(8*c - d*x^3)*Sqrt[c +
d*x^3]) + (2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(243*c^(3/2)*d
^2)
```

Rubi in Sympy [A] time = 22.1705, size = 73, normalized size = 0.86

$$\frac{8}{27d^2\sqrt{c+dx^3}\left(8c-dx^3\right)}-\frac{2}{81cd^2\sqrt{c+dx^3}}+\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{\frac{3}{2}}d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**5/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] 8/(27*d**2*sqrt(c + d*x**3)*(8*c - d*x**3)) - 2/(81*c*d**2*sqrt(c
 + d*x**3)) + 2*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(243*c**(3/2)
*d**2)
```

Mathematica [A] time = 0.209956, size = 73, normalized size = 0.86

$$\frac{2\left(\frac{3\sqrt{c}\left(4c+dx^3\right)}{\left(8c-dx^3\right)\sqrt{c+dx^3}}+\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)\right)}{243c^{3/2}d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*((3*Sqrt[c]*(4*c + d*x^3))/((8*c - d*x^3)*Sqrt[c + d*x^3]) + A
rcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]))/(243*c^(3/2)*d^2)
```

Maple [C] time = 0.017, size = 908, normalized size = 10.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/d*(2/27/d/c/((x^3+c/d)*d)^(1/2)+1/243*I/d^3/c^2*2^(1/2)*sum((-c
*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)
^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*
d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I
*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*E
llipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alp
ha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3
^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)),_alpha=RootOf(_Z^3*d-8*c)))+8*c/d*(-1/243/d/c^2*(d*x^3+c)^(1
/2)/(d*x^3-8*c)-2/243/d/c^2/((x^3+c/d)*d)^(1/2)-1/1458*I/d^3/c^3*
2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^
(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*
I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^
(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2
*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-
c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1
/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2
/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.223638, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{dx^3+c}\left(dx^3-8\,c\right)\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)-6\,\left(dx^3+4\,c\right)\sqrt{c}}{243\,\left(cd^3x^3-8\,c^2d^2\right)\sqrt{dx^3+c}\sqrt{c}},\right.$$
$$\left.-\frac{2\left(\sqrt{dx^3+c}\left(dx^3-8\,c\right)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+3\,\left(dx^3+4\,c\right)\sqrt{-c}\right)}{243\,\left(cd^3x^3-8\,c^2d^2\right)\sqrt{dx^3+c}\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] [1/243*(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(c)
 + 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) - 6*(d*x^3 + 4*c)*sqrt(c))
/((c*d^3*x^3 - 8*c^2*d^2)*sqrt(d*x^3 + c)*sqrt(c)), -2/243*(sqrt(
d*x^3 + c)*(d*x^3 - 8*c)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) +
 3*(d*x^3 + 4*c)*sqrt(-c))/((c*d^3*x^3 - 8*c^2*d^2)*sqrt(d*x^3 +
c)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.22691, size = 103, normalized size = 1.21

$$-\frac{2\left(\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{\sqrt{-c}cd}+\frac{3\left(dx^3+4c\right)}{\left(\left(dx^3+c\right)^{\frac{3}{2}}-9\sqrt{dx^3+c}c\right)cd}\right)}{243\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] -2/243*(arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c*d) + 3*(
d*x^3 + 4*c)/(((d*x^3 + c)^(3/2) - 9*sqrt(d*x^3 + c)*c)*c*d))/d
```

3.445 $\int \frac{x^2}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=88

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{5/2}d}-\frac{1}{81c^2d\sqrt{c+dx^3}}+\frac{1}{27cd\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] -1/(81*c^2*d*Sqrt[c + d*x^3]) + 1/(27*c*d*(8*c - d*x^3)*Sqrt[c +
d*x^3]) + ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]/(243*c^(5/2)*d)
```

Rubi [A] time = 0.187863, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{5/2}d}-\frac{1}{81c^2d\sqrt{c+dx^3}}+\frac{1}{27cd\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -1/(81*c^2*d*Sqrt[c + d*x^3]) + 1/(27*c*d*(8*c - d*x^3)*Sqrt[c +
d*x^3]) + ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]/(243*c^(5/2)*d)
```

Rubi in Sympy [A] time = 23.7357, size = 76, normalized size = 0.86

$$-\frac{2}{27cd\sqrt{c+dx^3}\left(8c-dx^3\right)}+\frac{\sqrt{c+dx^3}}{81c^2d\left(8c-dx^3\right)}+\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{\frac{5}{2}}d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -2/(27*c*d*sqrt(c + d*x**3)*(8*c - d*x**3)) + sqrt(c + d*x**3)/(8
1*c**2*d*(8*c - d*x**3)) + atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(2
43*c**(5/2)*d)
```

Mathematica [A] time = 0.195383, size = 72, normalized size = 0.82

$$\frac{\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{c^{5/2}}+\frac{3dx^3-15c}{c^2(8c-dx^3)\sqrt{c+dx^3}}}{243d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((-15*c + 3*d*x^3)/(c^2*(8*c - d*x^3)*Sqrt[c + d*x^3]) + ArcTanh[
Sqrt[c + d*x^3]/(3*Sqrt[c])]/c^(5/2))/(243*d)
```

Maple [C] time = 0.01, size = 463, normalized size = 5.3

$$-\frac{1}{243\,dc^{2}\left(dx^{3}-8\,c\right)}\sqrt{dx^{3}+c}-\frac{2}{243\,dc^{2}}\frac{1}{\sqrt{\left(x^{3}+\frac{c}{d}\right)d}}$$

$$-\frac{\frac{i}{1458}\sqrt{2}}{d^{3}c^{3}}\sum_{\_alpha=RootOf\left(\_Z^{3}d-8\,c\right)}1\sqrt[3]{-cd^{2}}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^{2}}+\sqrt[3]{-cd^{2}}\right)\right)\frac{1}{\sqrt[3]{-cd^{2}}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^{2}}\right)\left(-3\sqrt[3]{-cd^{2}}+i\sqrt{\ldots}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/243/d/c^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-2/243/d/c^2/((x^3+c/d)*d
)^(1/2)-1/1458*I/d^3/c^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d
-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.221395, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{dx^{3}+c}\left(dx^{3}-8\,c\right)\log\left(\frac{\left(dx^{3}+10\,c\right)\sqrt{c}+6\,\sqrt{dx^{3}+c}c}{dx^{3}-8\,c}\right)-6\,\left(dx^{3}-5\,c\right)\sqrt{c}}{486\,\left(c^{2}d^{2}x^{3}-8\,c^{3}d\right)\sqrt{dx^{3}+c}\sqrt{c}},\right.$$
$$\left.-\frac{\sqrt{dx^{3}+c}\left(dx^{3}-8\,c\right)\arctan\left(\frac{3\,c}{\sqrt{dx^{3}+c}\sqrt{-c}}\right)+3\,\left(dx^{3}-5\,c\right)\sqrt{-c}}{243\,\left(c^{2}d^{2}x^{3}-8\,c^{3}d\right)\sqrt{dx^{3}+c}\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] [1/486*(sqrt(d*x^3 + c)*(d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqrt(c)
 + 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) - 6*(d*x^3 - 5*c)*sqrt(c))
/((c^2*d^2*x^3 - 8*c^3*d)*sqrt(d*x^3 + c)*sqrt(c)), -1/243*(sqrt(
d*x^3 + c)*(d*x^3 - 8*c)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) +
 3*(d*x^3 - 5*c)*sqrt(-c))/((c^2*d^2*x^3 - 8*c^3*d)*sqrt(d*x^3 +
c)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219872, size = 97, normalized size = 1.1

$$-\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{243\sqrt{-c}c^2d}-\frac{dx^3-5\,c}{81\left((dx^3+c)^{\frac{3}{2}}-9\sqrt{dx^3+c}c\right)c^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] -1/243*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^2*d) - 1/
81*(d*x^3 - 5*c)/(((d*x^3 + c)^(3/2) - 9*sqrt(d*x^3 + c)*c)*c^2*d
)
```

3.446 $\int \frac{1}{x(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=106

$$\frac{7\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{7776c^{7/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{7/2}}+\frac{5}{648c^3\sqrt{c+dx^3}}+\frac{1}{216c^2\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] 5/(648*c^3*Sqrt[c + d*x^3]) + 1/(216*c^2*(8*c - d*x^3)*Sqrt[c + d
*x^3]) + (7*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(7776*c^(7/2))
- ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(96*c^(7/2))
```

Rubi [A] time = 0.380532, antiderivative size = 106, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.259

$$\frac{7\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{7776c^{7/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{7/2}}+\frac{5}{648c^3\sqrt{c+dx^3}}+\frac{1}{216c^2\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] 5/(648*c^3*Sqrt[c + d*x^3]) + 1/(216*c^2*(8*c - d*x^3)*Sqrt[c + d
*x^3]) + (7*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(7776*c^(7/2))
- ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]]/(96*c^(7/2))
```

Rubi in Sympy [A] time = 55.6895, size = 92, normalized size = 0.87

$$\frac{1}{216c^2\sqrt{c+dx^3}\left(8c-dx^3\right)}+\frac{5}{648c^3\sqrt{c+dx^3}}+\frac{7\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{7776c^{\frac{7}{2}}}-\frac{\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{96c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] 1/(216*c**2*sqrt(c + d*x**3)*(8*c - d*x**3)) + 5/(648*c**3*sqrt(c
 + d*x**3)) + 7*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(7776*c**(7/2
)) - atanh(sqrt(c + d*x**3)/sqrt(c))/(96*c**(7/2))
```

Mathematica [C] time = 0.374883, size = 338, normalized size = 3.19

$$\frac{-\frac{20dx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{c^2(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{45dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\right.}{c^2(dx^3-8c)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},\right.\right.}}{324\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((43*c - 5*d*x^3)/(16*c^4 - 2*c^3*d*x^3) - (20*d*x^3*AppellF1[1,
1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])/(c^2*(8*c - d*x^3)*(16*c
*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)] + d*x^3*(App
ellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[2,
3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (45*d*x^3*AppellF1[3
/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/(c^2*(-8*c + d*x^3
```

```
)*(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)
] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]
- c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)])))/(3
24*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 953, normalized size = 9.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/64/c^2*(2/3/c/((x^3+c/d)*d)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c
^(1/2))/c^(3/2))+1/8*d/c*(-1/243/d/c^2*(d*x^3+c)^(1/2)/(d*x^3-8*c
)-2/243/d/c^2/((x^3+c/d)*d)^(1/2)-1/1458*I/d^3/c^3*2^(1/2)*sum((-
c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2
)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c
*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(
I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(
d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-
I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*
EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_al
pha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*
3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)),_alpha=RootOf(_Z^3*d-8*c)))-1/64*d/c^2*(2/27/d/c/((x^3+c/d)
*d)^(1/2)+1/243*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*
x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c
*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2
)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-
(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1
/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*
d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*
d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)^2 x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x), x)
```

Fricas [A] time = 0.229867, size = 1, normalized size = 0.01

$$\left[\frac{7\,\sqrt{dx^3 + c}\left(dx^3 - 8\,c\right)\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right) + 81\,\sqrt{dx^3 + c}\left(dx^3 - 8\,c\right)\log\left(\frac{\left(dx^3+2\,c\right)\sqrt{c}-2\,\sqrt{dx^3+c}c}{x^3}\right) + 24\left(5\,dx^3 - 43\,c\right)}{15552\left(c^3dx^3 - 8\,c^4\right)\sqrt{dx^3 + c}\sqrt{c}}\right.$$

$$\left.-\frac{7\,\sqrt{dx^3 + c}\left(dx^3 - 8\,c\right)\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right) - 81\,\sqrt{dx^3 + c}\left(dx^3 - 8\,c\right)\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right) - 12\left(5\,dx^3 - 43\,c\right)\sqrt{-c}}{7776\left(c^3dx^3 - 8\,c^4\right)\sqrt{dx^3 + c}\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x),x, algorithm="fricas")
```

```
[Out] [1/15552*(7*sqrt(d*x^3 + c)*(d*x^3 - 8*c)*log(((d*x^3 + 10*c)*sqr
t(c) + 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) + 81*sqrt(d*x^3 + c)*(
d*x^3 - 8*c)*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^
3) + 24*(5*d*x^3 - 43*c)*sqrt(c))/((c^3*d*x^3 - 8*c^4)*sqrt(d*x^3
 + c)*sqrt(c)), -1/7776*(7*sqrt(d*x^3 + c)*(d*x^3 - 8*c)*arctan(3
*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 81*sqrt(d*x^3 + c)*(d*x^3 - 8*c)
*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))) - 12*(5*d*x^3 - 43*c)*sqrt(
-c))/((c^3*d*x^3 - 8*c^4)*sqrt(d*x^3 + c)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223934, size = 126, normalized size = 1.19

$$\frac{\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{96\sqrt{-c}c^3} - \frac{7\arctan\left(\frac{\sqrt{dx^3+c}}{3\sqrt{-c}}\right)}{7776\sqrt{-c}c^3} + \frac{5\,dx^3 - 43\,c}{648\left((dx^3+c)^{\frac{3}{2}} - 9\sqrt{dx^3+c}c\right)c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x),x, algorithm="giac")
```

```
[Out] 1/96*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) - 7/7776*arc
tan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^3) + 1/648*(5*d*x^3
 - 43*c)/(((d*x^3 + c)^(3/2) - 9*sqrt(d*x^3 + c)*c)*c^3)
```

3.447 $\int \frac{1}{x^4(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=143

$$\frac{5d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{31104c^{9/2}}+\frac{5d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{9/2}}-\frac{35d}{2592c^4\sqrt{c+dx^3}}+\frac{5d}{864c^3\left(8c-dx^3\right)\sqrt{c+dx^3}}-\frac{1}{24c^2x^3\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] (-35*d)/(2592*c^4*Sqrt[c + d*x^3]) + (5*d)/(864*c^3*(8*c - d*x^3)
*Sqrt[c + d*x^3]) - 1/(24*c^2*x^3*(8*c - d*x^3)*Sqrt[c + d*x^3])
+ (5*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(31104*c^(9/2)) + (5
*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(384*c^(9/2))
```

Rubi [A] time = 0.502188, antiderivative size = 143, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.296

$$\frac{5d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{31104c^{9/2}}+\frac{5d\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{9/2}}-\frac{35d}{2592c^4\sqrt{c+dx^3}}+\frac{5d}{864c^3\left(8c-dx^3\right)\sqrt{c+dx^3}}-\frac{1}{24c^2x^3\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-35*d)/(2592*c^4*Sqrt[c + d*x^3]) + (5*d)/(864*c^3*(8*c - d*x^3)
*Sqrt[c + d*x^3]) - 1/(24*c^2*x^3*(8*c - d*x^3)*Sqrt[c + d*x^3])
+ (5*d*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(31104*c^(9/2)) + (5
*d*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(384*c^(9/2))
```

Rubi in Sympy [A] time = 75.1026, size = 129, normalized size = 0.9

$$-\frac{1}{24c^2x^3\sqrt{c+dx^3}\left(8c-dx^3\right)}+\frac{5d}{864c^3\sqrt{c+dx^3}\left(8c-dx^3\right)}-\frac{35d}{2592c^4\sqrt{c+dx^3}}+\frac{5d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{31104c^{\frac{9}{2}}}+\frac{5d\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{384c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -1/(24*c**2*x**3*sqrt(c + d*x**3)*(8*c - d*x**3)) + 5*d/(864*c**3
*sqrt(c + d*x**3)*(8*c - d*x**3)) - 35*d/(2592*c**4*sqrt(c + d*x*
*3)) + 5*d*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(31104*c**(9/2)) +
 5*d*atanh(sqrt(c + d*x**3)/sqrt(c))/(384*c**(9/2))
```

Mathematica [C] time = 0.385686, size = 350, normalized size = 2.45

$$\frac{\frac{280cd^2x^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{\left(8c-dx^3\right)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+16cF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{450cd^2x^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3}\cdots\right.}{\left(8c-dx^3\right)\left(5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\cdots\right.\right.}}{2592c^4x^3\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((108*c^2 + 265*c*d*x^3 - 35*d^2*x^6)/(-8*c + d*x^3) + (280*c*d^2
*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c -
 d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8*c)]
 + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4
*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (450*c*
d^2*x^6*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d*x^3)])/
((8*c - d*x^3)*(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)),
(8*c)/(d*x^3)] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8
*c)/(d*x^3)] - c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(
d*x^3)])))/(2592*c^4*x^3*Sqrt[c + d*x^3])
```

Maple [C] time = 0.02, size = 1019, normalized size = 7.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/64/c^2*(-1/3*(d*x^3+c)^(1/2)/c^2/x^3-2/3*d/c^2/((x^3+c/d)*d)^(1
/2)+d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2))+1/256/c^3*d*(2/3/
c/((x^3+c/d)*d)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2
))+1/64*d^2/c^2*(-1/243/d/c^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)-2/243/d
/c^2/((x^3+c/d)*d)^(1/2)-1/1458*I/d^3/c^3*2^(1/2)*sum((-c*d^2)^(1
/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/
3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)
*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticP
i(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c
*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c
*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_al
pha=RootOf(_Z^3*d-8*c)))-1/256*d^2/c^3*(2/27/d/c/((x^3+c/d)*d)^(1
/2)+1/243*I/d^3/c^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*
(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^
(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3
)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^
2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)^2 x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^4), x)
```

Fricas [A] time = 0.232454, size = 1, normalized size = 0.01

$$\left[\frac{5\left(d^2x^6-8\,cdx^3\right)\sqrt{dx^3+c}\log\left(\frac{\left(dx^3+10\,c\right)\sqrt{c}+6\,\sqrt{dx^3+c}c}{dx^3-8\,c}\right)+405\left(d^2x^6-8\,cdx^3\right)\sqrt{dx^3+c}\log\left(\frac{\left(dx^3+2\,c\right)\sqrt{c}+2\,\sqrt{dx^3+c}c}{x^3}\right)-24\,(35}{62208\,(c^4dx^6-8\,c^5x^3)\sqrt{dx^3+c}\sqrt{c}}\right.$$

$$-\frac{5\left(d^2x^6-8\,cdx^3\right)\sqrt{dx^3+c}\arctan\left(\frac{3\,c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+405\left(d^2x^6-8\,cdx^3\right)\sqrt{dx^3+c}\arctan\left(\frac{c}{\sqrt{dx^3+c}\sqrt{-c}}\right)+12\left(35\,d^2x^6-265\,c}{31104\,(c^4dx^6-8\,c^5x^3)\sqrt{dx^3+c}\sqrt{-c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^4),x, algorithm="fricas")
```

```
[Out] [1/62208*(5*(d^2*x^6 - 8*c*d*x^3)*sqrt(d*x^3 + c)*log(((d*x^3 + 1
0*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) + 405*(d^2*x^6
 - 8*c*d*x^3)*sqrt(d*x^3 + c)*log(((d*x^3 + 2*c)*sqrt(c) + 2*sqrt
(d*x^3 + c)*c)/x^3) - 24*(35*d^2*x^6 - 265*c*d*x^3 - 108*c^2)*sqr
t(c))/((c^4*d*x^6 - 8*c^5*x^3)*sqrt(d*x^3 + c)*sqrt(c)), -1/31104
*(5*(d^2*x^6 - 8*c*d*x^3)*sqrt(d*x^3 + c)*arctan(3*c/(sqrt(d*x^3
+ c)*sqrt(-c))) + 405*(d^2*x^6 - 8*c*d*x^3)*sqrt(d*x^3 + c)*arcta
n(c/(sqrt(d*x^3 + c)*sqrt(-c))) + 12*(35*d^2*x^6 - 265*c*d*x^3 -
108*c^2)*sqrt(-c))/((c^4*d*x^6 - 8*c^5*x^3)*sqrt(d*x^3 + c)*sqrt(
-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221646, size = 171, normalized size = 1.2

$$-\frac{1}{31104}\,d\left(\frac{405\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^4}+\frac{5\,\arctan\left(\frac{\sqrt{dx^3+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c^4}+\frac{12\left(35\left(dx^3+c\right)^2-335\left(dx^3+c\right)c+192\,c^2\right)}{\left(\left(dx^3+c\right)^{\frac{5}{2}}-10\left(dx^3+c\right)^{\frac{3}{2}}c+9\,\sqrt{dx^3+c}c^2\right)c^4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^4),x, algorithm="giac")
```

```
[Out] -1/31104*d*(405*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^4) +
 5*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^4) + 12*(35*(
d*x^3 + c)^2 - 335*(d*x^3 + c)*c + 192*c^2)/(((d*x^3 + c)^(5/2) -
 10*(d*x^3 + c)^(3/2)*c + 9*sqrt(d*x^3 + c)*c^2)*c^4))
```

3.448 $\int \frac{1}{x^7(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=185

$$\frac{13d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{497664c^{11/2}}-\frac{33d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{11/2}}+\frac{665d^2}{41472c^5\sqrt{c+dx^3}}-\frac{71d^2}{13824c^4\left(8c-dx^3\right)\sqrt{c+dx^3}}+\frac{17d}{384c^3x^3\left(8c-dx^3\right)\sqrt{c+dx^3}}-\frac{1}{48c^2x^6\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] (665*d^2)/(41472*c^5*Sqrt[c + d*x^3]) - (71*d^2)/(13824*c^4*(8*c
- d*x^3)*Sqrt[c + d*x^3]) - 1/(48*c^2*x^6*(8*c - d*x^3)*Sqrt[c +
d*x^3]) + (17*d)/(384*c^3*x^3*(8*c - d*x^3)*Sqrt[c + d*x^3]) + (1
3*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(497664*c^(11/2)) - (
33*d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(2048*c^(11/2))
```

Rubi [A] time = 0.649548, antiderivative size = 185, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 8, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.296

$$\frac{13d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{497664c^{11/2}}-\frac{33d^2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{11/2}}+\frac{665d^2}{41472c^5\sqrt{c+dx^3}}-\frac{71d^2}{13824c^4\left(8c-dx^3\right)\sqrt{c+dx^3}}+\frac{17d}{384c^3x^3\left(8c-dx^3\right)\sqrt{c+dx^3}}-\frac{1}{48c^2x^6\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (665*d^2)/(41472*c^5*Sqrt[c + d*x^3]) - (71*d^2)/(13824*c^4*(8*c
- d*x^3)*Sqrt[c + d*x^3]) - 1/(48*c^2*x^6*(8*c - d*x^3)*Sqrt[c +
d*x^3]) + (17*d)/(384*c^3*x^3*(8*c - d*x^3)*Sqrt[c + d*x^3]) + (1
3*d^2*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(497664*c^(11/2)) - (
33*d^2*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(2048*c^(11/2))
```

Rubi in Sympy [A] time = 97.0921, size = 160, normalized size = 0.86

$$-\frac{1}{48c^2x^6\sqrt{c+dx^3}\left(8c-dx^3\right)}+\frac{11d}{3456c^3x^3\sqrt{c+dx^3}\left(8c-dx^3\right)}+\frac{71d}{13824c^4x^3\sqrt{c+dx^3}}+\frac{665d^2}{41472c^5\sqrt{c+dx^3}}+\frac{13d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{497664c^{\frac{11}{2}}}-\frac{33d^2\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{2048c^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -1/(48*c**2*x**6*sqrt(c + d*x**3)*(8*c - d*x**3)) + 11*d/(3456*c*
*3*x**3*sqrt(c + d*x**3)*(8*c - d*x**3)) + 71*d/(13824*c**4*x**3*
sqrt(c + d*x**3)) + 665*d**2/(41472*c**5*sqrt(c + d*x**3)) + 13*d
**2*atanh(sqrt(c + d*x**3)/(3*sqrt(c)))/(497664*c**(11/2)) - 33*d
**2*atanh(sqrt(c + d*x**3)/sqrt(c))/(2048*c**(11/2))
```

Mathematica [C] time = 0.462981, size = 349, normalized size = 1.89

$$\frac{\frac{\frac{8910cd^3x^9F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}{5dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)+16cF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)-cF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},\frac{8c}{dx^3}\right)}+864c^3-1836c^2dx^3-5107cd^2x^6+665d^3x^9}{dx^3-8c}-\frac{5320\ldots}{(8c-dx^3)\left(dx^3\left(F_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},\ldots\right.\right.\right.}}{41472c^5x^6\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^7*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((-5320*c*d^3*x^9*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (d*x^3)/(8
*c)])/((8*c - d*x^3)*(16*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), (
d*x^3)/(8*c)] + d*x^3*(AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), (d*x^
3)/(8*c)] - 4*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), (d*x^3)/(8*c)]
))) + (864*c^3 - 1836*c^2*d*x^3 - 5107*c*d^2*x^6 + 665*d^3*x^9 +
(8910*c*d^3*x^9*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(d
*x^3)])/(5*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), (8*c)/(
d*x^3)] + 16*c*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), (8*c)/(d*
x^3)] - c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), (8*c)/(d*x^3)]
))/(-8*c + d*x^3))/(41472*c^5*x^6*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 1106, normalized size = 6.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/64/c^2*(-1/6*(d*x^3+c)^(1/2)/c^2/x^6+7/12*d*(d*x^3+c)^(1/2)/c^3
/x^3+2/3*d^2/c^3/((x^3+c/d)*d)^(1/2)-5/4*d^2*arctanh((d*x^3+c)^(1
/2)/c^(1/2))/c^(7/2))+3/4096/c^4*d^2*(2/3/c/((x^3+c/d)*d)^(1/2)-2
/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2))+1/256/c^3*d*(-1/3*(d
*x^3+c)^(1/2)/c^2/x^3-2/3*d/c^2/((x^3+c/d)*d)^(1/2)+d*arctanh((d*
x^3+c)^(1/2)/c^(1/2))/c^(5/2))+1/512*d^3/c^3*(-1/243/d/c^2*(d*x^3
+c)^(1/2)/(d*x^3-8*c)-2/243/d/c^2/((x^3+c/d)*d)^(1/2)-1/1458*I/d^
3/c^3*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c
*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*
(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c
*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/
2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alph
a*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d
^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))-3/4096*d^3/
c^4*(2/27/d/c/((x^3+c/d)*d)^(1/2)+1/243*I/d^3/c^2*2^(1/2)*sum((-c
*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)
^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*
d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I
*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*E
llipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alp
ha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3
^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3 + c)^{\frac{3}{2}} (dx^3 - 8\,c)^2 x^7}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^7),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^7), x)
```

Fricas [A] time = 0.232975, size = 1, normalized size = 0.01

$$\left[\frac{13\left(d^{3}x^{9}-8\,cd^{2}x^{6}\right)\sqrt{dx^{3}+c}\log\left(\frac{\left(dx^{3}+10\,c\right)\sqrt{c}+6\,\sqrt{dx^{3}+c}c}{dx^{3}-8\,c}\right)+8019\left(d^{3}x^{9}-8\,cd^{2}x^{6}\right)\sqrt{dx^{3}+c}\log\left(\frac{\left(dx^{3}+2\,c\right)\sqrt{c}-2\,\sqrt{dx^{3}+c}c}{x^{3}}\right)+2\cdots}{995328\left(c^{5}dx^{9}-8\,c^{6}x^{6}\right)\sqrt{dx^{3}+c}\sqrt{c}}\right.$$

$$-\frac{13\left(d^{3}x^{9}-8\,cd^{2}x^{6}\right)\sqrt{dx^{3}+c}\arctan\left(\frac{3\,c}{\sqrt{dx^{3}+c}\sqrt{-c}}\right)-8019\left(d^{3}x^{9}-8\,cd^{2}x^{6}\right)\sqrt{dx^{3}+c}\arctan\left(\frac{c}{\sqrt{dx^{3}+c}\sqrt{-c}}\right)-12\left(665\,d^{3}x^{9}-\cdots\right.}{497664\left(c^{5}dx^{9}-8\,c^{6}x^{6}\right)\sqrt{dx^{3}+c}\sqrt{-c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^7),x, algorithm="fricas")
```

```
[Out] [1/995328*(13*(d^3*x^9 - 8*c*d^2*x^6)*sqrt(d*x^3 + c)*log(((d*x^3
 + 10*c)*sqrt(c) + 6*sqrt(d*x^3 + c)*c)/(d*x^3 - 8*c)) + 8019*(d^
3*x^9 - 8*c*d^2*x^6)*sqrt(d*x^3 + c)*log(((d*x^3 + 2*c)*sqrt(c) -
 2*sqrt(d*x^3 + c)*c)/x^3) + 24*(665*d^3*x^9 - 5107*c*d^2*x^6 - 1
836*c^2*d*x^3 + 864*c^3)*sqrt(c))/((c^5*d*x^9 - 8*c^6*x^6)*sqrt(d
*x^3 + c)*sqrt(c)), -1/497664*(13*(d^3*x^9 - 8*c*d^2*x^6)*sqrt(d*
x^3 + c)*arctan(3*c/(sqrt(d*x^3 + c)*sqrt(-c))) - 8019*(d^3*x^9 -
 8*c*d^2*x^6)*sqrt(d*x^3 + c)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))
) - 12*(665*d^3*x^9 - 5107*c*d^2*x^6 - 1836*c^2*d*x^3 + 864*c^3)*
sqrt(-c))/((c^5*d*x^9 - 8*c^6*x^6)*sqrt(d*x^3 + c)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222187, size = 180, normalized size = 0.97

$$\frac{1}{497664}\,d^{2}\left(\frac{8019\,\arctan\left(\frac{\sqrt{dx^{3}+c}}{\sqrt{-c}}\right)}{\sqrt{-c}c^{5}}-\frac{13\,\arctan\left(\frac{\sqrt{dx^{3}+c}}{3\,\sqrt{-c}}\right)}{\sqrt{-c}c^{5}}+\frac{12\left(341\,dx^{3}-2731\,c\right)}{\left(\left(dx^{3}+c\right)^{\frac{3}{2}}-9\,\sqrt{dx^{3}+c}c\right)c^{5}}+\frac{1296\left(3\left(dx^{3}+c\right)^{\frac{3}{2}}-4\,\sqrt{dx^{3}+\cdots}\right.}{c^{5}d^{2}x^{6}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^7),x, algorithm="giac")
```

```
[Out] 1/497664*d^2*(8019*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^5
) - 13*arctan(1/3*sqrt(d*x^3 + c)/sqrt(-c))/(sqrt(-c)*c^5) + 12*(
341*d*x^3 - 2731*c)/(((d*x^3 + c)^(3/2) - 9*sqrt(d*x^3 + c)*c)*c^
5) + 1296*(3*(d*x^3 + c)^(3/2) - 4*sqrt(d*x^3 + c)*c)/(c^5*d^2*x^
6))
```

3.449 $\int \frac{x^7}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=668

$$\frac{4\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{81\sqrt{3}c^{5/6}d^{8/3}}-\frac{4\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{243c^{5/6}d^{8/3}}+\frac{4\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{5/6}d^{8/3}}+\frac{2\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{81\sqrt[4]{3}c^{2/3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\ 3^{3/4}c^{2/3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{2\sqrt{c+dx^3}}{81cd^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{8x^2}{27d^2\left(8c-dx^3\right)\sqrt{c+dx^3}}-\frac{2x^2}{81cd^2\sqrt{c+dx^3}}$$

```
[Out] (-2*x^2)/(81*c*d^2*Sqrt[c + d*x^3]) + (8*x^2)/(27*d^2*(8*c - d*x^
3)*Sqrt[c + d*x^3]) + (2*Sqrt[c + d*x^3])/(81*c*d^(8/3)*((1 + Sqr
t[3])*c^(1/3) + d^(1/3)*x)) + (4*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3)
 + d^(1/3)*x))/Sqrt[c + d*x^3]])/(81*Sqrt[3]*c^(5/6)*d^(8/3)) - (
4*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(
243*c^(5/6)*d^(8/3)) + (4*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
243*c^(5/6)*d^(8/3)) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/3)*x)*S
qrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d
^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/
(27*3^(3/4)*c^(2/3)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/
((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (2*Sqrt
[2]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(
2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(
1/3)*x)], -7 - 4*Sqrt[3]])/(81*3^(1/4)*c^(2/3)*d^(8/3)*Sqrt[(c^(1
/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.73881, antiderivative size = 668, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.518

$$\frac{4\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{81\sqrt{3}c^{5/6}d^{8/3}}-\frac{4\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{243c^{5/6}d^{8/3}}+\frac{4\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{5/6}d^{8/3}}+\frac{2\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{81\sqrt[4]{3}c^{2/3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{27\ 3^{3/4}c^{2/3}d^{8/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{2\sqrt{c+dx^3}}{81cd^{8/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{8x^2}{27d^2\left(8c-dx^3\right)\sqrt{c+dx^3}}-\frac{2x^2}{81cd^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]   Int[x^7/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-2*x^2)/(81*c*d^2*Sqrt[c + d*x^3]) + (8*x^2)/(27*d^2*(8*c - d*x^
3)*Sqrt[c + d*x^3]) + (2*Sqrt[c + d*x^3])/(81*c*d^(8/3)*((1 + Sqr
t[3])*c^(1/3) + d^(1/3)*x)) + (4*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3)
 + d^(1/3)*x))/Sqrt[c + d*x^3]])/(81*Sqrt[3]*c^(5/6)*d^(8/3)) - (
4*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(
243*c^(5/6)*d^(8/3)) + (4*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(
243*c^(5/6)*d^(8/3)) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/3)*x)*S
qrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^
(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d
^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/
(27*3^(3/4)*c^(2/3)*d^(8/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/
((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (2*Sqrt
[2]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(
2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(
1/3)*x)], -7 - 4*Sqrt[3]])/(81*3^(1/4)*c^(2/3)*d^(8/3)*Sqrt[(c^(1
/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.9131, size = 51, normalized size = 0.08

$$\frac{x^8\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{8}{3},\frac{3}{2},2,\frac{11}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{512c^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**7/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x**8*sqrt(c + d*x**3)*appellf1(8/3, 3/2, 2, 11/3, -d*x**3/c, d*x*
*3/(8*c))/(512*c**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.477602, size = 357, normalized size = 0.53

$$\frac{2x^2\left(\frac{32dx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{800cF_1\left(\frac{2}{3};\frac{1}{2}\right.}{(dx^3-8c)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\right.\right.\right.}\right.}{405d^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^7/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*x^2*((20*c + 5*d*x^3)/(8*c^2 - c*d*x^3) + (800*c*AppellF1[2/3,
 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((-8*c + d*x^3)*(40*c
*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^
3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*Ap
pellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (32*d*
x^3*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((-8
*c + d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3
)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*
x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)
/(8*c)])))))/(405*d^2*Sqrt[c + d*x^3])
```

Maple [C] time = 0.064, size = 2255, normalized size = 3.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/d^2*(2/3/c*x^2/((x^3+c/d)*d)^(1/2)+2/9*I/c*3^(1/2)/d*(-c*d^2)^(
1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+16*c/
d^2*(-2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)-2/81*I/c^2*3^(1/2)/d*(-c*d
^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1
/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+
1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d
^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^
(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-
c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2
)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^
2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-
```

```
8*c)))+64*c^2/d^2*(-1/1944/c^3*x^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/
243/c^3*x^2/((x^3+c/d)*d)^(1/2)+5/1944*I/c^3*3^(1/2)/d*(-c*d^2)^(
1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-5/5832
*I/c^3/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*
(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^
(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3
)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^
2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^7}{(d^3x^9-15\,cd^2x^6+48\,c^2dx^3+64\,c^3)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x^7/((d^3*x^9 - 15*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)*sq
rt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**7/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8c)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x^7/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

3.450 $\int \frac{x^4}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=671

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{81\sqrt{3}c^{11/6}d^{5/3}}+\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{243c^{11/6}d^{5/3}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{11/6}d^{5/3}}+\frac{\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{81\sqrt[4]{3}c^{5/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)\middle|-7-4\sqrt{3}\right)}{54\,3^{3/4}c^{5/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt{c+dx^3}}{81c^2d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{x^2}{81c^2d\sqrt{c+dx^3}}+\frac{x^2}{27cd\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] -x^2/(81*c^2*d*Sqrt[c + d*x^3]) + x^2/(27*c*d*(8*c - d*x^3)*Sqrt[
c + d*x^3]) + Sqrt[c + d*x^3]/(81*c^2*d^(5/3)*((1 + Sqrt[3])*c^(1
/3) + d^(1/3)*x)) - ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x)
)/Sqrt[c + d*x^3]]/(81*Sqrt[3]*c^(11/6)*d^(5/3)) + ArcTanh[(c^(1/
3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])]/(243*c^(11/6)*d^(5
/3)) - ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]/(243*c^(11/6)*d^(5/3)
) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1
/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqr
t[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(54*3^(3/4)*c^(5/3)
*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1
/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (Sqrt[2]*(c^(1/3) + d^(1/3
)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/
3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt
[3]])/(81*3^(1/4)*c^(5/3)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3
)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.70187, antiderivative size = 671, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.518$

$$-\frac{\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{81\sqrt{3}c^{11/6}d^{5/3}}+\frac{\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{243c^{11/6}d^{5/3}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{243c^{11/6}d^{5/3}}+\frac{\sqrt{2}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{81\sqrt[4]{3}c^{5/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{54\ 3^{3/4}c^{5/3}d^{5/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{\sqrt{c+dx^3}}{81c^2d^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{x^2}{81c^2d\sqrt{c+dx^3}}+\frac{x^2}{27cd\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -x^2/(81*c^2*d*Sqrt[c + d*x^3]) + x^2/(27*c*d*(8*c - d*x^3)*Sqrt[
c + d*x^3]) + Sqrt[c + d*x^3]/(81*c^2*d^(5/3)*((1 + Sqrt[3])*c^(1
/3) + d^(1/3)*x)) - ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x)
)/Sqrt[c + d*x^3]]/(81*Sqrt[3]*c^(11/6)*d^(5/3)) + ArcTanh[(c^(1/
3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])]/(243*c^(11/6)*d^(5
/3)) - ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]/(243*c^(11/6)*d^(5/3)
) - (Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1
/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqr
t[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(54*3^(3/4)*c^(5/3)
*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1
/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) + (Sqrt[2]*(c^(1/3) + d^(1/3
)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/
3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt
[3]])/(81*3^(1/4)*c^(5/3)*d^(5/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3
)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.9254, size = 51, normalized size = 0.08

$$\frac{x^5\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{5}{3},\frac{3}{2},2,\frac{8}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{320c^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x**5*sqrt(c + d*x**3)*appellf1(5/3, 3/2, 2, 8/3, -d*x**3/c, d*x**
3/(8*c))/(320*c**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.429753, size = 337, normalized size = 0.5

$$\frac{x^2\left(\frac{5\left(x^3-\frac{5c}{d}\right)-\frac{32cx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}}{c^2}+\frac{1000F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{d}{}\right.}{d\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{d}{}\right.\right.\right.}\right.}{405\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^2*((1000*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c
)])/(d*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*
c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(
8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]
))) + (5*((-5*c)/d + x^3) - (32*c*x^3*AppellF1[5/3, 1/2, 1, 8/3,
-((d*x^3)/c), (d*x^3)/(8*c)])/(64*c*AppellF1[5/3, 1/2, 1, 8/3, -(
(d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3,
 -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((
d*x^3)/c), (d*x^3)/(8*c)])))/c^2))/(405*(8*c - d*x^3)*Sqrt[c + d*
x^3])
```

Maple [C] time = 0.016, size = 1788, normalized size = 2.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/d*(-2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)-2/81*I/c^2*3^(1/2)/d*(-c*d
^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1
/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+
1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d
^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^
(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-
c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2
)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^
2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-
8*c)))+8*c/d*(-1/1944/c^3*x^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/243/c
^3*x^2/((x^3+c/d)*d)^(1/2)+5/1944*I/c^3*3^(1/2)/d*(-c*d^2)^(1/3)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
```

```
*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-5/5832*I/c^
3/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{(d^3x^9-15\,cd^2x^6+48\,c^2dx^3+64\,c^3)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x^4/((d^3*x^9 - 15*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)*sq
rt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")

[Out] integrate(x^4/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

3.451 $\int \frac{x}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=665

$$-\frac{5\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1296\sqrt{3}c^{17/6}d^{2/3}}+\frac{5\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{3888c^{17/6}d^{2/3}}-\frac{5\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{3888c^{17/6}d^{2/3}}$$
$$-\frac{5\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{324\sqrt{2}\sqrt[4]{3}c^{8/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{5\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{432\ 3^{3/4}c^{8/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{5\sqrt{c+dx^3}}{648c^3d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{5x^2}{648c^3\sqrt{c+dx^3}}+\frac{x^2}{216c^2\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] (5*x^2)/(648*c^3*Sqrt[c + d*x^3]) + x^2/(216*c^2*(8*c - d*x^3)*Sq
rt[c + d*x^3]) - (5*Sqrt[c + d*x^3])/(648*c^3*d^(2/3)*((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)) - (5*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) +
 d^(1/3)*x))/Sqrt[c + d*x^3]])/(1296*Sqrt[3]*c^(17/6)*d^(2/3)) +
(5*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/
(3888*c^(17/6)*d^(2/3)) - (5*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
)/(3888*c^(17/6)*d^(2/3)) + (5*Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/
3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1
/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqr
t[3]])/(432*3^(3/4)*c^(8/3)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1
/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) -
 (5*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(
2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(
1/3)*x)], -7 - 4*Sqrt[3]])/(324*Sqrt[2]*3^(1/4)*c^(8/3)*d^(2/3)*S
qrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 1.71756, antiderivative size = 665, normalized size of antiderivative = 1., number of

steps used = 15, number of rules used = 14, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.56$

$$-\frac{5\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1296\sqrt{3}c^{17/6}d^{2/3}}+\frac{5\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{3888c^{17/6}d^{2/3}}-\frac{5\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{3888c^{17/6}d^{2/3}}$$

$$-\frac{5\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{324\sqrt{2}\sqrt[4]{3}c^{8/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$

$$+\frac{5\sqrt{2-\sqrt{3}}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{432\ 3^{3/4}c^{8/3}d^{2/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$

$$-\frac{5\sqrt{c+dx^3}}{648c^3d^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{5x^2}{648c^3\sqrt{c+dx^3}}+\frac{x^2}{216c^2\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (5*x^2)/(648*c^3*Sqrt[c + d*x^3]) + x^2/(216*c^2*(8*c - d*x^3)*Sq
rt[c + d*x^3]) - (5*Sqrt[c + d*x^3])/(648*c^3*d^(2/3)*((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)) - (5*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) +
 d^(1/3)*x))/Sqrt[c + d*x^3]])/(1296*Sqrt[3]*c^(17/6)*d^(2/3)) +
(5*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/
(3888*c^(17/6)*d^(2/3)) - (5*ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]
)/(3888*c^(17/6)*d^(2/3)) + (5*Sqrt[2 - Sqrt[3]]*(c^(1/3) + d^(1/
3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt
[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1
/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqr
t[3]])/(432*3^(3/4)*c^(8/3)*d^(2/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1
/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3]) -
 (5*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(
2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin
[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(
1/3)*x)], -7 - 4*Sqrt[3]])/(324*Sqrt[2]*3^(1/4)*c^(8/3)*d^(2/3)*S
qrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1
/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 22.2538, size = 51, normalized size = 0.08

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},\frac{3}{2},2,\frac{5}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{128c^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, 3/2, 2, 5/3, -d*x**3/c, d*x**
3/(8*c))/(128*c**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.421815, size = 366, normalized size = 0.55

$$\frac{\frac{8dx^5F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{c^2(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{25x^2F_1\left(\frac{2}{3};\frac{1}{2},1;\right.}{c(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\right.\right.\right.}}{162\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((43*c*x^2 - 5*d*x^5)/(32*c^4 - 4*c^3*d*x^3) - (25*x^2*AppellF1[2
/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(c*(8*c - d*x^3)*(
40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*
d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] -
4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (8
*d*x^5*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(
c^2*(8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c),
(d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c
), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (
d*x^3)/(8*c)]))))/(162*Sqrt[c + d*x^3])
```

Maple [C] time = 0.01, size = 903, normalized size = 1.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/1944/c^3*x^2*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/243/c^3*x^2/((x^3+c
/d)*d)^(1/2)+5/1944*I/c^3*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^
3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-5/5832*I/c^3/d^3*2^(1/2)*
sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2
)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)
^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2
*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)
^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+
2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(
-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-
1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(
2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{(d^3x^9 - 15\,cd^2x^6 + 48\,c^2dx^3 + 64\,c^3)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x/((d^3*x^9 - 15*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)*sqrt
(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

3.452 $\int \frac{1}{x^2(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=686

$$\frac{31\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{648\sqrt{2}\sqrt[4]{3}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{31\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{864\,3^{3/4}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}} - \frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1296\sqrt{3}c^{23/6}} + \frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{3888c^{23/6}} - \frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{3888c^{23/6}} - \frac{31\sqrt{c+dx^3}}{1296c^4x} + \frac{31\sqrt[3]{d}\sqrt{c+dx^3}}{1296c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)} + \frac{5}{648c^3x\sqrt{c+dx^3}} + \frac{1}{216c^2x\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] 5/(648*c^3*x*Sqrt[c + d*x^3]) + 1/(216*c^2*x*(8*c - d*x^3)*Sqrt[c
 + d*x^3]) - (31*Sqrt[c + d*x^3])/(1296*c^4*x) + (31*d^(1/3)*Sqrt
[c + d*x^3])/(1296*c^4*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^
(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x
^3]])/(1296*Sqrt[3]*c^(23/6)) + (d^(1/3)*ArcTanh[(c^(1/3) + d^(1/
3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])]])/(3888*c^(23/6)) - (d^(1/3)*
ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])]])/(3888*c^(23/6)) - (31*Sqrt[
2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3
)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]]])/(864*3^(3/4)*c^(11/3)
*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)^2]*Sqrt[c + d*x^3]) + (31*d^(1/3)*(c^(1/3) + d^(1/3)*x)*
Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) +
d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])
/(648*Sqrt[2]*3^(1/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x
))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.07514, antiderivative size = 686, normalized size of antiderivative = 1., number of

steps used = 16, number of rules used = 15, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.556$

$$\frac{31\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{648\sqrt{2}\sqrt[4]{3}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{31\sqrt{2-\sqrt{3}}\sqrt[3]{d}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{864\,3^{3/4}c^{11/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{\sqrt[3]{d}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{1296\sqrt{3}c^{23/6}}+\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{3888c^{23/6}}-\frac{\sqrt[3]{d}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{3888c^{23/6}}-\frac{31\sqrt{c+dx^3}}{1296c^4x}+\frac{31\sqrt[3]{d}\sqrt{c+dx^3}}{1296c^4\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{5}{648c^3x\sqrt{c+dx^3}}+\frac{1}{216c^2x\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] 5/(648*c^3*x*Sqrt[c + d*x^3]) + 1/(216*c^2*x*(8*c - d*x^3)*Sqrt[c
 + d*x^3]) - (31*Sqrt[c + d*x^3])/(1296*c^4*x) + (31*d^(1/3)*Sqrt
[c + d*x^3])/(1296*c^4*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (d^
(1/3)*ArcTan[(Sqrt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x
^3]])/(1296*Sqrt[3]*c^(23/6)) + (d^(1/3)*ArcTanh[(c^(1/3) + d^(1/
3)*x)^2/(3*c^(1/6)*Sqrt[c + d*x^3])])/(3888*c^(23/6)) - (d^(1/3)*
ArcTanh[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(3888*c^(23/6)) - (31*Sqrt[
2 - Sqrt[3]]*d^(1/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3
)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]
*EllipticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[
3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(864*3^(3/4)*c^(11/3)
*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)^2]*Sqrt[c + d*x^3]) + (31*d^(1/3)*(c^(1/3) + d^(1/3)*x)*
Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) +
d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])
/(648*Sqrt[2]*3^(1/4)*c^(11/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x
))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 28.1193, size = 53, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{1}{3},\frac{3}{2},2,\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64c^4x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, 3/2, 2, 2/3, -d*x**3/c, d*x**3/(
8*c))/(64*c**4*x*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.521584, size = 374, normalized size = 0.55

$$\frac{\frac{13000c^2dx^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{992cd^2x^5F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3}\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\right.\right.\right.}}{6480c^4\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((5*(162*c^2 + 227*c*d*x^3 - 31*d^2*x^6))/(-8*c*x + d*x^4) + (130
00*c^2*d*x^2*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*
c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c)
, (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/
c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), (
d*x^3)/(8*c)]))) - (992*c*d^2*x^5*AppellF1[5/3, 1/2, 1, 8/3, -((d
*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(64*c*AppellF1[5/3, 1/2,
 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8/3, 1/
2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3, 3/2, 1
, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(6480*c^4*Sqrt[c + d*x^3
])
```

Maple [C] time = 0.02, size = 2269, normalized size = 3.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/64/c^2*(-2/3*d*x^2/c^2/((x^3+c/d)*d)^(1/2)-(d*x^3+c)^(1/2)/c^2/
x-5/9*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-
1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(
-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2))))+1/8*d/c*(-1/1944/c^3*x^2*(d*x^3+c)^(1/2)
/(d*x^3-8*c)+2/243/c^3*x^2/((x^3+c/d)*d)^(1/2)+5/1944*I/c^3*3^(1/
2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1
/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*E
llipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)))-5/5832*I/c^3/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/
2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^
(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^
2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^
2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(
1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_a
```

```
lpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=Roo
tOf(_Z^3*d-8*c)))-1/64*d/c^2*(-2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)-2
/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-
1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(
-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*
d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^
(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d
^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*
3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*
3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*El
lipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alph
a^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^
(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^
(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(d^3x^{11}-15\,cd^2x^8+48\,c^2dx^5+64\,c^3x^2)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/((d^3*x^11 - 15*c*d^2*x^8 + 48*c^2*d*x^5 + 64*c^3*x^2)
*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^2), x)
```

3.453 $\int \frac{1}{x^5(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=708

$$-\frac{11d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{82944\sqrt{3}c^{29/6}}+\frac{11d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{248832c^{29/6}}-\frac{11d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{248832c^{29/6}}-\frac{77d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1296\sqrt{2}\sqrt[4]{3}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{77\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1728\ 3^{3/4}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{77d^{4/3}\sqrt{c+dx^3}}{2592c^5\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{77d\sqrt{c+dx^3}}{2592c^5x}-\frac{253\sqrt{c+dx^3}}{20736c^4x^4}+\frac{5}{648c^3x^4\sqrt{c+dx^3}}+\frac{1}{216c^2x^4\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] 5/(648*c^3*x^4*Sqrt[c + d*x^3]) + 1/(216*c^2*x^4*(8*c - d*x^3)*Sq
rt[c + d*x^3]) - (253*Sqrt[c + d*x^3])/(20736*c^4*x^4) + (77*d*Sq
rt[c + d*x^3])/(2592*c^5*x) - (77*d^(4/3)*Sqrt[c + d*x^3])/(2592*
c^5*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (11*d^(4/3)*ArcTan[(Sq
rt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(82944*Sqr
t[3]*c^(29/6)) + (11*d^(4/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c
^(1/6)*Sqrt[c + d*x^3])])/(248832*c^(29/6)) - (11*d^(4/3)*ArcTanh
[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(248832*c^(29/6)) + (77*Sqrt[2 - S
qrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(
1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Elli
pticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(1728*3^(3/4)*c^(14/3)*Sqr
t[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*Sqrt[c + d*x^3]) - (77*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt
[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1
/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(12
96*Sqrt[2]*3^(1/4)*c^(14/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/
((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.56691, antiderivative size = 708, normalized size of antiderivative = 1., number of

steps used = 17, number of rules used = 15, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.556$

$$-\frac{11d^{4/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{82944\sqrt{3}c^{29/6}}+\frac{11d^{4/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{248832c^{29/6}}-\frac{11d^{4/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{248832c^{29/6}}-\frac{77d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1296\sqrt{2}\sqrt[4]{3}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{77\sqrt{2-\sqrt{3}}d^{4/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{1728\,3^{3/4}c^{14/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{77d^{4/3}\sqrt{c+dx^3}}{2592c^5\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}+\frac{77d\sqrt{c+dx^3}}{2592c^5x}-\frac{253\sqrt{c+dx^3}}{20736c^4x^4}+\frac{5}{648c^3x^4\sqrt{c+dx^3}}+\frac{1}{216c^2x^4\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] 5/(648*c^3*x^4*Sqrt[c + d*x^3]) + 1/(216*c^2*x^4*(8*c - d*x^3)*Sq
rt[c + d*x^3]) - (253*Sqrt[c + d*x^3])/(20736*c^4*x^4) + (77*d*Sq
rt[c + d*x^3])/(2592*c^5*x) - (77*d^(4/3)*Sqrt[c + d*x^3])/(2592*
c^5*((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)) - (11*d^(4/3)*ArcTan[(Sq
rt[3]*c^(1/6)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(82944*Sqr
t[3]*c^(29/6)) + (11*d^(4/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c
^(1/6)*Sqrt[c + d*x^3])])/(248832*c^(29/6)) - (11*d^(4/3)*ArcTanh
[Sqrt[c + d*x^3]/(3*Sqrt[c])])/(248832*c^(29/6)) + (77*Sqrt[2 - S
qrt[3]]*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(
1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Elli
pticE[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c
^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(1728*3^(3/4)*c^(14/3)*Sqr
t[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3
)*x)^2]*Sqrt[c + d*x^3]) - (77*d^(4/3)*(c^(1/3) + d^(1/3)*x)*Sqrt
[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/
3) + d^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1
/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(12
96*Sqrt[2]*3^(1/4)*c^(14/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/
((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 27.1172, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{4}{3},\frac{3}{2},2,-\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{256c^4x^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-4/3, 3/2, 2, -1/3, -d*x**3/c, d*x**3/
(8*c))/(256*c**4*x**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.420618, size = 389, normalized size = 0.55

$$-\frac{\frac{244750c^2d^2x^6F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{19712cd^3x^9F_1\left(\frac{5}{3};\frac{1}{2},\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},\right.\right.\right.}}{103680c^5x^4\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((5*(648*c^3 - 2997*c^2*d*x^3 - 4565*c*d^2*x^6 + 616*d^3*x^9))/(-
8*c + d*x^3) - (244750*c^2*d^2*x^6*AppellF1[2/3, 1/2, 1, 5/3, -((
d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(40*c*AppellF1[2/3, 1/2
, 1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1
/2, 2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1
, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) + (19712*c*d^3*x^9*AppellF
1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*
(64*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3
*d*x^3*(AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]
- 4*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/
(103680*c^5*x^4*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 2774, normalized size = 3.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/64/c^2*(-1/4*(d*x^3+c)^(1/2)/c^2/x^4+13/8*d*(d*x^3+c)^(1/2)/c^3
/x+2/3*d^2/c^3*x^2/((x^3+c/d)*d)^(1/2)+55/72*I*d/c^3*3^(1/2)*(-c*
d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+
1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))
+1/256/c^3*d*(-2/3*d*x^2/c^2/((x^3+c/d)*d)^(1/2)-(d*x^3+c)^(1/2)/
c^2/x-5/9*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*
((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1
/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3)))^(1/2))))+1/64*d^2/c^2*(-1/1944/c^3*x^2*(d*x^3
+c)^(1/2)/(d*x^3-8*c)+2/243/c^3*x^2/((x^3+c/d)*d)^(1/2)+5/1944*I/
c^3*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-
c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2
```

```
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2
)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)))-5/5832*I/c^3/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^
(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)
))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(
1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/
2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c
)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/
2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellipti
cPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(
-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)
*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_
alpha=RootOf(_Z^3*d-8*c)))-1/256*d^2/c^3*(-2/27/c^2*x^2/((x^3+c/d
)*d)^(1/2)-2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*El
lipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^
2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/243*I/c^2/d^3*2^(1/2)*sum(1
/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^5),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^5), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^5),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)^2x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^5),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^5), x)
```

3.454 $\int \frac{1}{x^8(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=732

$$-\frac{7d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{331776\sqrt{3}c^{35/6}}+\frac{7d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{995328c^{35/6}}-\frac{7d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{995328c^{35/6}}+\frac{5179d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{72576\sqrt{2}\sqrt[4]{3}c^{17/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}-\frac{5179\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{96768\,3^{3/4}c^{17/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}+\frac{5179d^{7/3}\sqrt{c+dx^3}}{145152c^6\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{5179d^2\sqrt{c+dx^3}}{145152c^6x}+\frac{8257d\sqrt{c+dx^3}}{580608c^5x^4}-\frac{191\sqrt{c+dx^3}}{18144c^4x^7}+\frac{5}{648c^3x^7\sqrt{c+dx^3}}+\frac{1}{216c^2x^7\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

```
[Out] 5/(648*c^3*x^7*Sqrt[c + d*x^3]) + 1/(216*c^2*x^7*(8*c - d*x^3)*Sq
rt[c + d*x^3]) - (191*Sqrt[c + d*x^3])/(18144*c^4*x^7) + (8257*d*
Sqrt[c + d*x^3])/(580608*c^5*x^4) - (5179*d^2*Sqrt[c + d*x^3])/(1
45152*c^6*x) + (5179*d^(7/3)*Sqrt[c + d*x^3])/(145152*c^6*((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)) - (7*d^(7/3)*ArcTan[(Sqrt[3]*c^(1/6
)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(331776*Sqrt[3]*c^(35/
6)) + (7*d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[
c + d*x^3])])/(995328*c^(35/6)) - (7*d^(7/3)*ArcTanh[Sqrt[c + d*x
^3]/(3*Sqrt[c])])/(995328*c^(35/6)) - (5179*Sqrt[2 - Sqrt[3]]*d^(
7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^
(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSi
n[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)], -7 - 4*Sqrt[3]])/(96768*3^(3/4)*c^(17/3)*Sqrt[(c^(1/3)
*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sq
rt[c + d*x^3]) + (5179*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3
) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(
1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(72576*Sqrt
[2]*3^(1/4)*c^(17/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi [A] time = 2.88137, antiderivative size = 732, normalized size of antiderivative = 1., number of

steps used = 18, number of rules used = 15, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.556$

$$-\frac{7d^{7/3}\tan^{-1}\left(\frac{\sqrt{3}\sqrt[6]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\sqrt{c+dx^3}}\right)}{331776\sqrt{3}c^{35/6}}+\frac{7d^{7/3}\tanh^{-1}\left(\frac{\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}{3\sqrt[6]{c}\sqrt{c+dx^3}}\right)}{995328c^{35/6}}-\frac{7d^{7/3}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{3\sqrt{c}}\right)}{995328c^{35/6}}$$
$$+\frac{5179d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{72576\sqrt{2}\sqrt[4]{3}c^{17/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$-\frac{5179\sqrt{2-\sqrt{3}}d^{7/3}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)\sqrt{\frac{c^{2/3}-\sqrt[3]{c}\sqrt[3]{d}x+d^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{d}x+\left(1-\sqrt{3}\right)\sqrt[3]{c}}{\sqrt[3]{d}x+\left(1+\sqrt{3}\right)\sqrt[3]{c}}\right)|-7-4\sqrt{3}\right)}{96768\ 3^{3/4}c^{17/3}\sqrt{\frac{\sqrt[3]{c}\left(\sqrt[3]{c}+\sqrt[3]{d}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)^2}}\sqrt{c+dx^3}}$$
$$+\frac{5179d^{7/3}\sqrt{c+dx^3}}{145152c^6\left(\left(1+\sqrt{3}\right)\sqrt[3]{c}+\sqrt[3]{d}x\right)}-\frac{5179d^2\sqrt{c+dx^3}}{145152c^6x}+\frac{8257d\sqrt{c+dx^3}}{580608c^5x^4}$$
$$-\frac{191\sqrt{c+dx^3}}{18144c^4x^7}+\frac{5}{648c^3x^7\sqrt{c+dx^3}}+\frac{1}{216c^2x^7\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^8*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] 5/(648*c^3*x^7*Sqrt[c + d*x^3]) + 1/(216*c^2*x^7*(8*c - d*x^3)*Sq
rt[c + d*x^3]) - (191*Sqrt[c + d*x^3])/(18144*c^4*x^7) + (8257*d*
Sqrt[c + d*x^3])/(580608*c^5*x^4) - (5179*d^2*Sqrt[c + d*x^3])/(1
45152*c^6*x) + (5179*d^(7/3)*Sqrt[c + d*x^3])/(145152*c^6*((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)) - (7*d^(7/3)*ArcTan[(Sqrt[3]*c^(1/6
)*(c^(1/3) + d^(1/3)*x))/Sqrt[c + d*x^3]])/(331776*Sqrt[3]*c^(35/
6)) + (7*d^(7/3)*ArcTanh[(c^(1/3) + d^(1/3)*x)^2/(3*c^(1/6)*Sqrt[
c + d*x^3])])/(995328*c^(35/6)) - (7*d^(7/3)*ArcTanh[Sqrt[c + d*x
^3]/(3*Sqrt[c])])/(995328*c^(35/6)) - (5179*Sqrt[2 - Sqrt[3]]*d^(
7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3) - c^(1/3)*d^(1/3)*x + d^
(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*EllipticE[ArcSi
n[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/((1 + Sqrt[3])*c^(1/3) + d^
(1/3)*x)], -7 - 4*Sqrt[3]])/(96768*3^(3/4)*c^(17/3)*Sqrt[(c^(1/3)
*(c^(1/3) + d^(1/3)*x))/((1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sq
rt[c + d*x^3]) + (5179*d^(7/3)*(c^(1/3) + d^(1/3)*x)*Sqrt[(c^(2/3
) - c^(1/3)*d^(1/3)*x + d^(2/3)*x^2)/((1 + Sqrt[3])*c^(1/3) + d^(
1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*c^(1/3) + d^(1/3)*x)/(
(1 + Sqrt[3])*c^(1/3) + d^(1/3)*x)], -7 - 4*Sqrt[3]])/(72576*Sqrt
[2]*3^(1/4)*c^(17/3)*Sqrt[(c^(1/3)*(c^(1/3) + d^(1/3)*x))/((1 + S
qrt[3])*c^(1/3) + d^(1/3)*x)^2]*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 28.2971, size = 56, normalized size = 0.08

$$-\frac{\sqrt{c+dx^3}\ \mathrm{appellf}_1\left(-\frac{7}{3},\frac{3}{2},2,-\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{448c^4x^7\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**8/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-7/3, 3/2, 2, -4/3, -d*x**3/c, d*x**3/
(8*c))/(448*c**4*x**7*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.426386, size = 374, normalized size = 0.51

$$\frac{\frac{8293750c^2d^3x^9F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+40cF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{662912cd^4x^{12}F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+64cF}}{2903040c^6x^7\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^8*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-51840*c^4 + 93960*c^3*d*x^3 - 509085*c^2*d^2*x^6 - 766345*c*d^3
*x^9 + 103580*d^4*x^12 + (8293750*c^2*d^3*x^9*AppellF1[2/3, 1/2,
1, 5/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(40*c*AppellF1[2/3, 1/2, 1,
 5/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[5/3, 1/2,
2, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[5/3, 3/2, 1, 8/
3, -((d*x^3)/c), (d*x^3)/(8*c)])) - (662912*c*d^4*x^12*AppellF1[5
/3, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)])/(64*c*AppellF1[5/3
, 1/2, 1, 8/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[8
/3, 1/2, 2, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[8/3,
3/2, 1, 11/3, -((d*x^3)/c), (d*x^3)/(8*c)])))/(2903040*c^6*x^7*(8
*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.02, size = 3299, normalized size = 4.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^8/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/64/c^2*(-1/7*(d*x^3+c)^(1/2)/c^2/x^7+25/56*d*(d*x^3+c)^(1/2)/c^
3/x^4-237/112*d^2*(d*x^3+c)^(1/2)/c^4/x-2/3*d^3/c^4*x^2/((x^3+c/d
)*d)^(1/2)-935/1008*I*d^2/c^4*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))+3/4096/c^4*d^2*(-2/3*d
*x^2/c^2/((x^3+c/d)*d)^(1/2)-(d*x^3+c)^(1/2)/c^2/x-5/9*I/c^2*3^(1
/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/
3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*El
lipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^
2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2))))+1/256/c^3*d*(-1/4*(d*x^3+c)^(1/2)/c^2/x^4+13/8*d*(d*x^3+
c)^(1/2)/c^3/x+2/3*d^2/c^3*x^2/((x^3+c/d)*d)^(1/2)+55/72*I*d/c^3*
3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)
^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)
```

```
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3
)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2))))+1/512*d^3/c^3*(-1/1944/c^3*x^2*(d*x^3+c)^(1/2)/(d*x^
3-8*c)+2/243/c^3*x^2/((x^3+c/d)*d)^(1/2)+5/1944*I/c^3*3^(1/2)/d*(
-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*
(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Ellipti
cF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
))-5/5832*I/c^3/d^3*2^(1/2)*sum(1/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*
(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*
(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*
d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/
3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3
^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(
-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z
^3*d-8*c)))-3/4096*d^3/c^4*(-2/27/c^2*x^2/((x^3+c/d)*d)^(1/2)-2/8
1*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/
d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c
*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha*(-c*d^
2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2
)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^
(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^
3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^
(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Elli
pticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^
2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1
/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^8),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^8), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^8),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**8/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)^2 x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^8),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^8), x)
```

3.455 $\int \frac{x^6}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=66

$$\frac{x^7\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{7}{3};2,\frac{3}{2};\frac{10}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{448c^3\sqrt{c+dx^3}}$$

```
[Out] (x^7*Sqrt[1 + (d*x^3)/c]*AppellF1[7/3, 2, 3/2, 10/3, (d*x^3)/(8*c
), -((d*x^3)/c)])/(448*c^3*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.222756, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$\frac{x^7\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{7}{3};2,\frac{3}{2};\frac{10}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{448c^3\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^7*Sqrt[1 + (d*x^3)/c]*AppellF1[7/3, 2, 3/2, 10/3, (d*x^3)/(8*c
), -((d*x^3)/c)])/(448*c^3*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 27.0398, size = 51, normalized size = 0.77

$$\frac{x^7\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{7}{3},\frac{3}{2},2,\frac{10}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{448c^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x**7*sqrt(c + d*x**3)*appellf1(7/3, 3/2, 2, 10/3, -d*x**3/c, d*x*
*3/(8*c))/(448*c**4*sqrt(1 + d*x**3/c))
```

Mathematica [C] time = 0.915646, size = 189, normalized size = 2.86

$$-\frac{6\sqrt[3]{-d}x\left(4c+dx^3\right)+2i3^{3/4}\sqrt[3]{c}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-d}x-\sqrt[3]{c}\right)}{\sqrt[3]{c}}}\sqrt{\frac{(-d)^{2/3}x^2}{c^{2/3}}+\frac{\sqrt[3]{-d}x}{\sqrt[3]{c}}+1}\left(dx^3-8c\right)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-d}x}{\sqrt[3]{c}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{243c(-d)^{7/3}\left(dx^3-8c\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^6/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(6*(-d)^(1/3)*x*(4*c + d*x^3) + (2*I)*3^(3/4)*c^(1/3)*Sqrt[((-1)
^(5/6)*(-c^(1/3) + (-d)^(1/3)*x))/c^(1/3)]*Sqrt[1 + ((-d)^(1/3)*x
)/c^(1/3) + ((-d)^(2/3)*x^2)/c^(2/3)]*(-8*c + d*x^3)*EllipticF[Ar
cSin[Sqrt[-(-1)^(5/6) - (I*(-d)^(1/3)*x)/c^(1/3)]/3^(1/4)], (-1)^
(1/3)])/(243*c*(-d)^(7/3)*(-8*c + d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.063, size = 1791, normalized size = 27.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/d^2*(2/3/c*x/((x^3+c/d)*d)^(1/2)-2/9*I/c*3^(1/2)/d*(-c*d^2)^(1/
3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+16*c/d^2*(-2/27/c^2*x/((x^3
+c/d)*d)^(1/2)+2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^
3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^
2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2
)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^
(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^
3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^
(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Elli
pticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^
2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1
/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
),_alpha=RootOf(_Z^3*d-8*c))+64*c^2/d^2*(-1/1944/c^3*x*(d*x^3+c)
^(1/2)/(d*x^3-8*c)+2/243/c^3*x/((x^3+c/d)*d)^(1/2)-5/1944*I/c^3*3
^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2
)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))-1/972*I
/c^3/d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*
(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^
(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3
)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^
2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x^6/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^6}{(d^3x^9 - 15\,cd^2x^6 + 48\,c^2dx^3 + 64\,c^3)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x^6/((d^3*x^9 - 15*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)*sq
rt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x^6/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

3.456 $\int \frac{x^3}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=66

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};2,\frac{3}{2};\frac{7}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{256c^3\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 2, 3/2, 7/3, (d*x^3)/(8*c)
, -((d*x^3)/c)])/(256*c^3*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.21534, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};2,\frac{3}{2};\frac{7}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{256c^3\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 2, 3/2, 7/3, (d*x^3)/(8*c)
, -((d*x^3)/c)])/(256*c^3*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 31.3396, size = 51, normalized size = 0.77

$$\frac{x^4\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{4}{3},\frac{3}{2},2,\frac{7}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{256c^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 3/2, 2, 7/3, -d*x**3/c, d*x**
3/(8*c))/(256*c**4*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.364595, size = 333, normalized size = 5.05

$$\frac{\frac{x\left(\frac{7cx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+56cF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{5c}{d}+x^3\right)}{c^2}+\frac{160xF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{d\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)\right)}}{81\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((160*x*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)])/
(d*(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)]
+ 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)
] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])))
+ (x*((-5*c)/d + x^3 + (7*c*x^3*AppellF1[4/3, 1/2, 1, 7/3, -((d*x
^3)/c), (d*x^3)/(8*c)])/(56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3
)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*
```

```
x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)
/c), (d*x^3)/(8*c)]))))/c^2)/(81*(8*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.016, size = 1478, normalized size = 22.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/d*(-2/27/c^2*x/((x^3+c/d)*d)^(1/2)+2/81*I/c^2*3^(1/2)/d*(-c*d^2
)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/
d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^
2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/243*I/c^2/d^3*2^(1/2)
*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*
d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d
^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-
1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)
*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*
d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),-1/18/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2
)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))+8*c/d*(-1/194
4/c^3*x*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/243/c^3*x/((x^3+c/d)*d)^(1/
2)-5/1944*I/c^3*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)
*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c
*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2))-1/972*I/c^3/d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(
1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*
d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*
3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*
d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)
*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*
d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-c*d^2)
^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*
_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=R
ootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{(d^3x^9 - 15\,cd^2x^6 + 48\,c^2dx^3 + 64\,c^3)\sqrt{dx^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(x^3/((d^3*x^9 - 15*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)*sq
rt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(dx^3 + c)^{\frac{3}{2}}(dx^3 - 8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(x^3/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

3.457 $\int \frac{1}{(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=64

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};2,\frac{3}{2};\frac{4}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{64c^3\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 2, 3/2, 4/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(64*c^3*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.0998728, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};2,\frac{3}{2};\frac{4}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{64c^3\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 2, 3/2, 4/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(64*c^3*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.6411, size = 49, normalized size = 0.77

$$\frac{x\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{1}{3},\frac{3}{2},2,\frac{4}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{64c^4\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 3/2, 2, 4/3, -d*x**3/c, d*x**3/(
8*c))/(64*c**4*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.28851, size = 331, normalized size = 5.17

$$\frac{x\left(\frac{1216c^2F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}-\frac{35cdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+5}\right.}{648c^3\left(8c-dx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*(43*c - 5*d*x^3 + (1216*c^2*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^
3)/c), (d*x^3)/(8*c)])/(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)
/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^
3)/c), (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c)
, (d*x^3)/(8*c)])) - (35*c*d*x^3*AppellF1[4/3, 1/2, 1, 7/3, -((d*
x^3)/c), (d*x^3)/(8*c)])/(56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^
3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d
*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3
```

```
)/c), (d*x^3)/(8*c)]))))/(648*c^3*(8*c - d*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.008, size = 747, normalized size = 11.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/1944/c^3*x*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/243/c^3*x/((x^3+c/d)*
d)^(1/2)-5/1944*I/c^3*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2))-1/972*I/c^3/d^3*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(
1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3))
)/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1
/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2
)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2
)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Elliptic
Pi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alpha^2*(-
c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*
c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)^(1/3)/
(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_a
lpha=RootOf(_Z^3*d-8*c))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8\,c)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(d^3x^9-15\,cd^2x^6+48\,c^2dx^3+64\,c^3)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="fricas")
```

```
[Out] integral(1/((d^3*x^9 - 15*c*d^2*x^6 + 48*c^2*d*x^3 + 64*c^3)*sqrt
(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(dx^3+c\right)^{\frac{3}{2}}\left(dx^3-8\,c\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2), x)
```

3.458 $\int \frac{1}{x^3(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};2,\frac{3}{2};\frac{1}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{128c^3x^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 2, 3/2, 1/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(128*c^3*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.207452, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};2,\frac{3}{2};\frac{1}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{128c^3x^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 2, 3/2, 1/3, (d*x^3)/(8*c),
-((d*x^3)/c)])/(128*c^3*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 27.0794, size = 54, normalized size = 0.82

$$-\frac{\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{2}{3},\frac{3}{2},2,\frac{1}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{128c^4x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 3/2, 2, 1/3, -d*x**3/c, d*x**3/(
8*c))/(128*c**4*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.443458, size = 375, normalized size = 5.68

$$\frac{-\frac{19648c^2dx^3F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}+\frac{1169cd^2x^6F_1\left(\frac{4}{3};\frac{1}{2},1\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},\right.\right.\right.}}{10368c^4x^2\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((648*c^2 + 1249*c*d*x^3 - 167*d^2*x^6)/(-8*c + d*x^3) - (19648*c
^2*d*x^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)])
/((8*c - d*x^3)*(32*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), (d
*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c),
(d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), (d*x^
3)/(8*c)]))) + (1169*c*d^2*x^6*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^
3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(56*c*AppellF1[4/3, 1/2, 1,
 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[7/3, 1/2,
2, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[7/3, 3/2, 1, 1
```

```
0/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(10368*c^4*x^2*Sqrt[c + d*x
^3])
```

Maple [C] time = 0.02, size = 1805, normalized size = 27.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/64/c^2*(-1/2/c^2*(d*x^3+c)^(1/2)/x^2-2/3*d/c^2*x/((x^3+c/d)*d)^
(1/2)+7/18*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*
EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*
d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)))+1/8*d/c*(-1/1944/c^3*x*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/24
3/c^3*x/((x^3+c/d)*d)^(1/2)-5/1944*I/c^3*3^(1/2)/d*(-c*d^2)^(1/3)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))-1/972*I/c^3/d^3*2^(1/2)*sum(1/
_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/
3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d
*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_a
lpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d
^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18
/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)
*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))-1/64*d/c^2*(-2/27/c^
2*x/((x^3+c/d)*d)^(1/2)+2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha
^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-
3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+
1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2
*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2
/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*
I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/
2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(d^3x^{12}-15\,cd^2x^9+48\,c^2dx^6+64\,c^3x^3)\sqrt{dx^3+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/((d^3*x^12 - 15*c*d^2*x^9 + 48*c^2*d*x^6 + 64*c^3*x^3)
*sqrt(d*x^3 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^3), x)
```

3.459 $\int \frac{1}{x^6(8c-dx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{5}{3};2,\frac{3}{2};-\frac{2}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{320c^3x^5\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-5/3, 2, 3/2, -2/3, (d*x^3)/(8*c),
 -((d*x^3)/c)])/(320*c^3*x^5*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.218851, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{5}{3};2,\frac{3}{2};-\frac{2}{3};\frac{dx^3}{8c},-\frac{dx^3}{c}\right)}{320c^3x^5\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^6*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-5/3, 2, 3/2, -2/3, (d*x^3)/(8*c),
 -((d*x^3)/c)])/(320*c^3*x^5*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 27.9145, size = 56, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{5}{3},\frac{3}{2},2,-\frac{2}{3},-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{320c^4x^5\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**6/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-5/3, 3/2, 2, -2/3, -d*x**3/c, d*x**3/
(8*c))/(320*c**4*x**5*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.398522, size = 388, normalized size = 5.88

$$\frac{\frac{262336c^2d^2x^6F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)+32cF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)\right)}-\frac{14189cd^3x^9F_1\left(\frac{4}{3};\frac{1}{2},1;\right.}{(8c-dx^3)\left(3dx^3\left(F_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},\frac{dx^3}{8c}\right)-4F_1\left(\frac{7}{3};\frac{3}{2},1;\right.\right.\right.}}{103680c^5x^5\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^6*(8*c - d*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((2592*c^3 - 7128*c^2*d*x^3 - 15373*c*d^2*x^6 + 2027*d^3*x^9)/(-8
*c + d*x^3) + (262336*c^2*d^2*x^6*AppellF1[1/3, 1/2, 1, 4/3, -((d
*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(32*c*AppellF1[1/3, 1/2,
 1, 4/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*d*x^3*(AppellF1[4/3, 1/
2, 2, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] - 4*AppellF1[4/3, 3/2, 1,
 7/3, -((d*x^3)/c), (d*x^3)/(8*c)]))) - (14189*c*d^3*x^9*AppellF1
[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)])/((8*c - d*x^3)*(
56*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), (d*x^3)/(8*c)] + 3*
d*x^3*(AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)] -
```

```
 4*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), (d*x^3)/(8*c)]))))/(
103680*c^5*x^5*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 2156, normalized size = 32.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^6/(-d*x^3+8*c)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/64/c^2*(-1/5/c^2*(d*x^3+c)^(1/2)/x^5+17/20*d/c^3*(d*x^3+c)^(1/2
)/x^2+2/3*d^2/c^3*x/((x^3+c/d)*d)^(1/2)-91/180*I*d/c^3*3^(1/2)*(-
c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(
x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/256/c^3*d*(-1/2
/c^2*(d*x^3+c)^(1/2)/x^2-2/3*d/c^2*x/((x^3+c/d)*d)^(1/2)+7/18*I/c
^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d
^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*
3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/64
*d^2/c^2*(-1/1944/c^3*x*(d*x^3+c)^(1/2)/(d*x^3-8*c)+2/243/c^3*x/(
(x^3+c/d)*d)^(1/2)-5/1944*I/c^3*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)
-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2))-1/972*I/c^3/d^3*2^(1/2)*sum(1/_alpha^2*
(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(
-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d
*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^
2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3)
)*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_
alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+
I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)),_alpha=RootOf(_Z^3*d-8*c))-1/256*d^2/c^3*(-2/27/c^2*x/((
x^3+c/d)*d)^(1/2)+2/81*I/c^2*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2))+1/243*I/c^2/d^3*2^(1/2)*sum(1/_alpha^2*(-c
*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)
^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*
d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I
*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*E
llipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),-1/18/d*(2*I*_alp
ha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3
```

```
^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/c,(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)),_alpha=RootOf(_Z^3*d-8*c)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^6),x, algorithm="maxima")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^6), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^6),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**6/(-d*x**3+8*c)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx^3+c)^{\frac{3}{2}}(dx^3-8c)^2x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^6),x, algorithm="giac")
```

```
[Out] integrate(1/((d*x^3 + c)^(3/2)*(d*x^3 - 8*c)^2*x^6), x)
```

3.460 $\int \frac{x^8\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=161

$$-\frac{a^2\left(c+dx^3\right)^{3/2}}{3b^2\left(a+bx^3\right)(bc-ad)}+\frac{a(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}\sqrt{bc-ad}}-\frac{a\sqrt{c+dx^3}(4bc-5ad)}{3b^3(bc-ad)}+\frac{2\left(c+dx^3\right)^{3/2}}{9b^2d}$$

```
[Out] -(a*(4*b*c - 5*a*d)*Sqrt[c + d*x^3])/(3*b^3*(b*c - a*d)) + (2*(c
+ d*x^3)^(3/2))/(9*b^2*d) - (a^2*(c + d*x^3)^(3/2))/(3*b^2*(b*c -
 a*d)*(a + b*x^3)) + (a*(4*b*c - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c +
 d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.532934, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{a^2\left(c+dx^3\right)^{3/2}}{3b^2\left(a+bx^3\right)(bc-ad)}+\frac{a(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}\sqrt{bc-ad}}-\frac{a\sqrt{c+dx^3}(4bc-5ad)}{3b^3(bc-ad)}+\frac{2\left(c+dx^3\right)^{3/2}}{9b^2d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] -(a*(4*b*c - 5*a*d)*Sqrt[c + d*x^3])/(3*b^3*(b*c - a*d)) + (2*(c
+ d*x^3)^(3/2))/(9*b^2*d) - (a^2*(c + d*x^3)^(3/2))/(3*b^2*(b*c -
 a*d)*(a + b*x^3)) + (a*(4*b*c - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c +
 d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 46.6628, size = 139, normalized size = 0.86

$$\frac{a^2\left(c+dx^3\right)^{\frac{3}{2}}}{3b^2\left(a+bx^3\right)(ad-bc)}-\frac{a\sqrt{c+dx^3}\,(5ad-4bc)}{3b^3\,(ad-bc)}+\frac{a\,(5ad-4bc)\,\text{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{7}{2}}\sqrt{ad-bc}}+\frac{2\left(c+dx^3\right)^{\frac{3}{2}}}{9b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] a**2*(c + d*x**3)**(3/2)/(3*b**2*(a + b*x**3)*(a*d - b*c)) - a*sq
rt(c + d*x**3)*(5*a*d - 4*b*c)/(3*b**3*(a*d - b*c)) + a*(5*a*d -
4*b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(7/2)
*sqrt(a*d - b*c)) + 2*(c + d*x**3)**(3/2)/(9*b**2*d)
```

Mathematica [A] time = 0.293466, size = 111, normalized size = 0.69

$$\frac{\sqrt{c+dx^3}\left(-\frac{3a^2}{a+bx^3}-12a+\frac{2b\left(c+dx^3\right)}{d}\right)}{9b^3}+\frac{a(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] (Sqrt[c + d*x^3]*(-12*a - (3*a^2)/(a + b*x^3) + (2*b*(c + d*x^3))
/d))/(9*b^3) + (a*(4*b*c - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3
])/Sqrt[b*c - a*d]])/(3*b^(7/2)*Sqrt[b*c - a*d])
```

Maple [C] time = 0.057, size = 917, normalized size = 5.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(1/2)/(b*x^3+a)^2,x)
```

```
[Out] 2/9*(d*x^3+c)^(3/2)/b^2/d+a^2/b^2*(-1/3*(d*x^3+c)^(1/2)/b/(b*x^3+
a)-1/6*I/b/d*2^(1/2)*sum(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootO
f(_Z^3*b+a)))-2*a/b^2*(2/3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^(1/2)*
sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(
-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x
+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^
2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(
2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2
*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1
/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.226139, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2b^2dx^6+2\left(b^2c-5abd\right)x^3+2abc-15a^2d\right)\sqrt{dx^3+c}\sqrt{b^2c-abd}-3\left(4a^2bcd-5a^3d^2+\left(4ab^2cd-5a^2bd^2\right)x^3\right)\log(}{18\left(b^4dx^3+ab^3d\right)\sqrt{b^2c-abd}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] [1/18*(2*(2*b^2*d*x^6 + 2*(b^2*c - 5*a*b*d)*x^3 + 2*a*b*c - 15*a^
2*d)*sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d) - 3*(4*a^2*b*c*d - 5*a^3
*d^2 + (4*a*b^2*c*d - 5*a^2*b*d^2)*x^3)*log(((b*d*x^3 + 2*b*c - a
*d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x
^3 + a)))/((b^4*d*x^3 + a*b^3*d)*sqrt(b^2*c - a*b*d)), 1/9*((2*b^
```

```
2*d*x^6 + 2*(b^2*c - 5*a*b*d)*x^3 + 2*a*b*c - 15*a^2*d)*sqrt(d*x^
3 + c)*sqrt(-b^2*c + a*b*d) + 3*(4*a^2*b*c*d - 5*a^3*d^2 + (4*a*b
^2*c*d - 5*a^2*b*d^2)*x^3)*arctan(-(b*c - a*d)/(sqrt(d*x^3 + c)*s
qrt(-b^2*c + a*b*d))))/((b^4*d*x^3 + a*b^3*d)*sqrt(-b^2*c + a*b*d
))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.218818, size = 184, normalized size = 1.14

$$-\frac{\sqrt{dx^3+c}a^2d}{3\left((dx^3+c)b-bc+ad\right)b^3}-\frac{\left(4\,abc-5\,a^2d\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\,\sqrt{-b^2c+abd}b^3}+\frac{2\,\left(\left(dx^3+c\right)^{\frac{3}{2}}b^4d^2-6\,\sqrt{dx^3+c}ab^3d^3\right)}{9\,b^6d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^8/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] -1/3*sqrt(d*x^3 + c)*a^2*d/(((d*x^3 + c)*b - b*c + a*d)*b^3) - 1/
3*(4*a*b*c - 5*a^2*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*
d))/(sqrt(-b^2*c + a*b*d)*b^3) + 2/9*((d*x^3 + c)^(3/2)*b^4*d^2 -
 6*sqrt(d*x^3 + c)*a*b^3*d^3)/(b^6*d^3)
```

3.461 $\int \frac{x^5\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=136

$$-\frac{(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^3}(2bc-3ad)}{3b^2(bc-ad)}+\frac{a\left(c+dx^3\right)^{3/2}}{3b\left(a+bx^3\right)(bc-ad)}$$

```
[Out] ((2*b*c - 3*a*d)*Sqrt[c + d*x^3])/(3*b^2*(b*c - a*d)) + (a*(c + d
*x^3)^(3/2))/(3*b*(b*c - a*d)*(a + b*x^3)) - ((2*b*c - 3*a*d)*Arc
Tanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(5/2)*Sqrt[
b*c - a*d])
```

Rubi [A] time = 0.306957, antiderivative size = 136, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^3}(2bc-3ad)}{3b^2(bc-ad)}+\frac{a\left(c+dx^3\right)^{3/2}}{3b\left(a+bx^3\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] ((2*b*c - 3*a*d)*Sqrt[c + d*x^3])/(3*b^2*(b*c - a*d)) + (a*(c + d
*x^3)^(3/2))/(3*b*(b*c - a*d)*(a + b*x^3)) - ((2*b*c - 3*a*d)*Arc
Tanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(5/2)*Sqrt[
b*c - a*d])
```

Rubi in Sympy [A] time = 34.437, size = 117, normalized size = 0.86

$$-\frac{a\left(c+dx^3\right)^{\frac{3}{2}}}{3b\left(a+bx^3\right)(ad-bc)}+\frac{2\sqrt{c+dx^3}\left(\frac{3ad}{2}-bc\right)}{3b^2\left(ad-bc\right)}-\frac{2\left(\frac{3ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{5}{2}}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] -a*(c + d*x**3)**(3/2)/(3*b*(a + b*x**3)*(a*d - b*c)) + 2*sqrt(c
+ d*x**3)*(3*a*d/2 - b*c)/(3*b**2*(a*d - b*c)) - 2*(3*a*d/2 - b*c
)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(5/2)*sqrt
(a*d - b*c))
```

Mathematica [A] time = 0.156974, size = 91, normalized size = 0.67

$$\frac{1}{3}\left(\frac{\left(\frac{a}{a+bx^3}+2\right)\sqrt{c+dx^3}}{b^2}-\frac{(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{b^{5/2}\sqrt{bc-ad}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] ((Sqrt[c + d*x^3]*(2 + a/(a + b*x^3)))/b^2 - ((2*b*c - 3*a*d)*Arc
Tanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(b^(5/2)*Sqrt[b*
```

```
c - a*d]))/3
```

Maple [C] time = 0.016, size = 897, normalized size = 6.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^3+c)^(1/2)/(b*x^3+a)^2,x)
```

```
[Out] 1/b*(2/3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^(1/2)*sum((-c*d^2)^(1/3)
*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-
c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+
I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-
c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/
2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-
c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1
/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^
2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-
3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
),_alpha=RootOf(_Z^3*b+a)))-a/b*(-1/3*(d*x^3+c)^(1/2)/b/(b*x^3+a)
-1/6*I/b/d*2^(1/2)*sum(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1
/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1
/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^
2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c
*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(
1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c
*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)
*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2
)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*
d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(
_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.223743, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2\,bx^3+3\,a\right)\sqrt{dx^3+c}\sqrt{b^2c-abd}-\left(\left(2\,b^2c-3\,abd\right)x^3+2\,abc-3\,a^2d\right)\log\left(\frac{\left(bdx^3+2\,bc-ad\right)\sqrt{b^2c-abd}+2\,\sqrt{dx^3+c}\left(b^2c-abd\right)}{bx^3+a}\right)}{6\left(b^3x^3+ab^2\right)\sqrt{b^2c-abd}},\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] [1/6*(2*(2*b*x^3 + 3*a)*sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d) - ((2
*b^2*c - 3*a*b*d)*x^3 + 2*a*b*c - 3*a^2*d)*log(((b*d*x^3 + 2*b*c
```

```
- a*d)*sqrt(b^2*c - a*b*d) + 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(
b*x^3 + a)))/((b^3*x^3 + a*b^2)*sqrt(b^2*c - a*b*d)), 1/3*((2*b*x
^3 + 3*a)*sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d) - ((2*b^2*c - 3*a*
b*d)*x^3 + 2*a*b*c - 3*a^2*d)*arctan(-(b*c - a*d)/(sqrt(d*x^3 + c
)*sqrt(-b^2*c + a*b*d))))/((b^3*x^3 + a*b^2)*sqrt(-b^2*c + a*b*d)
)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] Integral(x**5*sqrt(c + d*x**3)/(a + b*x**3)**2, x)
```

GIAC/XCAS [A] time = 0.219888, size = 150, normalized size = 1.1

$$\frac{\frac{\sqrt{dx^3+c}ad^2}{((dx^3+c)b-bc+ad)b^2}+\frac{2\sqrt{dx^3+c}d}{b^2}+\frac{(2bcd-3ad^2)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}b^2}}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^5/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/3*(sqrt(d*x^3 + c)*a*d^2/(((d*x^3 + c)*b - b*c + a*d)*b^2) + 2*
sqrt(d*x^3 + c)*d/b^2 + (2*b*c*d - 3*a*d^2)*arctan(sqrt(d*x^3 + c
)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^2))/d
```

3.462 $\int \frac{x^2\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=80

$$-\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^3}}{3b\left(a+bx^3\right)}$$

```
[Out] -Sqrt[c + d*x^3]/(3*b*(a + b*x^3)) - (d*ArcTanh[(Sqrt[b]*Sqrt[c +
 d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.191382, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^3}}{3b\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] -Sqrt[c + d*x^3]/(3*b*(a + b*x^3)) - (d*ArcTanh[(Sqrt[b]*Sqrt[c +
 d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 21.1262, size = 65, normalized size = 0.81

$$-\frac{\sqrt{c+dx^3}}{3b\left(a+bx^3\right)}+\frac{d\,\text{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{3}{2}}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] -sqrt(c + d*x**3)/(3*b*(a + b*x**3)) + d*atan(sqrt(b)*sqrt(c + d*
x**3)/sqrt(a*d - b*c))/(3*b**(3/2)*sqrt(a*d - b*c))
```

Mathematica [A] time = 0.0906777, size = 80, normalized size = 1.

$$-\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^3}}{3b\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] -Sqrt[c + d*x^3]/(3*b*(a + b*x^3)) - (d*ArcTanh[(Sqrt[b]*Sqrt[c +
 d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Maple [C] time = 0.01, size = 453, normalized size = 5.7

$$-\frac{1}{3 b (b x^3 + a)} \sqrt{d x^3 + c}$$

$$-\frac{\frac{i}{6}\sqrt{2}}{bd} \sum_{\_alpha = RootOf(b\_Z^3 + a)} \frac{1}{ad - bc} \sqrt[3]{-cd^2} \sqrt{\frac{i}{2} d \left(2x + \frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2} + \sqrt[3]{-cd^2}\right)\right) \frac{1}{\sqrt[3]{-cd^2}}} \sqrt{d \left(x - \frac{1}{d}\sqrt[3]{-cd^2}\right) \left(-3\sqrt[3]{-cd^2} + \right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(d*x^3+c)^(1/2)/(b*x^3+a)^2,x)
```

```
[Out] -1/3*(d*x^3+c)^(1/2)/b/(b*x^3+a)-1/6*I/b/d*2^(1/2)*sum(1/(a*d-b*c
)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c
*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3
*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1
/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*
d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/
3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I
*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2
)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/
2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.223868, size = 1, normalized size = 0.01

$$\left[\frac{(bdx^3 + ad)\log\left(\frac{(bdx^3 + 2bc - ad)\sqrt{b^2c - abd} - 2\sqrt{dx^3 + c}(b^2c - abd)}{bx^3 + a}\right) - 2\sqrt{dx^3 + c}\sqrt{b^2c - abd}}{6(b^2x^3 + ab)\sqrt{b^2c - abd}}, -\frac{(bdx^3 + ad)\arctan\left(-\frac{bc - ad}{\sqrt{dx^3 + c}\sqrt{-b^2c + abd}}\right) + \sqrt{dx^3 + c}\sqrt{-b^2c + abd}}{3(b^2x^3 + ab)\sqrt{-b^2c + abd}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] [1/6*((b*d*x^3 + a*d)*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c - a
*b*d) - 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a)) - 2*sqrt(
d*x^3 + c)*sqrt(b^2*c - a*b*d))/((b^2*x^3 + a*b)*sqrt(b^2*c - a*b
*d)), -1/3*((b*d*x^3 + a*d)*arctan(-(b*c - a*d)/(sqrt(d*x^3 + c)*
sqrt(-b^2*c + a*b*d))) + sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d))/((
b^2*x^3 + a*b)*sqrt(-b^2*c + a*b*d))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] Integral(x**2*sqrt(c + d*x**3)/(a + b*x**3)**2, x)
```

GIAC/XCAS [A] time = 0.216741, size = 107, normalized size = 1.34

$$\frac{1}{3}\,d\left(\frac{\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}b}-\frac{\sqrt{dx^3+c}}{((dx^3+c)b-bc+ad)b}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^2/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/3*d*(arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*
c + a*b*d)*b) - sqrt(d*x^3 + c)/(((d*x^3 + c)*b - b*c + a*d)*b))
```

3.463 $\int \frac{\sqrt{c+dx^3}}{x(a+bx^3)^2}\,dx$

Optimal. Leaf size=121

$$\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2\sqrt{b}\sqrt{bc-ad}}-\frac{2\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}+\frac{\sqrt{c+dx^3}}{3a\,(a+bx^3)}$$

```
[Out] Sqrt[c + d*x^3]/(3*a*(a + b*x^3)) - (2*Sqrt[c]*ArcTanh[Sqrt[c + d
*x^3]/Sqrt[c]])/(3*a^2) + ((2*b*c - a*d)*ArcTanh[(Sqrt[b]*Sqrt[c
+ d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*Sqrt[b]*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.36369, antiderivative size = 121, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2\sqrt{b}\sqrt{bc-ad}}-\frac{2\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}+\frac{\sqrt{c+dx^3}}{3a\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[c + d*x^3]/(x*(a + b*x^3)^2),x]
```

```
[Out] Sqrt[c + d*x^3]/(3*a*(a + b*x^3)) - (2*Sqrt[c]*ArcTanh[Sqrt[c + d
*x^3]/Sqrt[c]])/(3*a^2) + ((2*b*c - a*d)*ArcTanh[(Sqrt[b]*Sqrt[c
+ d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*Sqrt[b]*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 39.262, size = 105, normalized size = 0.87

$$\frac{\sqrt{c+dx^3}}{3a\,(a+bx^3)}-\frac{2\sqrt{c}\,\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}+\frac{2\left(\frac{ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^2\sqrt{b}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((d*x**3+c)**(1/2)/x/(b*x**3+a)**2,x)
```

```
[Out] sqrt(c + d*x**3)/(3*a*(a + b*x**3)) - 2*sqrt(c)*atanh(sqrt(c + d*
x**3)/sqrt(c))/(3*a**2) + 2*(a*d/2 - b*c)*atan(sqrt(b)*sqrt(c + d
*x**3)/sqrt(a*d - b*c))/(3*a**2*sqrt(b)*sqrt(a*d - b*c))
```

Mathematica [C] time = 0.368235, size = 306, normalized size = 2.53

$$\frac{\frac{\frac{10bcdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}{-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}+3(c+dx^3)}{a}-\frac{6cdx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-b\ldots\right.}{x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\ldots\right.\right.}}{9\,(a+bx^3)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[c + d*x^3]/(x*(a + b*x^3)^2),x]
```

```
[Out] ((-6*c*d*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)])/
(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)] + x^3*
(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*A
ppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)])) + (3*(c + d*x
^3) + (10*b*c*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/
```

```
(b*x^3))])/(-5*b*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -
(a/(b*x^3))] + 2*a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a
/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*
x^3))]))/a)/(9*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 934, normalized size = 7.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x/(b*x^3+a)^2,x)
```

```
[Out] 1/a^2*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))*c
^(1/2))-b/a*(-1/3*(d*x^3+c)^(1/2)/b/(b*x^3+a)-1/6*I/b/d*2^(1/2)*s
um(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^
2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1
/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*
d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d
-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)
^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-
b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a^2*(2
/3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*
I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)
^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1
/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*
(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)
^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/
3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alp
ha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alp
ha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(bx^3 + a)^2 x} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x), x)
```

Fricas [A] time = 0.250116, size = 1, normalized size = 0.01

$$\left[\frac{2\left(bx^3+a\right)\sqrt{b^2c-abd}\sqrt{c}\log\left(\frac{dx^3-2\sqrt{dx^3+c}\sqrt{c}+2c}{x^3}\right)+2\sqrt{dx^3+c}\sqrt{b^2c-abd}a-\left(\left(2b^2c-abd\right)x^3+2abc-a^2d\right)\log\left(\frac{(bdx^3 \cdots}{}\right)}{6\left(a^2bx^3+a^3\right)\sqrt{b^2c-abd}}\right.$$

$$-\frac{4\left(bx^3+a\right)\sqrt{b^2c-abd}\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)-2\sqrt{dx^3+c}\sqrt{b^2c-abd}a+\left(\left(2b^2c-abd\right)x^3+2abc-a^2d\right)\log\left(\frac{(bdx^3+2bc- \cdots}{}\right)}{6\left(a^2bx^3+a^3\right)\sqrt{b^2c-abd}}$$

$$-\frac{2\left(bx^3+a\right)\sqrt{-b^2c+abd}\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)-\sqrt{dx^3+c}\sqrt{-b^2c+abd}a-\left(\left(2b^2c-abd\right)x^3+2abc-a^2d\right)\arctan\left(-\frac{\cdots}{\sqrt{dx \cdots}}\right)}{3\left(a^2bx^3+a^3\right)\sqrt{-b^2c+abd}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x),x, algorithm="fricas")
```

```
[Out] [1/6*(2*(b*x^3 + a)*sqrt(b^2*c - a*b*d)*sqrt(c)*log((d*x^3 - 2*sq
rt(d*x^3 + c)*sqrt(c) + 2*c)/x^3) + 2*sqrt(d*x^3 + c)*sqrt(b^2*c
- a*b*d)*a - ((2*b^2*c - a*b*d)*x^3 + 2*a*b*c - a^2*d)*log(((b*d*
x^3 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*x^3 + c)*(b^2*c
 - a*b*d))/(b*x^3 + a)))/((a^2*b*x^3 + a^3)*sqrt(b^2*c - a*b*d)),
 1/3*((b*x^3 + a)*sqrt(-b^2*c + a*b*d)*sqrt(c)*log((d*x^3 - 2*sqr
t(d*x^3 + c)*sqrt(c) + 2*c)/x^3) + sqrt(d*x^3 + c)*sqrt(-b^2*c +
a*b*d)*a + ((2*b^2*c - a*b*d)*x^3 + 2*a*b*c - a^2*d)*arctan(-(b*c
 - a*d)/(sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d))))/((a^2*b*x^3 + a^
3)*sqrt(-b^2*c + a*b*d)), -1/6*(4*(b*x^3 + a)*sqrt(b^2*c - a*b*d)
*sqrt(-c)*arctan(sqrt(d*x^3 + c)/sqrt(-c)) - 2*sqrt(d*x^3 + c)*sq
rt(b^2*c - a*b*d)*a + ((2*b^2*c - a*b*d)*x^3 + 2*a*b*c - a^2*d)*l
og(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*x^3 +
c)*(b^2*c - a*b*d))/(b*x^3 + a)))/((a^2*b*x^3 + a^3)*sqrt(b^2*c -
 a*b*d)), -1/3*(2*(b*x^3 + a)*sqrt(-b^2*c + a*b*d)*sqrt(-c)*arcta
n(sqrt(d*x^3 + c)/sqrt(-c)) - sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d
)*a - ((2*b^2*c - a*b*d)*x^3 + 2*a*b*c - a^2*d)*arctan(-(b*c - a*
d)/(sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d))))/((a^2*b*x^3 + a^3)*sq
rt(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219857, size = 170, normalized size = 1.4

$$\frac{1}{3}d^2\left(\frac{\sqrt{dx^3+c}}{((dx^3+c)b-bc+ad)ad}-\frac{(2bc-ad)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}a^2d^2}+\frac{2c\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x),x, algorithm="giac")
```

```
[Out] 1/3*d^2*(sqrt(d*x^3 + c)/(((d*x^3 + c)*b - b*c + a*d)*a*d) - (2*b
*c - a*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
```

```
^2*c + a*b*d)*a^2*d^2) + 2*c*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a^
2*sqrt(-c)*d^2))
```

3.464 $\int \frac{\sqrt{c+dx^3}}{x^4(a+bx^3)^2}\,dx$

Optimal. Leaf size=161

$$-\frac{\sqrt{b}(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^3\sqrt{bc-ad}}+\frac{(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3\sqrt{c}}-\frac{2b\sqrt{c+dx^3}}{3a^2\left(a+bx^3\right)}-\frac{\sqrt{c+dx^3}}{3ax^3\left(a+bx^3\right)}$$

```
[Out] (-2*b*Sqrt[c + d*x^3])/(3*a^2*(a + b*x^3)) - Sqrt[c + d*x^3]/(3*a
*x^3*(a + b*x^3)) + ((4*b*c - a*d)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c
]])/(3*a^3*Sqrt[c]) - (Sqrt[b]*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*S
qrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^3*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.657199, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{\sqrt{b}(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^3\sqrt{bc-ad}}+\frac{(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3\sqrt{c}}-\frac{2b\sqrt{c+dx^3}}{3a^2\left(a+bx^3\right)}-\frac{\sqrt{c+dx^3}}{3ax^3\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^4*(a + b*x^3)^2),x]
```

```
[Out] (-2*b*Sqrt[c + d*x^3])/(3*a^2*(a + b*x^3)) - Sqrt[c + d*x^3]/(3*a
*x^3*(a + b*x^3)) + ((4*b*c - a*d)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c
]])/(3*a^3*Sqrt[c]) - (Sqrt[b]*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*S
qrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^3*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 60.8262, size = 136, normalized size = 0.84

$$\frac{\sqrt{c+dx^3}}{3ax^3\left(a+bx^3\right)}-\frac{2\sqrt{c+dx^3}}{3a^2x^3}-\frac{\sqrt{b}\left(3ad-4bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^3\sqrt{ad-bc}}-\frac{(ad-4bc)\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**4/(b*x**3+a)**2,x)
```

```
[Out] sqrt(c + d*x**3)/(3*a*x**3*(a + b*x**3)) - 2*sqrt(c + d*x**3)/(3*
a**2*x**3) - sqrt(b)*(3*a*d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**3
)/sqrt(a*d - b*c))/(3*a**3*sqrt(a*d - b*c)) - (a*d - 4*b*c)*atanh
(sqrt(c + d*x**3)/sqrt(c))/(3*a**3*sqrt(c))
```

Mathematica [C] time = 0.620375, size = 410, normalized size = 2.55

$$\frac{\frac{12abcdx^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{5bdx^3\left(3ac+4adx^3+2bcx^3+6bdx^6\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}{-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2c}}{9a^2x^3\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^4*(a + b*x^3)^2),x]
```

```
[Out] ((12*a*b*c*d*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a
)])/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)] +
x^3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^3)/a)] + a
```

```
*d*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)])) + (5*b*d*
x^3*(3*a*c + 2*b*c*x^3 + 4*a*d*x^3 + 6*b*d*x^6)*AppellF1[3/2, 1/2
, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] - 3*(a + 2*b*x^3)*(c + d*x^
3)*(2*a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]
+ b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(-
5*b*d*x^3*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))]
+ 2*a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] +
b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))])))/(9*a
^2*x^3*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 978, normalized size = 6.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^4/(b*x^3+a)^2,x)
```

```
[Out] 1/a^2*(-1/3*(d*x^3+c)^(1/2)/x^3-1/3*d*arctanh((d*x^3+c)^(1/2)/c^(
1/2))/c^(1/2))+1/a^2*b^2*(-1/3*(d*x^3+c)^(1/2)/b/(b*x^3+a)-1/6*I/
b/d*2^(1/2)*sum(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*
3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*
(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3
)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(
1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_a
lpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(
1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_a
lpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)
-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+
a)))-2*b/a^3*(2/3*(d*x^3+c)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(
1/2))*c^(1/2))+2/a^3*b^2*(2/3*(d*x^3+c)^(1/2)/b+1/3*I/b/d^2*2^(1/
2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3
)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3)
)/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(
2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3)
)^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alp
ha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2
)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d
*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3
^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*
3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(bx^3 + a)^2 x^4} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^4),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^4), x)
```

Fricas [A] time = 0.255736, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^4),x, algorithm="fricas")
```

```
[Out] [-1/6*(((4*b^2*c - 3*a*b*d)*x^6 + (4*a*b*c - 3*a^2*d)*x^3)*sqrt(c
)*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 +
 c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) + 2*(2*a*b*x^3
+ a^2)*sqrt(d*x^3 + c)*sqrt(c) + ((4*b^2*c - a*b*d)*x^6 + (4*a*b*
c - a^2*d)*x^3)*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)
/x^3))/((a^3*b*x^6 + a^4*x^3)*sqrt(c)), -1/6*(2*((4*b^2*c - 3*a*b
*d)*x^6 + (4*a*b*c - 3*a^2*d)*x^3)*sqrt(c)*sqrt(-b/(b*c - a*d))*a
rctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) + 2*
(2*a*b*x^3 + a^2)*sqrt(d*x^3 + c)*sqrt(c) + ((4*b^2*c - a*b*d)*x^
6 + (4*a*b*c - a^2*d)*x^3)*log(((d*x^3 + 2*c)*sqrt(c) - 2*sqrt(d*
x^3 + c)*c)/x^3))/((a^3*b*x^6 + a^4*x^3)*sqrt(c)), -1/6*(((4*b^2*
c - 3*a*b*d)*x^6 + (4*a*b*c - 3*a^2*d)*x^3)*sqrt(-c)*sqrt(b/(b*c
- a*d))*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*(b*c - a*d
)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) + 2*(2*a*b*x^3 + a^2)*sqrt(d*
x^3 + c)*sqrt(-c) + 2*((4*b^2*c - a*b*d)*x^6 + (4*a*b*c - a^2*d)*
x^3)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((a^3*b*x^6 + a^4*x^3)
*sqrt(-c)), -1/3*(((4*b^2*c - 3*a*b*d)*x^6 + (4*a*b*c - 3*a^2*d)*
x^3)*sqrt(-c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b
*c - a*d))/(sqrt(d*x^3 + c)*b)) + (2*a*b*x^3 + a^2)*sqrt(d*x^3 +
c)*sqrt(-c) + ((4*b^2*c - a*b*d)*x^6 + (4*a*b*c - a^2*d)*x^3)*arc
tan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((a^3*b*x^6 + a^4*x^3)*sqrt(-c
))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**4/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.228008, size = 258, normalized size = 1.6

$$-\frac{1}{3}d^{3}\left(\frac{2\left(dx^{3}+c\right)^{\frac{3}{2}}b-2\sqrt{dx^{3}+c}bc+\sqrt{dx^{3}+c}ad}{\left(\left(dx^{3}+c\right)^{2}b-2\left(dx^{3}+c\right)bc+bc^{2}+\left(dx^{3}+c\right)ad-acd\right)a^{2}d^{2}}-\frac{\left(4b^{2}c-3abd\right)\arctan\left(\frac{\sqrt{dx^{3}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{\sqrt{-b^{2}c+abd}a^{3}d^{3}}+\frac{\left(4bc-ad\right)\mathrm{arc}}{a^{3}\sqrt{-}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^4),x, algorithm="giac")
```

```
[Out] -1/3*d^3*((2*(d*x^3 + c)^(3/2)*b - 2*sqrt(d*x^3 + c)*b*c + sqrt(d
*x^3 + c)*a*d)/(((d*x^3 + c)^2*b - 2*(d*x^3 + c)*b*c + b*c^2 + (d
*x^3 + c)*a*d - a*c*d)*a^2*d^2) - (4*b^2*c - 3*a*b*d)*arctan(sqrt
(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*a^3*d^3
) + (4*b*c - a*d)*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a^3*sqrt(-c)*
d^3))
```

3.465 $\int \frac{x^3\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=64

$$\frac{x^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};2,-\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 2, -1/2, 7/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(4*a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.201263, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};2,-\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] (x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 2, -1/2, 7/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(4*a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 29.9501, size = 53, normalized size = 0.83

$$\frac{x^4\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{4}{3},-\frac{1}{2},2,\frac{7}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{4a^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**3*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, -1/2, 2, 7/3, -d*x**3/c, -b*x
**3/a)/(4*a**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.34705, size = 324, normalized size = 5.06

$$\frac{x\left(\frac{32ac^2F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}-\frac{35acdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\right.}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\right.\right.}\right.}{12b\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(x^3*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] (x*(-4*(c + d*x^3) + (32*a*c^2*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^
3)/c), -((b*x^3)/a)])/(8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)
/c), -((b*x^3)/a)] - 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d
*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3
)/c), -((b*x^3)/a)])) - (35*a*c*d*x^3*AppellF1[4/3, 1/2, 1, 7/3,
-((d*x^3)/c), -((b*x^3)/a)])/(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3,
-((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2,
```

```
10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/
3, -((d*x^3)/c), -((b*x^3)/a)]))))/(12*b*(a + b*x^3)*Sqrt[c + d*x
^3])
```

Maple [C] time = 0.057, size = 1468, normalized size = 22.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(d*x^3+c)^(1/2)/(b*x^3+a)^2,x)
```

```
[Out] 1/b*(-2/3*I/b*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((
x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ell
ipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2))+1/3*I/b/d^2*2^(1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*
(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*
(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*
d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/
3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)
*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/
2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3
^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(
-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=R
ootOf(_Z^3*b+a)))-a/b*(1/3/a*x*(d*x^3+c)^(1/2)/(b*x^3+a)-1/9*I/b/
a*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^
2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/18*I
/a/b/d^2*2^(1/2)*sum((a*d-4*b*c)/_alpha^2/(a*d-b*c)*(-c*d^2)^(1/3
)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)
+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(
-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1
/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(
-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d
^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d
-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x^3}{\left(bx^3 + a\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a)^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3\sqrt{c + dx^3}}{(a + bx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] Integral(x**3*sqrt(c + d*x**3)/(a + b*x**3)**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x^3}{(bx^3 + a)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x^3/(b*x^3 + a)^2, x)
```

3.466 $\int \frac{x\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=64

$$\frac{x^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};2,-\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (x^2*Sqrt[c + d*x^3]*AppellF1[2/3, 2, -1/2, 5/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(2*a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.155973, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{x^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};2,-\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] (x^2*Sqrt[c + d*x^3]*AppellF1[2/3, 2, -1/2, 5/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(2*a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 18.5954, size = 53, normalized size = 0.83

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},-\frac{1}{2},2,\frac{5}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, -1/2, 2, 5/3, -d*x**3/c, -b*x
**3/a)/(2*a**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.338729, size = 324, normalized size = 5.06

$$\frac{x^2\left(\frac{25c^2F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{8cdx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3}\right.}{3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3}\right.\right.}\right.}{15\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*Sqrt[c + d*x^3])/(a + b*x^3)^2,x]
```

```
[Out] (x^2*((5*(c + d*x^3))/a + (25*c^2*AppellF1[2/3, 1/2, 1, 5/3, -((d
*x^3)/c), -((b*x^3)/a)])/(10*a*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*
x^3)/c), -((b*x^3)/a)] - 3*x^3*(2*b*c*AppellF1[5/3, 1/2, 2, 8/3,
-((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 3/2, 1, 8/3, -((d
*x^3)/c), -((b*x^3)/a)])) + (8*c*d*x^3*AppellF1[5/3, 1/2, 1, 8/3,
 -((d*x^3)/c), -((b*x^3)/a)])/(-16*a*c*AppellF1[5/3, 1/2, 1, 8/3,
 -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[8/3, 1/2, 2,
```

```
11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11
/3, -((d*x^3)/c), -((b*x^3)/a)]))))/(15*(a + b*x^3)*Sqrt[c + d*x^
3])
```

Maple [C] time = 0.055, size = 908, normalized size = 14.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(1/2)/(b*x^3+a)^2,x)
```

```
[Out] 1/3/a*x^2*(d*x^3+c)^(1/2)/(b*x^3+a)+1/9*I/b/a*3^(1/2)*(-c*d^2)^(1
/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/18*I/
a/b/d^2*2^(1/2)*sum((-a*d-2*b*c)/_alpha/(a*d-b*c)*(-c*d^2)^(1/3)*
(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c
*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I
*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c
*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2
)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c
*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2
)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3
*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/
3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))
,_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}x}{(bx^3 + a)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a)^2, x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] Integral(x*sqrt(c + d*x**3)/(a + b*x**3)**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}x}{(bx^3+a)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)*x/(b*x^3 + a)^2, x)
```

3.467 $\int \frac{\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=59

$$\frac{x\sqrt{c+dx^3}F_1\left(\frac{1}{3};2,-\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (x*Sqrt[c + d*x^3]*AppellF1[1/3, 2, -1/2, 4/3, -((b*x^3)/a), -((d
*x^3)/c)])/(a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.0961927, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{c+dx^3}F_1\left(\frac{1}{3};2,-\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[c + d*x^3]/(a + b*x^3)^2,x]
```

```
[Out] (x*Sqrt[c + d*x^3]*AppellF1[1/3, 2, -1/2, 4/3, -((b*x^3)/a), -((d
*x^3)/c)])/(a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 19.2715, size = 49, normalized size = 0.83

$$\frac{x\sqrt{c+dx^3}\operatorname{appellf}_1\left(\frac{1}{3},-\frac{1}{2},2,\frac{4}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, -1/2, 2, 4/3, -d*x**3/c, -b*x**3
/a)/(a**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.34182, size = 322, normalized size = 5.46

$$\frac{x\left(\frac{64c^2F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}-\frac{7cdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\right.}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\right.\right.}\right.}{12\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[c + d*x^3]/(a + b*x^3)^2,x]
```

```
[Out] (x*((4*(c + d*x^3))/a + (64*c^2*AppellF1[1/3, 1/2, 1, 4/3, -((d*x
^3)/c), -((b*x^3)/a)])/(8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3
)/c), -((b*x^3)/a)] - 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((
d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^
3)/c), -((b*x^3)/a)])) - (7*c*d*x^3*AppellF1[4/3, 1/2, 1, 7/3, -(
(d*x^3)/c), -((b*x^3)/a)])/(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -(
(d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 10
```

```
/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3,
 -((d*x^3)/c), -((b*x^3)/a)]))))/(12*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.008, size = 753, normalized size = 12.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/(b*x^3+a)^2,x)
```

```
[Out] 1/3/a*x*(d*x^3+c)^(1/2)/(b*x^3+a)-1/9*I/b/a*3^(1/2)*(-c*d^2)^(1/3
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*
d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/
3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/18*I/a/b/d^2*2^(1/2)*sum((a
*d-4*b*c)/_alpha^2/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d
*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/
3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^
(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_
alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^
(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_
alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3
)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b
+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{(bx^3+a)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/(b*x^3 + a)^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^3}}{(a+bx^3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/(b*x**3+a)**2,x)
```

```
[Out] Integral(sqrt(c + d*x**3)/(a + b*x**3)**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(bx^3 + a)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/(b*x^3 + a)^2, x)
```

3.468 $\int \frac{\sqrt{c+dx^3}}{x^2(a+bx^3)^2}\,dx$

Optimal. Leaf size=62

$$-\frac{\sqrt{c+dx^3}F_1\left(-\frac{1}{3};2,-\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2x\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -((Sqrt[c + d*x^3]*AppellF1[-1/3, 2, -1/2, 2/3, -((b*x^3)/a), -((
d*x^3)/c)])/(a^2*x*Sqrt[1 + (d*x^3)/c]))
```

Rubi [A] time = 0.193935, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$

$$-\frac{\sqrt{c+dx^3}F_1\left(-\frac{1}{3};2,-\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2x\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^2*(a + b*x^3)^2),x]
```

```
[Out] -((Sqrt[c + d*x^3]*AppellF1[-1/3, 2, -1/2, 2/3, -((b*x^3)/a), -((
d*x^3)/c)])/(a^2*x*Sqrt[1 + (d*x^3)/c]))
```

Rubi in Sympy [A] time = 23.0086, size = 53, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,\operatorname{appellf_1}\left(-\frac{1}{3},-\frac{1}{2},2,\frac{2}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a^2x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**2/(b*x**3+a)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, -1/2, 2, 2/3, -d*x**3/c, -b*x**3
/a)/(a**2*x*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.850153, size = 347, normalized size = 5.6

$$\frac{\frac{25acx^3(9ad-8bc)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{64abcdx^6F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{d}{}\right.}{16acF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{d}{}\right.\right.}}{30a^2x\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^2*(a + b*x^3)^2),x]
```

```
[Out] (-10*(3*a + 4*b*x^3)*(c + d*x^3) + (25*a*c*(-8*b*c + 9*a*d)*x^3*A
ppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)])/(10*a*c*Ap
pellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)] - 3*x^3*(2*b
*c*AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*A
ppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])) + (64*a*b
*c*d*x^6*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])/
(16*a*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)] -
```

```
3*x^3*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/
a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)]
)))/(30*a^2*x*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 2227, normalized size = 35.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^2/(b*x^3+a)^2,x)
```

```
[Out] 1/a^2*(-(d*x^3+c)^(1/2)/x-I*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^
3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-
c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-b/a*(1/3/a*x^2*(d*x^3+c)
^(1/2)/(b*x^3+a)+1/9*I/b/a*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3
+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c
*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-
c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(
1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/18*I/a/b/d^2*2^(1/2)*sum
((-a*d-2*b*c)/_alpha/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(
-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*
(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(
1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2
)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)
*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2
)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I
*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2
/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3
*b+a)))-b/a^2*(-2/3*I/b*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*El
lipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^
2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/b/d^2*2^(1/2)*sum(1/_al
pha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(
-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x
+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^
2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(
2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
```

```
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2
*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1
/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{(bx^3+a)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^2),x, algorithm="maxima")

[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^2),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**2/(b*x**3+a)**2,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3+c}}{(bx^3+a)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^2),x, algorithm="giac")

[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^2), x)
```

3.469 $\int \frac{\sqrt{c+dx^3}}{x^3(a+bx^3)^2} \, dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{c+dx^3} F_1\left(-\frac{2}{3};2,-\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2x^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -(Sqrt[c + d*x^3]*AppellF1[-2/3, 2, -1/2, 1/3, -((b*x^3)/a), -((d
*x^3)/c)])/(2*a^2*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.189473, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{c+dx^3} F_1\left(-\frac{2}{3};2,-\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2x^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^3]/(x^3*(a + b*x^3)^2),x]
```

```
[Out] -(Sqrt[c + d*x^3]*AppellF1[-2/3, 2, -1/2, 1/3, -((b*x^3)/a), -((d
*x^3)/c)])/(2*a^2*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 22.4174, size = 56, normalized size = 0.88

$$-\frac{\sqrt{c+dx^3} \operatorname{appellf_1}\left(-\frac{2}{3},-\frac{1}{2},2,\frac{1}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a^2x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(1/2)/x**3/(b*x**3+a)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, -1/2, 2, 1/3, -d*x**3/c, -b*x**3
/a)/(2*a**2*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.721181, size = 347, normalized size = 5.42

$$\frac{\frac{16acx^3(9ad-20bc)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{35abcdx^6F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx}{c}\right.}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c}\right.\right.}}{24a^2x^2\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^3]/(x^3*(a + b*x^3)^2),x]
```

```
[Out] (-4*(3*a + 5*b*x^3)*(c + d*x^3) + (16*a*c*(-20*b*c + 9*a*d)*x^3*A
ppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])/(8*a*c*App
ellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)] - 3*x^3*(2*b*
c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Ap
pellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])) + (35*a*b*
c*d*x^6*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])/(
-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] +
```

```
3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/
a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)]
)))/(24*a^2*x^2*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 1768, normalized size = 27.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(1/2)/x^3/(b*x^3+a)^2,x)
```

```
[Out] 1/a^2*(-1/2/x^2*(d*x^3+c)^(1/2)-1/2*I*3^(1/2)*(-c*d^2)^(1/3)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(
1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(
1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)))-b/a*(1/3/a*x*(d*x^3+c)^(1/2)/(b*x^
3+a)-1/9*I/b/a*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-
1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*(
(x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*El
lipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^
2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2))+1/18*I/a/b/d^2*2^(1/2)*sum((a*d-4*b*c)/_alpha^2/(a*d-b*c)*
(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(
-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d
*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^
2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3)
)*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_
alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+
I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a^2*(-2/3*I/b*3^(1/2)
*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))
/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-
I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)
*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/b/d^2*2^(
1/2)*sum(1/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*
(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(
-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2
)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(
1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_al
pha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c
*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/
(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(bx^3 + a)^2 x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^3),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^3), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^3),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(1/2)/x**3/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^3 + c}}{(bx^3 + a)^2 x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^3),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^3 + c)/((b*x^3 + a)^2*x^3), x)
```

3.470 $\int \frac{x^8(c+dx^3)^{3/2}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=189

$$-\frac{a^2\left(c+dx^3\right)^{5/2}}{3b^2\left(a+bx^3\right)(bc-ad)}+\frac{a(4bc-7ad)\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{9/2}}-\frac{a\sqrt{c+dx^3}(4bc-7ad)}{3b^4}-\frac{a\left(c+dx^3\right)^{3/2}(4bc-7ad)}{9b^3(bc-ad)}+\frac{2\left(c+dx^3\right)^{5/2}}{15b^2d}$$

```
[Out] -(a*(4*b*c - 7*a*d)*Sqrt[c + d*x^3])/(3*b^4) - (a*(4*b*c - 7*a*d)
*(c + d*x^3)^(3/2))/(9*b^3*(b*c - a*d)) + (2*(c + d*x^3)^(5/2))/(
15*b^2*d) - (a^2*(c + d*x^3)^(5/2))/(3*b^2*(b*c - a*d)*(a + b*x^3
)) + (a*(4*b*c - 7*a*d)*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c +
 d*x^3])/Sqrt[b*c - a*d]])/(3*b^(9/2))
```

Rubi [A] time = 0.663962, antiderivative size = 189, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{a^2\left(c+dx^3\right)^{5/2}}{3b^2\left(a+bx^3\right)(bc-ad)}+\frac{a(4bc-7ad)\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{9/2}}-\frac{a\sqrt{c+dx^3}(4bc-7ad)}{3b^4}-\frac{a\left(c+dx^3\right)^{3/2}(4bc-7ad)}{9b^3(bc-ad)}+\frac{2\left(c+dx^3\right)^{5/2}}{15b^2d}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^8*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] -(a*(4*b*c - 7*a*d)*Sqrt[c + d*x^3])/(3*b^4) - (a*(4*b*c - 7*a*d)
*(c + d*x^3)^(3/2))/(9*b^3*(b*c - a*d)) + (2*(c + d*x^3)^(5/2))/(
15*b^2*d) - (a^2*(c + d*x^3)^(5/2))/(3*b^2*(b*c - a*d)*(a + b*x^3
)) + (a*(4*b*c - 7*a*d)*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c +
 d*x^3])/Sqrt[b*c - a*d]])/(3*b^(9/2))
```

Rubi in Sympy [A] time = 51.4904, size = 167, normalized size = 0.88

$$\frac{a^2\left(c+dx^3\right)^{\frac{5}{2}}}{3b^2\left(a+bx^3\right)(ad-bc)}-\frac{a\left(c+dx^3\right)^{\frac{3}{2}}(7ad-4bc)}{9b^3(ad-bc)}+\frac{a\sqrt{c+dx^3}\,(7ad-4bc)}{3b^4}-\frac{a\sqrt{ad-bc}\,(7ad-4bc)\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{9}{2}}}+\frac{2\left(c+dx^3\right)^{\frac{5}{2}}}{15b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] a**2*(c + d*x**3)**(5/2)/(3*b**2*(a + b*x**3)*(a*d - b*c)) - a*(c
 + d*x**3)**(3/2)*(7*a*d - 4*b*c)/(9*b**3*(a*d - b*c)) + a*sqrt(c
 + d*x**3)*(7*a*d - 4*b*c)/(3*b**4) - a*sqrt(a*d - b*c)*(7*a*d -
4*b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(9/2)
) + 2*(c + d*x**3)**(5/2)/(15*b**2*d)
```

Mathematica [A] time = 0.316265, size = 162, normalized size = 0.86

$$\frac{\sqrt{c+dx^3}\left(105a^3d^2+5a^2bd\left(14dx^3-19c\right)+2ab^2\left(3c^2-34cdx^3-7d^2x^6\right)+6b^3x^3\left(c+dx^3\right)^2\right)}{45b^4d\left(a+bx^3\right)}+\frac{a(4bc-7ad)\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^8*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] (Sqrt[c + d*x^3]*(105*a^3*d^2 + 6*b^3*x^3*(c + d*x^3)^2 + 5*a^2*b
*d*(-19*c + 14*d*x^3) + 2*a*b^2*(3*c^2 - 34*c*d*x^3 - 7*d^2*x^6))
)/(45*b^4*d*(a + b*x^3)) + (a*(4*b*c - 7*a*d)*Sqrt[b*c - a*d]*Arc
Tanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(9/2))
```

Maple [C] time = 0.06, size = 1003, normalized size = 5.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8*(d*x^3+c)^(3/2)/(b*x^3+a)^2,x)
```

```
[Out] 2/15*(d*x^3+c)^(5/2)/b^2/d+a^2/b^2*(1/3*(a*d-b*c)/b^2*(d*x^3+c)^(
1/2)/(b*x^3+a)+2/3*d*(d*x^3+c)^(1/2)/b^2+1/2*I/d/b^2*2^(1/2)*sum(
(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d
^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(
-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d
*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^
2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3)
)*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_
alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+
I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)
/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-2*a/b^2*(2/9/b*d*x^3*(d
*x^3+c)^(1/2)+2/3*(-d*(a*d-2*b*c)/b^2-2/3/b*d*c)/d*(d*x^3+c)^(1/2
)+1/3*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/(a*d-b*c
)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c
*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3
*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1
/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/
2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*
d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/
3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I
*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2
)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/
2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^8/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.225285, size = 1, normalized size = 0.01

$$\left[-\frac{15\left(4a^2bcd-7a^3d^2+\left(4ab^2cd-7a^2bd^2\right)x^3\right)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2bc-ad-2\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)-2\left(6b^3d^2x^9+2\left(6b^3cd-7\right.\right.}{90\left(b^5dx^3+ab^4d\right)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^8/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] [-1/90*(15*(4*a^2*b*c*d - 7*a^3*d^2 + (4*a*b^2*c*d - 7*a^2*b*d^2)
*x^3)*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c - a*d - 2*sqrt(d*x
^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) - 2*(6*b^3*d^2*x^9 +
2*(6*b^3*c*d - 7*a*b^2*d^2)*x^6 + 6*a*b^2*c^2 - 95*a^2*b*c*d + 10
5*a^3*d^2 + 2*(3*b^3*c^2 - 34*a*b^2*c*d + 35*a^2*b*d^2)*x^3)*sqrt
(d*x^3 + c))/(b^5*d*x^3 + a*b^4*d), 1/45*(15*(4*a^2*b*c*d - 7*a^3
*d^2 + (4*a*b^2*c*d - 7*a^2*b*d^2)*x^3)*sqrt(-(b*c - a*d)/b)*arct
an(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)) + (6*b^3*d^2*x^9 + 2*(6*
b^3*c*d - 7*a*b^2*d^2)*x^6 + 6*a*b^2*c^2 - 95*a^2*b*c*d + 105*a^3
*d^2 + 2*(3*b^3*c^2 - 34*a*b^2*c*d + 35*a^2*b*d^2)*x^3)*sqrt(d*x^
3 + c))/(b^5*d*x^3 + a*b^4*d)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**8*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223333, size = 285, normalized size = 1.51

$$-\frac{\left(4ab^2c^2-11a^2bcd+7a^3d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\sqrt{-b^2c+abd}b^4}-\frac{\sqrt{dx^3+c}a^2bcd-\sqrt{dx^3+c}a^3d^2}{3\left(\left(dx^3+c\right)b-bc+ad\right)b^4}+\frac{2\left(3\left(dx^3+c\right)^{\frac{5}{2}}b^8d^4-10\left(dx^3+c\right)^{\frac{3}{2}}ab^7d^5-30\sqrt{dx^3+c}ab^7cd^5+45\sqrt{dx^3+c}a^2b^6d^6\right)}{45b^{10}d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^8/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] -1/3*(4*a*b^2*c^2 - 11*a^2*b*c*d + 7*a^3*d^2)*arctan(sqrt(d*x^3 +
 c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^4) - 1/3*(sqr
t(d*x^3 + c)*a^2*b*c*d - sqrt(d*x^3 + c)*a^3*d^2)/(((d*x^3 + c)*b
 - b*c + a*d)*b^4) + 2/45*(3*(d*x^3 + c)^(5/2)*b^8*d^4 - 10*(d*x^
3 + c)^(3/2)*a*b^7*d^5 - 30*sqrt(d*x^3 + c)*a*b^7*c*d^5 + 45*sqrt
(d*x^3 + c)*a^2*b^6*d^6)/(b^10*d^5)
```

3.471 $\int \frac{x^5(c+dx^3)^{3/2}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=163

$$-\frac{(2bc-5ad)\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}+\frac{\sqrt{c+dx^3}(2bc-5ad)}{3b^3}+\frac{(c+dx^3)^{3/2}(2bc-5ad)}{9b^2(bc-ad)}+\frac{a(c+dx^3)^{5/2}}{3b(a+bx^3)(bc-ad)}$$

```
[Out] ((2*b*c - 5*a*d)*Sqrt[c + d*x^3])/(3*b^3) + ((2*b*c - 5*a*d)*(c +
 d*x^3)^(3/2))/(9*b^2*(b*c - a*d)) + (a*(c + d*x^3)^(5/2))/(3*b*(
b*c - a*d)*(a + b*x^3)) - ((2*b*c - 5*a*d)*Sqrt[b*c - a*d]*ArcTan
h[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/2))
```

Rubi [A] time = 0.388328, antiderivative size = 163, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{(2bc-5ad)\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}+\frac{\sqrt{c+dx^3}(2bc-5ad)}{3b^3}+\frac{(c+dx^3)^{3/2}(2bc-5ad)}{9b^2(bc-ad)}+\frac{a(c+dx^3)^{5/2}}{3b(a+bx^3)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] ((2*b*c - 5*a*d)*Sqrt[c + d*x^3])/(3*b^3) + ((2*b*c - 5*a*d)*(c +
 d*x^3)^(3/2))/(9*b^2*(b*c - a*d)) + (a*(c + d*x^3)^(5/2))/(3*b*(
b*c - a*d)*(a + b*x^3)) - ((2*b*c - 5*a*d)*Sqrt[b*c - a*d]*ArcTan
h[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/2))
```

Rubi in Sympy [A] time = 38.7524, size = 144, normalized size = 0.88

$$-\frac{a\left(c+dx^3\right)^{\frac{5}{2}}}{3b\left(a+bx^3\right)\left(ad-bc\right)}+\frac{2\left(c+dx^3\right)^{\frac{3}{2}}\left(\frac{5ad}{2}-bc\right)}{9b^2\left(ad-bc\right)}-\frac{2\sqrt{c+dx^3}\left(\frac{5ad}{2}-bc\right)}{3b^3}+\frac{2\sqrt{ad-bc}\left(\frac{5ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] -a*(c + d*x**3)**(5/2)/(3*b*(a + b*x**3)*(a*d - b*c)) + 2*(c + d*
x**3)**(3/2)*(5*a*d/2 - b*c)/(9*b**2*(a*d - b*c)) - 2*sqrt(c + d*
x**3)*(5*a*d/2 - b*c)/(3*b**3) + 2*sqrt(a*d - b*c)*(5*a*d/2 - b*c
)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(7/2))
```

Mathematica [A] time = 0.299008, size = 115, normalized size = 0.71

$$\frac{\sqrt{c+dx^3}\left(-\frac{3a(ad-bc)}{a+bx^3}-12ad+8bc+2bdx^3\right)}{9b^3}-\frac{(2bc-5ad)\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] (Sqrt[c + d*x^3]*(8*b*c - 12*a*d + 2*b*d*x^3 - (3*a*(-(b*c) + a*d
))/(a + b*x^3)))/(9*b^3) - ((2*b*c - 5*a*d)*Sqrt[b*c - a*d]*ArcTa
nh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(7/2))
```

Maple [C] time = 0.016, size = 983, normalized size = 6.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^3+c)^(3/2)/(b*x^3+a)^2,x)
```

```
[Out] 1/b*(2/9/b*d*x^3*(d*x^3+c)^(1/2)+2/3*(-d*(a*d-2*b*c)/b^2-2/3/b*d*
c)/d*(d*x^3+c)^(1/2)+1/3*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*
d-b^2*c^2)/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-a/
b*(1/3*(a*d-b*c)/b^2*(d*x^3+c)^(1/2)/(b*x^3+a)+2/3*d*(d*x^3+c)^(1
/2)/b^2+1/2*I/d/b^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*
(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)
*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^
(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3
)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^
2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/
2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*
d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-
I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(
2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^
3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^5/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.224496, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(\left(2\,b^2c-5\,abd\right)x^3+2\,abc-5\,a^2d\right)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)-2\left(2\,b^2dx^6+2\left(4\,b^2c-5\,abd\right)x^3+1\right.}{18\left(b^4x^3+ab^3\right)}\right.$$

$$-\frac{3\left(\left(2\,b^2c-5\,abd\right)x^3+2\,abc-5\,a^2d\right)\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)-\left(2\,b^2dx^6+2\left(4\,b^2c-5\,abd\right)x^3+11\,abc-15\,a^2d\right)\sqrt{d}}{9\left(b^4x^3+ab^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^5/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] [-1/18*(3*((2*b^2*c - 5*a*b*d)*x^3 + 2*a*b*c - 5*a^2*d)*sqrt((b*c
 - a*d)/b)*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*b*sqrt(
(b*c - a*d)/b))/(b*x^3 + a)) - 2*(2*b^2*d*x^6 + 2*(4*b^2*c - 5*a*
b*d)*x^3 + 11*a*b*c - 15*a^2*d)*sqrt(d*x^3 + c))/(b^4*x^3 + a*b^3
), -1/9*(3*((2*b^2*c - 5*a*b*d)*x^3 + 2*a*b*c - 5*a^2*d)*sqrt(-(b
*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b*c - a*d)/b)) - (2*b^
2*d*x^6 + 2*(4*b^2*c - 5*a*b*d)*x^3 + 11*a*b*c - 15*a^2*d)*sqrt(d
*x^3 + c))/(b^4*x^3 + a*b^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219562, size = 234, normalized size = 1.44

$$\frac{\left(2\,b^2c^2-7\,abcd+5\,a^2d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\,\sqrt{-b^2c+abd}b^3}+\frac{\sqrt{dx^3+c}abcd-\sqrt{dx^3+c}a^2d^2}{3\left(\left(dx^3+c\right)b-bc+ad\right)b^3}+\frac{2\left(\left(dx^3+c\right)^{\frac{3}{2}}b^4+3\,\sqrt{dx^3+c}b^4c-6\,\sqrt{dx^3+c}ab^3d\right)}{9\,b^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^5/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/3*(2*b^2*c^2 - 7*a*b*c*d + 5*a^2*d^2)*arctan(sqrt(d*x^3 + c)*b/
sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^3) + 1/3*(sqrt(d*x^
3 + c)*a*b*c*d - sqrt(d*x^3 + c)*a^2*d^2)/(((d*x^3 + c)*b - b*c +
 a*d)*b^3) + 2/9*((d*x^3 + c)^(3/2)*b^4 + 3*sqrt(d*x^3 + c)*b^4*c
 - 6*sqrt(d*x^3 + c)*a*b^3*d)/b^6
```

3.472 $\int \frac{x^2(c+dx^3)^{3/2}}{(a+bx^3)^2} dx$

Optimal. Leaf size=94

$$-\frac{d\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{b^{5/2}}-\frac{(c+dx^3)^{3/2}}{3b(a+bx^3)}+\frac{d\sqrt{c+dx^3}}{b^2}$$

```
[Out] (d*Sqrt[c + d*x^3])/b^2 - (c + d*x^3)^(3/2)/(3*b*(a + b*x^3)) - (
d*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*
d]])/b^(5/2)
```

Rubi [A] time = 0.233898, antiderivative size = 94, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{d\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{b^{5/2}}-\frac{(c+dx^3)^{3/2}}{3b(a+bx^3)}+\frac{d\sqrt{c+dx^3}}{b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] (d*Sqrt[c + d*x^3])/b^2 - (c + d*x^3)^(3/2)/(3*b*(a + b*x^3)) - (
d*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*
d]])/b^(5/2)
```

Rubi in Sympy [A] time = 23.6761, size = 78, normalized size = 0.83

$$-\frac{(c+dx^3)^{\frac{3}{2}}}{3b(a+bx^3)}+\frac{d\sqrt{c+dx^3}}{b^2}-\frac{d\sqrt{ad-bc}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{b^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] -(c + d*x**3)**(3/2)/(3*b*(a + b*x**3)) + d*sqrt(c + d*x**3)/b**2
 - d*sqrt(a*d - b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c
))/b**(5/2)
```

Mathematica [A] time = 0.175369, size = 94, normalized size = 1.

$$\frac{1}{3}\sqrt{c+dx^3}\left(\frac{ad-bc}{b^2(a+bx^3)}+\frac{2d}{b^2}\right)-\frac{d\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{b^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] (Sqrt[c + d*x^3]*((2*d)/b^2 + (-(b*c) + a*d)/(b^2*(a + b*x^3))))/
3 - (d*Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c
 - a*d]])/b^(5/2)
```

Maple [C] time = 0.01, size = 466, normalized size = 5.

$$\frac{ad-bc}{3\,b^2\,(bx^3+a)}\sqrt{dx^3+c}+\frac{2\,d}{3\,b^2}\sqrt{dx^3+c}$$
$$+\frac{\frac{i}{2}\sqrt{2}}{b^2d}\sum_{\_alpha=RootOf(b\_Z^3+a)}1\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd^2}+i\sqrt{3}\sqrt[3]{-\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(d*x^3+c)^(3/2)/(b*x^3+a)^2,x)
```

```
[Out] 1/3*(a*d-b*c)/b^2*(d*x^3+c)^(1/2)/(b*x^3+a)+2/3*d*(d*x^3+c)^(1/2)
/b^2+1/2*I/d/b^2*2^(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d
*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/
3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^
(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_
alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^
(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_
alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3
)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b
+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^2/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.224473, size = 1, normalized size = 0.01

$$\left[\frac{3\left(bdx^3+ad\right)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad-2\,\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right)+2\left(2\,bdx^3-bc+3\,ad\right)\sqrt{dx^3+c}}{6\left(b^3x^3+ab^2\right)},\right.$$
$$\left.-\frac{3\left(bdx^3+ad\right)\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)-\left(2\,bdx^3-bc+3\,ad\right)\sqrt{dx^3+c}}{3\left(b^3x^3+ab^2\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^2/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] [1/6*(3*(b*d*x^3 + a*d)*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c
- a*d - 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) + 2
*(2*b*d*x^3 - b*c + 3*a*d)*sqrt(d*x^3 + c))/(b^3*x^3 + a*b^2), -1
/3*(3*(b*d*x^3 + a*d)*sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)
/sqrt(-(b*c - a*d)/b)) - (2*b*d*x^3 - b*c + 3*a*d)*sqrt(d*x^3 + c
```

```
))/(b^3*x^3 + a*b^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219285, size = 161, normalized size = 1.71

$$\frac{1}{3}\,d\left(\frac{3\,(bc-ad)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}b^2}+\frac{2\,\sqrt{dx^3+c}}{b^2}-\frac{\sqrt{dx^3+c}bc-\sqrt{dx^3+c}ad}{((dx^3+c)b-bc+ad)b^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x^2/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] 1/3*d*(3*(b*c - a*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d
))/(sqrt(-b^2*c + a*b*d)*b^2) + 2*sqrt(d*x^3 + c)/b^2 - (sqrt(d*x
^3 + c)*b*c - sqrt(d*x^3 + c)*a*d)/(((d*x^3 + c)*b - b*c + a*d)*b
^2))
```

3.473 $\int \frac{(c+dx^3)^{3/2}}{x(a+bx^3)^2}\,dx$

Optimal. Leaf size=131

$$\frac{\sqrt{bc-ad}(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2b^{3/2}}-\frac{2c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}+\frac{\sqrt{c+dx^3}(bc-ad)}{3ab\,(a+bx^3)}$$

```
[Out] ((b*c - a*d)*Sqrt[c + d*x^3])/(3*a*b*(a + b*x^3)) - (2*c^(3/2)*Ar
cTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^2) + (Sqrt[b*c - a*d]*(2*b*c
 + a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^
2*b^(3/2))
```

Rubi [A] time = 0.434191, antiderivative size = 131, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\sqrt{bc-ad}(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2b^{3/2}}-\frac{2c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}+\frac{\sqrt{c+dx^3}(bc-ad)}{3ab\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x*(a + b*x^3)^2),x]
```

```
[Out] ((b*c - a*d)*Sqrt[c + d*x^3])/(3*a*b*(a + b*x^3)) - (2*c^(3/2)*Ar
cTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^2) + (Sqrt[b*c - a*d]*(2*b*c
 + a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^
2*b^(3/2))
```

Rubi in Sympy [A] time = 41.2839, size = 112, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,(ad-bc)}{3ab\,(a+bx^3)}-\frac{2c^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2}+\frac{\sqrt{ad-bc}\,(ad+2bc)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^2b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x/(b*x**3+a)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*(a*d - b*c)/(3*a*b*(a + b*x**3)) - 2*c**(3/2)*a
tanh(sqrt(c + d*x**3)/sqrt(c))/(3*a**2) + sqrt(a*d - b*c)*(a*d +
2*b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a**2*b**
(3/2))
```

Mathematica [C] time = 0.568384, size = 328, normalized size = 2.5

$$\frac{\frac{\frac{10b^2c^2dx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}{-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}+3(c+dx^3)(bc-ad)}{a}-\frac{6cdx^3(ad+bc)F_1\left(1;\frac{1}{2},\right.}{x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\right.\right.}}{9b\,(a+bx^3)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x*(a + b*x^3)^2),x]
```

```
[Out] ((-6*c*d*(b*c + a*d)*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((
b*x^3)/a)])/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3
```

```
)/a)] + x^3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^3)
/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)])) +
 (3*(b*c - a*d)*(c + d*x^3) + (10*b^2*c^2*d*x^3*AppellF1[3/2, 1/2
, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))])/(-5*b*d*x^3*AppellF1[3/2,
1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*d*AppellF1[5/2, 1/
2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1
, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/a)/(9*b*(a + b*x^3)*Sqrt[c +
 d*x^3])
```

Maple [C] time = 0.017, size = 1036, normalized size = 7.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x/(b*x^3+a)^2,x)
```

```
[Out] 1/a^2*(2/9*d*x^3*(d*x^3+c)^(1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(3/2
)*arctanh((d*x^3+c)^(1/2)/c^(1/2)))-b/a*(1/3*(a*d-b*c)/b^2*(d*x^3
+c)^(1/2)/(b*x^3+a)+2/3*d*(d*x^3+c)^(1/2)/b^2+1/2*I/d/b^2*2^(1/2)
*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/
(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*
x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha
^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^
(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(
2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(
1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a^2*(2/9/b*d*x^3
*(d*x^3+c)^(1/2)+2/3*(-d*(a*d-2*b*c)/b^2-2/3/b*d*c)/d*(d*x^3+c)^(
1/2)+1/3*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/(a*d-
b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+
(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/
(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*
x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha
^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^
(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(
2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(
1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^
(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx^3 + c)^{\frac{3}{2}}}{(bx^3 + a)^2 x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x), x)
```

Fricas [A] time = 0.249094, size = 1, normalized size = 0.01

$$\left[\frac{\left(\left(2\,b^2c + abd\right)x^3 + 2\,abc + a^2d\right)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right) + 2\,\left(b^2cx^3 + abc\right)\sqrt{c}\log\left(\frac{dx^3-2\,\sqrt{dx^3+c}\sqrt{c}+2\,c}{x^3}\right)}{6\,(a^2b^2x^3 + a^3b)}\right.$$

$$-\frac{4\,\left(b^2cx^3 + abc\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right) - \left(\left(2\,b^2c + abd\right)x^3 + 2\,abc + a^2d\right)\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^3+2\,bc-ad+2\,\sqrt{dx^3+c}b\sqrt{\frac{bc-ad}{b}}}{bx^3+a}\right) - 2\,\sqrt{}}{6\,(a^2b^2x^3 + a^3b)}$$

$$-\frac{2\,\left(b^2cx^3 + abc\right)\sqrt{-c}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right) - \left(\left(2\,b^2c + abd\right)x^3 + 2\,abc + a^2d\right)\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-\frac{bc-ad}{b}}}\right) - \sqrt{dx^3 + c}(abc - a^2}{3\,(a^2b^2x^3 + a^3b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x),x, algorithm="fricas")
```

```
[Out] [1/6*(((2*b^2*c + a*b*d)*x^3 + 2*a*b*c + a^2*d)*sqrt((b*c - a*d)/
b)*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a
*d)/b))/(b*x^3 + a)) + 2*(b^2*c*x^3 + a*b*c)*sqrt(c)*log((d*x^3 -
 2*sqrt(d*x^3 + c)*sqrt(c) + 2*c)/x^3) + 2*sqrt(d*x^3 + c)*(a*b*c
 - a^2*d))/(a^2*b^2*x^3 + a^3*b), 1/3*(((2*b^2*c + a*b*d)*x^3 + 2
*a*b*c + a^2*d)*sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(
-(b*c - a*d)/b)) + (b^2*c*x^3 + a*b*c)*sqrt(c)*log((d*x^3 - 2*sqr
t(d*x^3 + c)*sqrt(c) + 2*c)/x^3) + sqrt(d*x^3 + c)*(a*b*c - a^2*d
))/(a^2*b^2*x^3 + a^3*b), -1/6*(4*(b^2*c*x^3 + a*b*c)*sqrt(-c)*ar
ctan(sqrt(d*x^3 + c)/sqrt(-c)) - ((2*b^2*c + a*b*d)*x^3 + 2*a*b*c
 + a^2*d)*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt
(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)) - 2*sqrt(d*x^3 +
c)*(a*b*c - a^2*d))/(a^2*b^2*x^3 + a^3*b), -1/3*(2*(b^2*c*x^3 + a
*b*c)*sqrt(-c)*arctan(sqrt(d*x^3 + c)/sqrt(-c)) - ((2*b^2*c + a*b
*d)*x^3 + 2*a*b*c + a^2*d)*sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3
 + c)/sqrt(-(b*c - a*d)/b)) - sqrt(d*x^3 + c)*(a*b*c - a^2*d))/(a
^2*b^2*x^3 + a^3*b)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.219948, size = 223, normalized size = 1.7

$$\frac{1}{3}\,d^2\left(\frac{2\,c^2\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2} + \frac{\sqrt{dx^3 + c}bc - \sqrt{dx^3 + c}ad}{((dx^3 + c)b - bc + ad)abd} - \frac{\left(2\,b^2c^2 - abcd - a^2d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c + abd}a^2bd^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x),x, algorithm="giac")
```

```
[Out] 1/3*d^2*(2*c^2*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a^2*sqrt(-c)*d^2
) + (sqrt(d*x^3 + c)*b*c - sqrt(d*x^3 + c)*a*d)/(((d*x^3 + c)*b -
```

```
 b*c + a*d)*a*b*d) - (2*b^2*c^2 - a*b*c*d - a^2*d^2)*arctan(sqrt(
d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*a^2*b*d^
2))
```

3.474 $\int \frac{\left(c+dx^3\right)^{3/2}}{x^4\left(a+bx^3\right)^2}\,dx$

Optimal. Leaf size=170

$$\frac{\sqrt{c}(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3}-\frac{\sqrt{bc-ad}(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^3\sqrt{b}}-\frac{\sqrt{c+dx^3}(2bc-ad)}{3a^2\left(a+bx^3\right)}-\frac{c\sqrt{c+dx^3}}{3ax^3\left(a+bx^3\right)}$$

```
[Out] -((2*b*c - a*d)*Sqrt[c + d*x^3])/(3*a^2*(a + b*x^3)) - (c*Sqrt[c
+ d*x^3])/(3*a*x^3*(a + b*x^3)) + (Sqrt[c]*(4*b*c - 3*a*d)*ArcTan
h[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^3) - (Sqrt[b*c - a*d]*(4*b*c - a
*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^3*Sq
rt[b])
```

Rubi [A] time = 0.748304, antiderivative size = 170, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$\frac{\sqrt{c}(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3}-\frac{\sqrt{bc-ad}(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^3\sqrt{b}}-\frac{\sqrt{c+dx^3}(2bc-ad)}{3a^2\left(a+bx^3\right)}-\frac{c\sqrt{c+dx^3}}{3ax^3\left(a+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^4*(a + b*x^3)^2),x]
```

```
[Out] -((2*b*c - a*d)*Sqrt[c + d*x^3])/(3*a^2*(a + b*x^3)) - (c*Sqrt[c
+ d*x^3])/(3*a*x^3*(a + b*x^3)) + (Sqrt[c]*(4*b*c - 3*a*d)*ArcTan
h[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^3) - (Sqrt[b*c - a*d]*(4*b*c - a
*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^3*Sq
rt[b])
```

Rubi in Sympy [A] time = 79.1586, size = 153, normalized size = 0.9

$$-\frac{\sqrt{c+dx^3}\,(ad-bc)}{3abx^3\left(a+bx^3\right)}+\frac{\sqrt{c+dx^3}\,(ad-2bc)}{3a^2bx^3}-\frac{\sqrt{c}\,(3ad-4bc)\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3}+\frac{(ad-4bc)\sqrt{ad-bc}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^3\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**4/(b*x**3+a)**2,x)
```

```
[Out] -sqrt(c + d*x**3)*(a*d - b*c)/(3*a*b*x**3*(a + b*x**3)) + sqrt(c
+ d*x**3)*(a*d - 2*b*c)/(3*a**2*b*x**3) - sqrt(c)*(3*a*d - 4*b*c)
*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a**3) + (a*d - 4*b*c)*sqrt(a*
d - b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a**3*s
qrt(b))
```

Mathematica [C] time = 0.808406, size = 439, normalized size = 2.58

$$\frac{\frac{5bdx^3\left(3a\left(c^2+cdx^3-d^2x^6\right)+2bcx^3\left(c+3dx^3\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)-3\left(c+dx^3\right)\left(a\left(c-dx^3\right)+2bcx^3\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\right.\right.}{-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)}}{9a^2x^3\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^4*(a + b*x^3)^2),x]
```

```
[Out] ((6*a*c*d*(-2*b*c + a*d)*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c),
 -((b*x^3)/a)])/(4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*
x^3)/a)] - x^3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x
^3)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)])
) + (5*b*d*x^3*(2*b*c*x^3*(c + 3*d*x^3) + 3*a*(c^2 + c*d*x^3 - d^
2*x^6))*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] -
3*(c + d*x^3)*(2*b*c*x^3 + a*(c - d*x^3))*(2*a*d*AppellF1[5/2, 1/
2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1
, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(-5*b*d*x^3*AppellF1[3/2, 1/
2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*d*AppellF1[5/2, 1/2,
 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1,
7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(9*a^2*x^3*(a + b*x^3)*Sqrt[c
+ d*x^3])
```

Maple [C] time = 0.02, size = 1093, normalized size = 6.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^4/(b*x^3+a)^2,x)
```

```
[Out] 1/a^2*(-1/3*c*(d*x^3+c)^(1/2)/x^3+2/3*d*(d*x^3+c)^(1/2)-c^(1/2)*d
*arctanh((d*x^3+c)^(1/2)/c^(1/2)))+1/a^2*b^2*(1/3*(a*d-b*c)/b^2*(
d*x^3+c)^(1/2)/(b*x^3+a)+2/3*d*(d*x^3+c)^(1/2)/b^2+1/2*I/d/b^2*2^
(1/2)*sum((-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(
1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1
/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*
d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_
alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*
d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*
b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3
)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),
(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-2*b/a^3*(2/9*
d*x^3*(d*x^3+c)^(1/2)+8/9*c*(d*x^3+c)^(1/2)-2/3*c^(3/2)*arctanh((
d*x^3+c)^(1/2)/c^(1/2)))+2/a^3*b^2*(2/9/b*d*x^3*(d*x^3+c)^(1/2)+2
/3*(-d*(a*d-2*b*c)/b^2-2/3/b*d*c)/d*(d*x^3+c)^(1/2)+1/3*I/b^2/d^2
*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/(a*d-b*c)*(-c*d^2)^(1/3
)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)
+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(
-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1
/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(
-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(
1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d
^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d
-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{\left(bx^3 + a\right)^2 x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^4),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^4), x)
```

Fricas [A] time = 0.255062, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^4),x, algorithm="fricas")
```

```
[Out] [-1/6*(((4*b^2*c - a*b*d)*x^6 + (4*a*b*c - a^2*d)*x^3)*sqrt((b*c
- a*d)/b)*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*b*sqrt((
b*c - a*d)/b))/(b*x^3 + a)) + ((4*b^2*c - 3*a*b*d)*x^6 + (4*a*b*c
 - 3*a^2*d)*x^3)*sqrt(c)*log((d*x^3 - 2*sqrt(d*x^3 + c)*sqrt(c) +
 2*c)/x^3) + 2*((2*a*b*c - a^2*d)*x^3 + a^2*c)*sqrt(d*x^3 + c))/(
a^3*b*x^6 + a^4*x^3), -1/6*(2*((4*b^2*c - a*b*d)*x^6 + (4*a*b*c -
 a^2*d)*x^3)*sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^3 + c)/sqrt(-(b
*c - a*d)/b)) + ((4*b^2*c - 3*a*b*d)*x^6 + (4*a*b*c - 3*a^2*d)*x^
3)*sqrt(c)*log((d*x^3 - 2*sqrt(d*x^3 + c)*sqrt(c) + 2*c)/x^3) + 2
*((2*a*b*c - a^2*d)*x^3 + a^2*c)*sqrt(d*x^3 + c))/(a^3*b*x^6 + a^
4*x^3), 1/6*(2*((4*b^2*c - 3*a*b*d)*x^6 + (4*a*b*c - 3*a^2*d)*x^3
)*sqrt(-c)*arctan(sqrt(d*x^3 + c)/sqrt(-c)) - ((4*b^2*c - a*b*d)*
x^6 + (4*a*b*c - a^2*d)*x^3)*sqrt((b*c - a*d)/b)*log((b*d*x^3 + 2
*b*c - a*d + 2*sqrt(d*x^3 + c)*b*sqrt((b*c - a*d)/b))/(b*x^3 + a)
) - 2*((2*a*b*c - a^2*d)*x^3 + a^2*c)*sqrt(d*x^3 + c))/(a^3*b*x^6
 + a^4*x^3), 1/3*(((4*b^2*c - 3*a*b*d)*x^6 + (4*a*b*c - 3*a^2*d)*
x^3)*sqrt(-c)*arctan(sqrt(d*x^3 + c)/sqrt(-c)) - ((4*b^2*c - a*b*
d)*x^6 + (4*a*b*c - a^2*d)*x^3)*sqrt(-(b*c - a*d)/b)*arctan(sqrt(
d*x^3 + c)/sqrt(-(b*c - a*d)/b)) - ((2*a*b*c - a^2*d)*x^3 + a^2*c
)*sqrt(d*x^3 + c))/(a^3*b*x^6 + a^4*x^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/x**4/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.225684, size = 300, normalized size = 1.76

$$-\frac{1}{3}d^3\left(\frac{2\,(dx^3+c)^{\frac{3}{2}}bc-2\,\sqrt{dx^3+c}\,bc^2-(dx^3+c)^{\frac{3}{2}}ad+2\,\sqrt{dx^3+c}\,acd}{\left((dx^3+c)^2b-2\,(dx^3+c)bc+bc^2+(dx^3+c)ad-acd\right)a^2d^2}-\frac{\left(4\,b^2c^2-5\,abcd+a^2d^2\right)\arctan\left(\frac{\sqrt{dx^3+c}\,b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}\,a^3d^3}+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^4),x, algorithm="giac")
```

```
[Out] -1/3*d^3*((2*(d*x^3 + c)^(3/2)*b*c - 2*sqrt(d*x^3 + c)*b*c^2 - (d
*x^3 + c)^(3/2)*a*d + 2*sqrt(d*x^3 + c)*a*c*d)/((((d*x^3 + c)^2*b
- 2*(d*x^3 + c)*b*c + b*c^2 + (d*x^3 + c)*a*d - a*c*d)*a^2*d^2) -
 (4*b^2*c^2 - 5*a*b*c*d + a^2*d^2)*arctan(sqrt(d*x^3 + c)*b/sqrt(
-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*a^3*d^3) + (4*b*c^2 - 3*a*
c*d)*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a^3*sqrt(-c)*d^3))
```

3.475 $\int \frac{x^3 (c+dx^3)^{3/2}}{(a+bx^3)^2} \, dx$

Optimal. Leaf size=65

$$\frac{cx^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};2,-\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (c*x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 2, -3/2, 7/3, -((b*x^3)/a),
-((d*x^3)/c)])/(4*a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.207652, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{cx^4\sqrt{c+dx^3}F_1\left(\frac{4}{3};2,-\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] (c*x^4*Sqrt[c + d*x^3]*AppellF1[4/3, 2, -3/2, 7/3, -((b*x^3)/a),
-((d*x^3)/c)])/(4*a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 27.1094, size = 54, normalized size = 0.83

$$\frac{cx^4\sqrt{c+dx^3}\operatorname{appellf_1}\left(\frac{4}{3},-\frac{3}{2},2,\frac{7}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{4a^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] c*x**4*sqrt(c + d*x**3)*appellf1(4/3, -3/2, 2, 7/3, -d*x**3/c, -b
*x**3/a)/(4*a**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.889182, size = 358, normalized size = 5.51

$$\frac{x\left(-\frac{32ac^2(11ad-5bc)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{7acdx^3(55ad-43bc)F_1\left(\frac{4}{3} \cdots\right.}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3} \cdots\right.\right.}\cdots}{60b^2(a+bx^3)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^3*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] (x*(-4*(c + d*x^3)*(5*b*c - 11*a*d - 6*b*d*x^3) - (32*a*c^2*(-5*b
*c + 11*a*d)*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a
)])/(8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)]
 - 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3
)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)
])) + (7*a*c*d*(-43*b*c + 55*a*d)*x^3*AppellF1[4/3, 1/2, 1, 7/3,
-((d*x^3)/c), -((b*x^3)/a)])/(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3,
```

```
-((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2,
10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/
3, -((d*x^3)/c), -((b*x^3)/a)]))))/(60*b^2*(a + b*x^3)*Sqrt[c + d
*x^3])
```

Maple [C] time = 0.063, size = 1587, normalized size = 24.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(d*x^3+c)^(3/2)/(b*x^3+a)^2,x)
```

```
[Out] 1/b*(2/5/b*d*x*(d*x^3+c)^(1/2)-2/3*I*(-d*(a*d-2*b*c)/b^2-2/5/b*d*
c)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c
*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/
3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3
*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/_alpha^2/(a*d
-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)
+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))
/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2
*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alph
a^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)
^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*
(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^
(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-a/b*(-1/3*(a*d-b*
c)/a/b*x*(d*x^3+c)^(1/2)/(b*x^3+a)-2/3*I*(d^2/b^2-1/6/b^2*d*(a*d-
b*c)/a)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/
d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ellipti
cF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
)+1/18*I/a/b^2/d^2*2^(1/2)*sum((5*a^2*d^2-a*b*c*d-4*b^2*c^2)/_alp
ha^2/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^
2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1
/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*
d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d
-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)
^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-
b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}} x^3}{\left(bx^3 + a\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a)^2, x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}} x^3}{\left(bx^3 + a\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x^3/(b*x^3 + a)^2, x)
```

3.476 $\int \frac{x(c+dx^3)^{3/2}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=65

$$\frac{cx^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};2,-\frac{3}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (c*x^2*Sqrt[c + d*x^3]*AppellF1[2/3, 2, -3/2, 5/3, -((b*x^3)/a),
-((d*x^3)/c)])/(2*a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.160624, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{cx^2\sqrt{c+dx^3}F_1\left(\frac{2}{3};2,-\frac{3}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] (c*x^2*Sqrt[c + d*x^3]*AppellF1[2/3, 2, -3/2, 5/3, -((b*x^3)/a),
-((d*x^3)/c)])/(2*a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 18.7994, size = 54, normalized size = 0.83

$$\frac{cx^2\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{2}{3},-\frac{3}{2},2,\frac{5}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] c*x**2*sqrt(c + d*x**3)*appellf1(2/3, -3/2, 2, 5/3, -d*x**3/c, -b
*x**3/a)/(2*a**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.67491, size = 439, normalized size = 6.75

$$\frac{x^2\left(\frac{-15x^3(c+dx^3)(bc-ad)\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8ac\left(ad(10c+3dx^3)-bc(10c+9dx^3)\right)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a\left(16acF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)\right)} - \right.}{15b\,(a+bx^3)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x*(c + d*x^3)^(3/2))/(a + b*x^3)^2,x]
```

```
[Out] (x^2*((-25*c^2*(b*c + 2*a*d)*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)
/c), -((b*x^3)/a)])/(-10*a*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)
/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[5/3, 1/2, 2, 8/3, -((d
*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3
)/c), -((b*x^3)/a)])) + (-8*a*c*(a*d*(10*c + 3*d*x^3) - b*c*(10*c
 + 9*d*x^3))*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a
)] - 15*(b*c - a*d)*x^3*(c + d*x^3)*(2*b*c*AppellF1[8/3, 1/2, 2,
```

```
11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/
3, -((d*x^3)/c), -((b*x^3)/a)]))/(a*(16*a*c*AppellF1[5/3, 1/2, 1,
 8/3, -((d*x^3)/c), -((b*x^3)/a)] - 3*x^3*(2*b*c*AppellF1[8/3, 1/
2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2,
1, 11/3, -((d*x^3)/c), -((b*x^3)/a)]))))))/(15*b*(a + b*x^3)*Sqrt[
c + d*x^3])
```

Maple [C] time = 0.056, size = 955, normalized size = 14.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^3+c)^(3/2)/(b*x^3+a)^2,x)
```

```
[Out] -1/3*(a*d-b*c)/a/b*x^2*(d*x^3+c)^(1/2)/(b*x^3+a)-2/3*I*(d^2/b^2+1
/6/b^2*d*(a*d-b*c)/a)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)
^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*El
lipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^
2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^
(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d
^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/18*I/a/b^2/d^2*2^(1/2)*sum(
(7*a^2*d^2-5*a*b*c*d-2*b^2*c^2)/_alpha/(a*d-b*c)*(-c*d^2)^(1/3)*(
1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*
d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*
3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*
d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)
*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*
d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)
^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*
_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3
)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),
_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x}{\left(bx^3+a\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a)^2, x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}x}{\left(bx^3+a\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)*x/(b*x^3 + a)^2, x)
```

3.477 $\int \frac{(c+dx^3)^{3/2}}{(a+bx^3)^2}\,dx$

Optimal. Leaf size=60

$$\frac{cx\sqrt{c+dx^3}F_1\left(\frac{1}{3};2,-\frac{3}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] (c*x*Sqrt[c + d*x^3]*AppellF1[1/3, 2, -3/2, 4/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.0965379, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{cx\sqrt{c+dx^3}F_1\left(\frac{1}{3};2,-\frac{3}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(a + b*x^3)^2,x]
```

```
[Out] (c*x*Sqrt[c + d*x^3]*AppellF1[1/3, 2, -3/2, 4/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(a^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 19.3283, size = 51, normalized size = 0.85

$$\frac{cx\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{1}{3},-\frac{3}{2},2,\frac{4}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] c*x*sqrt(c + d*x**3)*appellf1(1/3, -3/2, 2, 4/3, -d*x**3/c, -b*x*
*3/a)/(a**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.62965, size = 437, normalized size = 7.28

$$\frac{x\left(\frac{-12x^3(c+dx^3)(bc-ad)\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-7ac\left(ad(8c+3dx^3)-bc(8c+9dx^3)\right)F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a\left(14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)\right)} - \frac{}{3}\right.}{12b(a+bx^3)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(a + b*x^3)^2,x]
```

```
[Out] (x*((-32*c^2*(2*b*c + a*d)*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c
), -((b*x^3)/a)])/(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c)
, -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x^
3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c
), -((b*x^3)/a)])) + (-7*a*c*(a*d*(8*c + 3*d*x^3) - b*c*(8*c + 9*
d*x^3))*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] -
12*(b*c - a*d)*x^3*(c + d*x^3)*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3,
```

```
 -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -(
(d*x^3)/c), -((b*x^3)/a)]))/(a*(14*a*c*AppellF1[4/3, 1/2, 1, 7/3,
 -((d*x^3)/c), -((b*x^3)/a)] - 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2,
 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10
/3, -((d*x^3)/c), -((b*x^3)/a)]))))))/(12*b*(a + b*x^3)*Sqrt[c + d
*x^3])
```

Maple [C] time = 0.008, size = 801, normalized size = 13.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/(b*x^3+a)^2,x)
```

```
[Out] -1/3*(a*d-b*c)/a/b*x*(d*x^3+c)^(1/2)/(b*x^3+a)-2/3*I*(d^2/b^2-1/6
/b^2*d*(a*d-b*c)/a)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(
1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2))+1/18*I/a/b^2/d^2*2^(1/2)*sum((5*a^2*d^2-a*b*c*d-4*b
^2*c^2)/_alpha^2/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3 + c\right)^{\frac{3}{2}}}{\left(bx^3 + a\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/(b*x^3 + a)^2,x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/(b*x^3 + a)^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/(b*x^3 + a)^2,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**3+c)**(3/2)/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx^3 + c)^{\frac{3}{2}}}{(bx^3 + a)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x^3 + c)^(3/2)/(b*x^3 + a)^2,x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/(b*x^3 + a)^2, x)
```

3.478 $\int \frac{(c+dx^3)^{3/2}}{x^2(a+bx^3)^2}\,dx$

Optimal. Leaf size=63

$$-\frac{c\sqrt{c+dx^3}F_1\left(-\frac{1}{3};2,-\frac{3}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2x\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -((c*Sqrt[c + d*x^3]*AppellF1[-1/3, 2, -3/2, 2/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a^2*x*Sqrt[1 + (d*x^3)/c]))
```

Rubi [A] time = 0.200707, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{c\sqrt{c+dx^3}F_1\left(-\frac{1}{3};2,-\frac{3}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2x\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c + d*x^3)^(3/2)/(x^2*(a + b*x^3)^2),x]
```

```
[Out] -((c*Sqrt[c + d*x^3]*AppellF1[-1/3, 2, -3/2, 2/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a^2*x*Sqrt[1 + (d*x^3)/c]))
```

Rubi in Sympy [A] time = 25.1536, size = 54, normalized size = 0.86

$$-\frac{c\sqrt{c+dx^3}\,\mathrm{appellf_1}\left(-\frac{1}{3},-\frac{3}{2},2,\frac{2}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a^2x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**3+c)**(3/2)/x**2/(b*x**3+a)**2,x)
```

```
[Out] -c*sqrt(c + d*x**3)*appellf1(-1/3, -3/2, 2, 2/3, -d*x**3/c, -b*x*
*3/a)/(a**2*x*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 1.09016, size = 365, normalized size = 5.79

$$\frac{\frac{25ac^2x^3(11ad-8bc)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}+\frac{16acdx^6(ad-4bc)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3}\right.}{3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c}\right.\right.}}{30a^2x\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(c + d*x^3)^(3/2)/(x^2*(a + b*x^3)^2),x]
```

```
[Out] (-10*(c + d*x^3)*(3*a*c + 4*b*c*x^3 - a*d*x^3) + (25*a*c^2*(-8*b*
c + 11*a*d)*x^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3
)/a)])/(10*a*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x^3)
/a)] - 3*x^3*(2*b*c*AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), -((b
*x^3)/a)] + a*d*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), -((b*x^3
)/a)])) + (16*a*c*d*(-4*b*c + a*d)*x^6*AppellF1[5/3, 1/2, 1, 8/3,
 -((d*x^3)/c), -((b*x^3)/a)])/(-16*a*c*AppellF1[5/3, 1/2, 1, 8/3,
```

```
-((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[8/3, 1/2, 2,
 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11
/3, -((d*x^3)/c), -((b*x^3)/a)]))))/(30*a^2*x*(a + b*x^3)*Sqrt[c +
 d*x^3])
```

Maple [C] time = 0.019, size = 2364, normalized size = 37.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^3+c)^(3/2)/x^2/(b*x^3+a)^2,x)
```

```
[Out] 1/a^2*(-c*(d*x^3+c)^(1/2)/x+2/7*d*x^2*(d*x^3+c)^(1/2)-9/7*I*c*3^(
1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1
/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1
/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c
*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*E
llipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d
^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2))))-b/a*(-1/3*(a*d-b*c)/a/b*x^2*(d*x^3+c)^(1/2)/(b*x^3+a)-2
/3*I*(d^2/b^2+1/6/b^2*d*(a*d-b*c)/a)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/18*I/a/b^2/d
^2*2^(1/2)*sum((7*a^2*d^2-5*a*b*c*d-2*b^2*c^2)/_alpha/(a*d-b*c)*(
-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-
c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*
(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/
(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2
-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))
*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_a
lpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I
*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a^2*(2/7/b*d*x^2*(d*x^
3+c)^(1/2)-2/3*I*(-d*(a*d-2*b*c)/b^2-4/7/b*d*c)*3^(1/2)/d*(-c*d^2
)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3
*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/_alpha/(a*d-b
*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(
-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x
```

```
+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^
2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(
2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2
*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1
/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(bx^3+a\right)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^2),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x**2/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(bx^3+a\right)^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^2),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^2), x)
```

3.479 $\int \frac{(c+dx^3)^{3/2}}{x^3(a+bx^3)^2}\,dx$

Optimal. Leaf size=65

$$-\frac{c\sqrt{c+dx^3}F_1\left(-\frac{2}{3};2,-\frac{3}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2x^2\sqrt{\frac{dx^3}{c}+1}}$$

```
[Out] -(c*Sqrt[c + d*x^3]*AppellF1[-2/3, 2, -3/2, 1/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(2*a^2*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi [A] time = 0.22164, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{c\sqrt{c+dx^3}F_1\left(-\frac{2}{3};2,-\frac{3}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2x^2\sqrt{\frac{dx^3}{c}+1}}$$

Antiderivative was successfully verified.

```
[In] Int[(c + d*x^3)^(3/2)/(x^3*(a + b*x^3)^2),x]
```

```
[Out] -(c*Sqrt[c + d*x^3]*AppellF1[-2/3, 2, -3/2, 1/3, -((b*x^3)/a), -(
(d*x^3)/c)])/(2*a^2*x^2*Sqrt[1 + (d*x^3)/c])
```

Rubi in Sympy [A] time = 22.7791, size = 58, normalized size = 0.89

$$-\frac{c\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{2}{3},-\frac{3}{2},2,\frac{1}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a^2x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((d*x**3+c)**(3/2)/x**3/(b*x**3+a)**2,x)
```

```
[Out] -c*sqrt(c + d*x**3)*appellf1(-2/3, -3/2, 2, 1/3, -d*x**3/c, -b*x*
*3/a)/(2*a**2*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.898256, size = 366, normalized size = 5.63

$$\frac{\frac{16ac^2x^3(17ad-20bc)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)}-\frac{7acdx^6(2ad-5bc)F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};\cdots\right.}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c}\cdots\right.\right.}\cdots}{24a^2x^2\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(c + d*x^3)^(3/2)/(x^3*(a + b*x^3)^2),x]
```

```
[Out] (-4*(c + d*x^3)*(3*a*c + 5*b*c*x^3 - 2*a*d*x^3) + (16*a*c^2*(-20*
b*c + 17*a*d)*x^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x
^3)/a)])/(8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3
)/a)] - 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((
b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^
3)/a)])) - (7*a*c*d*(-5*b*c + 2*a*d)*x^6*AppellF1[4/3, 1/2, 1, 7/
3, -((d*x^3)/c), -((b*x^3)/a)])/(-14*a*c*AppellF1[4/3, 1/2, 1, 7/
```

```
3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2,
2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1,
10/3, -((d*x^3)/c), -((b*x^3)/a)])))/(24*a^2*x^2*(a + b*x^3)*Sqrt
[c + d*x^3])
```

Maple [C] time = 0.017, size = 1902, normalized size = 29.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x^3+c)^(3/2)/x^3/(b*x^3+a)^2,x)
```

```
[Out] 1/a^2*(-1/2*c*(d*x^3+c)^(1/2)/x^2+2/5*d*x*(d*x^3+c)^(1/2)-9/10*I*
c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^
2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3
^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/
2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-b/a*(
-1/3*(a*d-b*c)/a/b*x*(d*x^3+c)^(1/2)/(b*x^3+a)-2/3*I*(d^2/b^2-1/6
/b^2*d*(a*d-b*c)/a)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1
/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(
1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d
*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(
1/3)))^(1/2))+1/18*I/a/b^2/d^2*2^(1/2)*sum((5*a^2*d^2-a*b*c*d-4*b
^2*c^2)/_alpha^2/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a
)))-b/a^2*(2/5/b*d*x*(d*x^3+c)^(1/2)-2/3*I*(-d*(a*d-2*b*c)/b^2-2/
5/b*d*c)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1
/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ellipt
icF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(
1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
))+1/3*I/b^2/d^2*2^(1/2)*sum((-a^2*d^2+2*a*b*c*d-b^2*c^2)/_alpha^
2/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^
(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*
I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^
(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2
*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-
c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/
2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2
/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c
),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(bx^3+a\right)^2x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^3),x, algorithm="maxima")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^3), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^3),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**3+c)**(3/2)/x**3/(b*x**3+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx^3+c\right)^{\frac{3}{2}}}{\left(bx^3+a\right)^2x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^3),x, algorithm="giac")
```

```
[Out] integrate((d*x^3 + c)^(3/2)/((b*x^3 + a)^2*x^3), x)
```

3.480 $\int \frac{x^8}{(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=123

$$-\frac{a^2\sqrt{c+dx^3}}{3b^2(a+bx^3)(bc-ad)}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}(bc-ad)^{3/2}}+\frac{2\sqrt{c+dx^3}}{3b^2d}$$

```
[Out] (2*Sqrt[c + d*x^3])/(3*b^2*d) - (a^2*Sqrt[c + d*x^3])/(3*b^2*(b*c
 - a*d)*(a + b*x^3)) + (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(5/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.446819, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.208$

$$-\frac{a^2\sqrt{c+dx^3}}{3b^2(a+bx^3)(bc-ad)}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{5/2}(bc-ad)^{3/2}}+\frac{2\sqrt{c+dx^3}}{3b^2d}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*Sqrt[c + d*x^3])/(3*b^2*d) - (a^2*Sqrt[c + d*x^3])/(3*b^2*(b*c
 - a*d)*(a + b*x^3)) + (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(5/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 35.1829, size = 105, normalized size = 0.85

$$\frac{a^2\sqrt{c+dx^3}}{3b^2(a+bx^3)(ad-bc)}-\frac{a(3ad-4bc)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{5}{2}}(ad-bc)^{\frac{3}{2}}}+\frac{2\sqrt{c+dx^3}}{3b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] a**2*sqrt(c + d*x**3)/(3*b**2*(a + b*x**3)*(a*d - b*c)) - a*(3*a*
d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(
5/2)*(a*d - b*c)**(3/2)) + 2*sqrt(c + d*x**3)/(3*b**2*d)
```

Mathematica [A] time = 0.400469, size = 107, normalized size = 0.87

$$\frac{1}{3}\left(\frac{\sqrt{c+dx^3}\left(\frac{a^2}{(a+bx^3)(ad-bc)}+\frac{2}{d}\right)}{b^2}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{b^{5/2}(bc-ad)^{3/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] ((Sqrt[c + d*x^3]*(2/d + a^2/((-(b*c) + a*d)*(a + b*x^3))))/b^2 +
 (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c -
a*d]])/(b^(5/2)*(b*c - a*d)^(3/2)))/3
```

Maple [C] time = 0.061, size = 911, normalized size = 7.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 2/3*(d*x^3+c)^(1/2)/b^2/d+a^2/b^2*(1/3/(a*d-b*c)*(d*x^3+c)^(1/2)/
(b*x^3+a)-1/6*I/d*2^(1/2)*sum(1/(a*d-b*c)^2*(-c*d^2)^(1/3)*(1/2*I
*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^
(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/
2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^
(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(
-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^
(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1
/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3
)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alph
a*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3
/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alph
a=RootOf(_Z^3*b+a))+2/3*I*a/b^2/d^2*2^(1/2)*sum(1/(a*d-b*c)*(-c*
d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^
(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d
^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*
3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*
3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*El
lipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alph
a^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^
(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(
-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/
3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.228928, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2\left(b^{2}c-abd\right)x^{3}+2\,abc-3\,a^{2}d\right)\sqrt{dx^{3}+c}\sqrt{b^{2}c-abd}+\left(4\,a^{2}bcd-3\,a^{3}d^{2}+\left(4\,ab^{2}cd-3\,a^{2}bd^{2}\right)x^{3}\right)\log\left(\frac{(bdx^{3}+2\,bc-ad)}{\ldots}\right.}{6\,(ab^{3}cd-a^{2}b^{2}d^{2}+(b^{4}cd-ab^{3}d^{2})x^{3})\sqrt{b^{2}c-abd}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [1/6*(2*(2*(b^2*c - a*b*d)*x^3 + 2*a*b*c - 3*a^2*d)*sqrt(d*x^3 +
c)*sqrt(b^2*c - a*b*d) + (4*a^2*b*c*d - 3*a^3*d^2 + (4*a*b^2*c*d
- 3*a^2*b*d^2)*x^3)*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c - a*b
*d) + 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a)))/((a*b^3*c*
d - a^2*b^2*d^2 + (b^4*c*d - a*b^3*d^2)*x^3)*sqrt(b^2*c - a*b*d))
, 1/3*((2*(b^2*c - a*b*d)*x^3 + 2*a*b*c - 3*a^2*d)*sqrt(d*x^3 + c
```

```
)*sqrt(-b^2*c + a*b*d) + (4*a^2*b*c*d - 3*a^3*d^2 + (4*a*b^2*c*d
- 3*a^2*b*d^2)*x^3)*arctan(-(b*c - a*d)/(sqrt(d*x^3 + c)*sqrt(-b^
2*c + a*b*d))))/((a*b^3*c*d - a^2*b^2*d^2 + (b^4*c*d - a*b^3*d^2)
*x^3)*sqrt(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220107, size = 181, normalized size = 1.47

$$-\frac{\sqrt{dx^3+c}a^2d}{3\,(b^3c-ab^2d)((dx^3+c)b-bc+ad)}-\frac{\left(4\,abc-3\,a^2d\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{3\,(b^3c-ab^2d)\sqrt{-b^2c+abd}}+\frac{2\,\sqrt{dx^3+c}}{3\,b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] -1/3*sqrt(d*x^3 + c)*a^2*d/((b^3*c - a*b^2*d)*((d*x^3 + c)*b - b*
c + a*d)) - 1/3*(4*a*b*c - 3*a^2*d)*arctan(sqrt(d*x^3 + c)*b/sqrt
(-b^2*c + a*b*d))/((b^3*c - a*b^2*d)*sqrt(-b^2*c + a*b*d)) + 2/3*
sqrt(d*x^3 + c)/(b^2*d)
```

3.481 $\int \frac{x^5}{(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=99

$$\frac{a\sqrt{c+dx^3}}{3b\,(a+bx^3)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}(bc-ad)^{3/2}}$$

```
[Out] (a*Sqrt[c + d*x^3])/(3*b*(b*c - a*d)*(a + b*x^3)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*
(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.258734, antiderivative size = 99, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{a\sqrt{c+dx^3}}{3b\,(a+bx^3)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (a*Sqrt[c + d*x^3])/(3*b*(b*c - a*d)*(a + b*x^3)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*
(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 23.9063, size = 82, normalized size = 0.83

$$-\frac{a\sqrt{c+dx^3}}{3b\,(a+bx^3)\,(ad-bc)}+\frac{2\left(\frac{ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{3}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -a*sqrt(c + d*x**3)/(3*b*(a + b*x**3)*(a*d - b*c)) + 2*(a*d/2 - b
*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*b**(3/2)*(a
*d - b*c)**(3/2))
```

Mathematica [A] time = 0.125087, size = 99, normalized size = 1.

$$\frac{a\sqrt{c+dx^3}}{3b\,(a+bx^3)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (a*Sqrt[c + d*x^3])/(3*b*(b*c - a*d)*(a + b*x^3)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3/2)*
(b*c - a*d)^(3/2))
```

Maple [C] time = 0.016, size = 892, normalized size = 9.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/3*I/b/d^2*2^(1/2)*sum(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootO
f(_Z^3*b+a))-a/b*(1/3/(a*d-b*c)*(d*x^3+c)^(1/2)/(b*x^3+a)-1/6*I/d
*2^(1/2)*sum(1/(a*d-b*c)^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a
)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.225233, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{dx^3+c}\sqrt{b^2c-abd}\,a+\left(\left(2\,b^2c-abd\right)x^3+2\,abc-a^2d\right)\log\left(\frac{\left(bdx^3+2\,bc-ad\right)\sqrt{b^2c-abd}-2\sqrt{dx^3+c}\left(b^2c-abd\right)}{bx^3+a}\right)}{6\left(ab^2c-a^2bd+\left(b^3c-ab^2d\right)x^3\right)\sqrt{b^2c-abd}}, \frac{\sqrt{dx^3+c}\sqrt{-b^2}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [1/6*(2*sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d)*a + ((2*b^2*c - a*b*d
)*x^3 + 2*a*b*c - a^2*d)*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c
- a*b*d) - 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a)))/((a*b
^2*c - a^2*b*d + (b^3*c - a*b^2*d)*x^3)*sqrt(b^2*c - a*b*d)), 1/3
*(sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d)*a - ((2*b^2*c - a*b*d)*x^3
 + 2*a*b*c - a^2*d)*arctan(-(b*c - a*d)/(sqrt(d*x^3 + c)*sqrt(-b^
```

```
2*c + a*b*d))))/((a*b^2*c - a^2*b*d + (b^3*c - a*b^2*d)*x^3)*sqrt
(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21929, size = 157, normalized size = 1.59

$$\frac{\frac{\sqrt{dx^3+c}ad^2}{(b^2c-abd)((dx^3+c)b-bc+ad)}+\frac{(2\,bcd-ad^2)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{(b^2c-abd)\sqrt{-b^2c+abd}}}{3\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 1/3*(sqrt(d*x^3 + c)*a*d^2/((b^2*c - a*b*d)*((d*x^3 + c)*b - b*c
+ a*d)) + (2*b*c*d - a*d^2)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c
+ a*b*d))/((b^2*c - a*b*d)*sqrt(-b^2*c + a*b*d)))/d
```

3.482 $\int \frac{x^2}{(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=87

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^3}}{3\,(a+bx^3)\,(bc-ad)}$$

```
[Out] -Sqrt[c + d*x^3]/(3*(b*c - a*d)*(a + b*x^3)) + (d*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b]*(b*c - a*d)^(3/2)
)
```

Rubi [A] time = 0.210226, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^3}}{3\,(a+bx^3)\,(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] -Sqrt[c + d*x^3]/(3*(b*c - a*d)*(a + b*x^3)) + (d*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b]*(b*c - a*d)^(3/2)
)
```

Rubi in Sympy [A] time = 20.3996, size = 70, normalized size = 0.8

$$\frac{\sqrt{c+dx^3}}{3\,(a+bx^3)\,(ad-bc)}+\frac{d\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3\sqrt{b}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] sqrt(c + d*x**3)/(3*(a + b*x**3)*(a*d - b*c)) + d*atan(sqrt(b)*sq
rt(c + d*x**3)/sqrt(a*d - b*c))/(3*sqrt(b)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 0.143089, size = 84, normalized size = 0.97

$$\frac{\frac{\sqrt{c+dx^3}}{a+bx^3}-\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{\sqrt{b}\sqrt{bc-ad}}}{3ad-3bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (Sqrt[c + d*x^3]/(a + b*x^3) - (d*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3
])/Sqrt[b*c - a*d]])/(Sqrt[b]*Sqrt[b*c - a*d]))/(-3*b*c + 3*a*d)
```

Maple [C] time = 0.01, size = 457, normalized size = 5.3

$$\frac{1}{(3\,ad-3\,bc)\,(bx^3+a)}\sqrt{dx^3+c}$$
$$-\frac{\frac{i}{6}\sqrt{2}}{d}\sum_{\_alpha=RootOf(b\_Z^3+a)}\frac{1}{(ad-bc)^2}\sqrt[3]{-cd^2}\sqrt{\frac{i}{2}d\left(2\,x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^2}+\sqrt[3]{-cd^2}\right)\right)\frac{1}{\sqrt[3]{-cd^2}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^2}\right)\left(-3\sqrt[3]{-cd\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/3/(a*d-b*c)*(d*x^3+c)^(1/2)/(b*x^3+a)-1/6*I/d*2^(1/2)*sum(1/(a*
d-b*c)^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/
3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d
*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_a
lpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d
^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b
/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)
*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.224804, size = 1, normalized size = 0.01

$$\left[-\frac{\left(bdx^3+ad\right)\log\left(\frac{\left(bdx^3+2\,bc-ad\right)\sqrt{b^2c-abd}-2\,\sqrt{dx^3+c}\left(b^2c-abd\right)}{bx^3+a}\right)+2\,\sqrt{dx^3+c}\sqrt{b^2c-abd}}{6\left(\left(b^2c-abd\right)x^3+abc-a^2d\right)\sqrt{b^2c-abd}},\ \frac{\left(bdx^3+ad\right)\arctan\left(-\frac{bc-ad}{\sqrt{dx^3+c}\sqrt{-b^2c}}\right.}{3\left(\left(b^2c-abd\right)x^3+abc\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [-1/6*((b*d*x^3 + a*d)*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c -
a*b*d) - 2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a)) + 2*sqrt
(d*x^3 + c)*sqrt(b^2*c - a*b*d))/(((b^2*c - a*b*d)*x^3 + a*b*c -
a^2*d)*sqrt(b^2*c - a*b*d)), 1/3*((b*d*x^3 + a*d)*arctan(-(b*c -
a*d)/(sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d))) - sqrt(d*x^3 + c)*sq
rt(-b^2*c + a*b*d))/(((b^2*c - a*b*d)*x^3 + a*b*c - a^2*d)*sqrt(-
b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217921, size = 124, normalized size = 1.43

$$-\frac{1}{3}\,d\left(\frac{\arctan\left(\frac{\sqrt{dx^3+c}\,b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}(bc-ad)}+\frac{\sqrt{dx^3+c}}{((dx^3+c)b-bc+ad)(bc-ad)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] -1/3*d*(arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2
*c + a*b*d)*(b*c - a*d)) + sqrt(d*x^3 + c)/(((d*x^3 + c)*b - b*c
+ a*d)*(b*c - a*d)))
```

3.483 $\int \frac{1}{x(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=132

$$\frac{\sqrt{b}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2(bc-ad)^{3/2}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}+\frac{b\sqrt{c+dx^3}}{3a\left(a+bx^3\right)(bc-ad)}$$

```
[Out] (b*Sqrt[c + d*x^3])/(3*a*(b*c - a*d)*(a + b*x^3)) - (2*ArcTanh[Sq
rt[c + d*x^3]/Sqrt[c]])/(3*a^2*Sqrt[c]) + (Sqrt[b]*(2*b*c - 3*a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*(b*c
 - a*d)^(3/2))
```

Rubi [A] time = 0.441004, antiderivative size = 132, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\sqrt{b}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2(bc-ad)^{3/2}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}+\frac{b\sqrt{c+dx^3}}{3a\left(a+bx^3\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (b*Sqrt[c + d*x^3])/(3*a*(b*c - a*d)*(a + b*x^3)) - (2*ArcTanh[Sq
rt[c + d*x^3]/Sqrt[c]])/(3*a^2*Sqrt[c]) + (Sqrt[b]*(2*b*c - 3*a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*(b*c
 - a*d)^(3/2))
```

Rubi in Sympy [A] time = 48.0701, size = 117, normalized size = 0.89

$$-\frac{b\sqrt{c+dx^3}}{3a\left(a+bx^3\right)(ad-bc)}-\frac{2\sqrt{b}\left(\frac{3ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^2\left(ad-bc\right)^{\frac{3}{2}}}-\frac{2\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**3)/(3*a*(a + b*x**3)*(a*d - b*c)) - 2*sqrt(b)*(3
*a*d/2 - b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a
**2*(a*d - b*c)**(3/2)) - 2*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a*
*2*sqrt(c))
```

Mathematica [C] time = 0.44019, size = 396, normalized size = 3.

$$\frac{b\left(\frac{6cdx^3F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{5dx^3\left(2ad+b\left(c+3dx^3\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)-3(c+d\cdots}{a\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\cdots\right.\right.}\cdots\right.}{9\left(a+bx^3\right)\sqrt{c+dx^3}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (b*((6*c*d*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)]
)/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)] + x^
```

```
3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^3)/a)] + a*d
*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)])) + (5*d*x^3*
(2*a*d + b*(c + 3*d*x^3))*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3))
, -(a/(b*x^3))] - 3*(c + d*x^3)*(2*a*d*AppellF1[5/2, 1/2, 2, 7/2,
 -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c
/(d*x^3)), -(a/(b*x^3))]))/(a*(-5*b*d*x^3*AppellF1[3/2, 1/2, 1, 5
/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*d*AppellF1[5/2, 1/2, 2, 7/2
, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(
c/(d*x^3)), -(a/(b*x^3))]))))/(9*(-(b*c) + a*d)*(a + b*x^3)*Sqrt[
c + d*x^3])
```

Maple [C] time = 0.018, size = 915, normalized size = 6.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -2/3*arctanh((d*x^3+c)^(1/2)/c^(1/2))/a^2/c^(1/2)-b/a*(1/3/(a*d-b
*c)*(d*x^3+c)^(1/2)/(b*x^3+a)-1/6*I/d*2^(1/2)*sum(1/(a*d-b*c)^2*(
-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^
2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-
c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*
(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/
(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2
-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))
*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_a
lpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I
*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/
d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))+1/3*I*b/a^2/d^2*2^(1/2)*
sum(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*
d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d
^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-
1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)
*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*
d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2
)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d
-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)^2 \sqrt{dx^3 + cx}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x), x)
```

Fricas [A] time = 0.269009, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/6*(2*sqrt(d*x^3 + c)*a*b*sqrt(c) + ((2*b^2*c - 3*a*b*d)*x^3 +
2*a*b*c - 3*a^2*d)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b
*c - a*d + 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*
x^3 + a)) + 2*((b^2*c - a*b*d)*x^3 + a*b*c - a^2*d)*log(((d*x^3 +
 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3))/((a^3*b*c - a^4*d + (a
^2*b^2*c - a^3*b*d)*x^3)*sqrt(c)), 1/3*(sqrt(d*x^3 + c)*a*b*sqrt(
c) + ((2*b^2*c - 3*a*b*d)*x^3 + 2*a*b*c - 3*a^2*d)*sqrt(c)*sqrt(-
b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x
^3 + c)*b)) + ((b^2*c - a*b*d)*x^3 + a*b*c - a^2*d)*log(((d*x^3 +
 2*c)*sqrt(c) - 2*sqrt(d*x^3 + c)*c)/x^3))/((a^3*b*c - a^4*d + (a
^2*b^2*c - a^3*b*d)*x^3)*sqrt(c)), 1/6*(2*sqrt(d*x^3 + c)*a*b*sqr
t(-c) + ((2*b^2*c - 3*a*b*d)*x^3 + 2*a*b*c - 3*a^2*d)*sqrt(-c)*sq
rt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*
(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) + 4*((b^2*c - a*b*d
)*x^3 + a*b*c - a^2*d)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((a^
3*b*c - a^4*d + (a^2*b^2*c - a^3*b*d)*x^3)*sqrt(-c)), 1/3*(sqrt(d
*x^3 + c)*a*b*sqrt(-c) + ((2*b^2*c - 3*a*b*d)*x^3 + 2*a*b*c - 3*a
^2*d)*sqrt(-c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(
b*c - a*d))/(sqrt(d*x^3 + c)*b)) + 2*((b^2*c - a*b*d)*x^3 + a*b*c
 - a^2*d)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/((a^3*b*c - a^4*d
 + (a^2*b^2*c - a^3*b*d)*x^3)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21869, size = 207, normalized size = 1.57

$$-\frac{1}{3}\,d^2\left(\frac{\left(2\,b^2c-3\,abd\right)\,\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\left(a^2bcd^2-a^3d^3\right)\sqrt{-b^2c+abd}}-\frac{\sqrt{dx^3+c}b}{\left(abcd-a^2d^2\right)\left((dx^3+c)b-bc+ad\right)}-\frac{2\,\arctan\left(\frac{\sqrt{dx^3+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x),x, algorithm="giac")
```

```
[Out] -1/3*d^2*((2*b^2*c - 3*a*b*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*
c + a*b*d))/((a^2*b*c*d^2 - a^3*d^3)*sqrt(-b^2*c + a*b*d)) - sqrt
(d*x^3 + c)*b/((a*b*c*d - a^2*d^2)*((d*x^3 + c)*b - b*c + a*d)) -
 2*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a^2*sqrt(-c)*d^2))
```

3.484 $\int \frac{1}{x^4(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=185

$$-\frac{b^{3/2}(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^3(bc-ad)^{3/2}}+\frac{(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3c^{3/2}}-\frac{b\sqrt{c+dx^3}(2bc-ad)}{3a^2c\,(a+bx^3)\,(bc-ad)}-\frac{\sqrt{c+dx^3}}{3acx^3\,(a+bx^3)}$$

```
[Out] -(b*(2*b*c - a*d)*Sqrt[c + d*x^3])/(3*a^2*c*(b*c - a*d)*(a + b*x^
3)) - Sqrt[c + d*x^3]/(3*a*c*x^3*(a + b*x^3)) + ((4*b*c + a*d)*Ar
cTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^3*c^(3/2)) - (b^(3/2)*(4*b*c
 - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*
a^3*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.734376, antiderivative size = 185, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{b^{3/2}(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^3(bc-ad)^{3/2}}+\frac{(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3c^{3/2}}-\frac{b\sqrt{c+dx^3}(2bc-ad)}{3a^2c\,(a+bx^3)\,(bc-ad)}-\frac{\sqrt{c+dx^3}}{3acx^3\,(a+bx^3)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] -(b*(2*b*c - a*d)*Sqrt[c + d*x^3])/(3*a^2*c*(b*c - a*d)*(a + b*x^
3)) - Sqrt[c + d*x^3]/(3*a*c*x^3*(a + b*x^3)) + ((4*b*c + a*d)*Ar
cTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^3*c^(3/2)) - (b^(3/2)*(4*b*c
 - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*
a^3*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 75.4665, size = 158, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}}{3acx^3\,(a+bx^3)}-\frac{b\sqrt{c+dx^3}\,(ad-2bc)}{3a^2c\,(a+bx^3)\,(ad-bc)}+\frac{b^{\frac{3}{2}}\,(5ad-4bc)\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^3\,(ad-bc)^{\frac{3}{2}}}+\frac{(ad+4bc)\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)/(3*a*c*x**3*(a + b*x**3)) - b*sqrt(c + d*x**3)*
(a*d - 2*b*c)/(3*a**2*c*(a + b*x**3)*(a*d - b*c)) + b**(3/2)*(5*a
*d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a**
3*(a*d - b*c)**(3/2)) + (a*d + 4*b*c)*atanh(sqrt(c + d*x**3)/sqrt
(c))/(3*a**3*c**(3/2))
```

Mathematica [C] time = 1.23665, size = 489, normalized size = 2.64

$$\frac{\frac{5bdx^3\left(-a^2d\left(3c+2dx^3\right)+3ab\left(c^2+cdx^3-d^2x^6\right)+2b^2cx^3\left(c+3dx^3\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+3\left(c+dx^3\right)\left(a^2d+ab\left(dx^3-c\right)-2b^2cx^3\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{c}{b\ldots}\right.\right.}{c(bc-ad)\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)\right)}}{9a^2x^3\,(a+bx^3)\,\sqrt{c\ldots}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] ((6*a*b*d*(-2*b*c + a*d)*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c),
 -((b*x^3)/a)])/((-(b*c) + a*d)*(-4*a*c*AppellF1[1, 1/2, 1, 2, -(
(d*x^3)/c), -((b*x^3)/a)] + x^3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((
d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c
), -((b*x^3)/a)]))) + (5*b*d*x^3*(-(a^2*d*(3*c + 2*d*x^3)) + 2*b^
2*c*x^3*(c + 3*d*x^3) + 3*a*b*(c^2 + c*d*x^3 - d^2*x^6))*AppellF1
[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 3*(c + d*x^3)*(a
^2*d - 2*b^2*c*x^3 + a*b*(-c + d*x^3))*(2*a*d*AppellF1[5/2, 1/2,
2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1, 7
/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(c*(b*c - a*d)*(-5*b*d*x^3*Appe
llF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*d*Appell
F1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5
/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))])))/(9*a^2*x^3*(a + b
*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 961, normalized size = 5.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/a^2*(-1/3*(d*x^3+c)^(1/2)/c/x^3+1/3*d*arctanh((d*x^3+c)^(1/2)/c
^(1/2))/c^(3/2))+1/a^2*b^2*(1/3/(a*d-b*c)*(d*x^3+c)^(1/2)/(b*x^3+
a)-1/6*I/d^2*2^(1/2)*sum(1/(a*d-b*c)^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootO
f(_Z^3*b+a)))+4/3*b/a^3*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(1/2)-
2/3*I/a^3*b^2/d^2*2^(1/2)*sum(1/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d
*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1
/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)
*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c
*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2
/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*
3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*
(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=
RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)^2 \sqrt{dx^3 + c}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^4), x)
```

Fricas [A] time = 0.340997, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/6*(((4*b^3*c^2 - 5*a*b^2*c*d)*x^6 + (4*a*b^2*c^2 - 5*a^2*b*c*d
)*x^3)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*c - a*d - 2
*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) -
2*(a^2*b*c - a^3*d + (2*a*b^2*c - a^2*b*d)*x^3)*sqrt(d*x^3 + c)*s
qrt(c) + ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^6 + (4*a*b^2*c^
2 - 3*a^2*b*c*d - a^3*d^2)*x^3)*log(((d*x^3 + 2*c)*sqrt(c) + 2*sq
rt(d*x^3 + c)*c)/x^3))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^6 + (a^4*b*c
^2 - a^5*c*d)*x^3)*sqrt(c)), -1/6*(2*((4*b^3*c^2 - 5*a*b^2*c*d)*x
^6 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^3)*sqrt(c)*sqrt(-b/(b*c - a*d)
)*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) +
 2*(a^2*b*c - a^3*d + (2*a*b^2*c - a^2*b*d)*x^3)*sqrt(d*x^3 + c)*
sqrt(c) - ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^6 + (4*a*b^2*c
^2 - 3*a^2*b*c*d - a^3*d^2)*x^3)*log(((d*x^3 + 2*c)*sqrt(c) + 2*s
qrt(d*x^3 + c)*c)/x^3))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^6 + (a^4*b*
c^2 - a^5*c*d)*x^3)*sqrt(c)), 1/6*(((4*b^3*c^2 - 5*a*b^2*c*d)*x^6
 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^3)*sqrt(-c)*sqrt(b/(b*c - a*d))*
log((b*d*x^3 + 2*b*c - a*d - 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b
/(b*c - a*d)))/(b*x^3 + a)) - 2*(a^2*b*c - a^3*d + (2*a*b^2*c - a
^2*b*d)*x^3)*sqrt(d*x^3 + c)*sqrt(-c) - 2*((4*b^3*c^2 - 3*a*b^2*c
*d - a^2*b*d^2)*x^6 + (4*a*b^2*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^3)*
arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))))/(((a^3*b^2*c^2 - a^4*b*c*d)
*x^6 + (a^4*b*c^2 - a^5*c*d)*x^3)*sqrt(-c)), -1/3*(((4*b^3*c^2 -
5*a*b^2*c*d)*x^6 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^3)*sqrt(-c)*sqrt
(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d
*x^3 + c)*b)) + (a^2*b*c - a^3*d + (2*a*b^2*c - a^2*b*d)*x^3)*sqr
t(d*x^3 + c)*sqrt(-c) + ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^
6 + (4*a*b^2*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^3)*arctan(c/(sqrt(d*x
^3 + c)*sqrt(-c))))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^6 + (a^4*b*c^2
- a^5*c*d)*x^3)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222305, size = 362, normalized size = 1.96

$$\frac{1}{3}d^3\left(\frac{\left(4b^3c-5ab^2d\right)\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\left(a^3bcd^3-a^4d^4\right)\sqrt{-b^2c+abd}}-\frac{2\left(dx^3+c\right)^{\frac{3}{2}}b^2c-2\sqrt{dx^3+c}b^2c^2-\left(dx^3+c\right)^{\frac{3}{2}}abd+2\sqrt{dx^3+c}abcd-\sqrt{dx^3}}{\left(a^2bc^2d^2-a^3cd^3\right)\left(\left(dx^3+c\right)^2b-2\left(dx^3+c\right)bc+bc^2+\left(dx^3+c\right)ad-acd\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*d^3*((4*b^3*c - 5*a*b^2*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2
*c + a*b*d))/((a^3*b*c*d^3 - a^4*d^4)*sqrt(-b^2*c + a*b*d)) - (2*
```

```
(d*x^3 + c)^(3/2)*b^2*c - 2*sqrt(d*x^3 + c)*b^2*c^2 - (d*x^3 + c)
^(3/2)*a*b*d + 2*sqrt(d*x^3 + c)*a*b*c*d - sqrt(d*x^3 + c)*a^2*d^
2)/((a^2*b*c^2*d^2 - a^3*c*d^3)*((d*x^3 + c)^2*b - 2*(d*x^3 + c)*
b*c + b*c^2 + (d*x^3 + c)*a*d - a*c*d)) - (4*b*c + a*d)*arctan(sq
rt(d*x^3 + c)/sqrt(-c))/(a^3*sqrt(-c)*c*d^3))
```

3.485 $\int \frac{x^3}{(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=64

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};2,\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a^2\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 2, 1/2, 7/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(4*a^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.211859, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};2,\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 2, 1/2, 7/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(4*a^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 26.7778, size = 53, normalized size = 0.83

$$\frac{x^4\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(\frac{4}{3},\frac{1}{2},2,\frac{7}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{4a^2c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 1/2, 2, 7/3, -d*x**3/c, -b*x*
*3/a)/(4*a**2*c*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.326594, size = 331, normalized size = 5.17

$$\frac{x\left(\frac{32ac^2F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}-\frac{7acdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\right.}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\right.\right.}\right.}{12\left(a+bx^3\right)\sqrt{c+dx^3}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*(4*(c + d*x^3) + (32*a*c^2*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3
)/c), -((b*x^3)/a)])/(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)
/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d
*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3
)/c), -((b*x^3)/a)])) - (7*a*c*d*x^3*AppellF1[4/3, 1/2, 1, 7/3, -
((d*x^3)/c), -((b*x^3)/a)])/(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -
((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 1
0/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3
```

```
, -((d*x^3)/c), -((b*x^3)/a)]))))/(12*(-(b*c) + a*d)*(a + b*x^3)*
Sqrt[c + d*x^3])
```

Maple [C] time = 0.057, size = 1207, normalized size = 18.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/3*I/b/d^2*2^(1/2)*sum(1/_alpha^2/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2
*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2
)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(
1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2
)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I
*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2
)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^
(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1
/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_al
pha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_al
pha=RootOf(_Z^3*b+a))-a/b*(-1/3*b/a/(a*d-b*c)*x*(d*x^3+c)^(1/2)/(
b*x^3+a)+1/9*I/(a*d-b*c)/a*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3
+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2))+1/18*I/a/d^2*2^(1/2)*sum((-7*a*d+4*b*c)/(a*d-b
*c)^2/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d
^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^
2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1
/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^
2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*
d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d
-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3
)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)
,1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)
^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-
b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3+a)^2\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((b*x^3 + a)^2*sqrt(d*x^3 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3+a)^2\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^3/((b*x^3 + a)^2*sqrt(d*x^3 + c)), x)
```

3.486 $\int \frac{x}{(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=64

$$\frac{x^2\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};2,\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2\sqrt{c+dx^3}}$$

```
[Out] (x^2*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 2, 1/2, 5/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(2*a^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.163049, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{x^2\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};2,\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^2*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 2, 1/2, 5/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(2*a^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 20.5183, size = 53, normalized size = 0.83

$$\frac{x^2\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{2}{3},\frac{1}{2},2,\frac{5}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a^2c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, 1/2, 2, 5/3, -d*x**3/c, -b*x*
*3/a)/(2*a**2*c*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.519086, size = 342, normalized size = 5.34

$$\frac{x^2\left(-\frac{8bcdx^3F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-16acF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{25c(bc-3ad)F_1\left(\frac{2}{3}\right.}{3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1\right.\right.}\right.}{15\left(a+bx^3\right)\sqrt{c+dx^3}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^2*((-5*b*(c + d*x^3))/a + (25*c*(b*c - 3*a*d)*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)])/(-10*a*c*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[5/
3, 1/2, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 3
/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])) - (8*b*c*d*x^3*AppellF1
[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])/(-16*a*c*AppellF1
[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*App
ellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*Appell
```

```
F1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)]))))/(15*(-(b*c)
 + a*d)*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.054, size = 923, normalized size = 14.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/3*b/a/(a*d-b*c)*x^2*(d*x^3+c)^(1/2)/(b*x^3+a)-1/9*I/(a*d-b*c)/
a*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)
/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^
2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))
^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^
2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1
/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)))+1/18*I/a/d^2*2^(1/2)*sum((-5*a*d+2*b*c)/(a*d-b*c)^2
/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^3+a)^2\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^3 + a)^2*sqrt(d*x^3 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^3 + a)^2 \sqrt{dx^3 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x/((b*x^3 + a)^2*sqrt(d*x^3 + c)), x)
```

3.487 $\int \frac{1}{(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=59

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};2,\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 2, 1/2, 4/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.0963542, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};2,\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 2, 1/2, 4/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 19.8986, size = 49, normalized size = 0.83

$$\frac{x\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{1}{3},\frac{1}{2},2,\frac{4}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a^2c\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 1/2, 2, 4/3, -d*x**3/c, -b*x**3/
a)/(a**2*c*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.530552, size = 341, normalized size = 5.78

$$\frac{x\left(\frac{7bcdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{32c(2bc-3ad)F_1\left(\frac{1}{3};\frac{1}{2},1\right.}{3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\right.\right.}\right.}{12\left(a+bx^3\right)\sqrt{c+dx^3}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*((-4*b*(c + d*x^3))/a + (32*c*(2*b*c - 3*a*d)*AppellF1[1/3, 1/
2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])/(-8*a*c*AppellF1[1/3, 1/2
, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3
, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/
2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])) + (7*b*c*d*x^3*AppellF1[
4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])/(-14*a*c*AppellF1[
4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*Appe
llF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF
```

```
1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)]))))/(12*(-(b*c)
+ a*d)*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.007, size = 769, normalized size = 13.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] -1/3*b/a/(a*d-b*c)*x*(d*x^3+c)^(1/2)/(b*x^3+a)+1/9*I/(a*d-b*c)/a*
3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)
^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*
3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/18*I/a
/d^2*2^(1/2)*sum((-7*a*d+4*b*c)/(a*d-b*c)^2/_alpha^2*(-c*d^2)^(1/
3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3
)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*
(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(
1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*
(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi
(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*
d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*
d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^
(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)), x)
```

3.488 $\int \frac{1}{x^2(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=62

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};2,\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2x\sqrt{c+dx^3}}$$

```
[Out] -((Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 2, 1/2, 2/3, -((b*x^3)/a),
-((d*x^3)/c)])/(a^2*x*Sqrt[c + d*x^3]))
```

Rubi [A] time = 0.204663, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};2,\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2x\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] -((Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 2, 1/2, 2/3, -((b*x^3)/a),
-((d*x^3)/c)])/(a^2*x*Sqrt[c + d*x^3]))
```

Rubi in Sympy [A] time = 23.5337, size = 53, normalized size = 0.85

$$-\frac{\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{1}{3},\frac{1}{2},2,\frac{2}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a^2cx\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, 1/2, 2, 2/3, -d*x**3/c, -b*x**3/
a)/(a**2*c*x*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 1.30683, size = 399, normalized size = 6.44

$$-\frac{\frac{25ax^3\left(3a^2d^2-15abcd+8b^2c^2\right)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{10\left(c+dx^3\right)\left(-3a^2d+3ab\left(c-dx^3\right)+4b^2cx^3\right)}{c}+\frac{}{3x^3\left(2bc\right.}}{30a^2x\left(a+bx^3\right)\sqrt{c+dx^3}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] ((10*(c + d*x^3)*(-3*a^2*d + 4*b^2*c*x^3 + 3*a*b*(c - d*x^3)))/c
- (25*a*(8*b^2*c^2 - 15*a*b*c*d + 3*a^2*d^2)*x^3*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)])/(-10*a*c*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[5/
3, 1/2, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 3
/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])) + (16*a*b*d*(4*b*c - 3*
a*d)*x^6*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])/
(-16*a*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)] +
 3*x^3*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)
```

```
/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)
])))/(30*a^2*(-(b*c) + a*d)*x*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.019, size = 1818, normalized size = 29.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/a^2*(-(d*x^3+c)^(1/2)/c/x-1/3*I/c*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+
1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-
c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3
)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^
2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1
/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))))-b/a*(-1/3*b/a/(a
*d-b*c)*x^2*(d*x^3+c)^(1/2)/(b*x^3+a)-1/9*I/(a*d-b*c)/a*3^(1/2)*(
-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(
-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*
(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*Ellipti
cF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1
/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)
))+1/18*I/a/d^2*2^(1/2)*sum((-5*a*d+2*b*c)/(a*d-b*c)^2/_alpha*(-c
*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)
^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*
d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d
*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I
*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*E
llipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alp
ha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3
^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*
(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1
/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))+1/3*I*b/a^2/d^2*2^(1/2)*su
m(1/_alpha/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*
(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/
2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/
(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^
(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_a
lpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-
c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)
/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)^2 \sqrt{dx^3 + c}\, x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)^2 \sqrt{dx^3 + c}x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^2), x)
```

3.489 $\int \frac{1}{x^3(a+bx^3)^2\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};2,\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2x^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 2, 1/2, 1/3, -((b*x^3)/a), -
((d*x^3)/c)])/(2*a^2*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.19739, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};2,\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2x^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 2, 1/2, 1/3, -((b*x^3)/a), -
((d*x^3)/c)])/(2*a^2*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 22.9945, size = 56, normalized size = 0.88

$$-\frac{\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{2}{3},\frac{1}{2},2,\frac{1}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a^2cx^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 1/2, 2, 1/3, -d*x**3/c, -b*x**3/
a)/(2*a**2*c*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 1.22107, size = 399, normalized size = 6.23

$$\frac{\frac{16ax^3(3a^2d^2+21abcd-20b^2c^2)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{4(c+dx^3)(-3a^2d+3ab(c-dx^3)+5b^2cx^3)}{c}+\cdots}{24a^2x^2(a+bx^3)\sqrt{c+dx^3}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(a + b*x^3)^2*Sqrt[c + d*x^3]),x]
```

```
[Out] ((4*(c + d*x^3)*(-3*a^2*d + 5*b^2*c*x^3 + 3*a*b*(c - d*x^3)))/c +
 (16*a*(-20*b^2*c^2 + 21*a*b*c*d + 3*a^2*d^2)*x^3*AppellF1[1/3, 1
/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])/(-8*a*c*AppellF1[1/3, 1/
2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/
3, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3
/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])) + (7*a*b*d*(-5*b*c + 3*
a*d)*x^6*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])/
(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] +
 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)
```

```
/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)
])))/(24*a^2*(-(b*c) + a*d)*x^2*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 1512, normalized size = 23.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a)^2/(d*x^3+c)^(1/2),x)
```

```
[Out] 1/a^2*(-1/2/c/x^2*(d*x^3+c)^(1/2)+1/6*I/c*3^(1/2)*(-c*d^2)^(1/3)*
(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2
)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d
^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))-b/a*(-1/3*b/a/(a*d-b*c)*x*(d*x
^3+c)^(1/2)/(b*x^3+a)+1/9*I/(a*d-b*c)/a*3^(1/2)*(-c*d^2)^(1/3)*(I
*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*
d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^
(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/18*I/a/d^2*2^(1/2)*sum((-7*a*d+
4*b*c)/(a*d-b*c)^2/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*
3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*
(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3
)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(
1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_a
lpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(
1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_a
lpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)
-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+
a))+1/3*I*b/a^2/d^2*2^(1/2)*sum(1/_alpha^2/(a*d-b*c)*(-c*d^2)^(1
/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/
3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)
*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticP
i(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c
*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c
*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)^2 \sqrt{dx^3 + c}\,x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^3), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^3),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/(b*x**3+a)**2/(d*x**3+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)^2 \sqrt{dx^3 + c}x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)^2*sqrt(d*x^3 + c)*x^3), x)
```

3.490 $\int \frac{x^8}{(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=149

$$-\frac{a^2d^2+2b^2c^2}{3b^2d\sqrt{c+dx^3}(bc-ad)^2}-\frac{a^2}{3b^2\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}+\frac{a(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}(bc-ad)^{5/2}}$$

```
[Out] -(2*b^2*c^2 + a^2*d^2)/(3*b^2*d*(b*c - a*d)^2*Sqrt[c + d*x^3]) -
a^2/(3*b^2*(b*c - a*d)*(a + b*x^3)*Sqrt[c + d*x^3]) + (a*(4*b*c -
 a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3
/2)*(b*c - a*d)^(5/2))
```

Rubi [A] time = 0.559496, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{a^2d^2+2b^2c^2}{3b^2d\sqrt{c+dx^3}(bc-ad)^2}-\frac{a^2}{3b^2\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}+\frac{a(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3b^{3/2}(bc-ad)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(2*b^2*c^2 + a^2*d^2)/(3*b^2*d*(b*c - a*d)^2*Sqrt[c + d*x^3]) -
a^2/(3*b^2*(b*c - a*d)*(a + b*x^3)*Sqrt[c + d*x^3]) + (a*(4*b*c -
 a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*b^(3
/2)*(b*c - a*d)^(5/2))
```

Rubi in Sympy [A] time = 44.6482, size = 134, normalized size = 0.9

$$\frac{a\left(ad-4bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3b^{\frac{3}{2}}\left(ad-bc\right)^{\frac{5}{2}}}-\frac{2c^2}{3d^2\left(a+bx^3\right)\sqrt{c+dx^3}\left(ad-bc\right)}-\frac{\sqrt{c+dx^3}\left(a^2d^2+2b^2c^2\right)}{3bd^2\left(a+bx^3\right)\left(ad-bc\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] a*(a*d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3
*b**(3/2)*(a*d - b*c)**(5/2)) - 2*c**2/(3*d**2*(a + b*x**3)*sqrt(
c + d*x**3)*(a*d - b*c)) - sqrt(c + d*x**3)*(a**2*d**2 + 2*b**2*c
**2)/(3*b*d**2*(a + b*x**3)*(a*d - b*c)**2)
```

Mathematica [A] time = 0.591203, size = 118, normalized size = 0.79

$$\frac{1}{3}\left(\frac{-\frac{a^2(c+dx^3)}{b(a+bx^3)}-\frac{2c^2}{d}}{\sqrt{c+dx^3}(bc-ad)^2}+\frac{a(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{b^{3/2}(bc-ad)^{5/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (((-2*c^2)/d - (a^2*(c + d*x^3))/(b*(a + b*x^3)))/((b*c - a*d)^2*
Sqrt[c + d*x^3]) + (a*(4*b*c - a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x
```

```
^3])/Sqrt[b*c - a*d]])/(b^(3/2)*(b*c - a*d)^(5/2)))/3
```

Maple [C] time = 0.072, size = 978, normalized size = 6.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] -2/3/b^2/d/(d*x^3+c)^(1/2)+a^2/b^2*(-1/3*b/(a*d-b*c)^2*(d*x^3+c)^
(1/2)/(b*x^3+a)-2/3*d/(a*d-b*c)^2/((x^3+c/d)*d)^(1/2)+1/2*I*b/d*2
^(1/2)*sum(1/(a*d-b*c)^3*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(
1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-
1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))
^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3
)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alph
a*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3
)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c
*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1
/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alph
a*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*
c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)
+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
)-2*a/b^2*(-2/3/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-1/3*I/d^2*b*2^(1/2)
*sum(1/(-a*d+b*c)/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*
3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*
(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3
)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(
1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_a
lpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(
1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_a
lpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)
-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1
/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+
a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.232446, size = 1, normalized size = 0.01

$$\left[-\frac{\left(4\,a^2bcd - a^3d^2 + \left(4\,ab^2cd - a^2bd^2\right)x^3\right)\sqrt{dx^3+c}\,\log\left(\frac{(bdx^3+2\,bc-ad)\sqrt{b^2c-abd}-2\,\sqrt{dx^3+c}\left(b^2c-abd\right)}{bx^3+a}\right) + 2\,\left(2\,abc^2 + a^2cd + \left(2\right.\right.}{6\,(ab^3c^2d - 2\,a^2b^2cd^2 + a^3bd^3 + (b^4c^2d - 2\,ab^3cd^2 + a^2b^2d^3)x^3)\sqrt{dx^3+c}\sqrt{b^2c-abd}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] [-1/6*((4*a^2*b*c*d - a^3*d^2 + (4*a*b^2*c*d - a^2*b*d^2)*x^3)*sq
rt(d*x^3 + c)*log(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) -
2*sqrt(d*x^3 + c)*(b^2*c - a*b*d))/(b*x^3 + a)) + 2*(2*a*b*c^2 +
a^2*c*d + (2*b^2*c^2 + a^2*d^2)*x^3)*sqrt(b^2*c - a*b*d))/((a*b^3
*c^2*d - 2*a^2*b^2*c*d^2 + a^3*b*d^3 + (b^4*c^2*d - 2*a*b^3*c*d^2
 + a^2*b^2*d^3)*x^3)*sqrt(d*x^3 + c)*sqrt(b^2*c - a*b*d)), 1/3*((
4*a^2*b*c*d - a^3*d^2 + (4*a*b^2*c*d - a^2*b*d^2)*x^3)*sqrt(d*x^3
 + c)*arctan(-(b*c - a*d)/(sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d)))
 - (2*a*b*c^2 + a^2*c*d + (2*b^2*c^2 + a^2*d^2)*x^3)*sqrt(-b^2*c
+ a*b*d))/((a*b^3*c^2*d - 2*a^2*b^2*c*d^2 + a^3*b*d^3 + (b^4*c^2*
d - 2*a*b^3*c*d^2 + a^2*b^2*d^3)*x^3)*sqrt(d*x^3 + c)*sqrt(-b^2*c
 + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.229246, size = 263, normalized size = 1.77

$$-\frac{\left(4\,abc-a^{2}d\right)\arctan\left(\frac{\sqrt{dx^{3}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{3\left(b^{3}c^{2}-2\,ab^{2}cd+a^{2}bd^{2}\right)\sqrt{-b^{2}c+abd}}-\frac{2\left(dx^{3}+c\right)b^{2}c^{2}-2\,b^{2}c^{3}+2\,abc^{2}d+\left(dx^{3}+c\right)a^{2}d^{2}}{3\left(b^{3}c^{2}d-2\,ab^{2}cd^{2}+a^{2}bd^{3}\right)\left(\left(dx^{3}+c\right)^{\frac{3}{2}}b-\sqrt{dx^{3}+c}bc+\sqrt{dx^{3}+c}ad\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] -1/3*(4*a*b*c - a^2*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b
*d))/((b^3*c^2 - 2*a*b^2*c*d + a^2*b*d^2)*sqrt(-b^2*c + a*b*d)) -
 1/3*(2*(d*x^3 + c)*b^2*c^2 - 2*b^2*c^3 + 2*a*b*c^2*d + (d*x^3 +
c)*a^2*d^2)/((b^3*c^2*d - 2*a*b^2*c*d^2 + a^2*b*d^3)*((d*x^3 + c)
^(3/2)*b - sqrt(d*x^3 + c)*b*c + sqrt(d*x^3 + c)*a*d))
```

3.491 $\int \frac{x^5}{(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=134

$$\frac{a}{3b\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}+\frac{ad+2bc}{3b\sqrt{c+dx^3}(bc-ad)^2}-\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}(bc-ad)^{5/2}}$$

```
[Out] (2*b*c + a*d)/(3*b*(b*c - a*d)^2*Sqrt[c + d*x^3]) + a/(3*b*(b*c -
 a*d)*(a + b*x^3)*Sqrt[c + d*x^3]) - ((2*b*c + a*d)*ArcTanh[(Sqrt
[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b]*(b*c - a*d)^(5/
2))
```

Rubi [A] time = 0.332811, antiderivative size = 134, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{a}{3b\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}+\frac{ad+2bc}{3b\sqrt{c+dx^3}(bc-ad)^2}-\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}(bc-ad)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (2*b*c + a*d)/(3*b*(b*c - a*d)^2*Sqrt[c + d*x^3]) + a/(3*b*(b*c -
 a*d)*(a + b*x^3)*Sqrt[c + d*x^3]) - ((2*b*c + a*d)*ArcTanh[(Sqrt
[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*Sqrt[b]*(b*c - a*d)^(5/
2))
```

Rubi in Sympy [A] time = 32.9731, size = 112, normalized size = 0.84

$$-\frac{a}{3b\left(a+bx^3\right)\sqrt{c+dx^3}\left(ad-bc\right)}+\frac{2\left(\frac{ad}{2}+bc\right)}{3b\sqrt{c+dx^3}\left(ad-bc\right)^2}+\frac{2\left(\frac{ad}{2}+bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3\sqrt{b}\left(ad-bc\right)^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -a/(3*b*(a + b*x**3)*sqrt(c + d*x**3)*(a*d - b*c)) + 2*(a*d/2 + b
*c)/(3*b*sqrt(c + d*x**3)*(a*d - b*c)**2) + 2*(a*d/2 + b*c)*atan(
sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*sqrt(b)*(a*d - b*c)*
*(5/2))
```

Mathematica [A] time = 0.292997, size = 111, normalized size = 0.83

$$\frac{1}{3}\left(\frac{3ac+adx^3+2bcx^3}{\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)^2}-\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{\sqrt{b}(bc-ad)^{5/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((3*a*c + 2*b*c*x^3 + a*d*x^3)/((b*c - a*d)^2*(a + b*x^3)*Sqrt[c
+ d*x^3]) - ((2*b*c + a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt
```

```
[b*c - a*d]])/(Sqrt[b]*(b*c - a*d)^(5/2)))/3
```

Maple [C] time = 0.016, size = 958, normalized size = 7.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/b*(-2/3/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-1/3*I/d^2*b*2^(1/2)*sum(1
/(-a*d+b*c)/(a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2
)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d
*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1
/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3
^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_
alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(
-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d
)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-a
/b*(-1/3*b/(a*d-b*c)^2*(d*x^3+c)^(1/2)/(b*x^3+a)-2/3*d/(a*d-b*c)^
2/((x^3+c/d)*d)^(1/2)+1/2*I*b/d*2^(1/2)*sum(1/(a*d-b*c)^3*(-c*d^2
)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/
3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)
^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(
1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3
+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(
1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellip
ticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2
*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/
2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*
d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.23321, size = 1, normalized size = 0.01

$$\left[\frac{\left(\left(2\,b^{2}c+abd\right)x^{3}+2\,abc+a^{2}d\right)\sqrt{dx^{3}+c}\log\left(\frac{\left(bdx^{3}+2\,bc-ad\right)\sqrt{b^{2}c-abd}-2\,\sqrt{dx^{3}+c}\left(b^{2}c-abd\right)}{bx^{3}+a}\right)+2\,\left(\left(2\,bc+ad\right)x^{3}+3\,ac\right)\sqrt{b^{2}c-}}{6\,(ab^{2}c^{2}-2\,a^{2}bcd+a^{3}d^{2}+(b^{3}c^{2}-2\,ab^{2}cd+a^{2}bd^{2})x^{3})\sqrt{dx^{3}+c}\sqrt{b^{2}c-abd}}\right.$$
$$\left.-\frac{\left(\left(2\,b^{2}c+abd\right)x^{3}+2\,abc+a^{2}d\right)\sqrt{dx^{3}+c}\arctan\left(-\frac{bc-ad}{\sqrt{dx^{3}+c}\sqrt{-b^{2}c+abd}}\right)-\left(\left(2\,bc+ad\right)x^{3}+3\,ac\right)\sqrt{-b^{2}c+abd}}{3\,(ab^{2}c^{2}-2\,a^{2}bcd+a^{3}d^{2}+(b^{3}c^{2}-2\,ab^{2}cd+a^{2}bd^{2})x^{3})\sqrt{dx^{3}+c}\sqrt{-b^{2}c+abd}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] [1/6*(((2*b^2*c + a*b*d)*x^3 + 2*a*b*c + a^2*d)*sqrt(d*x^3 + c)*l
og(((b*d*x^3 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*x^3 +
c)*(b^2*c - a*b*d))/(b*x^3 + a)) + 2*((2*b*c + a*d)*x^3 + 3*a*c)*
sqrt(b^2*c - a*b*d))/((a*b^2*c^2 - 2*a^2*b*c*d + a^3*d^2 + (b^3*c
^2 - 2*a*b^2*c*d + a^2*b*d^2)*x^3)*sqrt(d*x^3 + c)*sqrt(b^2*c - a
*b*d)), -1/3*(((2*b^2*c + a*b*d)*x^3 + 2*a*b*c + a^2*d)*sqrt(d*x^
3 + c)*arctan(-(b*c - a*d)/(sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d))
) - ((2*b*c + a*d)*x^3 + 3*a*c)*sqrt(-b^2*c + a*b*d))/((a*b^2*c^2
 - 2*a^2*b*c*d + a^3*d^2 + (b^3*c^2 - 2*a*b^2*c*d + a^2*b*d^2)*x^
3)*sqrt(d*x^3 + c)*sqrt(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.224442, size = 244, normalized size = 1.82

$$\frac{\frac{(2\,bcd+ad^2)\arctan\left(\frac{\sqrt{dx^3+c}\,b}{\sqrt{-b^2c+abd}}\right)}{(b^2c^2-2\,abcd+a^2d^2)\sqrt{-b^2c+abd}}+\frac{2\,(dx^3+c)\,bcd-2\,bc^2d+(dx^3+c)\,ad^2+2\,acd^2}{(b^2c^2-2\,abcd+a^2d^2)\left((dx^3+c)^{\frac{3}{2}}b-\sqrt{dx^3+c}\,bc+\sqrt{dx^3+c}\,ad\right)}}{3\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] 1/3*((2*b*c*d + a*d^2)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b
*d))/((b^2*c^2 - 2*a*b*c*d + a^2*d^2)*sqrt(-b^2*c + a*b*d)) + (2*
(d*x^3 + c)*b*c*d - 2*b*c^2*d + (d*x^3 + c)*a*d^2 + 2*a*c*d^2)/((
b^2*c^2 - 2*a*b*c*d + a^2*d^2)*((d*x^3 + c)^(3/2)*b - sqrt(d*x^3
+ c)*b*c + sqrt(d*x^3 + c)*a*d)))/d
```

3.492 $\int \frac{x^2}{(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=108

$$-\frac{d}{\sqrt{c+dx^3}(bc-ad)^2}-\frac{1}{3\,(a+bx^3)\,\sqrt{c+dx^3}(bc-ad)}+\frac{\sqrt{b}d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{(bc-ad)^{5/2}}$$

```
[Out] -(d/((b*c - a*d)^2*Sqrt[c + d*x^3])) - 1/(3*(b*c - a*d)*(a + b*x^
3)*Sqrt[c + d*x^3]) + (Sqrt[b]*d*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3]
)/Sqrt[b*c - a*d]])/(b*c - a*d)^(5/2)
```

Rubi [A] time = 0.25581, antiderivative size = 108, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{d}{\sqrt{c+dx^3}(bc-ad)^2}-\frac{1}{3\,(a+bx^3)\,\sqrt{c+dx^3}(bc-ad)}+\frac{\sqrt{b}d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{(bc-ad)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(d/((b*c - a*d)^2*Sqrt[c + d*x^3])) - 1/(3*(b*c - a*d)*(a + b*x^
3)*Sqrt[c + d*x^3]) + (Sqrt[b]*d*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3]
)/Sqrt[b*c - a*d]])/(b*c - a*d)^(5/2)
```

Rubi in Sympy [A] time = 27.0712, size = 90, normalized size = 0.83

$$-\frac{\sqrt{b}d\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{(ad-bc)^{\frac{5}{2}}}-\frac{d}{\sqrt{c+dx^3}\,(ad-bc)^2}+\frac{1}{3\,(a+bx^3)\,\sqrt{c+dx^3}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(b)*d*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(a*d -
b*c)**(5/2) - d/(sqrt(c + d*x**3)*(a*d - b*c)**2) + 1/(3*(a + b*x
**3)*sqrt(c + d*x**3)*(a*d - b*c))
```

Mathematica [A] time = 0.236054, size = 99, normalized size = 0.92

$$\frac{\sqrt{b}d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{(bc-ad)^{5/2}}-\frac{2ad+b\left(c+3dx^3\right)}{3\,(a+bx^3)\,\sqrt{c+dx^3}(bc-ad)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(2*a*d + b*(c + 3*d*x^3))/(3*(b*c - a*d)^2*(a + b*x^3)*Sqrt[c +
d*x^3]) + (Sqrt[b]*d*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c -
 a*d]])/(b*c - a*d)^(5/2)
```

Maple [C] time = 0.01, size = 485, normalized size = 4.5

$$-\frac{b}{3\left(ad-bc\right)^{2}\left(bx^{3}+a\right)}\sqrt{dx^{3}+c}-\frac{2d}{3\left(ad-bc\right)^{2}}\frac{1}{\sqrt{\left(x^{3}+\frac{c}{d}\right)d}}$$
$$+\frac{\frac{i}{2}b\sqrt{2}}{d}\sum_{\_alpha=RootOf\left(b\_Z^{3}+a\right)}\frac{1}{\left(ad-bc\right)^{3}}\sqrt[3]{-cd^{2}}\sqrt{\frac{i}{2}d\left(2x+\frac{1}{d}\left(-i\sqrt{3}\sqrt[3]{-cd^{2}}+\sqrt[3]{-cd^{2}}\right)\right)\frac{1}{\sqrt[3]{-cd^{2}}}}\sqrt{d\left(x-\frac{1}{d}\sqrt[3]{-cd^{2}}\right)\left(-3\sqrt[3]{-cd\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] -1/3*b/(a*d-b*c)^2*(d*x^3+c)^(1/2)/(b*x^3+a)-2/3*d/(a*d-b*c)^2/((
x^3+c/d)*d)^(1/2)+1/2*I*b/d*2^(1/2)*sum(1/(a*d-b*c)^3*(-c*d^2)^(1
/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))
/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/
3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)
*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)
*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticP
i(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)
^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c
*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c
*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)
^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1
/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231193, size = 1, normalized size = 0.01

$$\left[-\frac{6\,bdx^{3}-3\left(bdx^{3}+ad\right)\sqrt{dx^{3}+c}\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^{3}+2\,bc-ad+2\,\sqrt{dx^{3}+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^{3}+a}\right)+2\,bc+4\,ad}{6\left(ab^{2}c^{2}-2\,a^{2}bcd+a^{3}d^{2}+(b^{3}c^{2}-2\,ab^{2}cd+a^{2}bd^{2})x^{3}\right)\sqrt{dx^{3}+c}},\right.$$
$$\left.-\frac{3\,bdx^{3}-3\left(bdx^{3}+ad\right)\sqrt{dx^{3}+c}\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^{3}+c}b}\right)+bc+2\,ad}{3\left(ab^{2}c^{2}-2\,a^{2}bcd+a^{3}d^{2}+(b^{3}c^{2}-2\,ab^{2}cd+a^{2}bd^{2})x^{3}\right)\sqrt{dx^{3}+c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] [-1/6*(6*b*d*x^3 - 3*(b*d*x^3 + a*d)*sqrt(d*x^3 + c)*sqrt(b/(b*c
- a*d))*log((b*d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*(b*c - a*d
)*sqrt(b/(b*c - a*d)))/(b*x^3 + a)) + 2*b*c + 4*a*d)/((a*b^2*c^2
- 2*a^2*b*c*d + a^3*d^2 + (b^3*c^2 - 2*a*b^2*c*d + a^2*b*d^2)*x^3
)*sqrt(d*x^3 + c)), -1/3*(3*b*d*x^3 - 3*(b*d*x^3 + a*d)*sqrt(d*x^
```

```
3 + c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*
d))/(sqrt(d*x^3 + c)*b)) + b*c + 2*a*d)/((a*b^2*c^2 - 2*a^2*b*c*d
 + a^3*d^2 + (b^3*c^2 - 2*a*b^2*c*d + a^2*b*d^2)*x^3)*sqrt(d*x^3
+ c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.218642, size = 203, normalized size = 1.88

$$-\frac{1}{3}\,d\left(\frac{3\,b\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{(b^2c^2-2\,abcd+a^2d^2)\sqrt{-b^2c+abd}}+\frac{3\,(dx^3+c)\,b-2\,bc+2\,ad}{(b^2c^2-2\,abcd+a^2d^2)\left((dx^3+c)^{\frac{3}{2}}b-\sqrt{dx^3+c}bc+\sqrt{dx^3+c}ad\right)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] -1/3*d*(3*b*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2*c + a*b*d))/((b^2*
c^2 - 2*a*b*c*d + a^2*d^2)*sqrt(-b^2*c + a*b*d)) + (3*(d*x^3 + c)
*b - 2*b*c + 2*a*d)/((b^2*c^2 - 2*a*b*c*d + a^2*d^2)*((d*x^3 + c)
^(3/2)*b - sqrt(d*x^3 + c)*b*c + sqrt(d*x^3 + c)*a*d)))
```

3.493 $\int \frac{1}{x(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=172

$$\frac{b^{3/2}(2bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2(bc-ad)^{5/2}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{3/2}}+\frac{b}{3a\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}+\frac{d(2ad+bc)}{3ac\sqrt{c+dx^3}(bc-ad)^2}$$

```
[Out] (d*(b*c + 2*a*d))/(3*a*c*(b*c - a*d)^2*Sqrt[c + d*x^3]) + b/(3*a*
(b*c - a*d)*(a + b*x^3)*Sqrt[c + d*x^3]) - (2*ArcTanh[Sqrt[c + d*
x^3]/Sqrt[c]])/(3*a^2*c^(3/2)) + (b^(3/2)*(2*b*c - 5*a*d)*ArcTanh
[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*(b*c - a*d)^(
5/2))
```

Rubi [A] time = 0.732981, antiderivative size = 172, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$\frac{b^{3/2}(2bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^2(bc-ad)^{5/2}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{3/2}}+\frac{b}{3a\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}+\frac{d(2ad+bc)}{3ac\sqrt{c+dx^3}(bc-ad)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (d*(b*c + 2*a*d))/(3*a*c*(b*c - a*d)^2*Sqrt[c + d*x^3]) + b/(3*a*
(b*c - a*d)*(a + b*x^3)*Sqrt[c + d*x^3]) - (2*ArcTanh[Sqrt[c + d*
x^3]/Sqrt[c]])/(3*a^2*c^(3/2)) + (b^(3/2)*(2*b*c - 5*a*d)*ArcTanh
[(Sqrt[b]*Sqrt[c + d*x^3])/Sqrt[b*c - a*d]])/(3*a^2*(b*c - a*d)^(
5/2))
```

Rubi in Sympy [A] time = 76.2381, size = 148, normalized size = 0.86

$$-\frac{b}{3a\left(a+bx^3\right)\sqrt{c+dx^3}\left(ad-bc\right)}+\frac{d\left(2ad+bc\right)}{3ac\sqrt{c+dx^3}\left(ad-bc\right)^2}+\frac{b^{\frac{3}{2}}\left(5ad-2bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^2\left(ad-bc\right)^{\frac{5}{2}}}-\frac{2\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -b/(3*a*(a + b*x**3)*sqrt(c + d*x**3)*(a*d - b*c)) + d*(2*a*d + b
*c)/(3*a*c*sqrt(c + d*x**3)*(a*d - b*c)**2) + b**(3/2)*(5*a*d - 2
*b*c)*atan(sqrt(b)*sqrt(c + d*x**3)/sqrt(a*d - b*c))/(3*a**2*(a*d
 - b*c)**(5/2)) - 2*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a**2*c**(3
/2))
```

Mathematica [C] time = 1.11039, size = 453, normalized size = 2.63

$$\frac{\frac{3\left(2a^2d^2+2abd^2x^3+b^2c\left(c+dx^3\right)\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)\right)-5bdx^3\left(4a^2d^2+2abd\left(2c+3dx^3\right)+b^2c\left(c+3dx^3\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\right.}{ac\left(-5bdx^3F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^3},-\frac{a}{bx^3}\right)\right)}}{9\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)^2}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((-6*b*d*(b*c + 2*a*d)*x^3*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -
((b*x^3)/a)])/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^3)/c), -((b*x
^3)/a)] + x^3*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^3)/c), -((b*x^
3)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^3)/c), -((b*x^3)/a)]))
 + (-5*b*d*x^3*(4*a^2*d^2 + b^2*c*(c + 3*d*x^3) + 2*a*b*d*(2*c +
3*d*x^3))*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))]
+ 3*(2*a^2*d^2 + 2*a*b*d^2*x^3 + b^2*c*(c + d*x^3))*(2*a*d*Appell
F1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5
/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(a*c*(-5*b*d*x^3*A
ppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*d*App
ellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF
1[5/2, 3/2, 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))])))/(9*(b*c - a*d)
^2*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C]   time = 0.017, size = 1002, normalized size = 5.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/a^2*(2/3/c/((x^3+c/d)*d)^(1/2)-2/3*arctanh((d*x^3+c)^(1/2)/c^(1
/2))/c^(3/2))-b/a*(-1/3*b/(a*d-b*c)^2*(d*x^3+c)^(1/2)/(b*x^3+a)-2
/3*d/(a*d-b*c)^2/((x^3+c/d)*d)^(1/2)+1/2*I*b/d*2^(1/2)*sum(1/(a*d
-b*c)^3*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a^2*(-2/3/(a*
d-b*c)/((x^3+c/d)*d)^(1/2)-1/3*I/d^2*b*2^(1/2)*sum(1/(-a*d+b*c)/(
a*d-b*c)*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1
/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/
3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d
*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/
3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_a
lpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d
^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b
/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)
*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(
I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x), x)
```

Fricas [A] time = 0.419228, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x),x, algorithm="fricas")
```

```
[Out] [-1/6*((2*a*b^2*c^2 - 5*a^2*b*c*d + (2*b^3*c^2 - 5*a*b^2*c*d)*x^3
)*sqrt(d*x^3 + c)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*
c - a*d - 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x
^3 + a)) - 2*(a*b^2*c^2 - 2*a^2*b*c*d + a^3*d^2 + (b^3*c^2 - 2*a*
b^2*c*d + a^2*b*d^2)*x^3)*sqrt(d*x^3 + c)*log(((d*x^3 + 2*c)*sqrt
(c) - 2*sqrt(d*x^3 + c)*c)/x^3) - 2*(a*b^2*c^2 + 2*a^3*d^2 + (a*b
^2*c*d + 2*a^2*b*d^2)*x^3)*sqrt(c))/((a^3*b^2*c^3 - 2*a^4*b*c^2*d
 + a^5*c*d^2 + (a^2*b^3*c^3 - 2*a^3*b^2*c^2*d + a^4*b*c*d^2)*x^3)
*sqrt(d*x^3 + c)*sqrt(c)), 1/3*((2*a*b^2*c^2 - 5*a^2*b*c*d + (2*b
^3*c^2 - 5*a*b^2*c*d)*x^3)*sqrt(d*x^3 + c)*sqrt(c)*sqrt(-b/(b*c -
 a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*
b)) + (a*b^2*c^2 - 2*a^2*b*c*d + a^3*d^2 + (b^3*c^2 - 2*a*b^2*c*d
 + a^2*b*d^2)*x^3)*sqrt(d*x^3 + c)*log(((d*x^3 + 2*c)*sqrt(c) - 2
*sqrt(d*x^3 + c)*c)/x^3) + (a*b^2*c^2 + 2*a^3*d^2 + (a*b^2*c*d +
2*a^2*b*d^2)*x^3)*sqrt(c))/((a^3*b^2*c^3 - 2*a^4*b*c^2*d + a^5*c*
d^2 + (a^2*b^3*c^3 - 2*a^3*b^2*c^2*d + a^4*b*c*d^2)*x^3)*sqrt(d*x
^3 + c)*sqrt(c)), -1/6*((2*a*b^2*c^2 - 5*a^2*b*c*d + (2*b^3*c^2 -
 5*a*b^2*c*d)*x^3)*sqrt(d*x^3 + c)*sqrt(-c)*sqrt(b/(b*c - a*d))*l
og((b*d*x^3 + 2*b*c - a*d - 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/
(b*c - a*d)))/(b*x^3 + a)) - 4*(a*b^2*c^2 - 2*a^2*b*c*d + a^3*d^2
 + (b^3*c^2 - 2*a*b^2*c*d + a^2*b*d^2)*x^3)*sqrt(d*x^3 + c)*arcta
n(c/(sqrt(d*x^3 + c)*sqrt(-c))) - 2*(a*b^2*c^2 + 2*a^3*d^2 + (a*b
^2*c*d + 2*a^2*b*d^2)*x^3)*sqrt(-c))/((a^3*b^2*c^3 - 2*a^4*b*c^2*
d + a^5*c*d^2 + (a^2*b^3*c^3 - 2*a^3*b^2*c^2*d + a^4*b*c*d^2)*x^3
)*sqrt(d*x^3 + c)*sqrt(-c)), 1/3*((2*a*b^2*c^2 - 5*a^2*b*c*d + (2
*b^3*c^2 - 5*a*b^2*c*d)*x^3)*sqrt(d*x^3 + c)*sqrt(-c)*sqrt(-b/(b*
c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 +
c)*b)) + 2*(a*b^2*c^2 - 2*a^2*b*c*d + a^3*d^2 + (b^3*c^2 - 2*a*b^
2*c*d + a^2*b*d^2)*x^3)*sqrt(d*x^3 + c)*arctan(c/(sqrt(d*x^3 + c)
*sqrt(-c))) + (a*b^2*c^2 + 2*a^3*d^2 + (a*b^2*c*d + 2*a^2*b*d^2)*
x^3)*sqrt(-c))/((a^3*b^2*c^3 - 2*a^4*b*c^2*d + a^5*c*d^2 + (a^2*b
^3*c^3 - 2*a^3*b^2*c^2*d + a^4*b*c*d^2)*x^3)*sqrt(d*x^3 + c)*sqrt
(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223288, size = 319, normalized size = 1.85

$$-\frac{1}{3}\,d^2\left(\frac{\left(2\,b^3c-5\,ab^2d\right)\,\arctan\left(\frac{\sqrt{dx^3+c}b}{\sqrt{-b^2c+abd}}\right)}{\left(a^2b^2c^2d^2-2\,a^3bcd^3+a^4d^4\right)\sqrt{-b^2c+abd}}-\frac{\left(dx^3+c\right)b^2c+2\left(dx^3+c\right)abd-2\,abcd+2\,a^2d^2}{\left(ab^2c^3d-2\,a^2bc^2d^2+a^3cd^3\right)\left(\left(dx^3+c\right)^{\frac{3}{2}}b-\sqrt{dx^3+c}bc+\sqrt{dx^3+c}ad\right)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x),x, algorithm="giac")
```

```
[Out] -1/3*d^2*((2*b^3*c - 5*a*b^2*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^
2*c + a*b*d))/((a^2*b^2*c^2*d^2 - 2*a^3*b*c*d^3 + a^4*d^4)*sqrt(-
b^2*c + a*b*d)) - ((d*x^3 + c)*b^2*c + 2*(d*x^3 + c)*a*b*d - 2*a*
b*c*d + 2*a^2*d^2)/((a*b^2*c^3*d - 2*a^2*b*c^2*d^2 + a^3*c*d^3)*(
(d*x^3 + c)^(3/2)*b - sqrt(d*x^3 + c)*b*c + sqrt(d*x^3 + c)*a*d))
 - 2*arctan(sqrt(d*x^3 + c)/sqrt(-c))/(a^2*sqrt(-c)*c*d^2))
```

3.494 $\int \frac{1}{x^4(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=241

$$-\frac{b^{5/2}(4bc-7ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^3(bc-ad)^{5/2}}+\frac{(3ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3c^{5/2}}-\frac{d\left(3a^2d^2-2abcd+2b^2c^2\right)}{3a^2c^2\sqrt{c+dx^3}(bc-ad)^2}-\frac{b(2bc-ad)}{3a^2c\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}-\frac{1}{3acx^3\left(a+bx^3\right)\sqrt{c+dx^3}}$$

```
[Out] -(d*(2*b^2*c^2 - 2*a*b*c*d + 3*a^2*d^2))/(3*a^2*c^2*(b*c - a*d)^2
*Sqrt[c + d*x^3]) - (b*(2*b*c - a*d))/(3*a^2*c*(b*c - a*d)*(a + b
*x^3)*Sqrt[c + d*x^3]) - 1/(3*a*c*x^3*(a + b*x^3)*Sqrt[c + d*x^3]
) + ((4*b*c + 3*a*d)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^3*c^(
5/2)) - (b^(5/2)*(4*b*c - 7*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3]
)/Sqrt[b*c - a*d]])/(3*a^3*(b*c - a*d)^(5/2))
```

Rubi [A] time = 1.16483, antiderivative size = 241, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333

$$-\frac{b^{5/2}(4bc-7ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{bc-ad}}\right)}{3a^3(bc-ad)^{5/2}}+\frac{(3ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3c^{5/2}}-\frac{d\left(3a^2d^2-2abcd+2b^2c^2\right)}{3a^2c^2\sqrt{c+dx^3}(bc-ad)^2}-\frac{b(2bc-ad)}{3a^2c\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}-\frac{1}{3acx^3\left(a+bx^3\right)\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(d*(2*b^2*c^2 - 2*a*b*c*d + 3*a^2*d^2))/(3*a^2*c^2*(b*c - a*d)^2
*Sqrt[c + d*x^3]) - (b*(2*b*c - a*d))/(3*a^2*c*(b*c - a*d)*(a + b
*x^3)*Sqrt[c + d*x^3]) - 1/(3*a*c*x^3*(a + b*x^3)*Sqrt[c + d*x^3]
) + ((4*b*c + 3*a*d)*ArcTanh[Sqrt[c + d*x^3]/Sqrt[c]])/(3*a^3*c^(
5/2)) - (b^(5/2)*(4*b*c - 7*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^3]
)/Sqrt[b*c - a*d]])/(3*a^3*(b*c - a*d)^(5/2))
```

Rubi in Sympy [A] time = 117.071, size = 216, normalized size = 0.9

$$-\frac{1}{3acx^3\left(a+bx^3\right)\sqrt{c+dx^3}}-\frac{b\left(ad-2bc\right)}{3a^2c\left(a+bx^3\right)\sqrt{c+dx^3}\left(ad-bc\right)}-\frac{d\left(3a^2d^2-2abcd+2b^2c^2\right)}{3a^2c^2\sqrt{c+dx^3}\left(ad-bc\right)^2}-\frac{b^{\frac{5}{2}}\left(7ad-4bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{ad-bc}}\right)}{3a^3\left(ad-bc\right)^{\frac{5}{2}}}+\frac{\left(3ad+4bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+dx^3}}{\sqrt{c}}\right)}{3a^3c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -1/(3*a*c*x**3*(a + b*x**3)*sqrt(c + d*x**3)) - b*(a*d - 2*b*c)/(
3*a**2*c*(a + b*x**3)*sqrt(c + d*x**3)*(a*d - b*c)) - d*(3*a**2*d
**2 - 2*a*b*c*d + 2*b**2*c**2)/(3*a**2*c**2*sqrt(c + d*x**3)*(a*d
 - b*c)**2) - b**(5/2)*(7*a*d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x*
*3)/sqrt(a*d - b*c))/(3*a**3*(a*d - b*c)**(5/2)) + (3*a*d + 4*b*c
)*atanh(sqrt(c + d*x**3)/sqrt(c))/(3*a**3*c**(5/2))
```

Mathematica [C] time = 2.04353, size = 582, normalized size = 2.41

$$\frac{6abcdx^6\left(3a^2d^2-2abcd+2b^2c^2\right)F_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{x^3\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}-\frac{3\left(a^3d^2\left(c+3dx^3\right)+a^2bd\left(-2c^2-cdx^3+3d^2x^6\right)+ab^2c\left(c^2-cdx^3\cdots\right.\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] ((6*a*b*c*d*(2*b^2*c^2 - 2*a*b*c*d + 3*a^2*d^2)*x^6*AppellF1[1, 1
/2, 1, 2, -((d*x^3)/c), -((b*x^3)/a)])/(-4*a*c*AppellF1[1, 1/2, 1
, 2, -((d*x^3)/c), -((b*x^3)/a)] + x^3*(2*b*c*AppellF1[2, 1/2, 2,
 3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d
*x^3)/c), -((b*x^3)/a)])) - (-5*b*d*x^3*(3*a^3*d^2*(c + 2*d*x^3)
+ 2*b^3*c^2*x^3*(c + 3*d*x^3) + a*b^2*c*(3*c^2 + 2*c*d*x^3 - 6*d^
2*x^6) + a^2*b*d*(-6*c^2 - c*d*x^3 + 9*d^2*x^6))*AppellF1[3/2, 1/
2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 3*(2*b^3*c^2*x^3*(c + d*
x^3) + a^3*d^2*(c + 3*d*x^3) + a*b^2*c*(c^2 - c*d*x^3 - 2*d^2*x^6
) + a^2*b*d*(-2*c^2 - c*d*x^3 + 3*d^2*x^6))*(2*a*d*AppellF1[5/2,
1/2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2,
 1, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(-5*b*d*x^3*AppellF1[3/2,
1/2, 1, 5/2, -(c/(d*x^3)), -(a/(b*x^3))] + 2*a*d*AppellF1[5/2, 1/
2, 2, 7/2, -(c/(d*x^3)), -(a/(b*x^3))] + b*c*AppellF1[5/2, 3/2, 1
, 7/2, -(c/(d*x^3)), -(a/(b*x^3))]))/(9*a^2*c^2*(b*c - a*d)^2*x^3
*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 1067, normalized size = 4.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/a^2*(-1/3*(d*x^3+c)^(1/2)/c^2/x^3-2/3*d/c^2/((x^3+c/d)*d)^(1/2)
+d*arctanh((d*x^3+c)^(1/2)/c^(1/2))/c^(5/2))+1/a^2*b^2*(-1/3*b/(a
*d-b*c)^2*(d*x^3+c)^(1/2)/(b*x^3+a)-2/3*d/(a*d-b*c)^2/((x^3+c/d)*
d)^(1/2)+1/2*I*b/d*2^(1/2)*sum(1/(a*d-b*c)^3*(-c*d^2)^(1/3)*(1/2*
I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)
^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1
/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)
^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*
(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)
^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/
3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alp
ha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alp
ha=RootOf(_Z^3*b+a)))-2*b/a^3*(2/3/c/((x^3+c/d)*d)^(1/2)-2/3*arct
anh((d*x^3+c)^(1/2)/c^(1/2))/c^(3/2))+2/a^3*b^2*(-2/3/(a*d-b*c)/(
(x^3+c/d)*d)^(1/2)-1/3*I/d^2*b*2^(1/2)*sum(1/(-a*d+b*c)/(a*d-b*c)
*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*
d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*
(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/
d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2
)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d
^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3
))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2
)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*
_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)
+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2
)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^4), x)
```

Fricas [A] time = 0.792627, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/6*(((4*b^4*c^3 - 7*a*b^3*c^2*d)*x^6 + (4*a*b^3*c^3 - 7*a^2*b^
2*c^2*d)*x^3)*sqrt(d*x^3 + c)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*
d*x^3 + 2*b*c - a*d + 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c -
 a*d)))/(b*x^3 + a)) - ((4*b^4*c^3 - 5*a*b^3*c^2*d - 2*a^2*b^2*c*
d^2 + 3*a^3*b*d^3)*x^6 + (4*a*b^3*c^3 - 5*a^2*b^2*c^2*d - 2*a^3*b
*c*d^2 + 3*a^4*d^3)*x^3)*sqrt(d*x^3 + c)*log(((d*x^3 + 2*c)*sqrt(
c) + 2*sqrt(d*x^3 + c)*c)/x^3) + 2*(a^2*b^2*c^3 - 2*a^3*b*c^2*d +
 a^4*c*d^2 + (2*a*b^3*c^2*d - 2*a^2*b^2*c*d^2 + 3*a^3*b*d^3)*x^6
+ (2*a*b^3*c^3 - a^2*b^2*c^2*d - a^3*b*c*d^2 + 3*a^4*d^3)*x^3)*sq
rt(c))/(((a^3*b^3*c^4 - 2*a^4*b^2*c^3*d + a^5*b*c^2*d^2)*x^6 + (a
^4*b^2*c^4 - 2*a^5*b*c^3*d + a^6*c^2*d^2)*x^3)*sqrt(d*x^3 + c)*sq
rt(c)), -1/6*(2*((4*b^4*c^3 - 7*a*b^3*c^2*d)*x^6 + (4*a*b^3*c^3 -
 7*a^2*b^2*c^2*d)*x^3)*sqrt(d*x^3 + c)*sqrt(c)*sqrt(-b/(b*c - a*d
))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b))
- ((4*b^4*c^3 - 5*a*b^3*c^2*d - 2*a^2*b^2*c*d^2 + 3*a^3*b*d^3)*x^
6 + (4*a*b^3*c^3 - 5*a^2*b^2*c^2*d - 2*a^3*b*c*d^2 + 3*a^4*d^3)*x
^3)*sqrt(d*x^3 + c)*log(((d*x^3 + 2*c)*sqrt(c) + 2*sqrt(d*x^3 + c
)*c)/x^3) + 2*(a^2*b^2*c^3 - 2*a^3*b*c^2*d + a^4*c*d^2 + (2*a*b^3
*c^2*d - 2*a^2*b^2*c*d^2 + 3*a^3*b*d^3)*x^6 + (2*a*b^3*c^3 - a^2*
b^2*c^2*d - a^3*b*c*d^2 + 3*a^4*d^3)*x^3)*sqrt(c))/(((a^3*b^3*c^4
 - 2*a^4*b^2*c^3*d + a^5*b*c^2*d^2)*x^6 + (a^4*b^2*c^4 - 2*a^5*b*
c^3*d + a^6*c^2*d^2)*x^3)*sqrt(d*x^3 + c)*sqrt(c)), -1/6*(((4*b^4
*c^3 - 7*a*b^3*c^2*d)*x^6 + (4*a*b^3*c^3 - 7*a^2*b^2*c^2*d)*x^3)*
sqrt(d*x^3 + c)*sqrt(-c)*sqrt(b/(b*c - a*d))*log((b*d*x^3 + 2*b*c
 - a*d + 2*sqrt(d*x^3 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^
3 + a)) + 2*((4*b^4*c^3 - 5*a*b^3*c^2*d - 2*a^2*b^2*c*d^2 + 3*a^3
*b*d^3)*x^6 + (4*a*b^3*c^3 - 5*a^2*b^2*c^2*d - 2*a^3*b*c*d^2 + 3*
a^4*d^3)*x^3)*sqrt(d*x^3 + c)*arctan(c/(sqrt(d*x^3 + c)*sqrt(-c))
) + 2*(a^2*b^2*c^3 - 2*a^3*b*c^2*d + a^4*c*d^2 + (2*a*b^3*c^2*d -
 2*a^2*b^2*c*d^2 + 3*a^3*b*d^3)*x^6 + (2*a*b^3*c^3 - a^2*b^2*c^2*
d - a^3*b*c*d^2 + 3*a^4*d^3)*x^3)*sqrt(-c))/(((a^3*b^3*c^4 - 2*a^
4*b^2*c^3*d + a^5*b*c^2*d^2)*x^6 + (a^4*b^2*c^4 - 2*a^5*b*c^3*d +
 a^6*c^2*d^2)*x^3)*sqrt(d*x^3 + c)*sqrt(-c)), -1/3*(((4*b^4*c^3 -
 7*a*b^3*c^2*d)*x^6 + (4*a*b^3*c^3 - 7*a^2*b^2*c^2*d)*x^3)*sqrt(d
*x^3 + c)*sqrt(-c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(
-b/(b*c - a*d))/(sqrt(d*x^3 + c)*b)) + ((4*b^4*c^3 - 5*a*b^3*c^2*
d - 2*a^2*b^2*c*d^2 + 3*a^3*b*d^3)*x^6 + (4*a*b^3*c^3 - 5*a^2*b^2
*c^2*d - 2*a^3*b*c*d^2 + 3*a^4*d^3)*x^3)*sqrt(d*x^3 + c)*arctan(c
/(sqrt(d*x^3 + c)*sqrt(-c))) + (a^2*b^2*c^3 - 2*a^3*b*c^2*d + a^4
*c*d^2 + (2*a*b^3*c^2*d - 2*a^2*b^2*c*d^2 + 3*a^3*b*d^3)*x^6 + (2
*a*b^3*c^3 - a^2*b^2*c^2*d - a^3*b*c*d^2 + 3*a^4*d^3)*x^3)*sqrt(-
c))/(((a^3*b^3*c^4 - 2*a^4*b^2*c^3*d + a^5*b*c^2*d^2)*x^6 + (a^4*
b^2*c^4 - 2*a^5*b*c^3*d + a^6*c^2*d^2)*x^3)*sqrt(d*x^3 + c)*sqrt(
-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.233655, size = 510, normalized size = 2.12

$$\frac{1}{3}\,d^{3}\left(\frac{\left(4\,b^{4}c-7\,ab^{3}d\right)\,\arctan\left(\frac{\sqrt{dx^{3}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{(a^{3}b^{2}c^{2}d^{3}-2\,a^{4}bcd^{4}+a^{5}d^{5})\sqrt{-b^{2}c+abd}}-\frac{2\left(dx^{3}+c\right)^{2}b^{3}c^{2}-2\left(dx^{3}+c\right)b^{3}c^{3}-2\left(dx^{3}+c\right)^{2}ab^{2}cd+3\left(dx^{3}+c\right)ab^{2}}{(a^{2}b^{2}c^{4}d^{2}-2\,a^{3}bc^{3}d^{3}+a^{4}c^{2}d^{4})\left(\left(dx^{3}+c\right)^{\frac{5}{2}}b-2\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*d^3*((4*b^4*c - 7*a*b^3*d)*arctan(sqrt(d*x^3 + c)*b/sqrt(-b^2
*c + a*b*d))/((a^3*b^2*c^2*d^3 - 2*a^4*b*c*d^4 + a^5*d^5)*sqrt(-b
^2*c + a*b*d)) - (2*(d*x^3 + c)^2*b^3*c^2 - 2*(d*x^3 + c)*b^3*c^3
 - 2*(d*x^3 + c)^2*a*b^2*c*d + 3*(d*x^3 + c)*a*b^2*c^2*d + 3*(d*x
^3 + c)^2*a^2*b*d^2 - 7*(d*x^3 + c)*a^2*b*c*d^2 + 2*a^2*b*c^2*d^2
 + 3*(d*x^3 + c)*a^3*d^3 - 2*a^3*c*d^3)/((a^2*b^2*c^4*d^2 - 2*a^3
*b*c^3*d^3 + a^4*c^2*d^4)*((d*x^3 + c)^(5/2)*b - 2*(d*x^3 + c)^(3
/2)*b*c + sqrt(d*x^3 + c)*b*c^2 + (d*x^3 + c)^(3/2)*a*d - sqrt(d*
x^3 + c)*a*c*d)) - (4*b*c + 3*a*d)*arctan(sqrt(d*x^3 + c)/sqrt(-c
))/(a^3*sqrt(-c)*c^2*d^3))
```

3.495 $\int \frac{x^3}{(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=67

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};2,\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a^2c\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 2, 3/2, 7/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(4*a^2*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.217807, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^4\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};2,\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4a^2c\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 2, 3/2, 7/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(4*a^2*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 27.1566, size = 54, normalized size = 0.81

$$\frac{x^4\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{4}{3},\frac{3}{2},2,\frac{7}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{4a^2c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x**4*sqrt(c + d*x**3)*appellf1(4/3, 3/2, 2, 7/3, -d*x**3/c, -b*x*
*3/a)/(4*a**2*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.762653, size = 346, normalized size = 5.16

$$\frac{x\left(\frac{21abcdx^3F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{32ac(2ad+bc)F_1\left(\frac{1}{3};\frac{1}{2},1\right.}{8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3}\right.\right.}\right.}{12\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)^2}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*(-4*(b*c + 2*a*d + 3*b*d*x^3) + (32*a*c*(b*c + 2*a*d)*AppellF1
[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)])/(8*a*c*AppellF1[1
/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^3)/a)] - 3*x^3*(2*b*c*Appel
lF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[
4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])) + (21*a*b*c*d*x^3
*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])/(-14*a*c
*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(
2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a
```

```
*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)]))))/(1
2*(b*c - a*d)^2*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.069, size = 1593, normalized size = 23.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/b*(2/3*d/c*x/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-2/9*I/c/(a*d-b*c)*3^
(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(
-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(
1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/
2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^
(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/
2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*
(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/d^2*
b*2^(1/2)*sum(1/(a*d-b*c)^2/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x
+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^
(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*
d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(
-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)
^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(
-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*
(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d
/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/
2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d
^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-
c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootO
f(_Z^3*b+a)))-a/b*(1/3*b^2/a/(a*d-b*c)^2*x*(d*x^3+c)^(1/2)/(b*x^3
+a)+2/3*d^2/c*x/(a*d-b*c)^2/((x^3+c/d)*d)^(1/2)-2/3*I*(1/6*b*d/(a
*d-b*c)^2/a+1/3*d^2/c/(a*d-b*c)^2)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1
/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/
2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2))+1/18*I/a/d^2*b*2^(1/2)*sum((13*a*d-4
*b*c)/(a*d-b*c)^3/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3
^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(
x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)
))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1
/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_al
pha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1
/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(
-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^
(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_al
pha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-
3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a
)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3 + a)^2 (dx^3 + c)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate(x^3/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)), x)
```

3.496 $\int \frac{x}{(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=67

$$\frac{x^2\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};2,\frac{3}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2c\sqrt{c+dx^3}}$$

```
[Out] (x^2*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 2, 3/2, 5/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(2*a^2*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.165478, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{x^2\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};2,\frac{3}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2c\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^2*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 2, 3/2, 5/3, -((b*x^3)/a),
 -((d*x^3)/c)])/(2*a^2*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 19.2021, size = 54, normalized size = 0.81

$$\frac{x^2\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},\frac{3}{2},2,\frac{5}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a^2c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x**2*sqrt(c + d*x**3)*appellf1(2/3, 3/2, 2, 5/3, -d*x**3/c, -b*x*
*3/a)/(2*a**2*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 1.03864, size = 482, normalized size = 7.19

$$\frac{x^2\left(\frac{8ac\left(20a^2d^2+18abd^2x^3+b^2c\left(10c+9dx^3\right)\right)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-15x^3\left(2a^2d^2+2abd^2x^3+b^2c\left(c+dx^3\right)\right)\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3}\right.\right.}{ac\left(16acF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)\right)}\right.}{15\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x^2*((-25*(b^2*c^2 - 6*a*b*c*d - a^2*d^2)*AppellF1[2/3, 1/2, 1,
5/3, -((d*x^3)/c), -((b*x^3)/a)])/(-10*a*c*AppellF1[2/3, 1/2, 1,
5/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[5/3, 1/2
, 2, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[5/3, 3/2, 1,
 8/3, -((d*x^3)/c), -((b*x^3)/a)])) + (8*a*c*(20*a^2*d^2 + 18*a*b
*d^2*x^3 + b^2*c*(10*c + 9*d*x^3))*AppellF1[5/3, 1/2, 1, 8/3, -((
d*x^3)/c), -((b*x^3)/a)] - 15*x^3*(2*a^2*d^2 + 2*a*b*d^2*x^3 + b^
2*c*(c + d*x^3))*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c),
```

```
 -((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -(
(b*x^3)/a)]))/(a*c*(16*a*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c
), -((b*x^3)/a)] - 3*x^3*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*
x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3
)/c), -((b*x^3)/a)])))))/(15*(b*c - a*d)^2*(a + b*x^3)*Sqrt[c + d
*x^3])
```

Maple [C] time = 0.063, size = 986, normalized size = 14.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/3*b^2/a/(a*d-b*c)^2*x^2*(d*x^3+c)^(1/2)/(b*x^3+a)+2/3*d^2/c*x^2
/(a*d-b*c)^2/((x^3+c/d)*d)^(1/2)-2/3*I*(-1/6*b*d/(a*d-b*c)^2/a-1/
3*d^2/c/(a*d-b*c)^2)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/
2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(
1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^
(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*Ell
ipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^
2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3)
)^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/18*I/a/d^2*b*2^(1/2)*sum((11
*a*d-2*b*c)/(a*d-b*c)^3/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(
-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*
(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(
1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2
)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)
*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2
)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2
/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I
*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2
/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)
^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3
*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate(x/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)), x)
```

3.497 $\int \frac{1}{(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=62

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};2,\frac{3}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2c\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 2, 3/2, 4/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a^2*c*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.0990805, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};2,\frac{3}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2c\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 2, 3/2, 4/3, -((b*x^3)/a), -
((d*x^3)/c)])/(a^2*c*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 19.5422, size = 51, normalized size = 0.82

$$\frac{x\sqrt{c+dx^3}\operatorname{appellf}_1\left(\frac{1}{3},\frac{3}{2},2,\frac{4}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a^2c^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] x*sqrt(c + d*x**3)*appellf1(1/3, 3/2, 2, 4/3, -d*x**3/c, -b*x**3/
a)/(a**2*c**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.993956, size = 480, normalized size = 7.74

$$\frac{x\left(\frac{7ac\left(16a^2d^2+18abd^2x^3+b^2c\left(8c+9dx^3\right)\right)F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-12x^3\left(2a^2d^2+2abd^2x^3+b^2c\left(c+dx^3\right)\right)\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\right.\right.}{ac\left(14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)\right)}\right.}{12\left(a+bx^3\right)\sqrt{c+dx^3}(bc-ad)^2}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (x*((-32*(2*b^2*c^2 - 6*a*b*c*d + a^2*d^2)*AppellF1[1/3, 1/2, 1,
4/3, -((d*x^3)/c), -((b*x^3)/a)])/(-8*a*c*AppellF1[1/3, 1/2, 1, 4
/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2,
 2, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1,
7/3, -((d*x^3)/c), -((b*x^3)/a)])) + (7*a*c*(16*a^2*d^2 + 18*a*b*
d^2*x^3 + b^2*c*(8*c + 9*d*x^3))*AppellF1[4/3, 1/2, 1, 7/3, -((d*
x^3)/c), -((b*x^3)/a)] - 12*x^3*(2*a^2*d^2 + 2*a*b*d^2*x^3 + b^2*
c*(c + d*x^3))*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -
```

```
((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b
*x^3)/a)]))/(a*c*(14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c),
 -((b*x^3)/a)] - 3*x^3*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^
3)/c), -((b*x^3)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/
c), -((b*x^3)/a)])))))/(12*(b*c - a*d)^2*(a + b*x^3)*Sqrt[c + d*x
^3])
```

Maple [C] time = 0.01, size = 830, normalized size = 13.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/3*b^2/a/(a*d-b*c)^2*x*(d*x^3+c)^(1/2)/(b*x^3+a)+2/3*d^2/c*x/(a*
d-b*c)^2/((x^3+c/d)*d)^(1/2)-2/3*I*(1/6*b*d/(a*d-b*c)^2/a+1/3*d^2
/c/(a*d-b*c)^2)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/
3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2
)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/
d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)
*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d
*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c
*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
))^(1/2))+1/18*I/a/d^2*b*2^(1/2)*sum((13*a*d-4*b*c)/(a*d-b*c)^3/_
alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/
3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3
))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*
(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3
))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_al
pha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^
2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/
d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*
3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I
*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*
(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + a)^2 (dx^3 + c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)), x)
```

3.498 $\int \frac{1}{x^2(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=65

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};2,\frac{3}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2cx\sqrt{c+dx^3}}$$

```
[Out] -((Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 2, 3/2, 2/3, -((b*x^3)/a),
-((d*x^3)/c)])/(a^2*c*x*Sqrt[c + d*x^3]))
```

Rubi [A] time = 0.212587, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};2,\frac{3}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{a^2cx\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -((Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 2, 3/2, 2/3, -((b*x^3)/a),
-((d*x^3)/c)])/(a^2*c*x*Sqrt[c + d*x^3]))
```

Rubi in Sympy [A] time = 23.8358, size = 54, normalized size = 0.83

$$-\frac{\sqrt{c+dx^3}\,\operatorname{appellf}_1\left(-\frac{1}{3},\frac{3}{2},2,\frac{2}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{a^2c^2x\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-1/3, 3/2, 2, 2/3, -d*x**3/c, -b*x**3/
a)/(a**2*c**2*x*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 2.09753, size = 483, normalized size = 7.43

$$-\frac{\frac{16abcdx^6(5a^2d^2-6abcd+4b^2c^2)F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-16acF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{25acx^3(5a^3d^3-6a^2bcd^2+21ab^2c^2d-8b}{10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)-3x^3\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};\right.\right.}}{30a^2c^2x\,(}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-10*(4*b^3*c^2*x^3*(c + d*x^3) + a^3*d^2*(3*c + 5*d*x^3) + 3*a*b
^2*c*(c^2 - c*d*x^3 - 2*d^2*x^6) + a^2*b*d*(-6*c^2 - 3*c*d*x^3 +
5*d^2*x^6)) + (25*a*c*(-8*b^3*c^3 + 21*a*b^2*c^2*d - 6*a^2*b*c*d^
2 + 5*a^3*d^3)*x^3*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*
x^3)/a)])/(10*a*c*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^3)/c), -((b*x
^3)/a)] - 3*x^3*(2*b*c*AppellF1[5/3, 1/2, 2, 8/3, -((d*x^3)/c), -
((b*x^3)/a)] + a*d*AppellF1[5/3, 3/2, 1, 8/3, -((d*x^3)/c), -((b*
x^3)/a)])) - (16*a*b*c*d*(4*b^2*c^2 - 6*a*b*c*d + 5*a^2*d^2)*x^6*
AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)])/(-16*a*c*
```

```
AppellF1[5/3, 1/2, 1, 8/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2
*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^3)/c), -((b*x^3)/a)] + a*
d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^3)/c), -((b*x^3)/a)])))/(30*
a^2*c^2*(b*c - a*d)^2*x*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.018, size = 2383, normalized size = 36.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/a^2*(-2/3*d*x^2/c^2/((x^3+c/d)*d)^(1/2)-(d*x^3+c)^(1/2)/c^2/x-5
/9*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*
3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d
*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^
(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2
)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(
1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3
^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/
d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*
d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2))))-b/a*(1/3*b^2/a/(a*d-b*c)^2*x^2*(d*x^3+c)^(1
/2)/(b*x^3+a)+2/3*d^2/c*x^2/(a*d-b*c)^2/((x^3+c/d)*d)^(1/2)-2/3*I
*(-1/6*b*d/(a*d-b*c)^2/a-1/3*d^2/c/(a*d-b*c)^2)*3^(1/2)/d*(-c*d^2
)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)
)*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d
*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2
/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d
^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^
(1/2)/d*(-c*d^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2
)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))
^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3
^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3
*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3
))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-
3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/1
8*I/a/d^2*b*2^(1/2)*sum((11*a*d-2*b*c)/(a*d-b*c)^3/_alpha*(-c*d^2
)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/
3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)
^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(
1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3
+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(
1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*Ellip
ticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2
*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/
2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*
d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))
)^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a^2*(2/3*d/c*x^2/(a*d-b*c)/(
(x^3+c/d)*d)^(1/2)+2/9*I/c/(a*d-b*c)*3^(1/2)*(-c*d^2)^(1/3)*(I*(x
+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(
-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/
3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1
/2)/(d*x^3+c)^(1/2)*((-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d
^2)^(1/3))*EllipticE(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I
*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(
1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2))+1/d*(-c*d^2)^(1/3)*EllipticF(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2
)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)))+1/3*I/d^2*b*2^(1
/2)*sum(1/(a*d-b*c)^2/_alpha*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I
*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d
*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/
```

```
3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^
(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_
alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^
(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d
*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2
)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_
alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3
)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(
1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b
+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^2), x)
```

3.499 $\int \frac{1}{x^3(a+bx^3)^2(c+dx^3)^{3/2}}\,dx$

Optimal. Leaf size=67

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};2,\frac{3}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2cx^2\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 2, 3/2, 1/3, -((b*x^3)/a), -
((d*x^3)/c)])/(2*a^2*c*x^2*Sqrt[c + d*x^3])
```

Rubi [A] time = 0.205784, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};2,\frac{3}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2a^2cx^2\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] -(Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 2, 3/2, 1/3, -((b*x^3)/a), -
((d*x^3)/c)])/(2*a^2*c*x^2*Sqrt[c + d*x^3])
```

Rubi in Sympy [A] time = 23.4225, size = 58, normalized size = 0.87

$$-\frac{\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{2}{3},\frac{3}{2},2,\frac{1}{3},-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{2a^2c^2x^2\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] -sqrt(c + d*x**3)*appellf1(-2/3, 3/2, 2, 1/3, -d*x**3/c, -b*x**3/
a)/(2*a**2*c**2*x**2*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 2.13514, size = 483, normalized size = 7.21

$$\frac{\frac{7abcdx^6(7a^2d^2-6abcd+5b^2c^2)F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}{3x^3\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)\right)-14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)}+\frac{16acx^3(7a^3d^3-6a^2bcd^2-33ab^2c^2d+20b^3 \ldots}{3x^3\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^3}{c},-\frac{bx^3}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^3}{c} \ldots\right.}}{24a^2c^2x^2\,(a \ldots}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(a + b*x^3)^2*(c + d*x^3)^(3/2)),x]
```

```
[Out] (-4*(5*b^3*c^2*x^3*(c + d*x^3) + a^3*d^2*(3*c + 7*d*x^3) + 3*a*b^
2*c*(c^2 - c*d*x^3 - 2*d^2*x^6) + a^2*b*d*(-6*c^2 - 3*c*d*x^3 + 7
*d^2*x^6)) + (16*a*c*(20*b^3*c^3 - 33*a*b^2*c^2*d - 6*a^2*b*c*d^2
 + 7*a^3*d^3)*x^3*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x
^3)/a)])/(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^3)/c), -((b*x^
3)/a)] + 3*x^3*(2*b*c*AppellF1[4/3, 1/2, 2, 7/3, -((d*x^3)/c), -(
(b*x^3)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/3, -((d*x^3)/c), -((b*x
^3)/a)])) + (7*a*b*c*d*(5*b^2*c^2 - 6*a*b*c*d + 7*a^2*d^2)*x^6*Ap
pellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)])/(-14*a*c*Ap
```

```
pellF1[4/3, 1/2, 1, 7/3, -((d*x^3)/c), -((b*x^3)/a)] + 3*x^3*(2*b
*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^3)/c), -((b*x^3)/a)] + a*d*
AppellF1[7/3, 3/2, 1, 10/3, -((d*x^3)/c), -((b*x^3)/a)])))/(24*a^
2*c^2*(b*c - a*d)^2*x^2*(a + b*x^3)*Sqrt[c + d*x^3])
```

Maple [C] time = 0.017, size = 1919, normalized size = 28.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a)^2/(d*x^3+c)^(3/2),x)
```

```
[Out] 1/a^2*(-1/2/c^2*(d*x^3+c)^(1/2)/x^2-2/3*d/c^2*x/((x^3+c/d)*d)^(1/
2)+7/18*I/c^2*3^(1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1
/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((
x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*
d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*Ell
ipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c
*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2
)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(
1/2)))-b/a*(1/3*b^2/a/(a*d-b*c)^2*x*(d*x^3+c)^(1/2)/(b*x^3+a)+2/3
*d^2/c*x/(a*d-b*c)^2/((x^3+c/d)*d)^(1/2)-2/3*I*(1/6*b*d/(a*d-b*c)
^2/a+1/3*d^2/c/(a*d-b*c)^2)*3^(1/2)/d*(-c*d^2)^(1/3)*(I*(x+1/2/d*
(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)
^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/
2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*
x^3+c)^(1/2)*EllipticF(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2
*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3
^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3)))^(1/2))+1/18*I/a/d^2*b*2^(1/2)*sum((13*a*d-4*b*c)/(
a*d-b*c)^3/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+1/d*(-I*3^(1/2)*
(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)*(d*(x-1/d*(
-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d^2)^(1/3)))^(1/2
)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(
-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^(1/3)*_alpha*3^(
1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-c*d^2)^(1/3)*_al
pha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(x+1/2/d*(-c*d^2)
^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^
(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2)*d-I*_alpha*(-c
*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^2)^(2/3)-3*c*d)/
(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c*d^2)^(1/3)+1/2*
I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf(_Z^3*b+a)))-b/a
^2*(2/3*d/c*x/(a*d-b*c)/((x^3+c/d)*d)^(1/2)-2/9*I/c/(a*d-b*c)*3^(
1/2)*(-c*d^2)^(1/3)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-
c*d^2)^(1/3))*3^(1/2)*d/(-c*d^2)^(1/3))^(1/2)*((x-1/d*(-c*d^2)^(1
/3))/(-3/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2
)*(-I*(x+1/2/d*(-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(
1/2)*d/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*EllipticF(1/3*3^(1/2
)*(I*(x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1
/2)*d/(-c*d^2)^(1/3))^(1/2),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(
-c*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2))+1/3*I/d^2*b
*2^(1/2)*sum(1/(a*d-b*c)^2/_alpha^2*(-c*d^2)^(1/3)*(1/2*I*d*(2*x+
1/d*(-I*3^(1/2)*(-c*d^2)^(1/3)+(-c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(
1/2)*(d*(x-1/d*(-c*d^2)^(1/3))/(-3*(-c*d^2)^(1/3)+I*3^(1/2)*(-c*d
^2)^(1/3)))^(1/2)*(-1/2*I*d*(2*x+1/d*(I*3^(1/2)*(-c*d^2)^(1/3)+(-
c*d^2)^(1/3)))/(-c*d^2)^(1/3))^(1/2)/(d*x^3+c)^(1/2)*(I*(-c*d^2)^
(1/3)*_alpha*3^(1/2)*d+2*_alpha^2*d^2-I*3^(1/2)*(-c*d^2)^(2/3)-(-
c*d^2)^(1/3)*_alpha*d-(-c*d^2)^(2/3))*EllipticPi(1/3*3^(1/2)*(I*(
x+1/2/d*(-c*d^2)^(1/3)-1/2*I*3^(1/2)/d*(-c*d^2)^(1/3))*3^(1/2)*d/
(-c*d^2)^(1/3))^(1/2),1/2*b/d*(2*I*_alpha^2*(-c*d^2)^(1/3)*3^(1/2
)*d-I*_alpha*(-c*d^2)^(2/3)*3^(1/2)+I*3^(1/2)*c*d-3*_alpha*(-c*d^
2)^(2/3)-3*c*d)/(a*d-b*c),(I*3^(1/2)/d*(-c*d^2)^(1/3)/(-3/2/d*(-c
*d^2)^(1/3)+1/2*I*3^(1/2)/d*(-c*d^2)^(1/3)))^(1/2)),_alpha=RootOf
(_Z^3*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^3), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^3),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/(b*x**3+a)**2/(d*x**3+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+a)^2(dx^3+c)^{\frac{3}{2}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a)^2*(d*x^3 + c)^(3/2)*x^3), x)
```

3.500 $\int (ex)^m \left(a+bx^3\right)^{5/2} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=134

$$\frac{2B\left(a+bx^3\right)^{7/2}(ex)^{m+1}}{be(2m+23)}-\frac{a^2\sqrt{a+bx^3}(ex)^{m+1}(2aB(m+1)-Ab(2m+23))\,{}_2F_1\left(-\frac{5}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{be(m+1)(2m+23)\sqrt{\frac{bx^3}{a}+1}}$$

```
[Out] (2*B*(e*x)^(1 + m)*(a + b*x^3)^(7/2))/(b*e*(23 + 2*m)) - (a^2*(2*
a*B*(1 + m) - A*b*(23 + 2*m))*(e*x)^(1 + m)*Sqrt[a + b*x^3]*Hyper
geometric2F1[-5/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(b*e*(1 +
 m)*(23 + 2*m)*Sqrt[1 + (b*x^3)/a])
```

Rubi [A] time = 0.269361, antiderivative size = 134, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{a^2\sqrt{a+bx^3}(ex)^{m+1}\left(\frac{A}{m+1}-\frac{2aB}{2bm+23b}\right)\,{}_2F_1\left(-\frac{5}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{e\sqrt{\frac{bx^3}{a}+1}}+\frac{2B\left(a+bx^3\right)^{7/2}(ex)^{m+1}}{be(2m+23)}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (2*B*(e*x)^(1 + m)*(a + b*x^3)^(7/2))/(b*e*(23 + 2*m)) + (a^2*(A/
(1 + m) - (2*a*B)/(23*b + 2*b*m))*(e*x)^(1 + m)*Sqrt[a + b*x^3]*H
ypergeometric2F1[-5/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(e*Sq
rt[1 + (b*x^3)/a])
```

Rubi in Sympy [A] time = 18.8742, size = 112, normalized size = 0.84

$$\frac{2B\,(ex)^{m+1}\left(a+bx^3\right)^{\frac{7}{2}}}{be\,(2m+23)}+\frac{a^2\,(ex)^{m+1}\sqrt{a+bx^3}\,(Ab\,(2m+23)-2Ba\,(m+1))\,{}_2F_1\left(\begin{matrix}-\frac{5}{2},\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{be\sqrt{1+\frac{bx^3}{a}}\,(m+1)\,(2m+23)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(b*x**3+a)**(5/2)*(B*x**3+A),x)
```

```
[Out] 2*B*(e*x)**(m + 1)*(a + b*x**3)**(7/2)/(b*e*(2*m + 23)) + a**2*(e
*x)**(m + 1)*sqrt(a + b*x**3)*(A*b*(2*m + 23) - 2*B*a*(m + 1))*hy
per((-5/2, m/3 + 1/3), (m/3 + 4/3,), -b*x**3/a)/(b*e*sqrt(1 + b*x
**3/a)*(m + 1)*(2*m + 23))
```

Mathematica [A] time = 0.506887, size = 200, normalized size = 1.49

$$\frac{x\sqrt{a+bx^3}(ex)^m\left(\frac{a^2A\,{}_2F_1\left(-\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{m+1}+\frac{ax^3(aB+2Ab)\,{}_2F_1\left(-\frac{1}{2},\frac{m+4}{3};\frac{m+7}{3};-\frac{bx^3}{a}\right)}{m+4}+bx^6\left(\frac{(2aB+Ab)\,{}_2F_1\left(-\frac{1}{2},\frac{m+7}{3};\frac{m+10}{3};-\frac{bx^3}{a}\right)}{m+7}+\frac{bBx^3\,{}_2F_1}{}\right.\right.}{\sqrt{\frac{bx^3}{a}+1}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^m*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (x*(e*x)^m*Sqrt[a + b*x^3]*((a^2*A*Hypergeometric2F1[-1/2, (1 + m
)/3, (4 + m)/3, -((b*x^3)/a)])/(1 + m) + (a*(2*A*b + a*B)*x^3*Hyp
ergeometric2F1[-1/2, (4 + m)/3, (7 + m)/3, -((b*x^3)/a)])/(4 + m)
 + b*x^6*(((A*b + 2*a*B)*Hypergeometric2F1[-1/2, (7 + m)/3, (10 +
 m)/3, -((b*x^3)/a)])/(7 + m) + (b*B*x^3*Hypergeometric2F1[-1/2,
(10 + m)/3, (13 + m)/3, -((b*x^3)/a)])/(10 + m))))/Sqrt[1 + (b*x^
3)/a]
```

Maple [F] time = 0.034, size = 0, normalized size = 0.

$$\int (ex)^m \left(bx^3+a\right)^{\frac{5}{2}} \left(Bx^3+A\right) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*(b*x^3+a)^(5/2)*(B*x^3+A),x)
```

```
[Out] int((e*x)^m*(b*x^3+a)^(5/2)*(B*x^3+A),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3+A\right) \left(bx^3+a\right)^{\frac{5}{2}} (ex)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^m,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bb^2x^9 + \left(2\,Bab + Ab^2\right)x^6 + \left(Ba^2 + 2\,Aab\right)x^3 + Aa^2\right)\sqrt{bx^3+a}\,(ex)^m\,,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^m,x, algorithm="fricas")
```

```
[Out] integral((B*b^2*x^9 + (2*B*a*b + A*b^2)*x^6 + (B*a^2 + 2*A*a*b)*x
^3 + A*a^2)*sqrt(b*x^3 + a)*(e*x)^m, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*(b*x**3+a)**(5/2)*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3+A\right) \left(bx^3+a\right)^{\frac{5}{2}} (ex)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^m,x, algorithm="giac")

[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^m, x)
```

3.501 $\int (ex)^m \left(a+bx^3\right)^{3/2} \left(A+Bx^3\right)\,dx$

Optimal. Leaf size=132

$$\frac{2B\left(a+bx^3\right)^{5/2}(ex)^{m+1}}{be(2m+17)}-\frac{a\sqrt{a+bx^3}(ex)^{m+1}(2aB(m+1)-Ab(2m+17))\,{}_2F_1\left(-\frac{3}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{be(m+1)(2m+17)\sqrt{\frac{bx^3}{a}+1}}$$

```
[Out] (2*B*(e*x)^(1 + m)*(a + b*x^3)^(5/2))/(b*e*(17 + 2*m)) - (a*(2*a*
B*(1 + m) - A*b*(17 + 2*m))*(e*x)^(1 + m)*Sqrt[a + b*x^3]*Hyperge
ometric2F1[-3/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(b*e*(1 + m
)*(17 + 2*m)*Sqrt[1 + (b*x^3)/a])
```

Rubi [A] time = 0.246178, antiderivative size = 132, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{a\sqrt{a+bx^3}(ex)^{m+1}\left(\frac{A}{m+1}-\frac{2aB}{2bm+17b}\right)\,{}_2F_1\left(-\frac{3}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{e\sqrt{\frac{bx^3}{a}+1}}+\frac{2B\left(a+bx^3\right)^{5/2}(ex)^{m+1}}{be(2m+17)}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (2*B*(e*x)^(1 + m)*(a + b*x^3)^(5/2))/(b*e*(17 + 2*m)) + (a*(A/(1
 + m) - (2*a*B)/(17*b + 2*b*m))*(e*x)^(1 + m)*Sqrt[a + b*x^3]*Hyp
ergeometric2F1[-3/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(e*Sqrt
[1 + (b*x^3)/a])
```

Rubi in Sympy [A] time = 17.8444, size = 110, normalized size = 0.83

$$\frac{2B(ex)^{m+1}\left(a+bx^3\right)^{\frac{5}{2}}}{be(2m+17)}+\frac{a(ex)^{m+1}\sqrt{a+bx^3}\,(Ab(2m+17)-2Ba(m+1))\,{}_2F_1\left(\begin{matrix}-\frac{3}{2},\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{be\sqrt{1+\frac{bx^3}{a}}(m+1)(2m+17)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] 2*B*(e*x)**(m + 1)*(a + b*x**3)**(5/2)/(b*e*(2*m + 17)) + a*(e*x)
**(m + 1)*sqrt(a + b*x**3)*(A*b*(2*m + 17) - 2*B*a*(m + 1))*hyper
((-3/2, m/3 + 1/3), (m/3 + 4/3,), -b*x**3/a)/(b*e*sqrt(1 + b*x**3
/a)*(m + 1)*(2*m + 17))
```

Mathematica [A] time = 0.222564, size = 149, normalized size = 1.13

$$\frac{x\sqrt{a+bx^3}(ex)^m\left(\frac{x^3(aB+Ab)\,{}_2F_1\left(-\frac{1}{2},\frac{m+4}{3};\frac{m+7}{3};-\frac{bx^3}{a}\right)}{m+4}+\frac{aA\,{}_2F_1\left(-\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{m+1}+\frac{bBx^6\,{}_2F_1\left(-\frac{1}{2},\frac{m+7}{3};\frac{m+10}{3};-\frac{bx^3}{a}\right)}{m+7}\right)}{\sqrt{\frac{bx^3}{a}+1}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^m*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (x*(e*x)^m*Sqrt[a + b*x^3]*((a*A*Hypergeometric2F1[-1/2, (1 + m)/
3, (4 + m)/3, -((b*x^3)/a)])/(1 + m) + ((A*b + a*B)*x^3*Hypergeom
etric2F1[-1/2, (4 + m)/3, (7 + m)/3, -((b*x^3)/a)])/(4 + m) + (b*
B*x^6*Hypergeometric2F1[-1/2, (7 + m)/3, (10 + m)/3, -((b*x^3)/a)
])/(7 + m)))/Sqrt[1 + (b*x^3)/a]
```

Maple [F] time = 0.033, size = 0, normalized size = 0.

$$\int (ex)^m \left(bx^3+a\right)^{\frac{3}{2}} \left(Bx^3+A\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] int((e*x)^m*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3+A\right)\left(bx^3+a\right)^{\frac{3}{2}} (ex)^m\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^m,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bbx^6+(Ba+Ab)x^3+Aa\right)\sqrt{bx^3+a}\,(ex)^m, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^m,x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)*(e*x)^
m, x)
```

Sympy [A] time = 90.502, size = 252, normalized size = 1.91

$$\frac{Aa^{\frac{3}{2}}e^m x x^m \left(\frac{m}{3}+\frac{1}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{m}{3}+\frac{1}{3} \\ \frac{m}{3}+\frac{4}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\left(\frac{m}{3}+\frac{4}{3}\right)} + \frac{A\sqrt{a}be^m x^4 x^m \left(\frac{m}{3}+\frac{4}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{m}{3}+\frac{4}{3} \\ \frac{m}{3}+\frac{7}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\left(\frac{m}{3}+\frac{7}{3}\right)} + \frac{Ba^{\frac{3}{2}}e^m x^4 x^m \left(\frac{m}{3}+\frac{4}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{m}{3}+\frac{4}{3} \\ \frac{m}{3}+\frac{7}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\left(\frac{m}{3}+\frac{7}{3}\right)} + \frac{B\sqrt{a}be^m x^7 x^m \left(\frac{m}{3}+\frac{7}{3}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{m}{3}+\frac{7}{3} \\ \frac{m}{3}+\frac{10}{3} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\left(\frac{m}{3}+\frac{10}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] A*a**(3/2)*e**m*x*x**m*gamma(m/3 + 1/3)*hyper((-1/2, m/3 + 1/3),
(m/3 + 4/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(m/3 + 4/3)) + A*
sqrt(a)*b*e**m*x**4*x**m*gamma(m/3 + 4/3)*hyper((-1/2, m/3 + 4/3)
, (m/3 + 7/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(m/3 + 7/3)) +
B*a**(3/2)*e**m*x**4*x**m*gamma(m/3 + 4/3)*hyper((-1/2, m/3 + 4/3
), (m/3 + 7/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(m/3 + 7/3)) +
 B*sqrt(a)*b*e**m*x**7*x**m*gamma(m/3 + 7/3)*hyper((-1/2, m/3 + 7
/3), (m/3 + 10/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(m/3 + 10/3
))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}}(ex)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^m,x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^m, x)
```

3.502 $\int (ex)^m \sqrt{a+bx^3} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=131

$$\frac{2B\left(a+bx^3\right)^{3/2}(ex)^{m+1}}{be(2m+11)}-\frac{\sqrt{a+bx^3}(ex)^{m+1}(2aB(m+1)-Ab(2m+11))\,{}_2F_1\left(-\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{be(m+1)(2m+11)\sqrt{\frac{bx^3}{a}+1}}$$

```
[Out] (2*B*(e*x)^(1 + m)*(a + b*x^3)^(3/2))/(b*e*(11 + 2*m)) - ((2*a*B*
(1 + m) - A*b*(11 + 2*m))*(e*x)^(1 + m)*Sqrt[a + b*x^3]*Hypergeom
etric2F1[-1/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(b*e*(1 + m)*
(11 + 2*m)*Sqrt[1 + (b*x^3)/a])
```

Rubi [A] time = 0.244327, antiderivative size = 131, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\sqrt{a+bx^3}(ex)^{m+1}\left(\frac{A}{m+1}-\frac{2aB}{2bm+11b}\right)\,{}_2F_1\left(-\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{e\sqrt{\frac{bx^3}{a}+1}}+\frac{2B\left(a+bx^3\right)^{3/2}(ex)^{m+1}}{be(2m+11)}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (2*B*(e*x)^(1 + m)*(a + b*x^3)^(3/2))/(b*e*(11 + 2*m)) + ((A/(1 +
 m) - (2*a*B)/(11*b + 2*b*m))*(e*x)^(1 + m)*Sqrt[a + b*x^3]*Hyper
geometric2F1[-1/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(e*Sqrt[1
 + (b*x^3)/a])
```

Rubi in Sympy [A] time = 17.5889, size = 109, normalized size = 0.83

$$\frac{2B(ex)^{m+1}\left(a+bx^3\right)^{\frac{3}{2}}}{be\,(2m+11)}+\frac{(ex)^{m+1}\sqrt{a+bx^3}\,(Ab\,(2m+11)-2Ba\,(m+1))\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{be\sqrt{1+\frac{bx^3}{a}}\,(m+1)\,(2m+11)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(b*x**3+a)**(1/2)*(B*x**3+A),x)
```

```
[Out] 2*B*(e*x)**(m + 1)*(a + b*x**3)**(3/2)/(b*e*(2*m + 11)) + (e*x)**
(m + 1)*sqrt(a + b*x**3)*(A*b*(2*m + 11) - 2*B*a*(m + 1))*hyper((
-1/2, m/3 + 1/3), (m/3 + 4/3,), -b*x**3/a)/(b*e*sqrt(1 + b*x**3/a
)*(m + 1)*(2*m + 11))
```

Mathematica [A] time = 0.107004, size = 110, normalized size = 0.84

$$\frac{x\sqrt{a+bx^3}(ex)^m\left(A(m+4)\,{}_2F_1\left(-\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)+B(m+1)x^3\,{}_2F_1\left(-\frac{1}{2},\frac{m+4}{3};\frac{m+7}{3};-\frac{bx^3}{a}\right)\right)}{(m+1)(m+4)\sqrt{\frac{bx^3}{a}+1}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^m*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (x*(e*x)^m*Sqrt[a + b*x^3]*(A*(4 + m)*Hypergeometric2F1[-1/2, (1
+ m)/3, (4 + m)/3, -((b*x^3)/a)] + B*(1 + m)*x^3*Hypergeometric2F
1[-1/2, (4 + m)/3, (7 + m)/3, -((b*x^3)/a)]))/((1 + m)*(4 + m)*Sq
rt[1 + (b*x^3)/a])
```

Maple [F] time = 0.033, size = 0, normalized size = 0.

$$\int (ex)^m \sqrt{bx^3+a}\left(Bx^3+A\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*(b*x^3+a)^(1/2)*(B*x^3+A),x)
```

```
[Out] int((e*x)^m*(b*x^3+a)^(1/2)*(B*x^3+A),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3+A\right)\sqrt{bx^3+a}\,(ex)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^m,x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bx^3+A\right)\sqrt{bx^3+a}\,(ex)^m\,,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^m,x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^m, x)
```

Sympy [A] time = 11.3943, size = 122, normalized size = 0.93

$$\frac{A\sqrt{a}e^m x x^m \Gamma\left(\frac{m}{3}+\frac{1}{3}\right) {}_2F_1\left(\left.\begin{matrix}-\frac{1}{2}, \frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\right|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{m}{3}+\frac{4}{3}\right)}+\frac{B\sqrt{a}e^m x^4 x^m \Gamma\left(\frac{m}{3}+\frac{4}{3}\right) {}_2F_1\left(\left.\begin{matrix}-\frac{1}{2}, \frac{m}{3}+\frac{4}{3}\\ \frac{m}{3}+\frac{7}{3}\end{matrix}\right|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{m}{3}+\frac{7}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*(b*x**3+a)**(1/2)*(B*x**3+A),x)
```

```
[Out] A*sqrt(a)*e**m*x*x**m*gamma(m/3 + 1/3)*hyper((-1/2, m/3 + 1/3), (
m/3 + 4/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(m/3 + 4/3)) + B*s
qrt(a)*e**m*x**4*x**m*gamma(m/3 + 4/3)*hyper((-1/2, m/3 + 4/3), (
m/3 + 7/3,), b*x**3*exp_polar(I*pi)/a)/(3*gamma(m/3 + 7/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\sqrt{bx^3 + a}\,(ex)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^m,x, algorithm="giac")

[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^m, x)
```

3.503 $\int \frac{(ex)^m (A+Bx^3)}{\sqrt{a+bx^3}} dx$

Optimal. Leaf size=131

$$\frac{2B\sqrt{a+bx^3}(ex)^{m+1}}{be(2m+5)} - \frac{\sqrt{\frac{bx^3}{a}+1}(ex)^{m+1}(2aB(m+1)-Ab(2m+5))\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{be(m+1)(2m+5)\sqrt{a+bx^3}}$$

```
[Out] (2*B*(e*x)^(1 + m)*Sqrt[a + b*x^3])/(b*e*(5 + 2*m)) - ((2*a*B*(1
+ m) - A*b*(5 + 2*m))*(e*x)^(1 + m)*Sqrt[1 + (b*x^3)/a]*Hypergeom
etric2F1[1/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(b*e*(1 + m)*(
5 + 2*m)*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.243811, antiderivative size = 131, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\sqrt{\frac{bx^3}{a}+1}(ex)^{m+1}\left(\frac{A}{m+1}-\frac{2aB}{2bm+5b}\right)\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{e\sqrt{a+bx^3}} + \frac{2B\sqrt{a+bx^3}(ex)^{m+1}}{be(2m+5)}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^m*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (2*B*(e*x)^(1 + m)*Sqrt[a + b*x^3])/(b*e*(5 + 2*m)) + ((A/(1 + m)
 - (2*a*B)/(5*b + 2*b*m))*(e*x)^(1 + m)*Sqrt[1 + (b*x^3)/a]*Hyper
geometric2F1[1/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(e*Sqrt[a
+ b*x^3])
```

Rubi in Sympy [A] time = 18.8866, size = 109, normalized size = 0.83

$$\frac{2B\,(ex)^{m+1}\sqrt{a+bx^3}}{be\,(2m+5)} + \frac{(ex)^{m+1}\sqrt{a+bx^3}\,(Ab\,(2m+5)-2Ba\,(m+1))\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{abe\sqrt{1+\frac{bx^3}{a}}\,(m+1)\,(2m+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*B*(e*x)**(m + 1)*sqrt(a + b*x**3)/(b*e*(2*m + 5)) + (e*x)**(m +
 1)*sqrt(a + b*x**3)*(A*b*(2*m + 5) - 2*B*a*(m + 1))*hyper((1/2,
m/3 + 1/3), (m/3 + 4/3,), -b*x**3/a)/(a*b*e*sqrt(1 + b*x**3/a)*(m
 + 1)*(2*m + 5))
```

Mathematica [A] time = 0.142292, size = 110, normalized size = 0.84

$$\frac{x\sqrt{a+bx^3}(ex)^m\left((Ab-aB)\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)+aB\,{}_2F_1\left(-\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)\right)}{ab(m+1)\sqrt{\frac{bx^3}{a}+1}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^m*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (x*(e*x)^m*Sqrt[a + b*x^3]*(a*B*Hypergeometric2F1[-1/2, (1 + m)/3
, (4 + m)/3, -((b*x^3)/a)] + (A*b - a*B)*Hypergeometric2F1[1/2, (
```

```
1 + m)/3, (4 + m)/3, -((b*x^3)/a)]))/(a*b*(1 + m)*Sqrt[1 + (b*x^3
)/a])
```

Maple [F] time = 0.036, size = 0, normalized size = 0.

$$\int (ex)^m \left(Bx^3 + A\right) \frac{1}{\sqrt{bx^3 + a}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] int((e*x)^m*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)(ex)^m}{\sqrt{bx^3 + a}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^m/sqrt(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bx^3 + A\right)(ex)^m}{\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*(e*x)^m/sqrt(b*x^3 + a), x)
```

Sympy [A] time = 7.47346, size = 119, normalized size = 0.91

$$\frac{Ae^m x x^m \Gamma\left(\frac{m}{3} + \frac{1}{3}\right) {}_2F_1\left(\begin{matrix} \frac{1}{2}, \frac{m}{3} + \frac{1}{3} \\ \frac{m}{3} + \frac{4}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{m}{3} + \frac{4}{3}\right)} + \frac{Be^m x^4 x^m \Gamma\left(\frac{m}{3} + \frac{4}{3}\right) {}_2F_1\left(\begin{matrix} \frac{1}{2}, \frac{m}{3} + \frac{4}{3} \\ \frac{m}{3} + \frac{7}{3} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{m}{3} + \frac{7}{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] A*e**m*x*x**m*gamma(m/3 + 1/3)*hyper((1/2, m/3 + 1/3), (m/3 + 4/3
,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(m/3 + 4/3)) + B*e*
*m*x**4*x**m*gamma(m/3 + 4/3)*hyper((1/2, m/3 + 4/3), (m/3 + 7/3,
), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(m/3 + 7/3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^m}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^m/sqrt(b*x^3 + a), x)
```

3.504 $\int \frac{(ex)^m(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=133

$$\frac{\sqrt{\frac{bx^3}{a}+1}(ex)^{m+1}(2aB(m+1)+A(b-2bm))\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{3abe(m+1)\sqrt{a+bx^3}}+\frac{2(ex)^{m+1}(Ab-aB)}{3abe\sqrt{a+bx^3}}$$

```
[Out] (2*(A*b - a*B)*(e*x)^(1 + m))/(3*a*b*e*Sqrt[a + b*x^3]) + ((2*a*B
*(1 + m) + A*(b - 2*b*m))*(e*x)^(1 + m)*Sqrt[1 + (b*x^3)/a]*Hyper
geometric2F1[1/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(3*a*b*e*(
1 + m)*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.239268, antiderivative size = 133, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\sqrt{\frac{bx^3}{a}+1}(ex)^{m+1}(2aB(m+1)+A(b-2bm))\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{3abe(m+1)\sqrt{a+bx^3}}+\frac{2(ex)^{m+1}(Ab-aB)}{3abe\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^m*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(A*b - a*B)*(e*x)^(1 + m))/(3*a*b*e*Sqrt[a + b*x^3]) + ((2*a*B
*(1 + m) + A*(b - 2*b*m))*(e*x)^(1 + m)*Sqrt[1 + (b*x^3)/a]*Hyper
geometric2F1[1/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(3*a*b*e*(
1 + m)*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 18.8188, size = 112, normalized size = 0.84

$$\frac{2\,(ex)^{m+1}\,(Ab-Ba)}{3abe\sqrt{a+bx^3}}+\frac{2\,(ex)^{m+1}\,\sqrt{a+bx^3}\left(\frac{Ab(-2m+1)}{2}+Ba\,(m+1)\right){}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{3a^2be\sqrt{1+\frac{bx^3}{a}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*(e*x)**(m + 1)*(A*b - B*a)/(3*a*b*e*sqrt(a + b*x**3)) + 2*(e*x)
**(m + 1)*sqrt(a + b*x**3)*(A*b*(-2*m + 1)/2 + B*a*(m + 1))*hyper
((1/2, m/3 + 1/3), (m/3 + 4/3,), -b*x**3/a)/(3*a**2*b*e*sqrt(1 +
b*x**3/a)*(m + 1))
```

Mathematica [A] time = 0.143381, size = 110, normalized size = 0.83

$$\frac{x\sqrt{\frac{bx^3}{a}+1}(ex)^m\left((Ab-aB)\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)+aB\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)\right)}{ab(m+1)\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^m*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (x*(e*x)^m*Sqrt[1 + (b*x^3)/a]*(a*B*Hypergeometric2F1[1/2, (1 + m
)/3, (4 + m)/3, -((b*x^3)/a)] + (A*b - a*B)*Hypergeometric2F1[3/2
```

```
, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)]))/(a*b*(1 + m)*Sqrt[a + b*x
^3])
```

Maple [F] time = 0.034, size = 0, normalized size = 0.

$$\int (ex)^m \left(Bx^3 + A\right) \left(bx^3 + a\right)^{-\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m*(B*x^3+A)/(b*x^3+a)^(3/2),x)

[Out] int((e*x)^m*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)(ex)^m}{\left(bx^3 + a\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(3/2),x, algorithm="maxima")

[Out] integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bx^3 + A\right)(ex)^m}{\left(bx^3 + a\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(3/2),x, algorithm="fricas")

[Out] integral((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(3/2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m*(B*x**3+A)/(b*x**3+a)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)(ex)^m}{\left(bx^3 + a\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(3/2), x)
```

3.505 $\int \frac{(ex)^m (A+Bx^3)}{(a+bx^3)^{5/2}} \, dx$

Optimal. Leaf size=133

$$\frac{\sqrt{\frac{bx^3}{a}+1}(ex)^{m+1}(2aB(m+1)+Ab(7-2m))\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{9a^2be(m+1)\sqrt{a+bx^3}}+\frac{2(ex)^{m+1}(Ab-aB)}{9abe\,(a+bx^3)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*(e*x)^(1 + m))/(9*a*b*e*(a + b*x^3)^(3/2)) + ((A*b
*(7 - 2*m) + 2*a*B*(1 + m))*(e*x)^(1 + m)*Sqrt[1 + (b*x^3)/a]*Hyp
ergeometric2F1[3/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(9*a^2*b
*e*(1 + m)*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.242909, antiderivative size = 133, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\sqrt{\frac{bx^3}{a}+1}(ex)^{m+1}(2aB(m+1)+Ab(7-2m))\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)}{9a^2be(m+1)\sqrt{a+bx^3}}+\frac{2(ex)^{m+1}(Ab-aB)}{9abe\,(a+bx^3)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^m*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*(A*b - a*B)*(e*x)^(1 + m))/(9*a*b*e*(a + b*x^3)^(3/2)) + ((A*b
*(7 - 2*m) + 2*a*B*(1 + m))*(e*x)^(1 + m)*Sqrt[1 + (b*x^3)/a]*Hyp
ergeometric2F1[3/2, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)])/(9*a^2*b
*e*(1 + m)*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 18.8836, size = 112, normalized size = 0.84

$$\frac{2\,(ex)^{m+1}\,(Ab-Ba)}{9abe\,(a+bx^3)^{\frac{3}{2}}}+\frac{2\,(ex)^{m+1}\,\sqrt{a+bx^3}\left(\frac{Ab(-2m+7)}{2}+Ba\,(m+1)\right){}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{m}{3}+\frac{1}{3}\\ \frac{m}{3}+\frac{4}{3}\end{matrix}\middle|-\frac{bx^3}{a}\right)}{9a^3be\sqrt{1+\frac{bx^3}{a}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*(e*x)**(m + 1)*(A*b - B*a)/(9*a*b*e*(a + b*x**3)**(3/2)) + 2*(e
*x)**(m + 1)*sqrt(a + b*x**3)*(A*b*(-2*m + 7)/2 + B*a*(m + 1))*hy
per((3/2, m/3 + 1/3), (m/3 + 4/3,), -b*x**3/a)/(9*a**3*b*e*sqrt(1
 + b*x**3/a)*(m + 1))
```

Mathematica [A] time = 0.147853, size = 110, normalized size = 0.83

$$\frac{x\sqrt{\frac{bx^3}{a}+1}(ex)^m\left((Ab-aB)\,{}_2F_1\left(\frac{5}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)+aB\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{3};\frac{m+4}{3};-\frac{bx^3}{a}\right)\right)}{a^2b(m+1)\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^m*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (x*(e*x)^m*Sqrt[1 + (b*x^3)/a]*(a*B*Hypergeometric2F1[3/2, (1 + m
)/3, (4 + m)/3, -((b*x^3)/a)] + (A*b - a*B)*Hypergeometric2F1[5/2
```

```
, (1 + m)/3, (4 + m)/3, -((b*x^3)/a)]))/(a^2*b*(1 + m)*Sqrt[a + b
*x^3])
```

Maple [F] time = 0.034, size = 0, normalized size = 0.

$$\int (ex)^m \left(Bx^3 + A\right) \left(bx^3 + a\right)^{-\frac{5}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] int((e*x)^m*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right) (ex)^m}{\left(bx^3 + a\right)^{\frac{5}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bx^3 + A\right) (ex)^m}{(b^2x^6 + 2\,abx^3 + a^2)\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*(e*x)^m/((b^2*x^6 + 2*a*b*x^3 + a^2)*sqrt(b*
x^3 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right) (ex)^m}{\left(bx^3 + a\right)^{\frac{5}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(5/2),x, algorithm="giac")

[Out] integrate((B*x^3 + A)*(e*x)^m/(b*x^3 + a)^(5/2), x)
```

3.506 $\int \frac{x^5}{\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=88

$$\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}}{3bd}-\frac{(ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^3}}{\sqrt{b}\sqrt{c+dx^3}}\right)}{3b^{3/2}d^{3/2}}$$

```
[Out] (Sqrt[a + b*x^3]*Sqrt[c + d*x^3])/(3*b*d) - ((b*c + a*d)*ArcTanh[
(Sqrt[d]*Sqrt[a + b*x^3])/(Sqrt[b]*Sqrt[c + d*x^3])])/(3*b^(3/2)*
d^(3/2))
```

Rubi [A] time = 0.264225, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}}{3bd}-\frac{(ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^3}}{\sqrt{b}\sqrt{c+dx^3}}\right)}{3b^{3/2}d^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (Sqrt[a + b*x^3]*Sqrt[c + d*x^3])/(3*b*d) - ((b*c + a*d)*ArcTanh[
(Sqrt[d]*Sqrt[a + b*x^3])/(Sqrt[b]*Sqrt[c + d*x^3])])/(3*b^(3/2)*
d^(3/2))
```

Rubi in Sympy [A] time = 18.3217, size = 75, normalized size = 0.85

$$\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}}{3bd}-\frac{(ad+bc)\operatorname{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^3}}{\sqrt{b}\sqrt{c+dx^3}}\right)}{3b^{\frac{3}{2}}d^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] sqrt(a + b*x**3)*sqrt(c + d*x**3)/(3*b*d) - (a*d + b*c)*atanh(sqr
t(d)*sqrt(a + b*x**3)/(sqrt(b)*sqrt(c + d*x**3)))/(3*b**(3/2)*d**
(3/2))
```

Mathematica [A] time = 0.121773, size = 103, normalized size = 1.17

$$\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}}{3bd}-\frac{(ad+bc)\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^3}\sqrt{c+dx^3}+ad+bc+2bdx^3\right)}{6b^{3/2}d^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (Sqrt[a + b*x^3]*Sqrt[c + d*x^3])/(3*b*d) - ((b*c + a*d)*Log[b*c
+ a*d + 2*b*d*x^3 + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^3]*Sqrt[c + d*
x^3]])/(6*b^(3/2)*d^(3/2))
```

Maple [F] time = 0.082, size = 0, normalized size = 0.

$$\int x^5 \frac{1}{\sqrt{bx^3+a}} \frac{1}{\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

```
[Out] int(x^5/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.257652, size = 1, normalized size = 0.01

$$\left[\frac{(bc+ad)\log\left(-4\left(2\,b^2d^2x^3+b^2cd+abd^2\right)\sqrt{bx^3+a}\sqrt{dx^3+c}+\left(8\,b^2d^2x^6+b^2c^2+6\,abcd+a^2d^2+8\left(b^2cd+abd^2\right)x^3\right)\sqrt{bd}\cdots\right.}{12\sqrt{bd}bd},\ -\frac{(bc+ad)\arctan\left(\frac{\left(2\,bdx^3+bc+ad\right)\sqrt{-bd}}{2\sqrt{bx^3+a}\sqrt{dx^3+c}bd}\right)-2\sqrt{bx^3+a}\sqrt{dx^3+c}\sqrt{-bd}}{6\sqrt{-bd}bd}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [1/12*((b*c + a*d)*log(-4*(2*b^2*d^2*x^3 + b^2*c*d + a*b*d^2)*sqr
t(b*x^3 + a)*sqrt(d*x^3 + c) + (8*b^2*d^2*x^6 + b^2*c^2 + 6*a*b*c
*d + a^2*d^2 + 8*(b^2*c*d + a*b*d^2)*x^3)*sqrt(b*d)) + 4*sqrt(b*x
^3 + a)*sqrt(d*x^3 + c)*sqrt(b*d))/(sqrt(b*d)*b*d), -1/6*((b*c +
a*d)*arctan(1/2*(2*b*d*x^3 + b*c + a*d)*sqrt(-b*d)/(sqrt(b*x^3 +
a)*sqrt(d*x^3 + c)*b*d)) - 2*sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*sqrt
(-b*d))/(sqrt(-b*d)*b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**5/(sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.235647, size = 140, normalized size = 1.59

$$\frac{\frac{(bc+ad)\ln\left(\left|-\sqrt{bx^3+a}\sqrt{bd}+\sqrt{b^2c+(bx^3+a)bd-abd}\right|\right)}{\sqrt{bd}d}+\frac{\sqrt{bx^3+a}\sqrt{b^2c+(bx^3+a)bd-abd}}{bd}}{3\,|b|}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] 1/3*((b*c + a*d)*ln(abs(-sqrt(b*x^3 + a)*sqrt(b*d) + sqrt(b^2*c +
 (b*x^3 + a)*b*d - a*b*d)))/(sqrt(b*d)*d) + sqrt(b*x^3 + a)*sqrt(
b^2*c + (b*x^3 + a)*b*d - a*b*d)/(b*d))/abs(b)
```

3.507 $\int \frac{x^2}{\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=48

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^3}}{\sqrt{b}\sqrt{c+dx^3}}\right)}{3\sqrt{b}\sqrt{d}}$$

```
[Out] (2*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^3])/(Sqrt[b]*Sqrt[c + d*x^3])])/
(3*Sqrt[b]*Sqrt[d])
```

Rubi [A] time = 0.157188, antiderivative size = 48, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^3}}{\sqrt{b}\sqrt{c+dx^3}}\right)}{3\sqrt{b}\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (2*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^3])/(Sqrt[b]*Sqrt[c + d*x^3])])/
(3*Sqrt[b]*Sqrt[d])
```

Rubi in Sympy [A] time = 13.5054, size = 44, normalized size = 0.92

$$\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{b}\sqrt{c+dx^3}}{\sqrt{d}\sqrt{a+bx^3}}\right)}{3\sqrt{b}\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] 2*atanh(sqrt(b)*sqrt(c + d*x**3)/(sqrt(d)*sqrt(a + b*x**3)))/(3*s
qrt(b)*sqrt(d))
```

Mathematica [A] time = 0.0431235, size = 63, normalized size = 1.31

$$\frac{\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^3}\sqrt{c+dx^3}+ad+bc+2bdx^3\right)}{3\sqrt{b}\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] Log[b*c + a*d + 2*b*d*x^3 + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^3]*Sqr
t[c + d*x^3]]/(3*Sqrt[b]*Sqrt[d])
```

Maple [F] time = 0.075, size = 0, normalized size = 0.

$$\int x^2 \frac{1}{\sqrt{bx^3+a}} \frac{1}{\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

```
[Out] int(x^2/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.236023, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(4\left(2\,b^2d^2x^3+b^2cd+abd^2\right)\sqrt{bx^3+a}\sqrt{dx^3+c}+\left(8\,b^2d^2x^6+b^2c^2+6\,abcd+a^2d^2+8\left(b^2cd+abd^2\right)x^3\right)\sqrt{bd}\right)}{6\sqrt{bd}}, \frac{\arctan\left(\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] [1/6*log(4*(2*b^2*d^2*x^3 + b^2*c*d + a*b*d^2)*sqrt(b*x^3 + a)*sq
rt(d*x^3 + c) + (8*b^2*d^2*x^6 + b^2*c^2 + 6*a*b*c*d + a^2*d^2 +
8*(b^2*c*d + a*b*d^2)*x^3)*sqrt(b*d))/sqrt(b*d), 1/3*arctan(1/2*(
2*b*d*x^3 + b*c + a*d)*sqrt(-b*d)/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c
)*b*d))/sqrt(-b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**2/(sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.230133, size = 73, normalized size = 1.52

$$-\frac{2\,b\ln\left(\left|-\sqrt{bx^3+a}\sqrt{bd}+\sqrt{b^2c+(bx^3+a)bd-abd}\right|\right)}{3\sqrt{bd}|b|}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] -2/3*b*ln(abs(-sqrt(b*x^3 + a)*sqrt(b*d) + sqrt(b^2*c + (b*x^3 +
a)*b*d - a*b*d)))/(sqrt(b*d)*abs(b))
```

3.508 $\int \frac{1}{x\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=48

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{c}\sqrt{a+bx^3}}{\sqrt{a}\sqrt{c+dx^3}}\right)}{3\sqrt{a}\sqrt{c}}$$

```
[Out] (-2*ArcTanh[(Sqrt[c]*Sqrt[a + b*x^3])/(Sqrt[a]*Sqrt[c + d*x^3])])
/(3*Sqrt[a]*Sqrt[c])
```

Rubi [A] time = 0.177712, antiderivative size = 48, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.115$

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{c}\sqrt{a+bx^3}}{\sqrt{a}\sqrt{c+dx^3}}\right)}{3\sqrt{a}\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (-2*ArcTanh[(Sqrt[c]*Sqrt[a + b*x^3])/(Sqrt[a]*Sqrt[c + d*x^3])])
/(3*Sqrt[a]*Sqrt[c])
```

Rubi in Sympy [A] time = 13.7643, size = 46, normalized size = 0.96

$$-\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{c}\sqrt{a+bx^3}}{\sqrt{a}\sqrt{c+dx^3}}\right)}{3\sqrt{a}\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] -2*atanh(sqrt(c)*sqrt(a + b*x**3)/(sqrt(a)*sqrt(c + d*x**3)))/(3*
sqrt(a)*sqrt(c))
```

Mathematica [C] time = 0.404513, size = 155, normalized size = 3.23

$$\frac{4bdx^3F_1\left(1;\frac{1}{2},\frac{1}{2};2;-\frac{a}{bx^3},-\frac{c}{dx^3}\right)}{3\sqrt{a+bx^3}\sqrt{c+dx^3}\left(-4bdx^3F_1\left(1;\frac{1}{2},\frac{1}{2};2;-\frac{a}{bx^3},-\frac{c}{dx^3}\right)+bcF_1\left(2;\frac{1}{2},\frac{3}{2};3;-\frac{a}{bx^3},-\frac{c}{dx^3}\right)+adF_1\left(2;\frac{3}{2},\frac{1}{2};3;-\frac{a}{bx^3},-\frac{c}{dx^3}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (4*b*d*x^3*AppellF1[1, 1/2, 1/2, 2, -(a/(b*x^3)), -(c/(d*x^3))])/
(3*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]*(-4*b*d*x^3*AppellF1[1, 1/2, 1
/2, 2, -(a/(b*x^3)), -(c/(d*x^3))] + b*c*AppellF1[2, 1/2, 3/2, 3,
 -(a/(b*x^3)), -(c/(d*x^3))] + a*d*AppellF1[2, 3/2, 1/2, 3, -(a/(
b*x^3)), -(c/(d*x^3))]))
```

Maple [F] time = 0.082, size = 0, normalized size = 0.

$$\int \frac{1}{x}\frac{1}{\sqrt{bx^3+a}}\frac{1}{\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

```
[Out] int(1/x/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.252921, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(-\frac{4\,(2\,a^2c^2+(abc^2+a^2cd)\,x^3)\,\sqrt{bx^3+a}\sqrt{dx^3+c}-((b^2c^2+6\,abcd+a^2d^2)\,x^6+8\,a^2c^2+8\,(abc^2+a^2cd)\,x^3)\,\sqrt{ac}}{x^6}\right)}{6\,\sqrt{ac}},\right.$$
$$\left.-\frac{\arctan\left(\frac{((bc+ad)x^3+2\,ac)\,\sqrt{-ac}}{2\,\sqrt{bx^3+a}\sqrt{dx^3+c}ac}\right)}{3\,\sqrt{-ac}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/6*log(-(4*(2*a^2*c^2 + (a*b*c^2 + a^2*c*d)*x^3)*sqrt(b*x^3 + a
)*sqrt(d*x^3 + c) - ((b^2*c^2 + 6*a*b*c*d + a^2*d^2)*x^6 + 8*a^2*
c^2 + 8*(a*b*c^2 + a^2*c*d)*x^3)*sqrt(a*c))/x^6)/sqrt(a*c), -1/3*
arctan(1/2*((b*c + a*d)*x^3 + 2*a*c)*sqrt(-a*c)/(sqrt(b*x^3 + a)*
sqrt(d*x^3 + c)*a*c))/sqrt(-a*c)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.217419, size = 120, normalized size = 2.5

$$-\frac{2\sqrt{bd}b\arctan\left(-\frac{b^2c+abd-\left(\sqrt{bx^3+a}\sqrt{bd}-\sqrt{b^2c+(bx^3+a)bd-abd}\right)^2}{2\sqrt{-abcd}b}\right)}{3\sqrt{-abcd}|b|}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x),x, algorithm="giac")
```

```
[Out] -2/3*sqrt(b*d)*b*arctan(-1/2*(b^2*c + a*b*d - (sqrt(b*x^3 + a)*sq
rt(b*d) - sqrt(b^2*c + (b*x^3 + a)*b*d - a*b*d))^2)/(sqrt(-a*b*c*
d)*b))/(sqrt(-a*b*c*d)*abs(b))
```

3.509 $\int \frac{1}{x^4\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=91

$$\frac{(ad+bc)\tanh^{-1}\left(\frac{\sqrt{c}\sqrt{a+bx^3}}{\sqrt{a}\sqrt{c+dx^3}}\right)}{3a^{3/2}c^{3/2}}-\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}}{3acx^3}$$

```
[Out] -(Sqrt[a + b*x^3]*Sqrt[c + d*x^3])/(3*a*c*x^3) + ((b*c + a*d)*Arc
Tanh[(Sqrt[c]*Sqrt[a + b*x^3])/(Sqrt[a]*Sqrt[c + d*x^3])])/(3*a^(
3/2)*c^(3/2))
```

Rubi [A] time = 0.280019, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{(ad+bc)\tanh^{-1}\left(\frac{\sqrt{c}\sqrt{a+bx^3}}{\sqrt{a}\sqrt{c+dx^3}}\right)}{3a^{3/2}c^{3/2}}-\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}}{3acx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] -(Sqrt[a + b*x^3]*Sqrt[c + d*x^3])/(3*a*c*x^3) + ((b*c + a*d)*Arc
Tanh[(Sqrt[c]*Sqrt[a + b*x^3])/(Sqrt[a]*Sqrt[c + d*x^3])])/(3*a^(
3/2)*c^(3/2))
```

Rubi in Sympy [A] time = 19.1217, size = 78, normalized size = 0.86

$$-\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}}{3acx^3}+\frac{(ad+bc)\,\mathrm{atanh}\left(\frac{\sqrt{c}\sqrt{a+bx^3}}{\sqrt{a}\sqrt{c+dx^3}}\right)}{3a^{\frac{3}{2}}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(a + b*x**3)*sqrt(c + d*x**3)/(3*a*c*x**3) + (a*d + b*c)*ata
nh(sqrt(c)*sqrt(a + b*x**3)/(sqrt(a)*sqrt(c + d*x**3)))/(3*a**(3/
2)*c**(3/2))
```

Mathematica [C] time = 0.338298, size = 192, normalized size = 2.11

$$\frac{\frac{2bdx^6(ad+bc)F_1\left(1;\frac{1}{2},\frac{1}{2};2;-\frac{a}{bx^3},-\frac{c}{dx^3}\right)}{4bdx^3F_1\left(1;\frac{1}{2},\frac{1}{2};2;-\frac{a}{bx^3},-\frac{c}{dx^3}\right)-bcF_1\left(2;\frac{1}{2},\frac{3}{2};3;-\frac{a}{bx^3},-\frac{c}{dx^3}\right)-adF_1\left(2;\frac{3}{2},\frac{1}{2};3;-\frac{a}{bx^3},-\frac{c}{dx^3}\right)}-\left(a+bx^3\right)\left(c+dx^3\right)}{3acx^3\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (-((a + b*x^3)*(c + d*x^3)) + (2*b*d*(b*c + a*d)*x^6*AppellF1[1,
1/2, 1/2, 2, -(a/(b*x^3)), -(c/(d*x^3))])/(4*b*d*x^3*AppellF1[1,
1/2, 1/2, 2, -(a/(b*x^3)), -(c/(d*x^3))] - b*c*AppellF1[2, 1/2, 3
/2, 3, -(a/(b*x^3)), -(c/(d*x^3))] - a*d*AppellF1[2, 3/2, 1/2, 3,
 -(a/(b*x^3)), -(c/(d*x^3))]))/(3*a*c*x^3*Sqrt[a + b*x^3]*Sqrt[c
+ d*x^3])
```

Maple [F] time = 0.072, size = 0, normalized size = 0.

$$\int \frac{1}{x^4}\frac{1}{\sqrt{bx^3+a}}\frac{1}{\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

```
[Out] int(1/x^4/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^4),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.291949, size = 1, normalized size = 0.01

$$\left[\frac{(bc+ad)x^3\log\left(\frac{4\left(2a^2c^2+\left(abc^2+a^2cd\right)x^3\right)\sqrt{bx^3+a}\sqrt{dx^3+c}+\left(\left(b^2c^2+6abcd+a^2d^2\right)x^6+8a^2c^2+8\left(abc^2+a^2cd\right)x^3\right)\sqrt{ac}}{x^6}\right)-4\sqrt{bx^3+a}\sqrt{dx^3+c}\sqrt{}}{12\sqrt{ac}acx^3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^4),x, algorithm="fricas")
```

```
[Out] [1/12*((b*c + a*d)*x^3*log((4*(2*a^2*c^2 + (a*b*c^2 + a^2*c*d)*x^
3)*sqrt(b*x^3 + a)*sqrt(d*x^3 + c) + ((b^2*c^2 + 6*a*b*c*d + a^2*
d^2)*x^6 + 8*a^2*c^2 + 8*(a*b*c^2 + a^2*c*d)*x^3)*sqrt(a*c))/x^6)
 - 4*sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*sqrt(a*c))/(sqrt(a*c)*a*c*x^
3), 1/6*((b*c + a*d)*x^3*arctan(1/2*((b*c + a*d)*x^3 + 2*a*c)*sqr
t(-a*c)/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*a*c)) - 2*sqrt(b*x^3 + a
)*sqrt(d*x^3 + c)*sqrt(-a*c))/(sqrt(-a*c)*a*c*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^4\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**4*sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [A] time = 0.242471, size = 558, normalized size = 6.13

$$\frac{\sqrt{bd}b^4d\left(\frac{(bc+ad)\arctan\left(-\frac{b^2c+abd-\left(\sqrt{bx^3+a}\sqrt{bd}-\sqrt{b^2c+\left(bx^3+a\right)bd-abd}\right)^2}{2\sqrt{-abcd}b}\right)}{\sqrt{-abcd}ab^3cd}-\frac{2\left(b^3c^2-2ab^2cd+a^2bd^2-\left(\sqrt{bx^3+a}\sqrt{bd}-\sqrt{b^2c+(b\cdots}\right.\right.}{\left(b^4c^2-2ab^3cd+a^2b^2d^2-2\left(\sqrt{bx^3+a}\sqrt{bd}-\sqrt{b^2c+(bx^3+a)bd-abd}\right)^2b^2c-2\left(\cdots\right.\right.}\right.}{3|b|}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*sqrt(b*d)*b^4*d*((b*c + a*d)*arctan(-1/2*(b^2*c + a*b*d - (sq
rt(b*x^3 + a)*sqrt(b*d) - sqrt(b^2*c + (b*x^3 + a)*b*d - a*b*d))^
2)/(sqrt(-a*b*c*d)*b))/(sqrt(-a*b*c*d)*a*b^3*c*d) - 2*(b^3*c^2 -
2*a*b^2*c*d + a^2*b*d^2 - (sqrt(b*x^3 + a)*sqrt(b*d) - sqrt(b^2*c
 + (b*x^3 + a)*b*d - a*b*d))^2*b*c - (sqrt(b*x^3 + a)*sqrt(b*d) -
 sqrt(b^2*c + (b*x^3 + a)*b*d - a*b*d))^2*a*d)/((b^4*c^2 - 2*a*b^
3*c*d + a^2*b^2*d^2 - 2*(sqrt(b*x^3 + a)*sqrt(b*d) - sqrt(b^2*c +
 (b*x^3 + a)*b*d - a*b*d))^2*b^2*c - 2*(sqrt(b*x^3 + a)*sqrt(b*d)
 - sqrt(b^2*c + (b*x^3 + a)*b*d - a*b*d))^2*a*b*d + (sqrt(b*x^3 +
 a)*sqrt(b*d) - sqrt(b^2*c + (b*x^3 + a)*b*d - a*b*d))^4)*a*b^2*c
*d))/abs(b)
```

3.510 $\int \frac{x^4}{\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=88

$$\frac{x^5\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{5}{3};\frac{1}{2},\frac{1}{2};\frac{8}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{5\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

```
[Out] (x^5*Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[5/3, 1/2, 1
/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)])/(5*Sqrt[a + b*x^3]*Sqrt[c +
 d*x^3])
```

Rubi [A] time = 0.398808, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$\frac{x^5\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{5}{3};\frac{1}{2},\frac{1}{2};\frac{8}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{5\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^5*Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[5/3, 1/2, 1
/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)])/(5*Sqrt[a + b*x^3]*Sqrt[c +
 d*x^3])
```

Rubi in Sympy [A] time = 27.788, size = 75, normalized size = 0.85

$$\frac{x^5\sqrt{a+bx^3}\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{5}{3},\frac{1}{2},\frac{1}{2},\frac{8}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{5ac\sqrt{1+\frac{bx^3}{a}}\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**5*sqrt(a + b*x**3)*sqrt(c + d*x**3)*appellf1(5/3, 1/2, 1/2, 8/
3, -b*x**3/a, -d*x**3/c)/(5*a*c*sqrt(1 + b*x**3/a)*sqrt(1 + d*x**
3/c))
```

Mathematica [A] time = 0.456362, size = 174, normalized size = 1.98

$$-\frac{16acx^5F_1\left(\frac{5}{3};\frac{1}{2},\frac{1}{2};\frac{8}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{5\sqrt{a+bx^3}\sqrt{c+dx^3}\left(3x^3\left(adF_1\left(\frac{8}{3};\frac{1}{2},\frac{3}{2};\frac{11}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)+bcF_1\left(\frac{8}{3};\frac{3}{2},\frac{1}{2};\frac{11}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)\right)-16acF_1\left(\frac{5}{3};\frac{1}{2},\frac{1}{2};\frac{8}{3};-\frac{bx^3}{a},-\frac{dx}{c}\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (-16*a*c*x^5*AppellF1[5/3, 1/2, 1/2, 8/3, -((b*x^3)/a), -((d*x^3)
/c)])/(5*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]*(-16*a*c*AppellF1[5/3, 1
/2, 1/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)] + 3*x^3*(a*d*AppellF1[8
/3, 1/2, 3/2, 11/3, -((b*x^3)/a), -((d*x^3)/c)] + b*c*AppellF1[8/
3, 3/2, 1/2, 11/3, -((b*x^3)/a), -((d*x^3)/c)])))
```

Maple [F] time = 0.078, size = 0, normalized size = 0.

$$\int x^{4} \frac{1}{\sqrt{b x^{3}+a}} \frac{1}{\sqrt{d x^{3}+c}} d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

```
[Out] int(x^4/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{4}}{\sqrt{b x^{3}+a} \sqrt{d x^{3}+c}} d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^{4}}{\sqrt{b x^{3}+a} \sqrt{d x^{3}+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] integral(x^4/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{4}}{\sqrt{a+b x^{3}} \sqrt{c+d x^{3}}} d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x**4/(sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{4}}{\sqrt{b x^{3}+a} \sqrt{d x^{3}+c}} d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^4/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

3.511 $\int \frac{x^3}{\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=88

$$\frac{x^4\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};\frac{1}{2},\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

```
[Out] (x^4*Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1/2, 1
/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)])/(4*Sqrt[a + b*x^3]*Sqrt[c +
 d*x^3])
```

Rubi [A] time = 0.401103, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{x^4\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{4}{3};\frac{1}{2},\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^4*Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[4/3, 1/2, 1
/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)])/(4*Sqrt[a + b*x^3]*Sqrt[c +
 d*x^3])
```

Rubi in Sympy [A] time = 34.2331, size = 75, normalized size = 0.85

$$\frac{x^4\sqrt{a+bx^3}\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(\frac{4}{3},\frac{1}{2},\frac{1}{2},\frac{7}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{4ac\sqrt{1+\frac{bx^3}{a}}\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**4*sqrt(a + b*x**3)*sqrt(c + d*x**3)*appellf1(4/3, 1/2, 1/2, 7/
3, -b*x**3/a, -d*x**3/c)/(4*a*c*sqrt(1 + b*x**3/a)*sqrt(1 + d*x**
3/c))
```

Mathematica [A] time = 0.473977, size = 172, normalized size = 1.95

$$\frac{7acx^4F_1\left(\frac{4}{3};\frac{1}{2},\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{\sqrt{a+bx^3}\sqrt{c+dx^3}\left(28acF_1\left(\frac{4}{3};\frac{1}{2},\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)-6x^3\left(adF_1\left(\frac{7}{3};\frac{1}{2},\frac{3}{2};\frac{10}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)+bcF_1\left(\frac{7}{3};\frac{3}{2},\frac{1}{2};\frac{10}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (7*a*c*x^4*AppellF1[4/3, 1/2, 1/2, 7/3, -((b*x^3)/a), -((d*x^3)/c
)])/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]*(28*a*c*AppellF1[4/3, 1/2, 1
/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)] - 6*x^3*(a*d*AppellF1[7/3, 1
/2, 3/2, 10/3, -((b*x^3)/a), -((d*x^3)/c)] + b*c*AppellF1[7/3, 3/
2, 1/2, 10/3, -((b*x^3)/a), -((d*x^3)/c)])))
```

Maple [F] time = 0.077, size = 0, normalized size = 0.

$$\int x^3 \frac{1}{\sqrt{bx^3+a}} \frac{1}{\sqrt{dx^3+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)

[Out] int(x^3/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{bx^3+a}\sqrt{dx^3+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")

[Out] integrate(x^3/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\sqrt{bx^3+a}\sqrt{dx^3+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")

[Out] integral(x^3/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{a+bx^3}\sqrt{c+dx^3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)

[Out] Integral(x**3/(sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{bx^3+a}\sqrt{dx^3+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")

[Out] integrate(x^3/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

3.512 $\int \frac{x}{\sqrt{a+bx^3}\sqrt{c+dx^3}} \, dx$

Optimal. Leaf size=88

$$\frac{x^2\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};\frac{1}{2},\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

```
[Out] (x^2*Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 1/2, 1
/2, 5/3, -((b*x^3)/a), -((d*x^3)/c)])/(2*Sqrt[a + b*x^3]*Sqrt[c +
 d*x^3])
```

Rubi [A] time = 0.297622, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^2\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{2}{3};\frac{1}{2},\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (x^2*Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[2/3, 1/2, 1
/2, 5/3, -((b*x^3)/a), -((d*x^3)/c)])/(2*Sqrt[a + b*x^3]*Sqrt[c +
 d*x^3])
```

Rubi in Sympy [A] time = 22.6115, size = 75, normalized size = 0.85

$$\frac{x^2\sqrt{a+bx^3}\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{2}{3},\frac{1}{2},\frac{1}{2},\frac{5}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2ac\sqrt{1+\frac{bx^3}{a}}\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] x**2*sqrt(a + b*x**3)*sqrt(c + d*x**3)*appellf1(2/3, 1/2, 1/2, 5/
3, -b*x**3/a, -d*x**3/c)/(2*a*c*sqrt(1 + b*x**3/a)*sqrt(1 + d*x**
3/c))
```

Mathematica [A] time = 0.453151, size = 172, normalized size = 1.95

$$-\frac{5acx^2F_1\left(\frac{2}{3};\frac{1}{2},\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{\sqrt{a+bx^3}\sqrt{c+dx^3}\left(3x^3\left(adF_1\left(\frac{5}{3};\frac{1}{2},\frac{3}{2};\frac{8}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)+bcF_1\left(\frac{5}{3};\frac{3}{2},\frac{1}{2};\frac{8}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (-5*a*c*x^2*AppellF1[2/3, 1/2, 1/2, 5/3, -((b*x^3)/a), -((d*x^3)/
c)])/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]*(-10*a*c*AppellF1[2/3, 1/2,
 1/2, 5/3, -((b*x^3)/a), -((d*x^3)/c)] + 3*x^3*(a*d*AppellF1[5/3,
 1/2, 3/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)] + b*c*AppellF1[5/3, 3
/2, 1/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)])))
```

Maple [F] time = 0.077, size = 0, normalized size = 0.

$$\int x \frac{1}{\sqrt{b x^3 + a}} \frac{1}{\sqrt{d x^3 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

```
[Out] int(x/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{b x^3 + a}\sqrt{d x^3 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\sqrt{b x^3 + a}\sqrt{d x^3 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")
```

```
[Out] integral(x/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{a + b x^3}\sqrt{c + d x^3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(x/(sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{b x^3 + a}\sqrt{d x^3 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")
```

```
[Out] integrate(x/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

3.513 $\int \frac{1}{\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=83

$$\frac{x\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};\frac{1}{2},\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

```
[Out] (x*Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1/2, 1/2
, 4/3, -((b*x^3)/a), -((d*x^3)/c)])/(Sqrt[a + b*x^3]*Sqrt[c + d*x
^3])
```

Rubi [A] time = 0.165912, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087

$$\frac{x\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(\frac{1}{3};\frac{1}{2},\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (x*Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[1/3, 1/2, 1/2
, 4/3, -((b*x^3)/a), -((d*x^3)/c)])/(Sqrt[a + b*x^3]*Sqrt[c + d*x
^3])
```

Rubi in Sympy [A] time = 26.2513, size = 71, normalized size = 0.86

$$\frac{x\sqrt{a+bx^3}\sqrt{c+dx^3}\,\text{appellf}_1\left(\frac{1}{3},\frac{1}{2},\frac{1}{2},\frac{4}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{ac\sqrt{1+\frac{bx^3}{a}}\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] x*sqrt(a + b*x**3)*sqrt(c + d*x**3)*appellf1(1/3, 1/2, 1/2, 4/3,
-b*x**3/a, -d*x**3/c)/(a*c*sqrt(1 + b*x**3/a)*sqrt(1 + d*x**3/c))
```

Mathematica [B] time = 0.427193, size = 170, normalized size = 2.05

$$-\frac{8acxF_1\left(\frac{1}{3};\frac{1}{2},\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{\sqrt{a+bx^3}\sqrt{c+dx^3}\left(3x^3\left(adF_1\left(\frac{4}{3};\frac{1}{2},\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)+bcF_1\left(\frac{4}{3};\frac{3}{2},\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (-8*a*c*x*AppellF1[1/3, 1/2, 1/2, 4/3, -((b*x^3)/a), -((d*x^3)/c)
])/(Sqrt[a + b*x^3]*Sqrt[c + d*x^3]*(-8*a*c*AppellF1[1/3, 1/2, 1/
2, 4/3, -((b*x^3)/a), -((d*x^3)/c)] + 3*x^3*(a*d*AppellF1[4/3, 1/
2, 3/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)] + b*c*AppellF1[4/3, 3/2,
 1/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)])))
```

Maple [F] time = 0.076, size = 0, normalized size = 0.

$$\int 1\frac{1}{\sqrt{b x^{3}+a}}\frac{1}{\sqrt{d x^{3}+c}}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)

[Out] int(1/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b x^{3}+a}\sqrt{d x^{3}+c}}\,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="maxima")

[Out] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{b x^{3}+a}\sqrt{d x^{3}+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="fricas")

[Out] integral(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{a+b x^{3}}\sqrt{c+d x^{3}}}\,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)

[Out] Integral(1/(sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b x^{3}+a}\sqrt{d x^{3}+c}}\,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)),x, algorithm="giac")

[Out] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)), x)
```

3.514 $\int \frac{1}{x^2\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=86

$$-\frac{\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};\frac{1}{2},\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{x\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

```
[Out] -((Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 1/2, 1/
2, 2/3, -((b*x^3)/a), -((d*x^3)/c)])/(x*Sqrt[a + b*x^3]*Sqrt[c +
d*x^3]))
```

Rubi [A] time = 0.378873, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$-\frac{\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{1}{3};\frac{1}{2},\frac{1}{2};\frac{2}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{x\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] -((Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[-1/3, 1/2, 1/
2, 2/3, -((b*x^3)/a), -((d*x^3)/c)])/(x*Sqrt[a + b*x^3]*Sqrt[c +
d*x^3]))
```

Rubi in Sympy [A] time = 28.0139, size = 75, normalized size = 0.87

$$-\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}\,\mathrm{appellf}_1\left(-\frac{1}{3},\frac{1}{2},\frac{1}{2},\frac{2}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{acx\sqrt{1+\frac{bx^3}{a}}\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(a + b*x**3)*sqrt(c + d*x**3)*appellf1(-1/3, 1/2, 1/2, 2/3,
-b*x**3/a, -d*x**3/c)/(a*c*x*sqrt(1 + b*x**3/a)*sqrt(1 + d*x**3/c
))
```

Mathematica [B] time = 0.566252, size = 357, normalized size = 4.15

$$\frac{-\frac{25x^3(ad+bc)F_1\left(\frac{2}{3};\frac{1}{2},\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{3x^3\left(adF_1\left(\frac{5}{3};\frac{1}{2},\frac{3}{2};\frac{8}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)+bcF_1\left(\frac{5}{3};\frac{3}{2},\frac{1}{2};\frac{8}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},\frac{1}{2};\frac{5}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}-\frac{64bdx^6F_1\left(\frac{5}{3};\frac{1}{2},\frac{1}{2};\frac{8}{3};-\right.}{3x^3\left(adF_1\left(\frac{8}{3};\frac{1}{2},\frac{3}{2};\frac{11}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)+bcF_1\left(\frac{8}{3};\frac{3}{2},\frac{1}{2};\frac{11}{3};-\right.\right.}}{10x\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] ((-10*(a + b*x^3)*(c + d*x^3))/(a*c) - (25*(b*c + a*d)*x^3*Appell
F1[2/3, 1/2, 1/2, 5/3, -((b*x^3)/a), -((d*x^3)/c)])/(-10*a*c*Appe
llF1[2/3, 1/2, 1/2, 5/3, -((b*x^3)/a), -((d*x^3)/c)] + 3*x^3*(a*d
*AppellF1[5/3, 1/2, 3/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)] + b*c*A
ppellF1[5/3, 3/2, 1/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)])) - (64*b
```

```
*d*x^6*AppellF1[5/3, 1/2, 1/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)])/
(-16*a*c*AppellF1[5/3, 1/2, 1/2, 8/3, -((b*x^3)/a), -((d*x^3)/c)]
 + 3*x^3*(a*d*AppellF1[8/3, 1/2, 3/2, 11/3, -((b*x^3)/a), -((d*x^
3)/c)] + b*c*AppellF1[8/3, 3/2, 1/2, 11/3, -((b*x^3)/a), -((d*x^3
)/c)])))/(10*x*Sqrt[a + b*x^3]*Sqrt[c + d*x^3])
```

Maple [F] time = 0.085, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2}}\frac{1}{\sqrt{b x^{3}+a}}\frac{1}{\sqrt{d x^{3}+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

```
[Out] int(1/x^2/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b x^{3}+a}\sqrt{d x^{3}+c}x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\sqrt{b x^{3}+a}\sqrt{d x^{3}+c}x^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{2}\sqrt{a+b x^{3}}\sqrt{c+d x^{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b x^{3}+a}\sqrt{d x^{3}+c}x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^2), x)
```

3.515 $\int \frac{1}{x^3\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$

Optimal. Leaf size=88

$$-\frac{\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};\frac{1}{2},\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2x^2\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

```
[Out] -(Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1/2, 1/2
, 1/3, -((b*x^3)/a), -((d*x^3)/c)])/(2*x^2*Sqrt[a + b*x^3]*Sqrt[c
 + d*x^3])
```

Rubi [A] time = 0.37888, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$-\frac{\sqrt{\frac{bx^3}{a}+1}\sqrt{\frac{dx^3}{c}+1}F_1\left(-\frac{2}{3};\frac{1}{2},\frac{1}{2};\frac{1}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2x^2\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] -(Sqrt[1 + (b*x^3)/a]*Sqrt[1 + (d*x^3)/c]*AppellF1[-2/3, 1/2, 1/2
, 1/3, -((b*x^3)/a), -((d*x^3)/c)])/(2*x^2*Sqrt[a + b*x^3]*Sqrt[c
 + d*x^3])
```

Rubi in Sympy [A] time = 27.8334, size = 78, normalized size = 0.89

$$-\frac{\sqrt{a+bx^3}\sqrt{c+dx^3}\,\text{appellf}_1\left(-\frac{2}{3},\frac{1}{2},\frac{1}{2},\frac{1}{3},-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{2acx^2\sqrt{1+\frac{bx^3}{a}}\sqrt{1+\frac{dx^3}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] -sqrt(a + b*x**3)*sqrt(c + d*x**3)*appellf1(-2/3, 1/2, 1/2, 1/3,
-b*x**3/a, -d*x**3/c)/(2*a*c*x**2*sqrt(1 + b*x**3/a)*sqrt(1 + d*x
**3/c))
```

Mathematica [B] time = 0.502535, size = 357, normalized size = 4.06

$$\frac{\frac{4x^3(ad+bc)F_1\left(\frac{1}{3};\frac{1}{2},\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}{3x^3\left(adF_1\left(\frac{4}{3};\frac{1}{2},\frac{3}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)+bcF_1\left(\frac{4}{3};\frac{3}{2},\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},\frac{1}{2};\frac{4}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)}+\frac{7bdx^6F_1\left(\frac{4}{3};\frac{1}{2},\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a}\right.}{28acF_1\left(\frac{4}{3};\frac{1}{2},\frac{1}{2};\frac{7}{3};-\frac{bx^3}{a},-\frac{dx^3}{c}\right)-6x^3\left(adF_1\left(\frac{7}{3};\frac{1}{2},\frac{3}{2};\frac{10}{3};-\frac{bx}{a}\right.\right.}}{2x^2\sqrt{a+bx^3}\sqrt{c+dx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*Sqrt[a + b*x^3]*Sqrt[c + d*x^3]),x]
```

```
[Out] (-(((a + b*x^3)*(c + d*x^3))/(a*c)) + (4*(b*c + a*d)*x^3*AppellF1
[1/3, 1/2, 1/2, 4/3, -((b*x^3)/a), -((d*x^3)/c)])/(-8*a*c*AppellF
1[1/3, 1/2, 1/2, 4/3, -((b*x^3)/a), -((d*x^3)/c)] + 3*x^3*(a*d*Ap
pellF1[4/3, 1/2, 3/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)] + b*c*Appe
llF1[4/3, 3/2, 1/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)])) + (7*b*d*x
```

```
^6*AppellF1[4/3, 1/2, 1/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)])/(28*
a*c*AppellF1[4/3, 1/2, 1/2, 7/3, -((b*x^3)/a), -((d*x^3)/c)] - 6*
x^3*(a*d*AppellF1[7/3, 1/2, 3/2, 10/3, -((b*x^3)/a), -((d*x^3)/c)
] + b*c*AppellF1[7/3, 3/2, 1/2, 10/3, -((b*x^3)/a), -((d*x^3)/c)]
)))/(2*x^2*Sqrt[a + b*x^3]*Sqrt[c + d*x^3])
```

Maple [F] time = 0.085, size = 0, normalized size = 0.

$$\int \frac{1}{x^3}\frac{1}{\sqrt{bx^3+a}}\frac{1}{\sqrt{dx^3+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

```
[Out] int(1/x^3/(b*x^3+a)^(1/2)/(d*x^3+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3+a}\sqrt{dx^3+c}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^3+a}\sqrt{dx^3+c}x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\sqrt{a+bx^3}\sqrt{c+dx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**3+a)**(1/2)/(d*x**3+c)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(a + b*x**3)*sqrt(c + d*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3+a}\sqrt{dx^3+c}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a)*sqrt(d*x^3 + c)*x^3), x)
```

3.516 $\int (ex)^{7/2}\sqrt{a+bx^3}\,(A+Bx^3)\,dx$

Optimal. Leaf size=161

$$-\frac{a^2e^{7/2}(2Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{24b^{5/2}}+\frac{ae^2(ex)^{3/2}\sqrt{a+bx^3}(2Ab-aB)}{24b^2}+\frac{(ex)^{9/2}\sqrt{a+bx^3}(2Ab-aB)}{12be}+\frac{B(ex)^{9/2}\left(a+bx^3\right)^{3/2}}{9be}$$

```
[Out] (a*(2*A*b - a*B)*e^2*(e*x)^(3/2)*Sqrt[a + b*x^3])/(24*b^2) + ((2*
A*b - a*B)*(e*x)^(9/2)*Sqrt[a + b*x^3])/(12*b*e) + (B*(e*x)^(9/2)
*(a + b*x^3)^(3/2))/(9*b*e) - (a^2*(2*A*b - a*B)*e^(7/2)*ArcTanh[
(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(24*b^(5/2))
```

Rubi [A] time = 0.341719, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.269

$$-\frac{a^2e^{7/2}(2Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{24b^{5/2}}+\frac{ae^2(ex)^{3/2}\sqrt{a+bx^3}(2Ab-aB)}{24b^2}+\frac{(ex)^{9/2}\sqrt{a+bx^3}(2Ab-aB)}{12be}+\frac{B(ex)^{9/2}\left(a+bx^3\right)^{3/2}}{9be}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^(7/2)*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (a*(2*A*b - a*B)*e^2*(e*x)^(3/2)*Sqrt[a + b*x^3])/(24*b^2) + ((2*
A*b - a*B)*(e*x)^(9/2)*Sqrt[a + b*x^3])/(12*b*e) + (B*(e*x)^(9/2)
*(a + b*x^3)^(3/2))/(9*b*e) - (a^2*(2*A*b - a*B)*e^(7/2)*ArcTanh[
(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(24*b^(5/2))
```

Rubi in Sympy [A] time = 28.9976, size = 141, normalized size = 0.88

$$\frac{B\left(ex\right)^{\frac{9}{2}}\left(a+bx^3\right)^{\frac{3}{2}}}{9be}-\frac{a^2e^{\frac{7}{2}}\left(Ab-\frac{Ba}{2}\right)\operatorname{atanh}\left(\frac{\sqrt{b}\left(ex\right)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{12b^{\frac{5}{2}}}+\frac{ae^2\left(ex\right)^{\frac{3}{2}}\sqrt{a+bx^3}\left(2Ab-Ba\right)}{24b^2}+\frac{\left(ex\right)^{\frac{9}{2}}\sqrt{a+bx^3}\left(Ab-\frac{Ba}{2}\right)}{6be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(7/2)*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] B*(e*x)**(9/2)*(a + b*x**3)**(3/2)/(9*b*e) - a**2*e**(7/2)*(A*b -
 B*a/2)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(
12*b**(5/2)) + a*e**2*(e*x)**(3/2)*sqrt(a + b*x**3)*(2*A*b - B*a)
/(24*b**2) + (e*x)**(9/2)*sqrt(a + b*x**3)*(A*b - B*a/2)/(6*b*e)
```

Mathematica [A] time = 0.264325, size = 124, normalized size = 0.77

$$\frac{e^2(ex)^{3/2}\left(\sqrt{b}\left(a+bx^3\right)\left(-3a^2B+2ab\left(3A+Bx^3\right)+4b^2x^3\left(3A+2Bx^3\right)\right)+3a^2\sqrt{\frac{a}{x^3}+b}(aB-2Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)\right)}{72b^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^(7/2)*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (e^2*(e*x)^(3/2)*(Sqrt[b]*(a + b*x^3)*(-3*a^2*B + 2*a*b*(3*A + B*
x^3) + 4*b^2*x^3*(3*A + 2*B*x^3)) + 3*a^2*(-2*A*b + a*B)*Sqrt[b +
 a/x^3]*ArcTanh[Sqrt[b + a/x^3]/Sqrt[b]]))/(72*b^(5/2)*Sqrt[a + b
*x^3])
```

Maple [C] time = 0.312, size = 7293, normalized size = 45.3

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(7/2)*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.692477, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(Ba^{3}-2\,Aa^{2}b\right)e^{3}\sqrt{\frac{e}{b}}\log\left(-8\,b^{2}ex^{6}-8\,abex^{3}-a^{2}e+4\left(2\,b^{2}x^{4}+abx\right)\sqrt{bx^{3}+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)-4\left(8\,Bb^{2}e^{3}x^{7}+2\left(Bab+6\,A\right.\right.}{288\,b^{2}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(7/2),x, algorithm="fricas")
```

```
[Out] [-1/288*(3*(B*a^3 - 2*A*a^2*b)*e^3*sqrt(e/b)*log(-8*b^2*e*x^6 - 8
*a*b*e*x^3 - a^2*e + 4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3 + a)*sqrt(e
*x)*sqrt(e/b)) - 4*(8*B*b^2*e^3*x^7 + 2*(B*a*b + 6*A*b^2)*e^3*x^4
 - 3*(B*a^2 - 2*A*a*b)*e^3*x)*sqrt(b*x^3 + a)*sqrt(e*x))/b^2, 1/1
44*(3*(B*a^3 - 2*A*a^2*b)*e^3*sqrt(-e/b)*arctan(2*sqrt(b*x^3 + a)
*sqrt(e*x)*x/((2*b*x^3 + a)*sqrt(-e/b))) + 2*(8*B*b^2*e^3*x^7 + 2
*(B*a*b + 6*A*b^2)*e^3*x^4 - 3*(B*a^2 - 2*A*a*b)*e^3*x)*sqrt(b*x^
3 + a)*sqrt(e*x))/b^2]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(7/2)*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\sqrt{bx^3 + a}\,(ex)^{\frac{7}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(7/2), x)
```

3.517 $\int (ex)^{5/2}\sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=324

$$-\frac{3^{3/4}a^{5/3}e^2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(16Ab-7aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{640b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3ae^2\sqrt{ex}\sqrt{a+bx^3}(16Ab-7aB)}{320b^2}+\frac{(ex)^{7/2}\sqrt{a+bx^3}(16Ab-7aB)}{80be}+\frac{B(ex)^{7/2}\left(a+bx^3\right)^{3/2}}{8be}$$

```
[Out] (3*a*(16*A*b - 7*a*B)*e^2*Sqrt[e*x]*Sqrt[a + b*x^3])/(320*b^2) +
((16*A*b - 7*a*B)*(e*x)^(7/2)*Sqrt[a + b*x^3])/(80*b*e) + (B*(e*x
)^(7/2)*(a + b*x^3)^(3/2))/(8*b*e) - (3^(3/4)*a^(5/3)*(16*A*b - 7
*a*B)*e^2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*
EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (
1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(640*b^2*Sqrt[(b^(1/3
)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]
*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.73923, antiderivative size = 324, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$

$$-\frac{3^{3/4}a^{5/3}e^2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(16Ab-7aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{640b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3ae^2\sqrt{ex}\sqrt{a+bx^3}(16Ab-7aB)}{320b^2}+\frac{(ex)^{7/2}\sqrt{a+bx^3}(16Ab-7aB)}{80be}+\frac{B(ex)^{7/2}\left(a+bx^3\right)^{3/2}}{8be}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^(5/2)*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (3*a*(16*A*b - 7*a*B)*e^2*Sqrt[e*x]*Sqrt[a + b*x^3])/(320*b^2) +
((16*A*b - 7*a*B)*(e*x)^(7/2)*Sqrt[a + b*x^3])/(80*b*e) + (B*(e*x
)^(7/2)*(a + b*x^3)^(3/2))/(8*b*e) - (3^(3/4)*a^(5/3)*(16*A*b - 7
*a*B)*e^2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*
EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (
1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(640*b^2*Sqrt[(b^(1/3
)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]
*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 36.3921, size = 292, normalized size = 0.9

$$\frac{B(ex)^{\frac{7}{2}}\left(a+bx^3\right)^{\frac{3}{2}}}{8be} - \frac{3^{\frac{3}{4}}a^{\frac{5}{3}}e^2\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(16Ab-7Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{640b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} + \frac{3ae^2\sqrt{ex}\sqrt{a+bx^3}(16Ab-7Ba)}{320b^2} + \frac{(ex)^{\frac{7}{2}}\sqrt{a+bx^3}(16Ab-7Ba)}{80be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(5/2)*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] B*(e*x)**(7/2)*(a + b*x**3)**(3/2)/(8*b*e) - 3**(3/4)*a**(5/3)*e*
*2*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2
)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*
x)*(16*A*b - 7*B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt
(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2
)/(640*b**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b
**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 3*a*e**2*sqrt(e*
x)*sqrt(a + b*x**3)*(16*A*b - 7*B*a)/(320*b**2) + (e*x)**(7/2)*sq
rt(a + b*x**3)*(16*A*b - 7*B*a)/(80*b*e)
```

Mathematica [C] time = 1.11357, size = 234, normalized size = 0.72

$$\frac{e^2\sqrt{ex}\left(-\sqrt[3]{-a}\left(a+bx^3\right)\left(21a^2B-12ab\left(4A+Bx^3\right)-8b^2x^3\left(8A+5Bx^3\right)\right)+i3^{3/4}a^2\sqrt[3]{b}x\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}}{\sqrt[3]{b}}}{x^2}}\right.}{320\sqrt[3]{-a}b^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^(5/2)*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (e^2*Sqrt[e*x]*(-((-a)^(1/3)*(a + b*x^3)*(21*a^2*B - 12*a*b*(4*A
+ B*x^3) - 8*b^2*x^3*(8*A + 5*B*x^3))) + I*3^(3/4)*a^2*b^(1/3)*(1
6*A*b - 7*a*B)*x*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1
/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/
x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*
x)]/3^(1/4)], (-1)^(1/3)]))/(320*(-a)^(1/3)*b^2*Sqrt[a + b*x^3])
```

Maple [C] time = 0.082, size = 4175, normalized size = 12.9

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(5/2)*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] 1/320*e^2*(e*x)^(1/2)*(b*x^3+a)^(1/2)/b^3/(-a*b^2)^(1/3)*(48*I*A*
((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*(1/b^2*e*x*(-b*x+(-a
*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3
^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*a*b^2+64*I*A*(
(b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*(1/b^2*e*x*(-b*x+(-a*
```

b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^3*b^3-192*I*A
*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*x*a^2*b^2*e+12*I*B*((b*x^3+a)*e*x)^(1/2)*(-a*b
^2)^(1/3)*3^(1/2)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3)))^(1/2)*x^3*a*b^2+40*I*B*((b*x^3+a)*e*x)^(1/2)*(-
a*b^2)^(1/3)*3^(1/2)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3)))^(1/2)*x^6*b^3-21*I*B*((b*x^3+a)*e*x)^(1/2)*(
-a*b^2)^(1/3)*3^(1/2)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3)))^(1/2)*a^2*b-96*A*(-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I
*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a^2*b^3*e-120*B*((b*x^3+a)*
e*x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^6*b^3-42*I*B*3^(1/2)*(-(I*3^(1/
2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-
3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*
(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a^3*b^2*e+4
2*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a
*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF
((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(
(I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x
^2*a^3*b^2*e+84*I*B*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x*a^3*b*e+192*A*(-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(
-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(
I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x
*a^2*b^2*e-42*I*B*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/
(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a^3*e-84*B*(-(I*3^(1/2)-3)*x*
b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)
^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/
2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x*a^3*b*
e-96*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipt
icF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2)
)*(-a*b^2)^(2/3)*a^2*b*e+42*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*
b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2

```
)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+
1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a^3*e-192*A*((b*x^3+a)*e*
x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/
2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^3*b^3-36*B*((b*x^3+a)*e*x)^(1/2)*
(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3)))^(1/2)*x^3*a*b^2+96*I*A*(-a*b^2)^(2/3)*3^(1/2)*(-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/
2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a^2*b*e+9
6*I*A*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3
^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3)
)^(1/2))*x^2*a^2*b^3*e-144*A*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)
*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x
+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))
^(1/2)*a*b^2+63*B*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*e*x
*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*a^2*
b)/((b*x^3+a)*e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right) \sqrt{bx^3 + a}\, (ex)^{\frac{5}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(Be^2x^5 + Ae^2x^2\right) \sqrt{bx^3 + a}\sqrt{ex}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*e^2*x^5 + A*e^2*x^2)*sqrt(b*x^3 + a)*sqrt(e*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**(5/2)*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\sqrt{bx^3 + a}\,(ex)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(5/2), x)
```

3.518 $\int (ex)^{3/2}\sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=581

$$-\frac{3^{3/4}\left(1-\sqrt{3}\right)a^{4/3}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(14Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{224b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}a^{4/3}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(14Ab-5aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{112b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3\left(1+\sqrt{3}\right)ae\sqrt{ex}\sqrt{a+bx^3}(14Ab-5aB)}{112b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\sqrt{a+bx^3}(14Ab-5aB)}{56be}+\frac{B(ex)^{5/2}\left(a+bx^3\right)^{3/2}}{7be}$$

```
[Out] ((14*A*b - 5*a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(56*b*e) + (3*(1 +
 Sqrt[3])*a*(14*A*b - 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(112*b^
(5/3)*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + (B*(e*x)^(5/2)*(a +
b*x^3)^(3/2))/(7*b*e) - (3*3^(1/4)*a^(4/3)*(14*A*b - 5*a*B)*e*Sqr
t[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[Arc
Cos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*
b^(1/3)*x)], (2 + Sqrt[3])/4])/(112*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1
/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
 b*x^3]) - (3^(3/4)*(1 - Sqrt[3])*a^(4/3)*(14*A*b - 5*a*B)*e*Sqrt
[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b
^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcC
os[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b
^(1/3)*x)], (2 + Sqrt[3])/4])/(224*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/
3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
b*x^3])
```

Rubi [A] time = 1.38212, antiderivative size = 581, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{3^{3/4}\left(1-\sqrt{3}\right)a^{4/3}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(14Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{224b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}a^{4/3}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(14Ab-5aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{112b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3\left(1+\sqrt{3}\right)ae\sqrt{ex}\sqrt{a+bx^3}(14Ab-5aB)}{112b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\sqrt{a+bx^3}(14Ab-5aB)}{56be}+\frac{B(ex)^{5/2}\left(a+bx^3\right)^{3/2}}{7be}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^(3/2)*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] ((14*A*b - 5*a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(56*b*e) + (3*(1 +
 Sqrt[3])*a*(14*A*b - 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(112*b^
(5/3)*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + (B*(e*x)^(5/2)*(a +
b*x^3)^(3/2))/(7*b*e) - (3*3^(1/4)*a^(4/3)*(14*A*b - 5*a*B)*e*Sqr
t[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[Arc
Cos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*
b^(1/3)*x)], (2 + Sqrt[3])/4])/(112*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1
/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
 b*x^3]) - (3^(3/4)*(1 - Sqrt[3])*a^(4/3)*(14*A*b - 5*a*B)*e*Sqrt
[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b
^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcC
os[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b
^(1/3)*x)], (2 + Sqrt[3])/4])/(224*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/
3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
b*x^3])
```

Rubi in Sympy [A] time = 70.0981, size = 529, normalized size = 0.91

$$\frac{B(ex)^{\frac{5}{2}}\left(a+bx^3\right)^{\frac{3}{2}}}{7be} - \frac{3\sqrt[4]{3}a^{\frac{4}{3}}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(14Ab-5Ba)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{112b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} - \frac{3^{\frac{3}{4}}a^{\frac{4}{3}}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(14Ab-5Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{224b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} + \frac{ae\sqrt{ex}\left(\frac{3}{56}+\frac{3\sqrt{3}}{56}\right)\sqrt{a+bx^3}(14Ab-5Ba)}{2b^{\frac{5}{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)} + \frac{(ex)^{\frac{5}{2}}\sqrt{a+bx^3}(14Ab-5Ba)}{56be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(3/2)*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] B*(e*x)**(5/2)*(a + b*x**3)**(3/2)/(7*b*e) - 3*3**(1/4)*a**(4/3)*
e*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)
/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x
)*(14*A*b - 5*B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(
3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)
/(112*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
+ b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) - 3**(3/4)*a**(
4/3)*e*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*
x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a
**(1/3) + b**(1/3)*x)*(14*A*b - 5*B*a)*elliptic_f(acos((a**(1/3)
+ b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3))
)), sqrt(3)/4 + 1/2)/(224*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b*
*(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x*
*3)) + a*e*sqrt(e*x)*(3/56 + 3*sqrt(3)/56)*sqrt(a + b*x**3)*(14*A
*b - 5*B*a)/(2*b**(5/3)*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))) +
(e*x)**(5/2)*sqrt(a + b*x**3)*(14*A*b - 5*B*a)/(56*b*e)
```

Mathematica [C] time = 5.36726, size = 279, normalized size = 0.48

$$\frac{x(ex)^{3/2}\left(2b\left(a+bx^3\right)\left(3aB+14Ab+8bBx^3\right)-a(14Ab-5aB)\left(-3\left(\frac{a}{x^3}+b\right)+\frac{\sqrt[6]{-1}3^{3/4}ab^{2/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}\ldots}{\sqrt[3]{b}\ldots}}{x^2}}\ldots}{\ldots}\right)\right)}{112b^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^(3/2)*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (x*(e*x)^(3/2)*(2*b*(a + b*x^3)*(14*A*b + 3*a*B + 8*b*B*x^3) - a*
(14*A*b - 5*a*B)*(-3*(b + a/x^3) + ((-1)^(1/6)*3^(3/4)*a*b^(2/3)*
Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a
)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*((-I)*Sqrt[3
]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]
/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(
5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/((-a)^
(2/3)*x))))/(112*b^2*Sqrt[a + b*x^3])
```

Maple [C] time = 0.082, size = 5358, normalized size = 9.2

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(3/2)*(B*x^3+A)*(b*x^3+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3+A\right)\sqrt{bx^3+a}\,(ex)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(Bex^4+Aex\right)\sqrt{bx^3+a}\sqrt{ex},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*e*x^4 + A*e*x)*sqrt(b*x^3 + a)*sqrt(e*x), x)
```

Sympy [A] time = 129.444, size = 97, normalized size = 0.17

$$\frac{A\sqrt{a}e^{\frac{3}{2}}x^{\frac{5}{2}}\Gamma\left(\frac{5}{6}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{5}{6}\\\frac{11}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{11}{6}\right)}+\frac{B\sqrt{a}e^{\frac{3}{2}}x^{\frac{11}{2}}\Gamma\left(\frac{11}{6}\right){}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{11}{6}\\\frac{17}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\Gamma\left(\frac{17}{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(3/2)*(B*x**3+A)*(b*x**3+a)**(1/2),x)
```

```
[Out] A*sqrt(a)*e**(3/2)*x**(5/2)*gamma(5/6)*hyper((-1/2, 5/6), (11/6,)
, b*x**3*exp_polar(I*pi)/a)/(3*gamma(11/6)) + B*sqrt(a)*e**(3/2)*
x**(11/2)*gamma(11/6)*hyper((-1/2, 11/6), (17/6,), b*x**3*exp_pol
ar(I*pi)/a)/(3*gamma(17/6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\left(Bx^3+A\right)\sqrt{bx^3+a}\,(ex)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*(e*x)^(3/2), x)
```

3.519 $\int \sqrt{ex}\sqrt{a+bx^3}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=121

$$\frac{a\sqrt{e}(4Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{12b^{3/2}}+\frac{(ex)^{3/2}\sqrt{a+bx^3}(4Ab-aB)}{12be}+\frac{B(ex)^{3/2}\left(a+bx^3\right)^{3/2}}{6be}$$

```
[Out] ((4*A*b - a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(12*b*e) + (B*(e*x)^(
3/2)*(a + b*x^3)^(3/2))/(6*b*e) + (a*(4*A*b - a*B)*Sqrt[e]*ArcTan
h[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(12*b^(3/2))
```

Rubi [A] time = 0.258785, antiderivative size = 121, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{a\sqrt{e}(4Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{12b^{3/2}}+\frac{(ex)^{3/2}\sqrt{a+bx^3}(4Ab-aB)}{12be}+\frac{B(ex)^{3/2}\left(a+bx^3\right)^{3/2}}{6be}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[e*x]*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] ((4*A*b - a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(12*b*e) + (B*(e*x)^(
3/2)*(a + b*x^3)^(3/2))/(6*b*e) + (a*(4*A*b - a*B)*Sqrt[e]*ArcTan
h[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(12*b^(3/2))
```

Rubi in Sympy [A] time = 22.9875, size = 104, normalized size = 0.86

$$\frac{B\left(ex\right)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{3}{2}}}{6be}+\frac{a\sqrt{e}\left(4Ab-Ba\right)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{12b^{\frac{3}{2}}}+\frac{(ex)^{\frac{3}{2}}\sqrt{a+bx^3}\left(4Ab-Ba\right)}{12be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((B*x**3+A)*(e*x)**(1/2)*(b*x**3+a)**(1/2),x)
```

```
[Out] B*(e*x)**(3/2)*(a + b*x**3)**(3/2)/(6*b*e) + a*sqrt(e)*(4*A*b - B
*a)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(12*b
**(3/2)) + (e*x)**(3/2)*sqrt(a + b*x**3)*(4*A*b - B*a)/(12*b*e)
```

Mathematica [A] time = 0.238444, size = 97, normalized size = 0.8

$$\frac{x\sqrt{ex}\left(\sqrt{b}\left(a+bx^3\right)\left(B\left(a+2bx^3\right)+4Ab\right)-a\sqrt{\frac{a}{x^3}+b}(aB-4Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)\right)}{12b^{3/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[e*x]*Sqrt[a + b*x^3]*(A + B*x^3),x]
```

```
[Out] (x*Sqrt[e*x]*(Sqrt[b]*(a + b*x^3)*(4*A*b + B*(a + 2*b*x^3)) - a*(
-4*A*b + a*B)*Sqrt[b + a/x^3]*ArcTanh[Sqrt[b + a/x^3]/Sqrt[b]]))/
(12*b^(3/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.063, size = 6858, normalized size = 56.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((B*x^3+A)*(e*x)^(1/2)*(b*x^3+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*sqrt(e*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.68395, size = 1, normalized size = 0.01

$$\left[-\frac{\left(Ba^2-4\,Aab\right)\sqrt{\frac{e}{b}}\log\left(-8\,b^2ex^6-8\,abex^3-a^2e-4\left(2\,b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)-4\left(2\,Bbx^4+(Ba+4\,Ab)x\right)\sqrt{bx^3+a}\sqrt{ex}}{48\,b}, -\frac{\left(Ba^2-4\,Aab\right)\sqrt{-\frac{e}{b}}\arctan\left(\frac{2\sqrt{bx^3+a}\sqrt{ex}x}{(2\,bx^3+a)\sqrt{-\frac{e}{b}}}\right)-2\left(2\,Bbx^4+(Ba+4\,Ab)x\right)\sqrt{bx^3+a}\sqrt{ex}}{24\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)*sqrt(e*x),x, algorithm="fricas")
```

```
[Out] [-1/48*((B*a^2 - 4*A*a*b)*sqrt(e/b)*log(-8*b^2*e*x^6 - 8*a*b*e*x^
3 - a^2*e - 4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3 + a)*sqrt(e*x)*sqrt(
e/b)) - 4*(2*B*b*x^4 + (B*a + 4*A*b)*x)*sqrt(b*x^3 + a)*sqrt(e*x)
)/b, -1/24*((B*a^2 - 4*A*a*b)*sqrt(-e/b)*arctan(2*sqrt(b*x^3 + a)
*sqrt(e*x)*x/((2*b*x^3 + a)*sqrt(-e/b))) - 2*(2*B*b*x^4 + (B*a +
4*A*b)*x)*sqrt(b*x^3 + a)*sqrt(e*x))/b]
```

Sympy [A] time = 14.0615, size = 201, normalized size = 1.66

$$\frac{A\sqrt{a}\,(ex)^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}{3e}+\frac{Aa\sqrt{e}\operatorname{asinh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{\sqrt{a}e^{\frac{3}{2}}}\right)}{3\sqrt{b}}+\frac{Ba^{\frac{3}{2}}\,(ex)^{\frac{3}{2}}}{12be\sqrt{1+\frac{bx^3}{a}}}+\frac{B\sqrt{a}\,(ex)^{\frac{9}{2}}}{4e^4\sqrt{1+\frac{bx^3}{a}}}-\frac{Ba^2\sqrt{e}\operatorname{asinh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{\sqrt{a}e^{\frac{3}{2}}}\right)}{12b^{\frac{3}{2}}}+\frac{Bb\,(ex)^{\frac{15}{2}}}{6\sqrt{a}e^7\sqrt{1+\frac{bx^3}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(e*x)**(1/2)*(b*x**3+a)**(1/2),x)
```

```
[Out] A*sqrt(a)*(e*x)**(3/2)*sqrt(1 + b*x**3/a)/(3*e) + A*a*sqrt(e)*asi
nh(sqrt(b)*(e*x)**(3/2)/(sqrt(a)*e**(3/2)))/(3*sqrt(b)) + B*a**(3
/2)*(e*x)**(3/2)/(12*b*e*sqrt(1 + b*x**3/a)) + B*sqrt(a)*(e*x)**(
9/2)/(4*e**4*sqrt(1 + b*x**3/a)) - B*a**2*sqrt(e)*asinh(sqrt(b)*(
e*x)**(3/2)/(sqrt(a)*e**(3/2)))/(12*b**(3/2)) + B*b*(e*x)**(15/2)
/(6*sqrt(a)*e**7*sqrt(1 + b*x**3/a))
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)*sqrt(e*x),x, algorithm="giac")
```

```
[Out] Timed out
```

3.520 $\int \frac{\sqrt{a+bx^3}\left(A+Bx^3\right)}{\sqrt{ex}}\,dx$

Optimal. Leaf size=286

$$\frac{3^{3/4}a^{2/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(10Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{40be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\sqrt{a+bx^3}(10Ab-aB)}{20be}+\frac{B\sqrt{ex}\left(a+bx^3\right)^{3/2}}{5be}$$

```
[Out] ((10*A*b - a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(20*b*e) + (B*Sqrt[e*x
]*(a + b*x^3)^(3/2))/(5*b*e) + (3^(3/4)*a^(2/3)*(10*A*b - a*B)*Sq
rt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[Ar
cCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])
*b^(1/3)*x)], (2 + Sqrt[3])/4])/(40*b*e*Sqrt[(b^(1/3)*x*(a^(1/3)
+ b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x
^3])
```

Rubi [A] time = 0.567522, antiderivative size = 286, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{3^{3/4}a^{2/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(10Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{40be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\sqrt{a+bx^3}(10Ab-aB)}{20be}+\frac{B\sqrt{ex}\left(a+bx^3\right)^{3/2}}{5be}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/Sqrt[e*x],x]
```

```
[Out] ((10*A*b - a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(20*b*e) + (B*Sqrt[e*x
]*(a + b*x^3)^(3/2))/(5*b*e) + (3^(3/4)*a^(2/3)*(10*A*b - a*B)*Sq
rt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[Ar
cCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])
*b^(1/3)*x)], (2 + Sqrt[3])/4])/(40*b*e*Sqrt[(b^(1/3)*x*(a^(1/3)
+ b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x
^3])
```

Rubi in Sympy [A] time = 28.6515, size = 246, normalized size = 0.86

$$\frac{B\sqrt{ex}\left(a+bx^3\right)^{\frac{3}{2}}}{5be}+\frac{3^{\frac{3}{4}}a^{\frac{2}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(10Ab-Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{40be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\sqrt{a+bx^3}\,(10Ab-Ba)}{20be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/(e*x)**(1/2),x)
```

```
[Out] B*sqrt(e*x)*(a + b*x**3)**(3/2)/(5*b*e) + 3**(3/4)*a**(2/3)*sqrt(
e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1
/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(10*A
*b - B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/
(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(40*b*e*
sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1
 + sqrt(3)))**2)*sqrt(a + b*x**3)) + sqrt(e*x)*sqrt(a + b*x**3)*(
10*A*b - B*a)/(20*b*e)
```

Mathematica [C] time = 0.714055, size = 209, normalized size = 0.73

$$\frac{\sqrt[3]{-a}x\left(a+bx^3\right)\left(3aB+10Ab+4bBx^3\right)-i3^{3/4}a\sqrt[3]{b}x^2\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(10Ab-aB)F\left(\sin^{-1}\left(\ldots\right.\right.}{20\sqrt[3]{-a}b\sqrt{ex}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/Sqrt[e*x],x]
```

```
[Out] ((-a)^(1/3)*x*(a + b*x^3)*(10*A*b + 3*a*B + 4*b*B*x^3) - I*3^(3/4
)*a*b^(1/3)*(10*A*b - a*B)*x^2*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(
1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b
^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1
/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)])/(20*(-a)^(1/3)*b*Sqrt[e*
x]*Sqrt[a + b*x^3])
```

Maple [C] time = 0.06, size = 3721, normalized size = 13.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/(e*x)^(1/2),x)
```

```
[Out] -1/20*(b*x^3+a)^(1/2)*x/b^2/(-a*b^2)^(1/3)*(-4*I*B*(1/b^2*e*x*(-b
*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3)
)*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+
a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^3*b^2-6*I*B*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3
^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^(1/2)*x^2*a^2*b^2
*e+60*I*A*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(
1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*E
llipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^
(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*3^(1/2)*x^2*a*b^3*e+12*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2
)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*x*a^2*b*e-120*I
```

```
*A*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elliptic
F((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),
((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(-
a*b^2)^(1/3)*3^(1/2)*x*a*b^2*e-60*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*
x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*
3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^
(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a*b^3*e-6*I*B*(-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(
1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2
)*a^2*e+6*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(
1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*E
llipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^
(1/2))*x^2*a^2*b^2*e+120*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2
)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(
-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/
(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x*a*b^2*e-12*B*(-(I*3^(1/2)-
3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*
3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x*a
^2*b*e+60*I*A*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I
*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-
3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*(-a*b^2)^(2/3)*3^(1/2)*a*b*e-60*A*(-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a*b*e+6*B*(-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*
3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^
(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*
3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(
1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2
)^(2/3)*a^2*e+12*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^3
*b^2-3*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(
1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^
2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a*b
-10*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3
)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^
(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*b^2+30
*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*b^2+9*B*(1/b^2*e*x*
(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x
^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*a*b)/(e*x)^(1/2)/((b*x^3+a)*e*x)^
(1/2)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(
-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b
```

```
*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/sqrt(e*x),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/sqrt(e*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bx^3 + A)\sqrt{bx^3 + a}}{\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/sqrt(e*x),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/sqrt(e*x), x)
```

Sympy [A] time = 7.46312, size = 97, normalized size = 0.34

$$\frac{A\sqrt{a}\sqrt{x}\,\Gamma\left(\frac{1}{6}\right){}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{1}{6} \\ \frac{7}{6} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{e}\,\Gamma\left(\frac{7}{6}\right)} + \frac{B\sqrt{a}x^{\frac{7}{2}}\,\Gamma\left(\frac{7}{6}\right){}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{7}{6} \\ \frac{13}{6} \end{matrix}\middle| \frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{e}\,\Gamma\left(\frac{13}{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/(e*x)**(1/2),x)
```

```
[Out] A*sqrt(a)*sqrt(x)*gamma(1/6)*hyper((-1/2, 1/6), (7/6,), b*x**3*ex
p_polar(I*pi)/a)/(3*sqrt(e)*gamma(7/6)) + B*sqrt(a)*x**(7/2)*gamm
a(7/6)*hyper((-1/2, 7/6), (13/6,), b*x**3*exp_polar(I*pi)/a)/(3*s
qrt(e)*gamma(13/6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/sqrt(e*x),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/sqrt(e*x), x)
```

3.521 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{(ex)^{3/2}}\,dx$

Optimal. Leaf size=580

$$-\frac{3^{3/4}\left(1-\sqrt{3}\right)\sqrt[3]{a}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+8Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{16b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}\sqrt[3]{a}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+8Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{8b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3\left(1+\sqrt{3}\right)\sqrt{ex}\sqrt{a+bx^3}(aB+8Ab)}{8b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\sqrt{a+bx^3}(aB+8Ab)}{4ae^4}-\frac{2A\left(a+bx^3\right)^{3/2}}{ae\sqrt{ex}}$$

```
[Out] ((8*A*b + a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(4*a*e^4) + (3*(1 + S
qrt[3])*(8*A*b + a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(8*b^(2/3)*e^2*(
a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) - (2*A*(a + b*x^3)^(3/2))/(a*
e*Sqrt[e*x]) - (3*3^(1/4)*a^(1/3)*(8*A*b + a*B)*Sqrt[e*x]*(a^(1/3
) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(
a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) +
 (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (
2 + Sqrt[3])/4])/(8*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3
)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (
3^(3/4)*(1 - Sqrt[3])*a^(1/3)*(8*A*b + a*B)*Sqrt[e*x]*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1
- Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
Sqrt[3])/4])/(16*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x
))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 1.34063, antiderivative size = 580, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{3^{3/4}\left(1-\sqrt{3}\right)\sqrt[3]{a}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+8Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{16b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}\sqrt[3]{a}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+8Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{8b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{3\left(1+\sqrt{3}\right)\sqrt{ex}\sqrt{a+bx^3}(aB+8Ab)}{8b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\sqrt{a+bx^3}(aB+8Ab)}{4ae^4}-\frac{2A\left(a+bx^3\right)^{3/2}}{ae\sqrt{ex}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/(e*x)^(3/2),x]
```

```
[Out] ((8*A*b + a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(4*a*e^4) + (3*(1 + S
qrt[3])*(8*A*b + a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(8*b^(2/3)*e^2*(
a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) - (2*A*(a + b*x^3)^(3/2))/(a*
e*Sqrt[e*x]) - (3*3^(1/4)*a^(1/3)*(8*A*b + a*B)*Sqrt[e*x]*(a^(1/3
) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(
a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) +
 (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (
2 + Sqrt[3])/4])/(8*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3
)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (
3^(3/4)*(1 - Sqrt[3])*a^(1/3)*(8*A*b + a*B)*Sqrt[e*x]*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1
- Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
Sqrt[3])/4])/(16*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x
))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 73.2283, size = 527, normalized size = 0.91

$$
-\frac{2A\left(a+bx^3\right)^{\frac{3}{2}}}{ae\sqrt{ex}}
-\frac{3\sqrt[4]{3}\sqrt[3]{a}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(8Ab+Ba)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{8b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}
-\frac{3^{\frac{3}{4}}\sqrt[3]{a}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(8Ab+Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{16b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}
+\frac{\sqrt{ex}\left(\frac{3}{4}+\frac{3\sqrt{3}}{4}\right)\sqrt{a+bx^3}(8Ab+Ba)}{2b^{\frac{2}{3}}e^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}
+\frac{(ex)^{\frac{5}{2}}\sqrt{a+bx^3}(8Ab+Ba)}{4ae^4}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/(e*x)**(3/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(3/2)/(a*e*sqrt(e*x)) - 3*3**(1/4)*a**(1/3)*sq
rt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a*
*(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(8
*A*b + B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1)
)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(8*b**
(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b*
*(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) - 3**(3/4)*a**(1/3)
*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3
) + b**(1/3)*x)*(8*A*b + B*a)*elliptic_f(acos((a**(1/3) + b**(1/3
)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(
3)/4 + 1/2)/(16*b**(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3
)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
+ sqrt(e*x)*(3/4 + 3*sqrt(3)/4)*sqrt(a + b*x**3)*(8*A*b + B*a)/(2
*b**(2/3)*e**2*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))) + (e*x)**(5
/2)*sqrt(a + b*x**3)*(8*A*b + B*a)/(4*a*e**4)
```

Mathematica [C] time = 4.66959, size = 283, normalized size = 0.49

$$\frac{x^{3/2}\left(\frac{2(a+bx^3)(Bx^3-8A)}{\sqrt{x}}-\frac{x^{5/2}(aB+8Ab)\left(-3\left(\frac{a}{x^3}+b\right)+\frac{\sqrt[6]{-1}\,3^{3/4}ab^{2/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\ \cdots\right.\right.}{(-a)^{2/3}x}\right)}{b}\right)}{8(ex)^{3/2}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/(e*x)^(3/2),x]
```

```
[Out] (x^(3/2)*((2*(a + b*x^3)*(-8*A + B*x^3))/Sqrt[x] - ((8*A*b + a*B)
*x^(5/2)*(-3*(b + a/x^3) + ((-1)^(1/6)*3^(3/4)*a*b^(2/3)*Sqrt[((-
1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/
b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*((-I)*Sqrt[3]*Ellipt
icE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)
], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (
I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/((-a)^(2/3)*x)
))/b))/(8*(e*x)^(3/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.077, size = 5736, normalized size = 9.9

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/(e*x)^(3/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3+A)\sqrt{bx^3+a}}{(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{(Bx^3+A)\sqrt{bx^3+a}}{\sqrt{ex}\,ex},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/(sqrt(e*x)*e*x), x)
```

Sympy [A] time = 8.89979, size = 100, normalized size = 0.17

$$\frac{A\sqrt{a}\,\Gamma\left(-\frac{1}{6}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},-\frac{1}{6}\\ \frac{5}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3e^{\frac{3}{2}}\sqrt{x}\,\Gamma\left(\frac{5}{6}\right)}+\frac{B\sqrt{a}x^{\frac{5}{2}}\,\Gamma\left(\frac{5}{6}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{5}{6}\\ \frac{11}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3e^{\frac{3}{2}}\,\Gamma\left(\frac{11}{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/(e*x)**(3/2),x)
```

```
[Out] A*sqrt(a)*gamma(-1/6)*hyper((-1/2, -1/6), (5/6,), b*x**3*exp_pola
r(I*pi)/a)/(3*e**(3/2)*sqrt(x)*gamma(5/6)) + B*sqrt(a)*x**(5/2)*g
amma(5/6)*hyper((-1/2, 5/6), (11/6,), b*x**3*exp_polar(I*pi)/a)/(
3*e**(3/2)*gamma(11/6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)\sqrt{bx^3+a}}{(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(3/2), x)
```

3.522 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{(ex)^{5/2}}\,dx$

Optimal. Leaf size=118

$$\frac{(aB+2Ab)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3\sqrt{b}e^{5/2}}+\frac{(ex)^{3/2}\sqrt{a+bx^3}(aB+2Ab)}{3ae^4}-\frac{2A\left(a+bx^3\right)^{3/2}}{3ae(ex)^{3/2}}$$

```
[Out] ((2*A*b + a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(3*a*e^4) - (2*A*(a +
 b*x^3)^(3/2))/(3*a*e*(e*x)^(3/2)) + ((2*A*b + a*B)*ArcTanh[(Sqrt
[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*Sqrt[b]*e^(5/2))
```

Rubi [A] time = 0.247429, antiderivative size = 118, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{(aB+2Ab)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3\sqrt{b}e^{5/2}}+\frac{(ex)^{3/2}\sqrt{a+bx^3}(aB+2Ab)}{3ae^4}-\frac{2A\left(a+bx^3\right)^{3/2}}{3ae(ex)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/(e*x)^(5/2),x]
```

```
[Out] ((2*A*b + a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(3*a*e^4) - (2*A*(a +
 b*x^3)^(3/2))/(3*a*e*(e*x)^(3/2)) + ((2*A*b + a*B)*ArcTanh[(Sqrt
[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*Sqrt[b]*e^(5/2))
```

Rubi in Sympy [A] time = 24.0637, size = 109, normalized size = 0.92

$$-\frac{2A\left(a+bx^3\right)^{\frac{3}{2}}}{3ae\,(ex)^{\frac{3}{2}}}+\frac{2\left(Ab+\frac{Ba}{2}\right)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{3\sqrt{b}e^{\frac{5}{2}}}+\frac{2\,(ex)^{\frac{3}{2}}\sqrt{a+bx^3}\left(Ab+\frac{Ba}{2}\right)}{3ae^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/(e*x)**(5/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(3/2)/(3*a*e*(e*x)**(3/2)) + 2*(A*b + B*a/2)*a
tanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(3*sqrt(b)
*e**(5/2)) + 2*(e*x)**(3/2)*sqrt(a + b*x**3)*(A*b + B*a/2)/(3*a*e
**4)
```

Mathematica [A] time = 0.246398, size = 92, normalized size = 0.78

$$\frac{x\left(\sqrt{b}\left(a+bx^3\right)\left(Bx^3-2A\right)+x^3\sqrt{\frac{a}{x^3}+b}(aB+2Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)\right)}{3\sqrt{b}(ex)^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/(e*x)^(5/2),x]
```

```
[Out] (x*(Sqrt[b]*(a + b*x^3)*(-2*A + B*x^3) + (2*A*b + a*B)*Sqrt[b + a
/x^3]*x^3*ArcTanh[Sqrt[b + a/x^3]/Sqrt[b]]))/(3*Sqrt[b]*(e*x)^(5/
2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.07, size = 6668, normalized size = 56.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/(e*x)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.677675, size = 1, normalized size = 0.01

$$\left[\frac{(Ba+2\,Ab)ex^2\log\left(-4\left(2\,b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}-\left(8\,b^2x^6+8\,abx^3+a^2\right)\sqrt{be}\right)+4\left(Bx^3-2\,A\right)\sqrt{bx^3+a}\sqrt{be}\sqrt{ex}}{12\,\sqrt{be}e^3x^2}, \frac{(Ba\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/12*((B*a + 2*A*b)*e*x^2*log(-4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3
+ a)*sqrt(e*x) - (8*b^2*x^6 + 8*a*b*x^3 + a^2)*sqrt(b*e)) + 4*(B*
x^3 - 2*A)*sqrt(b*x^3 + a)*sqrt(b*e)*sqrt(e*x))/(sqrt(b*e)*e^3*x^
2), 1/6*((B*a + 2*A*b)*e*x^2*arctan(2*sqrt(b*x^3 + a)*sqrt(-b*e)*
sqrt(e*x)*x/(2*b*e*x^3 + a*e)) + 2*(B*x^3 - 2*A)*sqrt(b*x^3 + a)*
sqrt(-b*e)*sqrt(e*x))/(sqrt(-b*e)*e^3*x^2)]
```

Sympy [A] time = 31.6847, size = 160, normalized size = 1.36

$$-\frac{2A\sqrt{a}}{3e^{\frac{5}{2}}x^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}+\frac{2A\sqrt{b}\operatorname{asinh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3e^{\frac{5}{2}}}-\frac{2Abx^{\frac{3}{2}}}{3\sqrt{a}e^{\frac{5}{2}}\sqrt{1+\frac{bx^3}{a}}}+\frac{B\sqrt{a}x^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}{3e^{\frac{5}{2}}}+\frac{Ba\operatorname{asinh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3\sqrt{b}e^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/(e*x)**(5/2),x)
```

```
[Out] -2*A*sqrt(a)/(3*e**(5/2)*x**(3/2)*sqrt(1 + b*x**3/a)) + 2*A*sqrt(
b)*asinh(sqrt(b)*x**(3/2)/sqrt(a))/(3*e**(5/2)) - 2*A*b*x**(3/2)/
(3*sqrt(a)*e**(5/2)*sqrt(1 + b*x**3/a)) + B*sqrt(a)*x**(3/2)*sqrt
(1 + b*x**3/a)/(3*e**(5/2)) + B*a*asinh(sqrt(b)*x**(3/2)/sqrt(a))
/(3*sqrt(b)*e**(5/2))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\sqrt{bx^3 + a}}{(ex)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(5/2), x)
```

3.523 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{(ex)^{7/2}}\,dx$

Optimal. Leaf size=283

$$\frac{3^{3/4}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(5aB+4Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{20\sqrt[3]{a}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\sqrt{a+bx^3}(5aB+4Ab)}{10ae^4}-\frac{2A\left(a+bx^3\right)^{3/2}}{5ae(ex)^{5/2}}$$

```
[Out] ((4*A*b + 5*a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(10*a*e^4) - (2*A*(a
+ b*x^3)^(3/2))/(5*a*e*(e*x)^(5/2)) + (3^(3/4)*(4*A*b + 5*a*B)*Sq
rt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[Ar
cCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])
*b^(1/3)*x)], (2 + Sqrt[3])/4])/(20*a^(1/3)*e^4*Sqrt[(b^(1/3)*x*(
a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt
[a + b*x^3])
```

Rubi [A] time = 0.561793, antiderivative size = 283, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{3^{3/4}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(5aB+4Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{20\sqrt[3]{a}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\sqrt{a+bx^3}(5aB+4Ab)}{10ae^4}-\frac{2A\left(a+bx^3\right)^{3/2}}{5ae(ex)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/(e*x)^(7/2),x]
```

```
[Out] ((4*A*b + 5*a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(10*a*e^4) - (2*A*(a
+ b*x^3)^(3/2))/(5*a*e*(e*x)^(5/2)) + (3^(3/4)*(4*A*b + 5*a*B)*Sq
rt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
 b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[Ar
cCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])
*b^(1/3)*x)], (2 + Sqrt[3])/4])/(20*a^(1/3)*e^4*Sqrt[(b^(1/3)*x*(
a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt
[a + b*x^3])
```

Rubi in Sympy [A] time = 29.3372, size = 253, normalized size = 0.89

$$-\frac{2A\left(a+bx^3\right)^{\frac{3}{2}}}{5ae\left(ex\right)^{\frac{5}{2}}}+\frac{\sqrt{ex}\sqrt{a+bx^3}\left(4Ab+5Ba\right)}{10ae^4}+\frac{3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(4Ab+5Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{20\sqrt[3]{a}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/(e*x)**(7/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(3/2)/(5*a*e*(e*x)**(5/2)) + sqrt(e*x)*sqrt(a
+ b*x**3)*(4*A*b + 5*B*a)/(10*a*e**4) + 3**(3/4)*sqrt(e*x)*sqrt((
a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1
/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(4*A*b + 5*B*a)*
elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3)
+ b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(20*a**(1/3)*e**4*
sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1
 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.714999, size = 199, normalized size = 0.7

$$\frac{x\left(\sqrt[3]{-a}\left(a+bx^3\right)\left(5Bx^3-4A\right)-i3^{3/4}\sqrt[3]{b}x^4\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(5aB+4Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right.\right.\right.}{10\sqrt[3]{-a}(ex)^{7/2}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/(e*x)^(7/2),x]
```

```
[Out] (x*((-a)^(1/3)*(a + b*x^3)*(-4*A + 5*B*x^3) - I*3^(3/4)*b^(1/3)*(
4*A*b + 5*a*B)*x^4*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^
(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2
)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3
)*x)]/3^(1/4)], (-1)^(1/3)]))/(10*(-a)^(1/3)*(e*x)^(7/2)*Sqrt[a +
 b*x^3])
```

Maple [C] time = 0.067, size = 3512, normalized size = 12.4

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/(e*x)^(7/2),x)
```

```
[Out] -1/10*(b*x^3+a)^(1/2)/x^2/(-a*b^2)^(1/3)/b*(-48*I*A*(-a*b^2)^(1/3
)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/
2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ell
ipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1
/2))*x^4*b^2*e-5*I*B*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)
*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x
+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))
^(1/2)*x^3*b+24*I*A*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*b*e-24*A*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3
^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^5*b^3*e+48*A*(-a*
```

```
b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1
/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*El
lipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(
1/2))*x^4*b^2*e-24*A*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*
x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*
3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^
(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*b*e+30*I*B*3^(1/2)*(-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(
-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(
I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^5*a*b^2*e-12*A
*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(
1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*
(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*b-60*I*B*(-a*b^2)^(1/
3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1
/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*El
lipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(
1/2))*x^4*a*b*e+24*I*A*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a
*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/
2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)
+1)/(I*3^(1/2)-3))^(1/2))*x^5*b^3*e+4*I*A*((b*x^3+a)*e*x)^(1/2)*(
-a*b^2)^(1/3)*3^(1/2)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3)))^(1/2)*b-30*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x
+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3
^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(
1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^5*a*b^2*e+60*B*(-a*b^2)^(1/3)*(-(
I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3
^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(
1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3
^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1
/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^4*a*b*
e-30*B*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/
3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^
(1/2)-3))^(1/2))*x^3*a*e+30*I*B*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/
2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-
3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*
(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*a*e+15*B*((
b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3
))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^3*b)/e^3/(e*x)^(1/2)/(
(b*x^3+a)*e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3
))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(7/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(7/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{(Bx^3 + A)\sqrt{bx^3 + a}}{\sqrt{ex}e^3x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(7/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/(sqrt(e*x)*e^3*x^3), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)*(b*x**3+a)**(1/2)/(e*x)**(7/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/(e*x)^(7/2), x)
```

3.524 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{x^{9/2}}\,dx$

Optimal. Leaf size=564

$$-\frac{3^{3/4}\left(1-\sqrt{3}\right)\sqrt[3]{b}\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(7aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{14a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}\sqrt[3]{b}\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(7aB+2Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{7a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{a+bx^3}(7aB+2Ab)}{7a\sqrt{x}}+\frac{3\left(1+\sqrt{3}\right)\sqrt[3]{b}\sqrt{x}\sqrt{a+bx^3}(7aB+2Ab)}{7a\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}-\frac{2A\left(a+bx^3\right)^{3/2}}{7ax^{7/2}}$$

```
[Out] (-2*(2*A*b + 7*a*B)*Sqrt[a + b*x^3])/(7*a*Sqrt[x]) + (3*(1 + Sqrt
[3])*b^(1/3)*(2*A*b + 7*a*B)*Sqrt[x]*Sqrt[a + b*x^3])/(7*a*(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)) - (2*A*(a + b*x^3)^(3/2))/(7*a*x^(
7/2)) - (3*3^(1/4)*b^(1/3)*(2*A*b + 7*a*B)*Sqrt[x]*(a^(1/3) + b^(
1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3)
 + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - S
qrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqr
t[3])/4])/(7*a^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (3^(3/4)*(1
- Sqrt[3])*b^(1/3)*(2*A*b + 7*a*B)*Sqrt[x]*(a^(1/3) + b^(1/3)*x)*
Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 +
Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*
b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4]
)/(14*a^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (
1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 1.16434, antiderivative size = 564, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$-\frac{3^{3/4}\left(1-\sqrt{3}\right)\sqrt[3]{b}\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(7aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{14a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{3\sqrt[4]{3}\sqrt[3]{b}\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(7aB+2Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{7a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{a+bx^3}(7aB+2Ab)}{7a\sqrt{x}}+\frac{3\left(1+\sqrt{3}\right)\sqrt[3]{b}\sqrt{x}\sqrt{a+bx^3}(7aB+2Ab)}{7a\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}-\frac{2A\left(a+bx^3\right)^{3/2}}{7ax^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^(9/2),x]
```

```
[Out] (-2*(2*A*b + 7*a*B)*Sqrt[a + b*x^3])/(7*a*Sqrt[x]) + (3*(1 + Sqrt
[3])*b^(1/3)*(2*A*b + 7*a*B)*Sqrt[x]*Sqrt[a + b*x^3])/(7*a*(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)) - (2*A*(a + b*x^3)^(3/2))/(7*a*x^(
7/2)) - (3*3^(1/4)*b^(1/3)*(2*A*b + 7*a*B)*Sqrt[x]*(a^(1/3) + b^(
1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3)
 + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - S
qrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqr
t[3])/4])/(7*a^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]) - (3^(3/4)*(1
- Sqrt[3])*b^(1/3)*(2*A*b + 7*a*B)*Sqrt[x]*(a^(1/3) + b^(1/3)*x)*
Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 +
Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*
b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4]
)/(14*a^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (
1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 52.3209, size = 513, normalized size = 0.91

$$-\frac{2A\left(a+bx^{3}\right)^{\frac{3}{2}}}{7ax^{\frac{7}{2}}}+\frac{\sqrt[3]{b}\sqrt{x}\left(\frac{6}{7}+\frac{6\sqrt{3}}{7}\right)\sqrt{a+bx^{3}}\left(Ab+\frac{7Ba}{2}\right)}{a\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}-\frac{4\sqrt{a+bx^{3}}\left(Ab+\frac{7Ba}{2}\right)}{7a\sqrt{x}}-\frac{6\sqrt[4]{3}\sqrt[3]{b}\sqrt{x}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab+\frac{7Ba}{2}\right)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{7a^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\sqrt{a+bx^{3}}}-\frac{3^{\frac{3}{4}}\sqrt[3]{b}\sqrt{x}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab+\frac{7Ba}{2}\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{7a^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\sqrt{a+bx^{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**(9/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(3/2)/(7*a*x**(7/2)) + b**(1/3)*sqrt(x)*(6/7 +
 6*sqrt(3)/7)*sqrt(a + b*x**3)*(A*b + 7*B*a/2)/(a*(a**(1/3) + b**
(1/3)*x*(1 + sqrt(3)))) - 4*sqrt(a + b*x**3)*(A*b + 7*B*a/2)/(7*a
*sqrt(x)) - 6*3**(1/4)*b**(1/3)*sqrt(x)*sqrt((a**(2/3) - a**(1/3)
*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3))
)**2)*(a**(1/3) + b**(1/3)*x)*(A*b + 7*B*a/2)*elliptic_e(acos((a*
*(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + s
qrt(3)))), sqrt(3)/4 + 1/2)/(7*a**(2/3)*sqrt(b**(1/3)*x*(a**(1/3)
 + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a +
 b*x**3)) - 3**(3/4)*b**(1/3)*sqrt(x)*sqrt((a**(2/3) - a**(1/3)*b
**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))*
*2)*(-sqrt(3) + 1)*(a**(1/3) + b**(1/3)*x)*(A*b + 7*B*a/2)*ellipt
ic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(
1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(7*a**(2/3)*sqrt(b**(1/3
)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))
**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 2.57209, size = 285, normalized size = 0.51

$$-\frac{-2(-a)^{2/3}\left(a+bx^{3}\right)\left(x^{3}(7aB+3Ab)+aA\right)+x^{3}(7aB+2Ab)\left(3(-a)^{2/3}\left(a+bx^{3}\right)+(-1)^{2/3}3^{3/4}ab^{2/3}x^{2}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\cdots\right.}{7(-a)^{5/3}x^{7/2}\sqrt{a+b\cdots}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^(9/2),x]
```

```
[Out] -(-2*(-a)^(2/3)*(a + b*x^3)*(a*A + (3*A*b + 7*a*B)*x^3) + (2*A*b
+ 7*a*B)*x^3*(3*(-a)^(2/3)*(a + b*x^3) + (-1)^(2/3)*3^(3/4)*a*b^(
2/3)*x^2*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*
Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*(Sq
rt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)
*x)]/3^(1/4)], (-1)^(1/3)] + (-1)^(5/6)*EllipticF[ArcSin[Sqrt[-(-
1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)])))/(
7*(-a)^(5/3)*x^(7/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.12, size = 5911, normalized size = 10.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^(9/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\sqrt{bx^3 + a}}{x^{\frac{9}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(9/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(9/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bx^3 + A\right)\sqrt{bx^3 + a}}{x^{\frac{9}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(9/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^(9/2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\sqrt{bx^3 + a}}{x^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(9/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(9/2), x)
```

3.525 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{x^{11/2}} dx$

Optimal. Leaf size=79

$$-\frac{2A(a+bx^3)^{3/2}}{9ax^{9/2}}-\frac{2B\sqrt{a+bx^3}}{3x^{3/2}}+\frac{2}{3}\sqrt{b}B\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)$$

```
[Out] (-2*B*Sqrt[a + b*x^3])/(3*x^(3/2)) - (2*A*(a + b*x^3)^(3/2))/(9*a
*x^(9/2)) + (2*Sqrt[b]*B*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a + b*x^3
]])/3
```

Rubi [A] time = 0.14234, antiderivative size = 79, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{2A(a+bx^3)^{3/2}}{9ax^{9/2}}-\frac{2B\sqrt{a+bx^3}}{3x^{3/2}}+\frac{2}{3}\sqrt{b}B\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^(11/2),x]
```

```
[Out] (-2*B*Sqrt[a + b*x^3])/(3*x^(3/2)) - (2*A*(a + b*x^3)^(3/2))/(9*a
*x^(9/2)) + (2*Sqrt[b]*B*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a + b*x^3
]])/3
```

Rubi in Sympy [A] time = 13.4074, size = 73, normalized size = 0.92

$$-\frac{2A(a+bx^3)^{\frac{3}{2}}}{9ax^{\frac{9}{2}}}+\frac{2B\sqrt{b}\,\mathrm{atanh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a+bx^3}}\right)}{3}-\frac{2B\sqrt{a+bx^3}}{3x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**(11/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(3/2)/(9*a*x**(9/2)) + 2*B*sqrt(b)*atanh(sqrt(
b)*x**(3/2)/sqrt(a + b*x**3))/3 - 2*B*sqrt(a + b*x**3)/(3*x**(3/2
))
```

Mathematica [A] time = 0.170781, size = 74, normalized size = 0.94

$$\frac{2}{3}\sqrt{b}B\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)-\frac{2\sqrt{a+bx^3}\left(a\left(A+3Bx^3\right)+Abx^3\right)}{9ax^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^(11/2),x]
```

```
[Out] (-2*Sqrt[a + b*x^3]*(A*b*x^3 + a*(A + 3*B*x^3)))/(9*a*x^(9/2)) +
(2*Sqrt[b]*B*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a + b*x^3]])/3
```

Maple [C] time = 0.091, size = 3759, normalized size = 47.6

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(b*x^3+a)^(1/2)/x^(11/2),x)
```

```
[Out] -2/9*(b*x^3+a)^(1/2)/x^(9/2)/b*(36*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((
I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-
a*b^2)^(1/3)*3^(1/2)*x^6*a*b-3*A*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2
)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*x)^(1/2)*x^3*b^2+
I*A*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*
x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))
)^(1/2)*((b*x^3+a)*x)^(1/2)*3^(1/2)*a*b-3*A*(1/b^2*x*(-b*x+(-a*b^
2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*x)^(1/
2)*a*b+I*A*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)
^(1/3)))^(1/2)*((b*x^3+a)*x)^(1/2)*3^(1/2)*x^3*b^2-18*I*B*(-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/
2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
)/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-
1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^
(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2)*x^5*a-18*I*B*(-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I
*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)
-3))^(1/2))*3^(1/2)*x^7*a*b^2-36*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3
^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*x^6*a*b+18
*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elliptic
F((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),
((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*
3^(1/2)*x^7*a*b^2-18*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3
^(1/2)-3))^(1/2))*x^7*a*b^2+3*I*B*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^
2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*x)^(1/2)*3^(1/2)
*x^3*a*b+18*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3
^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*EllipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^7*a*b^2+36*B*(-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)
*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I
*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x^
6*a*b-36*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1
/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*
```

```
b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*El
lipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(
I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x^6*a*b-18*B*(-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*
3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^
(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*
3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(
1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2
)^(2/3)*x^5*a+18*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))
/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^
(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1
/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*x^5*a+1
8*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(
-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipti
cF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
,((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))
*(-a*b^2)^(2/3)*3^(1/2)*x^5*a-9*B*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^
2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*x)^(1/2)*x^3*a*b
)/((b*x^3+a)*x)^(1/2)/a/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/
3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-
a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(11/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.372831, size = 1, normalized size = 0.01

$$\left[\frac{3\,Ba\sqrt{b}x^{5}\log\left(-8\,b^{2}x^{6}-8\,abx^{3}-4\left(2\,bx^{4}+ax\right)\sqrt{bx^{3}+a}\sqrt{b}\sqrt{x}-a^{2}\right)-4\left(\left(3\,Ba+Ab\right)x^{3}+Aa\right)\sqrt{bx^{3}+a}\sqrt{x}}{18\,ax^{5}},\ \frac{3\,Ba\sqrt{-b}x^{5}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(11/2),x, algorithm="fricas")
```

```
[Out] [1/18*(3*B*a*sqrt(b)*x^5*log(-8*b^2*x^6 - 8*a*b*x^3 - 4*(2*b*x^4
+ a*x)*sqrt(b*x^3 + a)*sqrt(b)*sqrt(x) - a^2) - 4*((3*B*a + A*b)*
x^3 + A*a)*sqrt(b*x^3 + a)*sqrt(x))/(a*x^5), 1/9*(3*B*a*sqrt(-b)*
x^5*arctan(2*sqrt(b*x^3 + a)*b*x^(3/2)/((2*b*x^3 + a)*sqrt(-b)))
- 2*((3*B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)*sqrt(x))/(a*x^5)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**(11/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.230913, size = 147, normalized size = 1.86

$$-\frac{2\,Bb\arctan\left(\frac{\sqrt{b+\frac{a}{x^3}}}{\sqrt{-b}}\right)}{3\,\sqrt{-b}}+\frac{2\left(3\,Bab\arctan\left(\frac{\sqrt{b}}{\sqrt{-b}}\right)+3\,Ba\sqrt{-b}\sqrt{b}+A\sqrt{-b}b^{\frac{3}{2}}\right)}{9\,a\sqrt{-b}}-\frac{2\left(3\,Ba^3\sqrt{b+\frac{a}{x^3}}+Aa^2\left(b+\frac{a}{x^3}\right)^{\frac{3}{2}}\right)}{9\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(11/2),x, algorithm="giac")
```

```
[Out] -2/3*B*b*arctan(sqrt(b + a/x^3)/sqrt(-b))/sqrt(-b) + 2/9*(3*B*a*b
*arctan(sqrt(b)/sqrt(-b)) + 3*B*a*sqrt(-b)*sqrt(b) + A*sqrt(-b)*b
^(3/2))/(a*sqrt(-b)) - 2/9*(3*B*a^3*sqrt(b + a/x^3) + A*a^2*(b +
a/x^3)^(3/2))/a^3
```

3.526 $\int \frac{\sqrt{a+bx^3}(A+Bx^3)}{x^{13/2}} dx$

Optimal. Leaf size=269

$$-\frac{3^{3/4}b\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(2Ab-11aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{55a^{4/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}(2Ab-11aB)}{55ax^{5/2}}-\frac{2A\left(a+bx^3\right)^{3/2}}{11ax^{11/2}}$$

```
[Out] (2*(2*A*b - 11*a*B)*Sqrt[a + b*x^3])/(55*a*x^(5/2)) - (2*A*(a + b
*x^3)^(3/2))/(11*a*x^(11/2)) - (3^(3/4)*b*(2*A*b - 11*a*B)*Sqrt[x
]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(
a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)], (2 + Sqrt[3])/4])/(55*a^(4/3)*Sqrt[(b^(1/3)*x*(a^(1/3) +
b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3
])
```

Rubi [A] time = 0.468752, antiderivative size = 269, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$-\frac{3^{3/4}b\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(2Ab-11aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{55a^{4/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{a+bx^3}(2Ab-11aB)}{55ax^{5/2}}-\frac{2A\left(a+bx^3\right)^{3/2}}{11ax^{11/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x^3]*(A + B*x^3))/x^(13/2),x]
```

```
[Out] (2*(2*A*b - 11*a*B)*Sqrt[a + b*x^3])/(55*a*x^(5/2)) - (2*A*(a + b
*x^3)^(3/2))/(11*a*x^(11/2)) - (3^(3/4)*b*(2*A*b - 11*a*B)*Sqrt[x
]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(
a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)], (2 + Sqrt[3])/4])/(55*a^(4/3)*Sqrt[(b^(1/3)*x*(a^(1/3) +
b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3
])
```

Rubi in Sympy [A] time = 21.5995, size = 243, normalized size = 0.9

$$-\frac{2A\left(a+bx^3\right)^{\frac{3}{2}}}{11ax^{\frac{11}{2}}}+\frac{4\sqrt{a+bx^3}\left(Ab-\frac{11Ba}{2}\right)}{55ax^{\frac{5}{2}}}-\frac{3^{\frac{3}{4}}b\sqrt{x}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(2Ab-11Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{55a^{\frac{4}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**(13/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(3/2)/(11*a*x**(11/2)) + 4*sqrt(a + b*x**3)*(A
*b - 11*B*a/2)/(55*a*x**(5/2)) - 3**(3/4)*b*sqrt(x)*sqrt((a**(2/3
) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(
1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(2*A*b - 11*B*a)*ellipt
ic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(
1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(55*a**(4/3)*sqrt(b**(1/
3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3))
)**2)*sqrt(a + b*x**3))
```

Mathematica [C]   time = 1.01132, size = 206, normalized size = 0.77

$$\sqrt{a+bx^3}\left(-\frac{2(11aB+3Ab)}{55ax^{5/2}}-\frac{2A}{11x^{11/2}}\right)$$
$$-\frac{2i3^{3/4}b^{4/3}x^{3/2}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{(-a)^{2/3}}{b^{2/3}x^2}+\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}+1}(11aB-2Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{55\sqrt[3]{-a}a\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[(Sqrt[a + b*x^3]*(A + B*x^3))/x^(13/2),x]
```

```
[Out] ((-2*A)/(11*x^(11/2)) - (2*(3*A*b + 11*a*B))/(55*a*x^(5/2)))*Sqrt
[a + b*x^3] - (((2*I)/55)*3^(3/4)*b^(4/3)*(-2*A*b + 11*a*B)*Sqrt[
(-1)^(5/6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*Sqrt[1 + (-a)^(2/3)/(b^
(2/3)*x^2) + (-a)^(1/3)/(b^(1/3)*x)]*x^(3/2)*EllipticF[ArcSin[Sqr
t[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]
)/((-a)^(1/3)*a*Sqrt[a + b*x^3])
```

Maple [C]   time = 0.089, size = 3690, normalized size = 13.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((B*x^3+A)*(b*x^3+a)^(1/2)/x^(13/2),x)
```

```
[Out] 2/55*(b*x^3+a)^(1/2)*(12*I*A*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3
^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^8*b^3-24*I*A*(-a*b^2)^(1/3)*3^(
1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elliptic
F((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),
((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*
x^7*b^2-11*I*B*((b*x^3+a)*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*(1/b^2*
x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^3
*a+12*I*A*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
```

```
-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/
2)+1)/(I*3^(1/2)-3))^(1/2))*x^6*b-5*I*A*((b*x^3+a)*x)^(1/2)*(-a*b
^2)^(1/3)*3^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b
^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(
-a*b^2)^(1/3)))^(1/2)*a-12*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1
)/(I*3^(1/2)-3))^(1/2))*x^8*b^3-3*I*A*((b*x^3+a)*x)^(1/2)*(-a*b^2
)^(1/3)*3^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2
)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a
*b^2)^(1/3)))^(1/2)*x^3*b+66*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a
*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/
2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)
+1)/(I*3^(1/2)-3))^(1/2))*x^8*a*b^2+24*A*(-a*b^2)^(1/3)*(-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)
*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^7*b^2-132*B*
(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*
3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3
)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3
))^(1/2))*x^7*a*b-12*A*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*
3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^6*b+66*B*(-a*b^2)^(2/3)*(-(I*3
^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)
+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^6*a-66*I*
B*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I
*3^(1/2)-3))^(1/2))*x^6*a-66*I*B*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/
(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^8*a*b^2+9*A*((b*x^3+a)*x)^(
1/2)*(-a*b^2)^(1/3)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3)))^(1/2)*x^3*b+33*B*((b*x^3+a)*x)^(1/2)*(-a*b^2)^(
1/3)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
))^(1/2)*x^3*a+132*I*B*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^
(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2
)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^7*a*b+15*A*((b*x^3+a)*
x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3)))^(1/2)*a)/x^(11/2)/(-a*b^2)^(1/3)/((b*x^3+a)
*x)^(1/2)/a/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/
```

```
2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^{\frac{13}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(13/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(13/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^{\frac{13}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(13/2),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)*sqrt(b*x^3 + a)/x^(13/2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)*(b*x**3+a)**(1/2)/x**(13/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{bx^3 + a}}{x^{\frac{13}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(13/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*sqrt(b*x^3 + a)/x^(13/2), x)
```

3.527 $\int (ex)^{7/2} \left(a+bx^3\right)^{3/2} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=201

$$-\frac{a^3 e^{7/2}(8Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{192b^{5/2}}+\frac{a^2e^2(ex)^{3/2}\sqrt{a+bx^3}(8Ab-3aB)}{192b^2}+\frac{(ex)^{9/2}\left(a+bx^3\right)^{3/2}(8Ab-3aB)}{72be}+\frac{a(ex)^{9/2}\sqrt{a+bx^3}(8Ab-3aB)}{96be}+\frac{B(ex)^{9/2}\left(a+bx^3\right)^{5/2}}{12be}$$

```
[Out] (a^2*(8*A*b - 3*a*B)*e^2*(e*x)^(3/2)*Sqrt[a + b*x^3])/(192*b^2) +
 (a*(8*A*b - 3*a*B)*(e*x)^(9/2)*Sqrt[a + b*x^3])/(96*b*e) + ((8*A
*b - 3*a*B)*(e*x)^(9/2)*(a + b*x^3)^(3/2))/(72*b*e) + (B*(e*x)^(9
/2)*(a + b*x^3)^(5/2))/(12*b*e) - (a^3*(8*A*b - 3*a*B)*e^(7/2)*Ar
cTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(192*b^(5
/2))
```

Rubi [A] time = 0.394775, antiderivative size = 201, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.269$

$$-\frac{a^3 e^{7/2}(8Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{192b^{5/2}}+\frac{a^2e^2(ex)^{3/2}\sqrt{a+bx^3}(8Ab-3aB)}{192b^2}+\frac{(ex)^{9/2}\left(a+bx^3\right)^{3/2}(8Ab-3aB)}{72be}+\frac{a(ex)^{9/2}\sqrt{a+bx^3}(8Ab-3aB)}{96be}+\frac{B(ex)^{9/2}\left(a+bx^3\right)^{5/2}}{12be}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^(7/2)*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (a^2*(8*A*b - 3*a*B)*e^2*(e*x)^(3/2)*Sqrt[a + b*x^3])/(192*b^2) +
 (a*(8*A*b - 3*a*B)*(e*x)^(9/2)*Sqrt[a + b*x^3])/(96*b*e) + ((8*A
*b - 3*a*B)*(e*x)^(9/2)*(a + b*x^3)^(3/2))/(72*b*e) + (B*(e*x)^(9
/2)*(a + b*x^3)^(5/2))/(12*b*e) - (a^3*(8*A*b - 3*a*B)*e^(7/2)*Ar
cTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(192*b^(5
/2))
```

Rubi in Sympy [A] time = 34.8102, size = 182, normalized size = 0.91

$$\frac{B\left(ex\right)^{\frac{9}{2}}\left(a+bx^3\right)^{\frac{5}{2}}}{12be}-\frac{a^3e^{\frac{7}{2}}\left(8Ab-3Ba\right)\operatorname{atanh}\left(\frac{\sqrt{b}\left(ex\right)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{192b^{\frac{5}{2}}}+\frac{a^2e^2\left(ex\right)^{\frac{3}{2}}\sqrt{a+bx^3}\left(8Ab-3Ba\right)}{192b^2}+\frac{a\left(ex\right)^{\frac{9}{2}}\sqrt{a+bx^3}\left(8Ab-3Ba\right)}{96be}+\frac{\left(ex\right)^{\frac{9}{2}}\left(a+bx^3\right)^{\frac{3}{2}}\left(8Ab-3Ba\right)}{72be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(7/2)*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] B*(e*x)**(9/2)*(a + b*x**3)**(5/2)/(12*b*e) - a**3*e**(7/2)*(8*A*
b - 3*B*a)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3))
)/(192*b**(5/2)) + a**2*e**2*(e*x)**(3/2)*sqrt(a + b*x**3)*(8*A*b
 - 3*B*a)/(192*b**2) + a*(e*x)**(9/2)*sqrt(a + b*x**3)*(8*A*b - 3
*B*a)/(96*b*e) + (e*x)**(9/2)*(a + b*x**3)**(3/2)*(8*A*b - 3*B*a)
/(72*b*e)
```

Mathematica [A] time = 0.291884, size = 147, normalized size = 0.73

$$\frac{e^2(ex)^{3/2}\left(3a^3\sqrt{\frac{a}{x^3}+b}(3aB-8Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)-\sqrt{b}\left(a+bx^3\right)\left(9a^3B-6a^2b\left(4A+Bx^3\right)-8ab^2x^3\left(14A+9Bx^3\right)-16\right.\right.}{576b^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^(7/2)*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (e^2*(e*x)^(3/2)*(-(Sqrt[b]*(a + b*x^3)*(9*a^3*B - 6*a^2*b*(4*A +
 B*x^3) - 16*b^3*x^6*(4*A + 3*B*x^3) - 8*a*b^2*x^3*(14*A + 9*B*x^
3))) + 3*a^3*(-8*A*b + 3*a*B)*Sqrt[b + a/x^3]*ArcTanh[Sqrt[b + a/
x^3]/Sqrt[b]]))/(576*b^(5/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.069, size = 7705, normalized size = 38.3

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(7/2)*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.699104, size = 1, normalized size = 0.

$$\left[-\frac{3\left(3Ba^4-8Aa^3b\right)e^3\sqrt{\frac{e}{b}}\log\left(-8b^2ex^6-8abex^3-a^2e+4\left(2b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)-4\left(48Bb^3e^3x^{10}+8\left(9Bab\right.\right.}{2304b^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(7/2),x, algorithm="fricas")
```

```
[Out] [-1/2304*(3*(3*B*a^4 - 8*A*a^3*b)*e^3*sqrt(e/b)*log(-8*b^2*e*x^6
- 8*a*b*e*x^3 - a^2*e + 4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3 + a)*sqr
t(e*x)*sqrt(e/b)) - 4*(48*B*b^3*e^3*x^10 + 8*(9*B*a*b^2 + 8*A*b^3
)*e^3*x^7 + 2*(3*B*a^2*b + 56*A*a*b^2)*e^3*x^4 - 3*(3*B*a^3 - 8*A
*a^2*b)*e^3*x)*sqrt(b*x^3 + a)*sqrt(e*x))/b^2, 1/1152*(3*(3*B*a^4
 - 8*A*a^3*b)*e^3*sqrt(-e/b)*arctan(2*sqrt(b*x^3 + a)*sqrt(e*x)*x
/((2*b*x^3 + a)*sqrt(-e/b))) + 2*(48*B*b^3*e^3*x^10 + 8*(9*B*a*b^
2 + 8*A*b^3)*e^3*x^7 + 2*(3*B*a^2*b + 56*A*a*b^2)*e^3*x^4 - 3*(3*
B*a^3 - 8*A*a^2*b)*e^3*x)*sqrt(b*x^3 + a)*sqrt(e*x))/b^2]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(7/2)*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}} (ex)^{\frac{7}{2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(7/2), x)
```

3.528 $\int (ex)^{5/2} \left(a+bx^3\right)^{3/2} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=364

$$-\frac{9\, 3^{3/4} a^{8/3} e^2 \sqrt{ex} \left(\sqrt[3]{a}+\sqrt[3]{b}x\right) \sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}} (22Ab-7aB) F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{14080 b^2 \sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}} \sqrt{a+bx^3}} + \frac{27a^2e^2\sqrt{ex}\sqrt{a+bx^3}(22Ab-7aB)}{7040b^2} + \frac{(ex)^{7/2}\left(a+bx^3\right)^{3/2}(22Ab-7aB)}{176be} + \frac{9a(ex)^{7/2}\sqrt{a+bx^3}(22Ab-7aB)}{1760be} + \frac{B(ex)^{7/2}\left(a+bx^3\right)^{5/2}}{11be}$$

```
[Out] (27*a^2*(22*A*b - 7*a*B)*e^2*Sqrt[e*x]*Sqrt[a + b*x^3])/(7040*b^2
) + (9*a*(22*A*b - 7*a*B)*(e*x)^(7/2)*Sqrt[a + b*x^3])/(1760*b*e)
 + ((22*A*b - 7*a*B)*(e*x)^(7/2)*(a + b*x^3)^(3/2))/(176*b*e) + (
B*(e*x)^(7/2)*(a + b*x^3)^(5/2))/(11*b*e) - (9*3^(3/4)*a^(8/3)*(2
2*A*b - 7*a*B)*e^2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3)
- a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^
(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(14080*b^2*S
qrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.779423, antiderivative size = 364, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$-\frac{9\, 3^{3/4} a^{8/3} e^2 \sqrt{ex} \left(\sqrt[3]{a}+\sqrt[3]{b}x\right) \sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}} (22Ab-7aB) F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{14080 b^2 \sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}} \sqrt{a+bx^3}} + \frac{27a^2e^2\sqrt{ex}\sqrt{a+bx^3}(22Ab-7aB)}{7040b^2} + \frac{(ex)^{7/2}\left(a+bx^3\right)^{3/2}(22Ab-7aB)}{176be} + \frac{9a(ex)^{7/2}\sqrt{a+bx^3}(22Ab-7aB)}{1760be} + \frac{B(ex)^{7/2}\left(a+bx^3\right)^{5/2}}{11be}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^(5/2)*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (27*a^2*(22*A*b - 7*a*B)*e^2*Sqrt[e*x]*Sqrt[a + b*x^3])/(7040*b^2
) + (9*a*(22*A*b - 7*a*B)*(e*x)^(7/2)*Sqrt[a + b*x^3])/(1760*b*e)
 + ((22*A*b - 7*a*B)*(e*x)^(7/2)*(a + b*x^3)^(3/2))/(176*b*e) + (
B*(e*x)^(7/2)*(a + b*x^3)^(5/2))/(11*b*e) - (9*3^(3/4)*a^(8/3)*(2
2*A*b - 7*a*B)*e^2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3)
- a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^
(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(14080*b^2*S
qrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 44.4171, size = 332, normalized size = 0.91

$$\frac{B(ex)^{\frac{7}{2}}\left(a+bx^3\right)^{\frac{5}{2}}}{11be} - \frac{9\cdot 3^{\frac{3}{4}}a^{\frac{8}{3}}e^2\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(22Ab-7Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{14080b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} + \frac{27a^2e^2\sqrt{ex}\sqrt{a+bx^3}(22Ab-7Ba)}{7040b^2} + \frac{9a(ex)^{\frac{7}{2}}\sqrt{a+bx^3}(22Ab-7Ba)}{1760be} + \frac{(ex)^{\frac{7}{2}}\left(a+bx^3\right)^{\frac{3}{2}}(22Ab-7Ba)}{176be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(5/2)*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] B*(e*x)**(7/2)*(a + b*x**3)**(5/2)/(11*b*e) - 9*3**(3/4)*a**(8/3)
*e**2*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x
**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/
3)*x)*(22*A*b - 7*B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-s
qrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 +
1/2)/(14080*b**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3
) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 27*a**2*e**
2*sqrt(e*x)*sqrt(a + b*x**3)*(22*A*b - 7*B*a)/(7040*b**2) + 9*a*(
e*x)**(7/2)*sqrt(a + b*x**3)*(22*A*b - 7*B*a)/(1760*b*e) + (e*x)*
*(7/2)*(a + b*x**3)**(3/2)*(22*A*b - 7*B*a)/(176*b*e)
```

Mathematica [C] time = 0.886921, size = 256, normalized size = 0.7

$$\frac{e^2\sqrt{ex}\left(-\sqrt[3]{-a}\left(a+bx^3\right)\left(189a^3B-54a^2b\left(11A+2Bx^3\right)-8ab^2x^3\left(209A+125Bx^3\right)-80b^3x^6\left(11A+8Bx^3\right)\right)+9i3^{3/4}a^3\sqrt[3]{b}\cdots\right.}{7040\sqrt[3]{-a}b^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^(5/2)*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (e^2*Sqrt[e*x]*(-((-a)^(1/3)*(a + b*x^3)*(189*a^3*B - 54*a^2*b*(1
1*A + 2*B*x^3) - 80*b^3*x^6*(11*A + 8*B*x^3) - 8*a*b^2*x^3*(209*A
 + 125*B*x^3))) + (9*I)*3^(3/4)*a^3*b^(1/3)*(22*A*b - 7*a*B)*x*Sq
rt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^
(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcS
in[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^
(1/3)]))/(7040*(-a)^(1/3)*b^2*Sqrt[a + b*x^3])
```

Maple [C] time = 0.067, size = 4619, normalized size = 12.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(5/2)*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] 1/7040*e^2*(e*x)^(1/2)*(b*x^3+a)^(1/2)/(-a*b^2)^(1/3)/b^3*(-189*I
*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
```

```
))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a^3*b+640*I
*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^9*b^4+880
*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^6*b^4+5
94*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(
1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a^2*b^2
+378*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipt
icF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2)
)*(-a*b^2)^(2/3)*a^4*e-2640*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I
*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)
^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2
)^(1/3)*x^6*b^4-1782*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)
*a^2*b^2+567*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*a^3*b-1
920*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+
2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^9*b^4-324*B*(1
/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1
/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^3*a^2*b^2-3000*B*(1/b^
2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^6*a*b^3-378*I*B*(-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)
*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)
*3^(1/2)*a^4*e+1188*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*3^(1/2)*x^2*a^3*b^3*e-378*I*B*(-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(
1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^(1/2)*x^2*a^4*b^2*e
+1188*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/
2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ell
ipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1
/2))*(-a*b^2)^(2/3)*3^(1/2)*a^3*b*e+378*B*(-(I*3^(1/2)-3)*x*b/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3
)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)
/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a^4*b^2*e-5016*A*(1/b^2*
e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2
)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(
(b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^3*a*b^3+2376*A*(-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)
*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I
```

```
*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x*
a^3*b^2*e-756*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I
*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-
3))^(1/2))*(-a*b^2)^(1/3)*x*a^4*b*e-1188*A*(-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a^3*b*e-1188
*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*
b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF(
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((
I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^
2*a^3*b^3*e+1000*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3
^(1/2)*x^6*a*b^3+1672*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1
/3)*3^(1/2)*x^3*a*b^3+108*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I
*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)
^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2
)^(1/3)*3^(1/2)*x^3*a^2*b^2-2376*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3
^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*x*a^3*b^2*
e+756*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/
2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ell
ipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1
/2))*(-a*b^2)^(1/3)*3^(1/2)*x*a^4*b*e)/((b*x^3+a)*e*x)^(1/2)/(I*3
^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1
/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2
)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx^3 + A)\,(bx^3 + a)^{\frac{3}{2}}\,(ex)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bbe^2x^8 + (Ba + Ab)e^2x^5 + Aae^2x^2\right)\sqrt{bx^3 + a}\sqrt{ex}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*b*e^2*x^8 + (B*a + A*b)*e^2*x^5 + A*a*e^2*x^2)*sqrt(b
*x^3 + a)*sqrt(e*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(5/2)*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}} (ex)^{\frac{5}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(5/2), x)
```

3.529 $\int (ex)^{3/2}\left(a+bx^3\right)^{3/2}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=621

$$-\frac{9\ 3^{3/4}\left(1-\sqrt{3}\right)a^{7/3}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{896b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{27\sqrt[4]{3}a^{7/3}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{448b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{27\left(1+\sqrt{3}\right)a^2e\sqrt{ex}\sqrt{a+bx^3}(4Ab-aB)}{448b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\left(a+bx^3\right)^{3/2}(4Ab-aB)}{28be}$$
$$+\frac{9a(ex)^{5/2}\sqrt{a+bx^3}(4Ab-aB)}{224be}+\frac{B(ex)^{5/2}\left(a+bx^3\right)^{5/2}}{10be}$$

```
[Out] (9*a*(4*A*b - a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(224*b*e) + (27*(
1 + Sqrt[3])*a^2*(4*A*b - a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(448*
b^(5/3)*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + ((4*A*b - a*B)*(e*
x)^(5/2)*(a + b*x^3)^(3/2))/(28*b*e) + (B*(e*x)^(5/2)*(a + b*x^3)
^(5/2))/(10*b*e) - (27*3^(1/4)*a^(7/3)*(4*A*b - a*B)*e*Sqrt[e*x]*
(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)
*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^
(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)
*x)], (2 + Sqrt[3])/4])/(448*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b
^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]
) - (9*3^(3/4)*(1 - Sqrt[3])*a^(7/3)*(4*A*b - a*B)*e*Sqrt[e*x]*(a
^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x
^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1
/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x
)], (2 + Sqrt[3])/4])/(896*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(
1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 1.52648, antiderivative size = 621, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.231$

$$-\frac{9\ 3^{3/4}\left(1-\sqrt{3}\right)a^{7/3}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{896b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{27\sqrt[4]{3}a^{7/3}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{448b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{27\left(1+\sqrt{3}\right)a^2e\sqrt{ex}\sqrt{a+bx^3}(4Ab-aB)}{448b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\left(a+bx^3\right)^{3/2}(4Ab-aB)}{28be}$$
$$+\frac{9a(ex)^{5/2}\sqrt{a+bx^3}(4Ab-aB)}{224be}+\frac{B(ex)^{5/2}\left(a+bx^3\right)^{5/2}}{10be}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^(3/2)*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (9*a*(4*A*b - a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(224*b*e) + (27*(
1 + Sqrt[3])*a^2*(4*A*b - a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(448*
b^(5/3)*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + ((4*A*b - a*B)*(e*
x)^(5/2)*(a + b*x^3)^(3/2))/(28*b*e) + (B*(e*x)^(5/2)*(a + b*x^3)
^(5/2))/(10*b*e) - (27*3^(1/4)*a^(7/3)*(4*A*b - a*B)*e*Sqrt[e*x]*
(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)
*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^
(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)
*x)], (2 + Sqrt[3])/4])/(448*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b
^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]
) - (9*3^(3/4)*(1 - Sqrt[3])*a^(7/3)*(4*A*b - a*B)*e*Sqrt[e*x]*(a
^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x
^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1
/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x
)], (2 + Sqrt[3])/4])/(896*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(
1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 81.35, size = 559, normalized size = 0.9

$$\frac{B(ex)^{\frac{5}{2}}\left(a+bx^3\right)^{\frac{5}{2}}}{10be} - \frac{27\sqrt[4]{3}a^{\frac{7}{3}}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(4Ab-Ba)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{448b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} - \frac{9\cdot 3^{\frac{3}{4}}a^{\frac{7}{3}}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(4Ab-Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{896b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} + \frac{a^2e\sqrt{ex}\left(\frac{27}{224}+\frac{27\sqrt{3}}{224}\right)\sqrt{a+bx^3}(4Ab-Ba)}{2b^{\frac{5}{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)} + \frac{9a(ex)^{\frac{5}{2}}\sqrt{a+bx^3}(4Ab-Ba)}{224be} + \frac{(ex)^{\frac{5}{2}}\left(a+bx^3\right)^{\frac{3}{2}}(4Ab-Ba)}{28be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(3/2)*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] B*(e*x)**(5/2)*(a + b*x**3)**(5/2)/(10*b*e) - 27*3**(1/4)*a**(7/3
)*e*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**
2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)
*x)*(4*A*b - B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3
) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/
(448*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) +
 b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) - 9*3**(3/4)*a**
(7/3)*e*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)
*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(
a**(1/3) + b**(1/3)*x)*(4*A*b - B*a)*elliptic_f(acos((a**(1/3) +
b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3))))
, sqrt(3)/4 + 1/2)/(896*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(
1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3
)) + a**2*e*sqrt(e*x)*(27/224 + 27*sqrt(3)/224)*sqrt(a + b*x**3)*
(4*A*b - B*a)/(2*b**(5/3)*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3))))
+ 9*a*(e*x)**(5/2)*sqrt(a + b*x**3)*(4*A*b - B*a)/(224*b*e) + (e*
x)**(5/2)*(a + b*x**3)**(3/2)*(4*A*b - B*a)/(28*b*e)
```

Mathematica [C] time = 6.49015, size = 303, normalized size = 0.49

$$\frac{x(ex)^{3/2}\left(2b\left(a+bx^3\right)\left(27a^2B+4ab\left(85A+46Bx^3\right)+16b^2x^3\left(10A+7Bx^3\right)\right)+45a^2(aB-4Ab)\left(-3\left(\frac{a}{x^3}+b\right)+\frac{\sqrt[6]{-1}3^{3/4}ab^{2/\cdots}}{\cdots}\right.\right.}{2240b^2\sqrt{a+bx^3}\cdots}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^(3/2)*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (x*(e*x)^(3/2)*(2*b*(a + b*x^3)*(27*a^2*B + 16*b^2*x^3*(10*A + 7*
B*x^3) + 4*a*b*(85*A + 46*B*x^3)) + 45*a^2*(-4*A*b + a*B)*(-3*(b
+ a/x^3) + ((-1)^(1/6)*3^(3/4)*a*b^(2/3)*Sqrt[((-1)^(5/6)*((-a)^(
1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^
(1/3)*x)/b^(1/3) + x^2)/x^2]*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[
-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)] +
 (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b
^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/((-a)^(2/3)*x))))/(2240*b^2*Sq
rt[a + b*x^3])
```

Maple [C] time = 0.072, size = 5790, normalized size = 9.3

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(3/2)*(b*x^3+a)^(3/2)*(B*x^3+A),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3+A\right)\left(bx^3+a\right)^{\frac{3}{2}}(ex)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bbex^7+(Ba+Ab)ex^4+Aaex\right)\sqrt{bx^3+a}\sqrt{ex},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*b*e*x^7 + (B*a + A*b)*e*x^4 + A*a*e*x)*sqrt(b*x^3 + a
)*sqrt(e*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(3/2)*(b*x**3+a)**(3/2)*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx^3 + A) (bx^3 + a)^{\frac{3}{2}} (ex)^{\frac{3}{2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*(e*x)^(3/2), x)
```

3.530 $\int \sqrt{ex}\left(a+bx^3\right)^{3/2}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=161

$$\frac{a^2\sqrt{e}(6Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{24b^{3/2}}+\frac{(ex)^{3/2}\left(a+bx^3\right)^{3/2}(6Ab-aB)}{36be}+\frac{a(ex)^{3/2}\sqrt{a+bx^3}(6Ab-aB)}{24be}+\frac{B(ex)^{3/2}\left(a+bx^3\right)^{5/2}}{9be}$$

```
[Out] (a*(6*A*b - a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(24*b*e) + ((6*A*b
- a*B)*(e*x)^(3/2)*(a + b*x^3)^(3/2))/(36*b*e) + (B*(e*x)^(3/2)*(
a + b*x^3)^(5/2))/(9*b*e) + (a^2*(6*A*b - a*B)*Sqrt[e]*ArcTanh[(S
qrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(24*b^(3/2))
```

Rubi [A] time = 0.324454, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{a^2\sqrt{e}(6Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{24b^{3/2}}+\frac{(ex)^{3/2}\left(a+bx^3\right)^{3/2}(6Ab-aB)}{36be}+\frac{a(ex)^{3/2}\sqrt{a+bx^3}(6Ab-aB)}{24be}+\frac{B(ex)^{3/2}\left(a+bx^3\right)^{5/2}}{9be}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[e*x]*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (a*(6*A*b - a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(24*b*e) + ((6*A*b
- a*B)*(e*x)^(3/2)*(a + b*x^3)^(3/2))/(36*b*e) + (B*(e*x)^(3/2)*(
a + b*x^3)^(5/2))/(9*b*e) + (a^2*(6*A*b - a*B)*Sqrt[e]*ArcTanh[(S
qrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(24*b^(3/2))
```

Rubi in Sympy [A] time = 27.7504, size = 138, normalized size = 0.86

$$\frac{B(ex)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{5}{2}}}{9be}+\frac{a^2\sqrt{e}\,(6Ab-Ba)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{24b^{\frac{3}{2}}}+\frac{a\,(ex)^{\frac{3}{2}}\sqrt{a+bx^3}\,(6Ab-Ba)}{24be}+\frac{(ex)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{3}{2}}(6Ab-Ba)}{36be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)*(e*x)**(1/2),x)
```

```
[Out] B*(e*x)**(3/2)*(a + b*x**3)**(5/2)/(9*b*e) + a**2*sqrt(e)*(6*A*b
- B*a)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(2
4*b**(3/2)) + a*(e*x)**(3/2)*sqrt(a + b*x**3)*(6*A*b - B*a)/(24*b
*e) + (e*x)**(3/2)*(a + b*x**3)**(3/2)*(6*A*b - B*a)/(36*b*e)
```

Mathematica [A] time = 0.273415, size = 123, normalized size = 0.76

$$\frac{x\sqrt{ex}\left(\sqrt{b}\left(a+bx^3\right)\left(3a^2B+2ab\left(15A+7Bx^3\right)+4b^2x^3\left(3A+2Bx^3\right)\right)-3a^2\sqrt{\frac{a}{x^3}+b}(aB-6Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)\right)}{72b^{3/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[e*x]*(a + b*x^3)^(3/2)*(A + B*x^3),x]
```

```
[Out] (x*Sqrt[e*x]*(Sqrt[b]*(a + b*x^3)*(3*a^2*B + 4*b^2*x^3*(3*A + 2*B
*x^3) + 2*a*b*(15*A + 7*B*x^3)) - 3*a^2*(-6*A*b + a*B)*Sqrt[b + a
/x^3]*ArcTanh[Sqrt[b + a/x^3]/Sqrt[b]]))/(72*b^(3/2)*Sqrt[a + b*x
^3])
```

Maple [C] time = 0.045, size = 7290, normalized size = 45.3

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)*(e*x)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*sqrt(e*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.651003, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(Ba^3-6\,Aa^2b\right)\sqrt{\frac{e}{b}}\log\left(-8\,b^2ex^6-8\,abex^3-a^2e-4\left(2\,b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)-4\left(8\,Bb^2x^7+2\left(7\,Bab+6\,Ab\right.\right.}{288\,b}\right.$$

$$\left.-\frac{3\left(Ba^3-6\,Aa^2b\right)\sqrt{-\frac{e}{b}}\arctan\left(\frac{2\sqrt{bx^3+a}\sqrt{ex}x}{\left(2\,bx^3+a\right)\sqrt{-\frac{e}{b}}}\right)-2\left(8\,Bb^2x^7+2\left(7\,Bab+6\,Ab^2\right)x^4+3\left(Ba^2+10\,Aab\right)x\right)\sqrt{bx^3+a}\sqrt{ex}}{144\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*sqrt(e*x),x, algorithm="fricas")
```

```
[Out] [-1/288*(3*(B*a^3 - 6*A*a^2*b)*sqrt(e/b)*log(-8*b^2*e*x^6 - 8*a*b
*e*x^3 - a^2*e - 4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3 + a)*sqrt(e*x)*
sqrt(e/b)) - 4*(8*B*b^2*x^7 + 2*(7*B*a*b + 6*A*b^2)*x^4 + 3*(B*a^
2 + 10*A*a*b)*x)*sqrt(b*x^3 + a)*sqrt(e*x))/b, -1/144*(3*(B*a^3 -
 6*A*a^2*b)*sqrt(-e/b)*arctan(2*sqrt(b*x^3 + a)*sqrt(e*x)*x/((2*b
*x^3 + a)*sqrt(-e/b))) - 2*(8*B*b^2*x^7 + 2*(7*B*a*b + 6*A*b^2)*x
^4 + 3*(B*a^2 + 10*A*a*b)*x)*sqrt(b*x^3 + a)*sqrt(e*x))/b]
```

Sympy [A] time = 71.4413, size = 335, normalized size = 2.08

$$\frac{Aa^{\frac{3}{2}}(ex)^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}{3e}+\frac{Aa^{\frac{3}{2}}(ex)^{\frac{3}{2}}}{12e\sqrt{1+\frac{bx^3}{a}}}+\frac{A\sqrt{a}b(ex)^{\frac{9}{2}}}{4e^4\sqrt{1+\frac{bx^3}{a}}}+\frac{Aa^2\sqrt{e}\operatorname{asinh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{\sqrt{a}e^{\frac{3}{2}}}\right)}{4\sqrt{b}}+\frac{Ab^2(ex)^{\frac{15}{2}}}{6\sqrt{a}e^7\sqrt{1+\frac{bx^3}{a}}}+\frac{Ba^{\frac{5}{2}}(ex)^{\frac{3}{2}}}{24be\sqrt{1+\frac{bx^3}{a}}}+\frac{17Ba^{\frac{3}{2}}(ex)^{\frac{9}{2}}}{72e^4\sqrt{1+\frac{bx^3}{a}}}+\frac{11B\sqrt{a}b(ex)^{\frac{15}{2}}}{36e^7\sqrt{1+\frac{bx^3}{a}}}-\frac{Ba^3\sqrt{e}\operatorname{asinh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{\sqrt{a}e^{\frac{3}{2}}}\right)}{24b^{\frac{3}{2}}}+\frac{Bb^2(ex)^{\frac{21}{2}}}{9\sqrt{a}e^{10}\sqrt{1+\frac{bx^3}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)*(e*x)**(1/2),x)
```

```
[Out] A*a**(3/2)*(e*x)**(3/2)*sqrt(1 + b*x**3/a)/(3*e) + A*a**(3/2)*(e*
x)**(3/2)/(12*e*sqrt(1 + b*x**3/a)) + A*sqrt(a)*b*(e*x)**(9/2)/(4
*e**4*sqrt(1 + b*x**3/a)) + A*a**2*sqrt(e)*asinh(sqrt(b)*(e*x)**(
3/2)/(sqrt(a)*e**(3/2)))/(4*sqrt(b)) + A*b**2*(e*x)**(15/2)/(6*sq
rt(a)*e**7*sqrt(1 + b*x**3/a)) + B*a**(5/2)*(e*x)**(3/2)/(24*b*e*
sqrt(1 + b*x**3/a)) + 17*B*a**(3/2)*(e*x)**(9/2)/(72*e**4*sqrt(1
+ b*x**3/a)) + 11*B*sqrt(a)*b*(e*x)**(15/2)/(36*e**7*sqrt(1 + b*x
**3/a)) - B*a**3*sqrt(e)*asinh(sqrt(b)*(e*x)**(3/2)/(sqrt(a)*e**(
3/2)))/(24*b**(3/2)) + B*b**2*(e*x)**(21/2)/(9*sqrt(a)*e**10*sqrt
(1 + b*x**3/a))
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)*sqrt(e*x),x, algorithm="giac")
```

```
[Out] Timed out
```

3.531 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{\sqrt{ex}}\,dx$

Optimal. Leaf size=324

$$\frac{9\,3^{3/4}a^{5/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(16Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{640be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\left(a+bx^3\right)^{3/2}(16Ab-aB)}{80be}+\frac{9a\sqrt{ex}\sqrt{a+bx^3}(16Ab-aB)}{320be}+\frac{B\sqrt{ex}\left(a+bx^3\right)^{5/2}}{8be}$$

```
[Out] (9*a*(16*A*b - a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(320*b*e) + ((16*A
*b - a*B)*Sqrt[e*x]*(a + b*x^3)^(3/2))/(80*b*e) + (B*Sqrt[e*x]*(a
 + b*x^3)^(5/2))/(8*b*e) + (9*3^(3/4)*a^(5/3)*(16*A*b - a*B)*Sqrt
[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b
^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcC
os[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b
^(1/3)*x)], (2 + Sqrt[3])/4])/(640*b*e*Sqrt[(b^(1/3)*x*(a^(1/3) +
 b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^
3])
```

Rubi [A] time = 0.67017, antiderivative size = 324, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{9\,3^{3/4}a^{5/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(16Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{640be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\left(a+bx^3\right)^{3/2}(16Ab-aB)}{80be}+\frac{9a\sqrt{ex}\sqrt{a+bx^3}(16Ab-aB)}{320be}+\frac{B\sqrt{ex}\left(a+bx^3\right)^{5/2}}{8be}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/Sqrt[e*x],x]
```


```
[Out] (9*a*(16*A*b - a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(320*b*e) + ((16*A
*b - a*B)*Sqrt[e*x]*(a + b*x^3)^(3/2))/(80*b*e) + (B*Sqrt[e*x]*(a
 + b*x^3)^(5/2))/(8*b*e) + (9*3^(3/4)*a^(5/3)*(16*A*b - a*B)*Sqrt
[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b
^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcC
os[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b
^(1/3)*x)], (2 + Sqrt[3])/4])/(640*b*e*Sqrt[(b^(1/3)*x*(a^(1/3) +
 b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^
3])
```

Rubi in Sympy [A] time = 34.8242, size = 282, normalized size = 0.87

$$\frac{B\sqrt{ex}\left(a+bx^3\right)^{\frac{5}{2}}}{8be}+\frac{9\cdot 3^{\frac{3}{4}}a^{\frac{5}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(16Ab-Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{640be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}+\frac{9a\sqrt{ex}\sqrt{a+bx^3}\,(16Ab-Ba)}{320be}+\frac{\sqrt{ex}\left(a+bx^3\right)^{\frac{3}{2}}(16Ab-Ba)}{80be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/(e*x)**(1/2),x)
```

```
[Out] B*sqrt(e*x)*(a + b*x**3)**(5/2)/(8*b*e) + 9*3**(3/4)*a**(5/3)*sqr
t(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**
(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(16
*A*b - B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1)
)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(640*b
*e*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x
*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 9*a*sqrt(e*x)*sqrt(a + b*
x**3)*(16*A*b - B*a)/(320*b*e) + sqrt(e*x)*(a + b*x**3)**(3/2)*(1
6*A*b - B*a)/(80*b*e)
```

Mathematica [C] time = 0.792484, size = 234, normalized size = 0.72

$$\frac{\sqrt[3]{-a}x\left(a+bx^3\right)\left(27a^2B+4ab\left(52A+19Bx^3\right)+8b^2x^3\left(8A+5Bx^3\right)\right)-9i3^{3/4}a^2\sqrt[3]{b}x^2\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x}{x^2}}}{320\sqrt[3]{-a}b\sqrt{ex}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/Sqrt[e*x],x]
```

```
[Out] ((-a)^(1/3)*x*(a + b*x^3)*(27*a^2*B + 8*b^2*x^3*(8*A + 5*B*x^3) +
 4*a*b*(52*A + 19*B*x^3)) - (9*I)*3^(3/4)*a^2*b^(1/3)*(16*A*b - a
*B)*x^2*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*S
qrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*Elli
pticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/
4)], (-1)^(1/3)])/(320*(-a)^(1/3)*b*Sqrt[e*x]*Sqrt[a + b*x^3])
```

Maple [C] time = 0.042, size = 4173, normalized size = 12.9

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/(e*x)^(1/2),x)
```

```
[Out] -1/320*(b*x^3+a)^(1/2)*x/(-a*b^2)^(1/3)/b^2*(-208*I*A*(1/b^2*e*x*
(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x
^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a*b^2+864*I*A*(-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(
```

-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(
I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3
^(1/2)*a^2*b*e-40*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*
3^(1/2)*x^6*b^3+864*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*3^(1/2)*x^2*a^2*b^3*e-54*I*B*(-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2
)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1
/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2)
*a^3*e-1728*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I
*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-
3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*x*a^2*b^2*e-864*A*(-(I*3^(1/2)-
3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*
3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a^2*b^3*e-54*I
B(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*
b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF(
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((
I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^
(1/2)*x^2*a^3*b^2*e+54*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I
*3^(1/2)-3))^(1/2))*x^2*a^3*b^2*e+120*B*((b*x^3+a)*e*x)^(1/2)*(-a
b^2)^(1/3)(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^
(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b
^2)^(1/3)))^(1/2)*x^6*b^3+1728*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/
2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x*a^2*b^2*e-27*I*B*(1/
b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a
b^2)^(1/3))(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/
2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a^2*b-108*B*(-(I*
3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a
b^2)^(1/3)))^(1/2)((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2
)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(
1/3)*x*a^3*b*e-76*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*
3^(1/2)*x^3*a*b^2-864*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*

```
3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a^2*b*e+54*B*(-(I*3^(1/2)-3)*x*
b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)
^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/
2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a^3*e+19
2*A*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2
)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/
2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^3*b^3+228*B*((b*
x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))
*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b
^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^3*a*b^2-64*I*A*(1/b^2*e*
x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b
*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^3*b^3+108*I*B*(-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/
2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
)/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/
2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+
3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/
3)*3^(1/2)*x*a^3*b*e+624*A*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*(
1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(
1/2)*a*b^2+81*B*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*(1/b^2*e*x*(
-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/
3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*a^2*b)
/(e*x)^(1/2)/((b*x^3+a)*e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x
+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/sqrt(e*x),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/sqrt(e*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bbx^6 + (Ba + Ab)x^3 + Aa)\sqrt{bx^3 + a}}{\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/sqrt(e*x),x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/sqrt(e
*x), x)
```

Sympy [A] time = 50.9421, size = 199, normalized size = 0.61

$$\frac{Aa^{\frac{3}{2}}\sqrt{x}\,\Gamma\left(\frac{1}{6}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{1}{6}\\ \frac{7}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{e}\,\Gamma\left(\frac{7}{6}\right)}+\frac{A\sqrt{a}bx^{\frac{7}{2}}\,\Gamma\left(\frac{7}{6}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{7}{6}\\ \frac{13}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{e}\,\Gamma\left(\frac{13}{6}\right)}+\frac{Ba^{\frac{3}{2}}x^{\frac{7}{2}}\,\Gamma\left(\frac{7}{6}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{7}{6}\\ \frac{13}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{e}\,\Gamma\left(\frac{13}{6}\right)}+\frac{B\sqrt{a}bx^{\frac{13}{2}}\,\Gamma\left(\frac{13}{6}\right)\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{13}{6}\\ \frac{19}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{e}\,\Gamma\left(\frac{19}{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/(e*x)**(1/2),x)
```

```
[Out] A*a**(3/2)*sqrt(x)*gamma(1/6)*hyper((-1/2, 1/6), (7/6,), b*x**3*e
xp_polar(I*pi)/a)/(3*sqrt(e)*gamma(7/6)) + A*sqrt(a)*b*x**(7/2)*g
amma(7/6)*hyper((-1/2, 7/6), (13/6,), b*x**3*exp_polar(I*pi)/a)/(
3*sqrt(e)*gamma(13/6)) + B*a**(3/2)*x**(7/2)*gamma(7/6)*hyper((-1
/2, 7/6), (13/6,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(e)*gamma(13/
6)) + B*sqrt(a)*b*x**(13/2)*gamma(13/6)*hyper((-1/2, 13/6), (19/6
,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(e)*gamma(19/6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)\left(bx^3+a\right)^{\frac{3}{2}}}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/sqrt(e*x),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/sqrt(e*x), x)
```

3.532 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{(ex)^{3/2}}\,dx$

Optimal. Leaf size=614

$$-\frac{9\,3^{3/4}\left(1-\sqrt{3}\right)a^{4/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+14Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{224b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{27\sqrt[4]{3}a^{4/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+14Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{112b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{27\left(1+\sqrt{3}\right)a\sqrt{ex}\sqrt{a+bx^3}(aB+14Ab)}{112b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\left(a+bx^3\right)^{3/2}(aB+14Ab)}{7ae^4}+\frac{9(ex)^{5/2}\sqrt{a+bx^3}(aB+14Ab)}{56e^4}-\frac{2A\left(a+bx^3\right)^{5/2}}{ae\sqrt{ex}}$$

```
[Out] (9*(14*A*b + a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(56*e^4) + (27*(1
+ Sqrt[3])*a*(14*A*b + a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(112*b^(2/
3)*e^2*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + ((14*A*b + a*B)*(e*
x)^(5/2)*(a + b*x^3)^(3/2))/(7*a*e^4) - (2*A*(a + b*x^3)^(5/2))/(
a*e*Sqrt[e*x]) - (27*3^(1/4)*a^(4/3)*(14*A*b + a*B)*Sqrt[e*x]*(a^
(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^
2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/
3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)
], (2 + Sqrt[3])/4])/(112*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) +
b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3
]) - (9*3^(3/4)*(1 - Sqrt[3])*a^(4/3)*(14*A*b + a*B)*Sqrt[e*x]*(a
^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x
^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1
/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x
)], (2 + Sqrt[3])/4])/(224*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) +
 b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^
3])
```

Rubi [A] time = 1.5153, antiderivative size = 614, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{9\,3^{3/4}\left(1-\sqrt{3}\right)a^{4/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+14Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{224b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{27\sqrt[4]{3}a^{4/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+14Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{112b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{27\left(1+\sqrt{3}\right)a\sqrt{ex}\sqrt{a+bx^3}(aB+14Ab)}{112b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\left(a+bx^3\right)^{3/2}(aB+14Ab)}{7ae^4}+\frac{9(ex)^{5/2}\sqrt{a+bx^3}(aB+14Ab)}{56e^4}-\frac{2A\left(a+bx^3\right)^{5/2}}{ae\sqrt{ex}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/(e*x)^(3/2),x]
```

```
[Out] (9*(14*A*b + a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(56*e^4) + (27*(1
+ Sqrt[3])*a*(14*A*b + a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(112*b^(2/
3)*e^2*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + ((14*A*b + a*B)*(e*
x)^(5/2)*(a + b*x^3)^(3/2))/(7*a*e^4) - (2*A*(a + b*x^3)^(5/2))/(
a*e*Sqrt[e*x]) - (27*3^(1/4)*a^(4/3)*(14*A*b + a*B)*Sqrt[e*x]*(a^
(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^
2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/
3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)
], (2 + Sqrt[3])/4])/(112*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) +
b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3
]) - (9*3^(3/4)*(1 - Sqrt[3])*a^(4/3)*(14*A*b + a*B)*Sqrt[e*x]*(a
^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x
^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1
/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x
)], (2 + Sqrt[3])/4])/(224*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) +
 b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^
3])
```

Rubi in Sympy [A] time = 82.6209, size = 563, normalized size = 0.92

$$-\frac{2A\left(a+bx^3\right)^{\frac{5}{2}}}{ae\sqrt{ex}}-\frac{27\sqrt[4]{3}a^{\frac{4}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(14Ab+Ba\right)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{112b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}-\frac{9\cdot3^{\frac{3}{4}}a^{\frac{4}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(14Ab+Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{224b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}+\frac{a\sqrt{ex}\left(\frac{27}{56}+\frac{27\sqrt{3}}{56}\right)\sqrt{a+bx^3}\left(14Ab+Ba\right)}{2b^{\frac{2}{3}}e^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}+\frac{9\left(ex\right)^{\frac{5}{2}}\sqrt{a+bx^3}\left(14Ab+Ba\right)}{56e^4}+\frac{\left(ex\right)^{\frac{5}{2}}\left(a+bx^3\right)^{\frac{3}{2}}\left(14Ab+Ba\right)}{7ae^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/(e*x)**(3/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(5/2)/(a*e*sqrt(e*x)) - 27*3**(1/4)*a**(4/3)*s
qrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(
14*A*b + B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) +
1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(112
*b**(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
+ b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) - 9*3**(3/4)*a*
*(4/3)*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*
x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a
**(1/3) + b**(1/3)*x)*(14*A*b + B*a)*elliptic_f(acos((a**(1/3) +
b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3))))
, sqrt(3)/4 + 1/2)/(224*b**(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) +
 b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b
*x**3)) + a*sqrt(e*x)*(27/56 + 27*sqrt(3)/56)*sqrt(a + b*x**3)*(1
4*A*b + B*a)/(2*b**(2/3)*e**2*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)
))) + 9*(e*x)**(5/2)*sqrt(a + b*x**3)*(14*A*b + B*a)/(56*e**4) +
(e*x)**(5/2)*(a + b*x**3)**(3/2)*(14*A*b + B*a)/(7*a*e**4)
```

Mathematica [C] time = 4.41843, size = 301, normalized size = 0.49

$$\frac{x^{3/2}\left(\frac{2\left(a+bx^3\right)\left(-112aA+17aBx^3+14Abx^3+8bBx^6\right)}{\sqrt{x}}-\frac{9ax^{5/2}(aB+14Ab)\left(-3\left(\frac{a}{x^3}+b\right)+\frac{\sqrt[6]{-1}3^{3/4}ab^{2/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}\left(\sqrt[3]{-1}\cdots\right)}{\cdots}\right)}{b}\cdots\right)}{112(ex)^{3/2}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/(e*x)^(3/2),x]
```

```
[Out] (x^(3/2)*((2*(a + b*x^3)*(-112*a*A + 14*A*b*x^3 + 17*a*B*x^3 + 8*
b*B*x^6))/Sqrt[x] - (9*a*(14*A*b + a*B)*x^(5/2)*(-3*(b + a/x^3) +
 ((-1)^(1/6)*3^(3/4)*a*b^(2/3)*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(
1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b
^(1/3) + x^2)/x^2]*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6
) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3
)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]
/3^(1/4)], (-1)^(1/3)]))/((-a)^(2/3)*x)))/b))/(112*(e*x)^(3/2)*Sq
rt[a + b*x^3])
```

Maple [C] time = 0.053, size = 6142, normalized size = 10.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/(e*x)^(3/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)\left(bx^3+a\right)^{\frac{3}{2}}}{(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bbx^{6} + (Ba + Ab)x^{3} + Aa\right)\sqrt{bx^{3} + a}}{\sqrt{ex}ex}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/(sqrt(
e*x)*e*x), x)
```

Sympy [A] time = 63.0681, size = 202, normalized size = 0.33

$$\frac{Aa^{\frac{3}{2}}\,\Gamma\left(-\frac{1}{6}\right){}_{2}F_{1}\left(\begin{matrix}-\frac{1}{2},-\frac{1}{6}\\ \frac{5}{6}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3e^{\frac{3}{2}}\sqrt{x}\,\Gamma\left(\frac{5}{6}\right)} + \frac{A\sqrt{a}bx^{\frac{5}{2}}\,\Gamma\left(\frac{5}{6}\right){}_{2}F_{1}\left(\begin{matrix}-\frac{1}{2},\frac{5}{6}\\ \frac{11}{6}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3e^{\frac{3}{2}}\,\Gamma\left(\frac{11}{6}\right)} + \frac{Ba^{\frac{3}{2}}x^{\frac{5}{2}}\,\Gamma\left(\frac{5}{6}\right){}_{2}F_{1}\left(\begin{matrix}-\frac{1}{2},\frac{5}{6}\\ \frac{11}{6}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3e^{\frac{3}{2}}\,\Gamma\left(\frac{11}{6}\right)} + \frac{B\sqrt{a}bx^{\frac{11}{2}}\,\Gamma\left(\frac{11}{6}\right){}_{2}F_{1}\left(\begin{matrix}-\frac{1}{2},\frac{11}{6}\\ \frac{17}{6}\end{matrix}\middle|\frac{bx^{3}e^{i\pi}}{a}\right)}{3e^{\frac{3}{2}}\,\Gamma\left(\frac{17}{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/(e*x)**(3/2),x)
```

```
[Out] A*a**(3/2)*gamma(-1/6)*hyper((-1/2, -1/6), (5/6,), b*x**3*exp_pol
ar(I*pi)/a)/(3*e**(3/2)*sqrt(x)*gamma(5/6)) + A*sqrt(a)*b*x**(5/2
)*gamma(5/6)*hyper((-1/2, 5/6), (11/6,), b*x**3*exp_polar(I*pi)/a
)/(3*e**(3/2)*gamma(11/6)) + B*a**(3/2)*x**(5/2)*gamma(5/6)*hyper
((-1/2, 5/6), (11/6,), b*x**3*exp_polar(I*pi)/a)/(3*e**(3/2)*gamm
a(11/6)) + B*sqrt(a)*b*x**(11/2)*gamma(11/6)*hyper((-1/2, 11/6),
(17/6,), b*x**3*exp_polar(I*pi)/a)/(3*e**(3/2)*gamma(17/6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^{3} + A\right)\left(bx^{3} + a\right)^{\frac{3}{2}}}{(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(3/2), x)
```

3.533 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{(ex)^{5/2}}\,dx$

Optimal. Leaf size=152

$$\frac{a(aB+4Ab)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{4\sqrt{b}e^{5/2}}+\frac{(ex)^{3/2}\left(a+bx^3\right)^{3/2}(aB+4Ab)}{6ae^4}+\frac{(ex)^{3/2}\sqrt{a+bx^3}(aB+4Ab)}{4e^4}-\frac{2A\left(a+bx^3\right)^{5/2}}{3ae(ex)^{3/2}}$$

```
[Out] ((4*A*b + a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(4*e^4) + ((4*A*b + a
*B)*(e*x)^(3/2)*(a + b*x^3)^(3/2))/(6*a*e^4) - (2*A*(a + b*x^3)^(
5/2))/(3*a*e*(e*x)^(3/2)) + (a*(4*A*b + a*B)*ArcTanh[(Sqrt[b]*(e*
x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(4*Sqrt[b]*e^(5/2))
```

Rubi [A] time = 0.306196, antiderivative size = 152, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{a(aB+4Ab)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{4\sqrt{b}e^{5/2}}+\frac{(ex)^{3/2}\left(a+bx^3\right)^{3/2}(aB+4Ab)}{6ae^4}+\frac{(ex)^{3/2}\sqrt{a+bx^3}(aB+4Ab)}{4e^4}-\frac{2A\left(a+bx^3\right)^{5/2}}{3ae(ex)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/(e*x)^(5/2),x]
```


```
[Out] ((4*A*b + a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(4*e^4) + ((4*A*b + a
*B)*(e*x)^(3/2)*(a + b*x^3)^(3/2))/(6*a*e^4) - (2*A*(a + b*x^3)^(
5/2))/(3*a*e*(e*x)^(3/2)) + (a*(4*A*b + a*B)*ArcTanh[(Sqrt[b]*(e*
x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(4*Sqrt[b]*e^(5/2))
```

Rubi in Sympy [A] time = 28.4392, size = 138, normalized size = 0.91

$$-\frac{2A\left(a+bx^3\right)^{\frac{5}{2}}}{3ae\left(ex\right)^{\frac{3}{2}}}+\frac{a\left(4Ab+Ba\right)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{4\sqrt{b}e^{\frac{5}{2}}}+\frac{(ex)^{\frac{3}{2}}\sqrt{a+bx^3}\left(4Ab+Ba\right)}{4e^4}+\frac{(ex)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{3}{2}}\left(4Ab+Ba\right)}{6ae^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/(e*x)**(5/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(5/2)/(3*a*e*(e*x)**(3/2)) + a*(4*A*b + B*a)*a
tanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(4*sqrt(b)
*e**(5/2)) + (e*x)**(3/2)*sqrt(a + b*x**3)*(4*A*b + B*a)/(4*e**4)
 + (e*x)**(3/2)*(a + b*x**3)**(3/2)*(4*A*b + B*a)/(6*a*e**4)
```

Mathematica [A] time = 0.239739, size = 111, normalized size = 0.73

$$\frac{x\left(3ax^3\sqrt{\frac{a}{x^3}+b}(aB+4Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)+\sqrt{b}\left(a+bx^3\right)\left(-8aA+5aBx^3+4Abx^3+2bBx^6\right)\right)}{12\sqrt{b}(ex)^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/(e*x)^(5/2),x]
```

```
[Out] (x*(Sqrt[b]*(a + b*x^3)*(-8*a*A + 4*A*b*x^3 + 5*a*B*x^3 + 2*b*B*x
^6) + 3*a*(4*A*b + a*B)*Sqrt[b + a/x^3]*x^3*ArcTanh[Sqrt[b + a/x^
3]/Sqrt[b]]))/(12*Sqrt[b]*(e*x)^(5/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.048, size = 7108, normalized size = 46.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/(e*x)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.658036, size = 1, normalized size = 0.01

$$\left[\frac{3\left(Ba^2+4\,Aab\right)ex^2\log\left(-4\left(2\,b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}-\left(8\,b^2x^6+8\,abx^3+a^2\right)\sqrt{be}\right)+4\left(2\,Bbx^6+(5\,Ba+4\,Ab)x^3-8\,A\cdots\right.}{48\,\sqrt{be}e^3x^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/48*(3*(B*a^2 + 4*A*a*b)*e*x^2*log(-4*(2*b^2*x^4 + a*b*x)*sqrt(
b*x^3 + a)*sqrt(e*x) - (8*b^2*x^6 + 8*a*b*x^3 + a^2)*sqrt(b*e)) +
 4*(2*B*b*x^6 + (5*B*a + 4*A*b)*x^3 - 8*A*a)*sqrt(b*x^3 + a)*sqrt
(b*e)*sqrt(e*x))/(sqrt(b*e)*e^3*x^2), 1/24*(3*(B*a^2 + 4*A*a*b)*e
*x^2*arctan(2*sqrt(b*x^3 + a)*sqrt(-b*e)*sqrt(e*x)*x/(2*b*e*x^3 +
 a*e)) + 2*(2*B*b*x^6 + (5*B*a + 4*A*b)*x^3 - 8*A*a)*sqrt(b*x^3 +
 a)*sqrt(-b*e)*sqrt(e*x))/(sqrt(-b*e)*e^3*x^2)]
```

Sympy [A] time = 130.744, size = 289, normalized size = 1.9

$$-\frac{2Aa^{\frac{3}{2}}}{3e^{\frac{5}{2}}x^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}+\frac{A\sqrt{a}bx^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}{3e^{\frac{5}{2}}}-\frac{2A\sqrt{a}bx^{\frac{3}{2}}}{3e^{\frac{5}{2}}\sqrt{1+\frac{bx^3}{a}}}+\frac{Aa\sqrt{b}\operatorname{asinh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{e^{\frac{5}{2}}}$$
$$+\frac{Ba^{\frac{3}{2}}x^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}{3e^{\frac{5}{2}}}+\frac{Ba^{\frac{3}{2}}x^{\frac{3}{2}}}{12e^{\frac{5}{2}}\sqrt{1+\frac{bx^3}{a}}}+\frac{B\sqrt{a}bx^{\frac{9}{2}}}{4e^{\frac{5}{2}}\sqrt{1+\frac{bx^3}{a}}}+\frac{Ba^2\operatorname{asinh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{4\sqrt{b}e^{\frac{5}{2}}}+\frac{Bb^2x^{\frac{15}{2}}}{6\sqrt{a}e^{\frac{5}{2}}\sqrt{1+\frac{bx^3}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/(e*x)**(5/2),x)
```

```
[Out] -2*A*a**(3/2)/(3*e**(5/2)*x**(3/2)*sqrt(1 + b*x**3/a)) + A*sqrt(a
)*b*x**(3/2)*sqrt(1 + b*x**3/a)/(3*e**(5/2)) - 2*A*sqrt(a)*b*x**(
3/2)/(3*e**(5/2)*sqrt(1 + b*x**3/a)) + A*a*sqrt(b)*asinh(sqrt(b)*
x**(3/2)/sqrt(a))/e**(5/2) + B*a**(3/2)*x**(3/2)*sqrt(1 + b*x**3/
a)/(3*e**(5/2)) + B*a**(3/2)*x**(3/2)/(12*e**(5/2)*sqrt(1 + b*x**
3/a)) + B*sqrt(a)*b*x**(9/2)/(4*e**(5/2)*sqrt(1 + b*x**3/a)) + B*
a**2*asinh(sqrt(b)*x**(3/2)/sqrt(a))/(4*sqrt(b)*e**(5/2)) + B*b**
2*x**(15/2)/(6*sqrt(a)*e**(5/2)*sqrt(1 + b*x**3/a))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\,(bx^3 + a)^{\frac{3}{2}}}{(ex)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(5/2), x)
```

3.534 $\int \frac{(a+bx^3)^{3/2}(A+Bx^3)}{(ex)^{7/2}}\,dx$

Optimal. Leaf size=314

$$\frac{9\,3^{3/4}a^{2/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{40e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\left(a+bx^3\right)^{3/2}(aB+2Ab)}{5ae^4}+\frac{9\sqrt{ex}\sqrt{a+bx^3}(aB+2Ab)}{20e^4}-\frac{2A\left(a+bx^3\right)^{5/2}}{5ae(ex)^{5/2}}$$

```
[Out] (9*(2*A*b + a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(20*e^4) + ((2*A*b +
a*B)*Sqrt[e*x]*(a + b*x^3)^(3/2))/(5*a*e^4) - (2*A*(a + b*x^3)^(5
/2))/(5*a*e*(e*x)^(5/2)) + (9*3^(3/4)*a^(2/3)*(2*A*b + a*B)*Sqrt[
e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCo
s[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)], (2 + Sqrt[3])/4])/(40*e^4*Sqrt[(b^(1/3)*x*(a^(1/3) + b
^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]
)
```

Rubi [A] time = 0.622666, antiderivative size = 314, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$

$$\frac{9\,3^{3/4}a^{2/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{40e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\left(a+bx^3\right)^{3/2}(aB+2Ab)}{5ae^4}+\frac{9\sqrt{ex}\sqrt{a+bx^3}(aB+2Ab)}{20e^4}-\frac{2A\left(a+bx^3\right)^{5/2}}{5ae(ex)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(3/2)*(A + B*x^3))/(e*x)^(7/2),x]
```

```
[Out] (9*(2*A*b + a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(20*e^4) + ((2*A*b +
a*B)*Sqrt[e*x]*(a + b*x^3)^(3/2))/(5*a*e^4) - (2*A*(a + b*x^3)^(5
/2))/(5*a*e*(e*x)^(5/2)) + (9*3^(3/4)*a^(2/3)*(2*A*b + a*B)*Sqrt[
e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCo
s[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)], (2 + Sqrt[3])/4])/(40*e^4*Sqrt[(b^(1/3)*x*(a^(1/3) + b
^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]
)
```

Rubi in Sympy [A] time = 35.7861, size = 286, normalized size = 0.91

$$-\frac{2A\left(a+bx^3\right)^{\frac{5}{2}}}{5ae\left(ex\right)^{\frac{5}{2}}}+\frac{9\cdot 3^{\frac{3}{4}}a^{\frac{2}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab+\frac{Ba}{2}\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{20e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}+\frac{9\sqrt{ex}\sqrt{a+bx^3}\left(Ab+\frac{Ba}{2}\right)}{10e^4}+\frac{2\sqrt{ex}\left(a+bx^3\right)^{\frac{3}{2}}\left(Ab+\frac{Ba}{2}\right)}{5ae^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(3/2)*(B*x**3+A)/(e*x)**(7/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(5/2)/(5*a*e*(e*x)**(5/2)) + 9*3**(3/4)*a**(2/
3)*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2
)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*
x)*(A*b + B*a/2)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3)
 + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(
20*e**4*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1
/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 9*sqrt(e*x)*sqrt(a +
 b*x**3)*(A*b + B*a/2)/(10*e**4) + 2*sqrt(e*x)*(a + b*x**3)**(3/2
)*(A*b + B*a/2)/(5*a*e**4)
```

Mathematica [C] time = 0.685735, size = 215, normalized size = 0.68

$$\frac{x\left(\sqrt[3]{-a}\left(a+bx^3\right)\left(-8aA+13aBx^3+10Abx^3+4bBx^6\right)-9i3^{3/4}a\sqrt[3]{b}x^4\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(aB+2Ab)F\right.}{20\sqrt[3]{-a}(ex)^{7/2}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(3/2)*(A + B*x^3))/(e*x)^(7/2),x]
```

```
[Out] (x*((-a)^(1/3)*(a + b*x^3)*(-8*a*A + 10*A*b*x^3 + 13*a*B*x^3 + 4*
b*B*x^6) - (9*I)*3^(3/4)*a*b^(1/3)*(2*A*b + a*B)*x^4*Sqrt[((-1)^(
5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2
/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(
-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/(
20*(-a)^(1/3)*(e*x)^(7/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.046, size = 3966, normalized size = 12.6

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(3/2)*(B*x^3+A)/(e*x)^(7/2),x)
```

```
[Out] -1/20*(b*x^3+a)^(1/2)*(-108*x^5*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+
(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
```

```
(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1
/2)+1)/(I*3^(1/2)-3))^(1/2))*a*b^3*e-54*x^5*B*(-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^
(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2
)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a^2*b^2*e-54*x^3*B*(-(I*
3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2
)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(
2/3)*a^2*e-10*I*x^3*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*
3^(1/2)*b^2+39*x^3*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*a
*b+54*I*x^5*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3
^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3)
)^(1/2))*3^(1/2)*a^2*b^2*e-108*I*x^4*B*(-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I
*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*a^2*b*e+
108*I*x^3*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(
1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*E
llipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^
(1/2))*(-a*b^2)^(2/3)*3^(1/2)*a*b*e-216*I*x^4*A*(-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2
)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1
/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)
*a*b^2*e+108*I*x^5*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3
))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2
)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(
1/2)-3))^(1/2))*3^(1/2)*a*b^3*e-4*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(
1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*
(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)
*(-a*b^2)^(1/3)*3^(1/2)*x^6*b^2-13*I*x^3*B*(1/b^2*e*x*(-b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^
(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a*b+8*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2
)*(-a*b^2)^(1/3)*3^(1/2)*a*b+54*I*x^3*B*(-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+
2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(
I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2)*a^2*e+3
0*x^3*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3
)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^
(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*b^2-24*A*(1/b^
2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*a*b+12*B*(1/b^2*e*x*(-b*x+(
```

```
-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e
*x)^(1/2)*(-a*b^2)^(1/3)*x^6*b^2+216*x^4*A*(-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*a*b^2*e+108*
x^4*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(
-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipti
cF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
,((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))
*(-a*b^2)^(1/3)*a^2*b*e-108*x^3*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+
(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1
/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a*b*e)/x^2/(-a*b^2)^(
1/3)/b/e^3/(e*x)^(1/2)/((b*x^3+a)*e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^2
*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^
2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(7/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(7/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bbx^6 + (Ba + Ab)x^3 + Aa)\sqrt{bx^3 + a}}{\sqrt{ex}e^3x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(7/2),x, algorithm="fricas")
```

```
[Out] integral((B*b*x^6 + (B*a + A*b)*x^3 + A*a)*sqrt(b*x^3 + a)/(sqrt(
e*x)*e^3*x^3), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(3/2)*(B*x**3+A)/(e*x)**(7/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{3}{2}}}{(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(7/2),x, algorithm="giac")

[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(3/2)/(e*x)^(7/2), x)
```

3.535 $\int (ex)^{7/2} \left(a+bx^3\right)^{5/2} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=241

$$-\frac{a^4e^{7/2}(10Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{384b^{5/2}}+\frac{a^3e^2(ex)^{3/2}\sqrt{a+bx^3}(10Ab-3aB)}{384b^2}+\frac{a^2(ex)^{9/2}\sqrt{a+bx^3}(10Ab-3aB)}{192be}+\frac{(ex)^{9/2}\left(a+bx^3\right)^{5/2}(10Ab-3aB)}{120be}+\frac{a(ex)^{9/2}\left(a+bx^3\right)^{3/2}(10Ab-3aB)}{144be}+\frac{B(ex)^{9/2}\left(a+bx^3\right)^{7/2}}{15be}$$

```
[Out] (a^3*(10*A*b - 3*a*B)*e^2*(e*x)^(3/2)*Sqrt[a + b*x^3])/(384*b^2)
+ (a^2*(10*A*b - 3*a*B)*(e*x)^(9/2)*Sqrt[a + b*x^3])/(192*b*e) +
(a*(10*A*b - 3*a*B)*(e*x)^(9/2)*(a + b*x^3)^(3/2))/(144*b*e) + ((
10*A*b - 3*a*B)*(e*x)^(9/2)*(a + b*x^3)^(5/2))/(120*b*e) + (B*(e*
x)^(9/2)*(a + b*x^3)^(7/2))/(15*b*e) - (a^4*(10*A*b - 3*a*B)*e^(7
/2)*ArcTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(38
4*b^(5/2))
```

Rubi [A] time = 0.471333, antiderivative size = 241, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.269

$$-\frac{a^4e^{7/2}(10Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{384b^{5/2}}+\frac{a^3e^2(ex)^{3/2}\sqrt{a+bx^3}(10Ab-3aB)}{384b^2}+\frac{a^2(ex)^{9/2}\sqrt{a+bx^3}(10Ab-3aB)}{192be}+\frac{(ex)^{9/2}\left(a+bx^3\right)^{5/2}(10Ab-3aB)}{120be}+\frac{a(ex)^{9/2}\left(a+bx^3\right)^{3/2}(10Ab-3aB)}{144be}+\frac{B(ex)^{9/2}\left(a+bx^3\right)^{7/2}}{15be}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^(7/2)*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (a^3*(10*A*b - 3*a*B)*e^2*(e*x)^(3/2)*Sqrt[a + b*x^3])/(384*b^2)
+ (a^2*(10*A*b - 3*a*B)*(e*x)^(9/2)*Sqrt[a + b*x^3])/(192*b*e) +
(a*(10*A*b - 3*a*B)*(e*x)^(9/2)*(a + b*x^3)^(3/2))/(144*b*e) + ((
10*A*b - 3*a*B)*(e*x)^(9/2)*(a + b*x^3)^(5/2))/(120*b*e) + (B*(e*
x)^(9/2)*(a + b*x^3)^(7/2))/(15*b*e) - (a^4*(10*A*b - 3*a*B)*e^(7
/2)*ArcTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(38
4*b^(5/2))
```

Rubi in Sympy [A] time = 41.4365, size = 218, normalized size = 0.9

$$\frac{B\left(ex\right)^{\frac{9}{2}}\left(a+bx^3\right)^{\frac{7}{2}}}{15be}-\frac{a^4e^{\frac{7}{2}}\left(10Ab-3Ba\right)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{384b^{\frac{5}{2}}}+\frac{a^3e^2\left(ex\right)^{\frac{3}{2}}\sqrt{a+bx^3}\left(10Ab-3Ba\right)}{384b^2}+\frac{a^2\left(ex\right)^{\frac{9}{2}}\sqrt{a+bx^3}\left(10Ab-3Ba\right)}{192be}+\frac{a\left(ex\right)^{\frac{9}{2}}\left(a+bx^3\right)^{\frac{3}{2}}\left(10Ab-3Ba\right)}{144be}+\frac{\left(ex\right)^{\frac{9}{2}}\left(a+bx^3\right)^{\frac{5}{2}}\left(10Ab-3Ba\right)}{120be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(7/2)*(b*x**3+a)**(5/2)*(B*x**3+A),x)
```

```
[Out] B*(e*x)**(9/2)*(a + b*x**3)**(7/2)/(15*b*e) - a**4*e**(7/2)*(10*A
*b - 3*B*a)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)
))/(384*b**(5/2)) + a**3*e**2*(e*x)**(3/2)*sqrt(a + b*x**3)*(10*A
*b - 3*B*a)/(384*b**2) + a**2*(e*x)**(9/2)*sqrt(a + b*x**3)*(10*A
*b - 3*B*a)/(192*b*e) + a*(e*x)**(9/2)*(a + b*x**3)**(3/2)*(10*A*
```

```
b - 3*B*a)/(144*b*e) + (e*x)**(9/2)*(a + b*x**3)**(5/2)*(10*A*b -
 3*B*a)/(120*b*e)
```

Mathematica [A] time = 0.298754, size = 168, normalized size = 0.7

$$\frac{e^2(ex)^{3/2}\left(15a^4\sqrt{\frac{a}{x^3}+b}(3aB-10Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)-\sqrt{b}\left(a+bx^3\right)\left(45a^4B-30a^3b\left(5A+Bx^3\right)-4a^2b^2x^3\left(295A+186B\right.\right.\right.}{5760b^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^(7/2)*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (e^2*(e*x)^(3/2)*(-(Sqrt[b]*(a + b*x^3)*(45*a^4*B - 30*a^3*b*(5*A
 + B*x^3) - 96*b^4*x^9*(5*A + 4*B*x^3) - 16*a*b^3*x^6*(85*A + 63*
B*x^3) - 4*a^2*b^2*x^3*(295*A + 186*B*x^3))) + 15*a^4*(-10*A*b +
3*a*B)*Sqrt[b + a/x^3]*ArcTanh[Sqrt[b + a/x^3]/Sqrt[b]]))/(5760*b
^(5/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.072, size = 8117, normalized size = 33.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(7/2)*(b*x^3+a)^(5/2)*(B*x^3+A),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.688862, size = 1, normalized size = 0.

$$\left[-\frac{15\left(3\,Ba^5-10\,Aa^4b\right)e^3\sqrt{\frac{e}{b}}\log\left(-8\,b^2ex^6-8\,abex^3-a^2e+4\left(2\,b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)-4\left(384\,Bb^4e^3x^{13}+48\,(\right.}{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(7/2),x, algorithm="fricas")
```

```
[Out] [-1/23040*(15*(3*B*a^5 - 10*A*a^4*b)*e^3*sqrt(e/b)*log(-8*b^2*e*x
^6 - 8*a*b*e*x^3 - a^2*e + 4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3 + a)*
sqrt(e*x)*sqrt(e/b)) - 4*(384*B*b^4*e^3*x^13 + 48*(21*B*a*b^3 + 1
```

```
0*A*b^4)*e^3*x^10 + 8*(93*B*a^2*b^2 + 170*A*a*b^3)*e^3*x^7 + 10*(
3*B*a^3*b + 118*A*a^2*b^2)*e^3*x^4 - 15*(3*B*a^4 - 10*A*a^3*b)*e^
3*x)*sqrt(b*x^3 + a)*sqrt(e*x))/b^2, 1/11520*(15*(3*B*a^5 - 10*A*
a^4*b)*e^3*sqrt(-e/b)*arctan(2*sqrt(b*x^3 + a)*sqrt(e*x)*x/((2*b*
x^3 + a)*sqrt(-e/b))) + 2*(384*B*b^4*e^3*x^13 + 48*(21*B*a*b^3 +
10*A*b^4)*e^3*x^10 + 8*(93*B*a^2*b^2 + 170*A*a*b^3)*e^3*x^7 + 10*
(3*B*a^3*b + 118*A*a^2*b^2)*e^3*x^4 - 15*(3*B*a^4 - 10*A*a^3*b)*e
^3*x)*sqrt(b*x^3 + a)*sqrt(e*x))/b^2]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(7/2)*(b*x**3+a)**(5/2)*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx^3 + A)(bx^3 + a)^{\frac{5}{2}} (ex)^{\frac{7}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(7/2), x)
```

3.536 $\int (ex)^{5/2}\left(a+bx^3\right)^{5/2}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=404

$$-\frac{27\, 3^{3/4} a^{11/3} e^2 \sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{11264 b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{81a^3e^2\sqrt{ex}\sqrt{a+bx^3}(4Ab-aB)}{5632b^2}+\frac{27a^2(ex)^{7/2}\sqrt{a+bx^3}(4Ab-aB)}{1408be}+\frac{15a(ex)^{7/2}\left(a+bx^3\right)^{3/2}(4Ab-aB)}{704be}+\frac{(ex)^{7/2}\left(a+bx^3\right)^{5/2}(4Ab-aB)}{44be}+\frac{B(ex)^{7/2}\left(a+bx^3\right)^{7/2}}{14be}$$

```
[Out] (81*a^3*(4*A*b - a*B)*e^2*Sqrt[e*x]*Sqrt[a + b*x^3])/(5632*b^2) +
 (27*a^2*(4*A*b - a*B)*(e*x)^(7/2)*Sqrt[a + b*x^3])/(1408*b*e) +
(15*a*(4*A*b - a*B)*(e*x)^(7/2)*(a + b*x^3)^(3/2))/(704*b*e) + ((
4*A*b - a*B)*(e*x)^(7/2)*(a + b*x^3)^(5/2))/(44*b*e) + (B*(e*x)^(
7/2)*(a + b*x^3)^(7/2))/(14*b*e) - (27*3^(3/4)*a^(11/3)*(4*A*b -
a*B)*e^2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*
b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*E
llipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(11264*b^2*Sqrt[(b^(1/
3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.882428, antiderivative size = 404, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$

$$-\frac{27\, 3^{3/4} a^{11/3} e^2 \sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{11264 b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{81a^3e^2\sqrt{ex}\sqrt{a+bx^3}(4Ab-aB)}{5632b^2}+\frac{27a^2(ex)^{7/2}\sqrt{a+bx^3}(4Ab-aB)}{1408be}+\frac{15a(ex)^{7/2}\left(a+bx^3\right)^{3/2}(4Ab-aB)}{704be}+\frac{(ex)^{7/2}\left(a+bx^3\right)^{5/2}(4Ab-aB)}{44be}+\frac{B(ex)^{7/2}\left(a+bx^3\right)^{7/2}}{14be}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^(5/2)*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```


```
[Out] (81*a^3*(4*A*b - a*B)*e^2*Sqrt[e*x]*Sqrt[a + b*x^3])/(5632*b^2) +
 (27*a^2*(4*A*b - a*B)*(e*x)^(7/2)*Sqrt[a + b*x^3])/(1408*b*e) +
(15*a*(4*A*b - a*B)*(e*x)^(7/2)*(a + b*x^3)^(3/2))/(704*b*e) + ((
4*A*b - a*B)*(e*x)^(7/2)*(a + b*x^3)^(5/2))/(44*b*e) + (B*(e*x)^(
7/2)*(a + b*x^3)^(7/2))/(14*b*e) - (27*3^(3/4)*a^(11/3)*(4*A*b -
a*B)*e^2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*
b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*E
llipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(11264*b^2*Sqrt[(b^(1/
3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 52.6039, size = 360, normalized size = 0.89

$$\frac{B(ex)^{\frac{7}{2}}\left(a+bx^3\right)^{\frac{7}{2}}}{14be} - \frac{27\cdot 3^{\frac{3}{4}}a^{\frac{11}{3}}e^2\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(4Ab-Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{11264b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} + \frac{81a^3e^2\sqrt{ex}\sqrt{a+bx^3}(4Ab-Ba)}{5632b^2} + \frac{27a^2(ex)^{\frac{7}{2}}\sqrt{a+bx^3}(4Ab-Ba)}{1408be} + \frac{15a(ex)^{\frac{7}{2}}\left(a+bx^3\right)^{\frac{3}{2}}(4Ab-Ba)}{704be} + \frac{(ex)^{\frac{7}{2}}\left(a+bx^3\right)^{\frac{5}{2}}(4Ab-Ba)}{44be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(5/2)*(b*x**3+a)**(5/2)*(B*x**3+A),x)
```

```
[Out] B*(e*x)**(7/2)*(a + b*x**3)**(7/2)/(14*b*e) - 27*3**(3/4)*a**(11/
3)*e**2*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)
*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(
1/3)*x)*(4*A*b - B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sq
rt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1
/2)/(11264*b**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
 + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 81*a**3*e**2
*sqrt(e*x)*sqrt(a + b*x**3)*(4*A*b - B*a)/(5632*b**2) + 27*a**2*(
e*x)**(7/2)*sqrt(a + b*x**3)*(4*A*b - B*a)/(1408*b*e) + 15*a*(e*x
)**(7/2)*(a + b*x**3)**(3/2)*(4*A*b - B*a)/(704*b*e) + (e*x)**(7/
2)*(a + b*x**3)**(5/2)*(4*A*b - B*a)/(44*b*e)
```

Mathematica [C] time = 0.921583, size = 276, normalized size = 0.68

$$\frac{e^2\sqrt{ex}\left(-\sqrt[3]{-a}\left(a+bx^3\right)\left(567a^4B-324a^3b\left(7A+Bx^3\right)-8a^2b^2x^3\left(1246A+727Bx^3\right)-32ab^3x^6\left(329A+236Bx^3\right)-256b^4x\right.\right.}{39424\sqrt[3]{-a}b}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^(5/2)*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (e^2*Sqrt[e*x]*(-((-a)^(1/3)*(a + b*x^3)*(567*a^4*B - 324*a^3*b*(
7*A + B*x^3) - 256*b^4*x^9*(14*A + 11*B*x^3) - 32*a*b^3*x^6*(329*
A + 236*B*x^3) - 8*a^2*b^2*x^3*(1246*A + 727*B*x^3))) + (189*I)*3
^(3/4)*a^4*b^(1/3)*(4*A*b - a*B)*x*Sqrt[((-1)^(5/6)*((-a)^(1/3) -
 b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*
x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a
)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/(39424*(-a)^(1/3)*b
^2*Sqrt[a + b*x^3])
```

Maple [C] time = 0.067, size = 5063, normalized size = 12.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(5/2)*(b*x^3+a)^(5/2)*(B*x^3+A),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{5}{2}}(ex)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bb^2e^2x^{11} + \left(2\,Bab + Ab^2\right)e^2x^8 + \left(Ba^2 + 2\,Aab\right)e^2x^5 + Aa^2e^2x^2\right)\sqrt{bx^3 + a}\sqrt{ex}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*b^2*e^2*x^11 + (2*B*a*b + A*b^2)*e^2*x^8 + (B*a^2 + 2
*A*a*b)*e^2*x^5 + A*a^2*e^2*x^2)*sqrt(b*x^3 + a)*sqrt(e*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(5/2)*(b*x**3+a)**(5/2)*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{5}{2}}(ex)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(5/2), x)
```

3.537 $\int (ex)^{3/2} \left(a+bx^3\right)^{5/2} \left(A+Bx^3\right) \, dx$

Optimal. Leaf size=661

$$-\frac{27\, 3^{3/4} \left(1-\sqrt{3}\right) a^{10/3} e \sqrt{ex} \left(\sqrt[3]{a}+\sqrt[3]{b}x\right) \sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(26Ab-5aB) F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{23296 b^{5/3} \sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}} \sqrt{a+bx^3}}$$
$$-\frac{81\sqrt[4]{3} a^{10/3} e \sqrt{ex} \left(\sqrt[3]{a}+\sqrt[3]{b}x\right) \sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(26Ab-5aB) E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{11648 b^{5/3} \sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}} \sqrt{a+bx^3}}$$
$$+\frac{81\left(1+\sqrt{3}\right) a^3 e \sqrt{ex}\sqrt{a+bx^3}(26Ab-5aB)}{11648 b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{27a^2(ex)^{5/2}\sqrt{a+bx^3}(26Ab-5aB)}{5824be}$$
$$+\frac{(ex)^{5/2}\left(a+bx^3\right)^{5/2}(26Ab-5aB)}{260be}+\frac{3a(ex)^{5/2}\left(a+bx^3\right)^{3/2}(26Ab-5aB)}{728be}+\frac{B(ex)^{5/2}\left(a+bx^3\right)^{7/2}}{13be}$$

```
[Out] (27*a^2*(26*A*b - 5*a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(5824*b*e)
+ (81*(1 + Sqrt[3])*a^3*(26*A*b - 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x
^3])/(11648*b^(5/3)*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + (3*a*(
26*A*b - 5*a*B)*(e*x)^(5/2)*(a + b*x^3)^(3/2))/(728*b*e) + ((26*A
*b - 5*a*B)*(e*x)^(5/2)*(a + b*x^3)^(5/2))/(260*b*e) + (B*(e*x)^(
5/2)*(a + b*x^3)^(7/2))/(13*b*e) - (81*3^(1/4)*a^(10/3)*(26*A*b -
 5*a*B)*e*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*
EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (
1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(11648*b^(5/3)*Sqrt[(
b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)
*x)^2]*Sqrt[a + b*x^3]) - (27*3^(3/4)*(1 - Sqrt[3])*a^(10/3)*(26*
A*b - 5*a*B)*e*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^
(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x
)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3
) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(23296*b^(5/3)*S
qrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 1.67917, antiderivative size = 661, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{27\, 3^{3/4} \left(1-\sqrt{3}\right) a^{10/3} e \sqrt{ex} \left(\sqrt[3]{a}+\sqrt[3]{b}x\right) \sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(26Ab-5aB) F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{23296 b^{5/3} \sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}} \sqrt{a+bx^3}}$$
$$-\frac{81\sqrt[4]{3} a^{10/3} e \sqrt{ex} \left(\sqrt[3]{a}+\sqrt[3]{b}x\right) \sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(26Ab-5aB) E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{11648 b^{5/3} \sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}} \sqrt{a+bx^3}}$$
$$+\frac{81\left(1+\sqrt{3}\right) a^3 e \sqrt{ex}\sqrt{a+bx^3}(26Ab-5aB)}{11648 b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{27a^2(ex)^{5/2}\sqrt{a+bx^3}(26Ab-5aB)}{5824be}$$
$$+\frac{(ex)^{5/2}\left(a+bx^3\right)^{5/2}(26Ab-5aB)}{260be}+\frac{3a(ex)^{5/2}\left(a+bx^3\right)^{3/2}(26Ab-5aB)}{728be}+\frac{B(ex)^{5/2}\left(a+bx^3\right)^{7/2}}{13be}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^(3/2)*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (27*a^2*(26*A*b - 5*a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(5824*b*e)
+ (81*(1 + Sqrt[3])*a^3*(26*A*b - 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x
^3])/(11648*b^(5/3)*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + (3*a*(
26*A*b - 5*a*B)*(e*x)^(5/2)*(a + b*x^3)^(3/2))/(728*b*e) + ((26*A
*b - 5*a*B)*(e*x)^(5/2)*(a + b*x^3)^(5/2))/(260*b*e) + (B*(e*x)^(
5/2)*(a + b*x^3)^(7/2))/(13*b*e) - (81*3^(1/4)*a^(10/3)*(26*A*b -
 5*a*B)*e*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*
EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (
1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(11648*b^(5/3)*Sqrt[(
b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)
*x)^2]*Sqrt[a + b*x^3]) - (27*3^(3/4)*(1 - Sqrt[3])*a^(10/3)*(26*
A*b - 5*a*B)*e*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^
(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x
)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3
) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(23296*b^(5/3)*S
qrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 91.7133, size = 605, normalized size = 0.92

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(3/2)*(b*x**3+a)**(5/2)*(B*x**3+A),x)
```

```
[Out] B*(e*x)**(5/2)*(a + b*x**3)**(7/2)/(13*b*e) - 81*3**(1/4)*a**(10/
3)*e*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x*
*2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3
)*x)*(26*A*b - 5*B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sq
rt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1
/2)/(11648*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(
1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) - 27*3**(3
/4)*a**(10/3)*e*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x +
b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3
) + 1)*(a**(1/3) + b**(1/3)*x)*(26*A*b - 5*B*a)*elliptic_f(acos((
a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 +
 sqrt(3)))), sqrt(3)/4 + 1/2)/(23296*b**(5/3)*sqrt(b**(1/3)*x*(a*
*(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sq
rt(a + b*x**3)) + a**3*e*sqrt(e*x)*(81/5824 + 81*sqrt(3)/5824)*sq
rt(a + b*x**3)*(26*A*b - 5*B*a)/(2*b**(5/3)*(a**(1/3) + b**(1/3)*
x*(1 + sqrt(3)))) + 27*a**2*(e*x)**(5/2)*sqrt(a + b*x**3)*(26*A*b
 - 5*B*a)/(5824*b*e) + 3*a*(e*x)**(5/2)*(a + b*x**3)**(3/2)*(26*A
*b - 5*B*a)/(728*b*e) + (e*x)**(5/2)*(a + b*x**3)**(5/2)*(26*A*b
- 5*B*a)/(260*b*e)
```

Mathematica [C] time = 2.33076, size = 337, normalized size = 0.51

$$\frac{e^2 \left(2(-a)^{2/3} b x^3 \left(a + b x^3\right) \left(a^2 (405 a B + 9542 A b) + 112 b^2 x^6 (55 a B + 26 A b) + 8 a b x^3 (625 a B + 1118 A b) + 2240 b^3 B x^9\right) + 135 a^3 (\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^(3/2)*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (e^2*(2*(-a)^(2/3)*b*x^3*(a + b*x^3)*(a^2*(9542*A*b + 405*a*B) +
8*a*b*(1118*A*b + 625*a*B)*x^3 + 112*b^2*(26*A*b + 55*a*B)*x^6 +
```

```
2240*b^3*B*x^9) + 135*a^3*(26*A*b - 5*a*B)*(3*(-a)^(2/3)*(a + b*x
^3) + (-1)^(2/3)*3^(3/4)*a*b^(2/3)*x^2*Sqrt[((-1)^(5/6)*((-a)^(1/
3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1
/3)*x)/b^(1/3) + x^2)/x^2]*(Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(
5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)] + (-1)^(
5/6)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*
x)]/3^(1/4)], (-1)^(1/3)])))/(58240*(-a)^(2/3)*b^2*Sqrt[e*x]*Sqr
t[a + b*x^3])
```

Maple [C] time = 0.076, size = 6202, normalized size = 9.4

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(3/2)*(b*x^3+a)^(5/2)*(B*x^3+A),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{5}{2}}(ex)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Bb^2ex^{10} + \left(2\,Bab + Ab^2\right)ex^7 + \left(Ba^2 + 2\,Aab\right)ex^4 + Aa^2ex\right)\sqrt{bx^3 + a}\sqrt{ex}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*b^2*e*x^10 + (2*B*a*b + A*b^2)*e*x^7 + (B*a^2 + 2*A*a
*b)*e*x^4 + A*a^2*e*x)*sqrt(b*x^3 + a)*sqrt(e*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(3/2)*(b*x**3+a)**(5/2)*(B*x**3+A),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{5}{2}}(ex)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*(e*x)^(3/2), x)
```

3.538 $\int \sqrt{ex}\left(a+bx^3\right)^{5/2}\left(A+Bx^3\right)\,dx$

Optimal. Leaf size=201

$$\frac{5a^3\sqrt{e}(8Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{192b^{3/2}}+\frac{5a^2(ex)^{3/2}\sqrt{a+bx^3}(8Ab-aB)}{192be}+\frac{(ex)^{3/2}\left(a+bx^3\right)^{5/2}(8Ab-aB)}{72be}+\frac{5a(ex)^{3/2}\left(a+bx^3\right)^{3/2}(8Ab-aB)}{288be}+\frac{B(ex)^{3/2}\left(a+bx^3\right)^{7/2}}{12be}$$

```
[Out] (5*a^2*(8*A*b - a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(192*b*e) + (5*
a*(8*A*b - a*B)*(e*x)^(3/2)*(a + b*x^3)^(3/2))/(288*b*e) + ((8*A*
b - a*B)*(e*x)^(3/2)*(a + b*x^3)^(5/2))/(72*b*e) + (B*(e*x)^(3/2)
*(a + b*x^3)^(7/2))/(12*b*e) + (5*a^3*(8*A*b - a*B)*Sqrt[e]*ArcTa
nh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(192*b^(3/2)
)
```

Rubi [A] time = 0.386291, antiderivative size = 201, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{5a^3\sqrt{e}(8Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{192b^{3/2}}+\frac{5a^2(ex)^{3/2}\sqrt{a+bx^3}(8Ab-aB)}{192be}+\frac{(ex)^{3/2}\left(a+bx^3\right)^{5/2}(8Ab-aB)}{72be}+\frac{5a(ex)^{3/2}\left(a+bx^3\right)^{3/2}(8Ab-aB)}{288be}+\frac{B(ex)^{3/2}\left(a+bx^3\right)^{7/2}}{12be}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[e*x]*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (5*a^2*(8*A*b - a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(192*b*e) + (5*
a*(8*A*b - a*B)*(e*x)^(3/2)*(a + b*x^3)^(3/2))/(288*b*e) + ((8*A*
b - a*B)*(e*x)^(3/2)*(a + b*x^3)^(5/2))/(72*b*e) + (B*(e*x)^(3/2)
*(a + b*x^3)^(7/2))/(12*b*e) + (5*a^3*(8*A*b - a*B)*Sqrt[e]*ArcTa
nh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(192*b^(3/2)
)
```

Rubi in Sympy [A] time = 33.5616, size = 177, normalized size = 0.88

$$\frac{B\left(ex\right)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{7}{2}}}{12be}+\frac{5a^3\sqrt{e}\left(8Ab-Ba\right)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{192b^{\frac{3}{2}}}+\frac{5a^2\left(ex\right)^{\frac{3}{2}}\sqrt{a+bx^3}\left(8Ab-Ba\right)}{192be}+\frac{5a\left(ex\right)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{3}{2}}\left(8Ab-Ba\right)}{288be}+\frac{\left(ex\right)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{5}{2}}\left(8Ab-Ba\right)}{72be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(5/2)*(B*x**3+A)*(e*x)**(1/2),x)
```

```
[Out] B*(e*x)**(3/2)*(a + b*x**3)**(7/2)/(12*b*e) + 5*a**3*sqrt(e)*(8*A
*b - B*a)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))
/(192*b**(3/2)) + 5*a**2*(e*x)**(3/2)*sqrt(a + b*x**3)*(8*A*b - B
*a)/(192*b*e) + 5*a*(e*x)**(3/2)*(a + b*x**3)**(3/2)*(8*A*b - B*a
)/(288*b*e) + (e*x)**(3/2)*(a + b*x**3)**(5/2)*(8*A*b - B*a)/(72*
b*e)
```

Mathematica [A] time = 0.273173, size = 144, normalized size = 0.72

$$\frac{x\sqrt{ex}\left(\sqrt{b}\left(a+bx^3\right)\left(15a^3B+2a^2b\left(132A+59Bx^3\right)+8ab^2x^3\left(26A+17Bx^3\right)+16b^3x^6\left(4A+3Bx^3\right)\right)-15a^3\sqrt{\frac{a}{x^3}+b}(aB-\right.}{576b^{3/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[e*x]*(a + b*x^3)^(5/2)*(A + B*x^3),x]
```

```
[Out] (x*Sqrt[e*x]*(Sqrt[b]*(a + b*x^3)*(15*a^3*B + 16*b^3*x^6*(4*A + 3
*B*x^3) + 8*a*b^2*x^3*(26*A + 17*B*x^3) + 2*a^2*b*(132*A + 59*B*x
^3)) - 15*a^3*(-8*A*b + a*B)*Sqrt[b + a/x^3]*ArcTanh[Sqrt[b + a/x
^3]/Sqrt[b]]))/(576*b^(3/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.047, size = 7702, normalized size = 38.3

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(5/2)*(B*x^3+A)*(e*x)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*sqrt(e*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.67271, size = 1, normalized size = 0.

$$\left[-\frac{15\left(Ba^4-8Aa^3b\right)\sqrt{\frac{e}{b}}\log\left(-8b^2ex^6-8abex^3-a^2e-4\left(2b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)-4\left(48Bb^3x^{10}+8\left(17Bab^2+\right.\right.}{2304b}\right.$$

$$-\frac{15\left(Ba^4-8Aa^3b\right)\sqrt{-\frac{e}{b}}\arctan\left(\frac{2\sqrt{bx^3+a}\sqrt{ex}x}{\left(2bx^3+a\right)\sqrt{-\frac{e}{b}}}\right)-2\left(48Bb^3x^{10}+8\left(17Bab^2+8Ab^3\right)x^7+2\left(59Ba^2b+104Aab^2\right)x^4+3\left(5\right.\right.}{1152b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*sqrt(e*x),x, algorithm="fricas")
```

```
[Out] [-1/2304*(15*(B*a^4 - 8*A*a^3*b)*sqrt(e/b)*log(-8*b^2*e*x^6 - 8*a
*b*e*x^3 - a^2*e - 4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3 + a)*sqrt(e*x
)*sqrt(e/b)) - 4*(48*B*b^3*x^10 + 8*(17*B*a*b^2 + 8*A*b^3)*x^7 +
2*(59*B*a^2*b + 104*A*a*b^2)*x^4 + 3*(5*B*a^3 + 88*A*a^2*b)*x)*sq
```

```
rt(b*x^3 + a)*sqrt(e*x))/b, -1/1152*(15*(B*a^4 - 8*A*a^3*b)*sqrt(
-e/b)*arctan(2*sqrt(b*x^3 + a)*sqrt(e*x)*x/((2*b*x^3 + a)*sqrt(-e
/b))) - 2*(48*B*b^3*x^10 + 8*(17*B*a*b^2 + 8*A*b^3)*x^7 + 2*(59*B
*a^2*b + 104*A*a*b^2)*x^4 + 3*(5*B*a^3 + 88*A*a^2*b)*x)*sqrt(b*x^
3 + a)*sqrt(e*x))/b]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(5/2)*(B*x**3+A)*(e*x)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)*sqrt(e*x),x, algorithm="giac")

[Out] Timed out
```

3.539 $\int \frac{(a+bx^3)^{5/2}(A+Bx^3)}{\sqrt{ex}}\,dx$

Optimal. Leaf size=364

$$\frac{27\,3^{3/4}a^{8/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(22Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{2816be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{27a^2\sqrt{ex}\sqrt{a+bx^3}(22Ab-aB)}{1408be}+\frac{\sqrt{ex}\left(a+bx^3\right)^{5/2}(22Ab-aB)}{176be}+\frac{3a\sqrt{ex}\left(a+bx^3\right)^{3/2}(22Ab-aB)}{352be}+\frac{B\sqrt{ex}\left(a+bx^3\right)^{7/2}}{11be}$$

```
[Out] (27*a^2*(22*A*b - a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(1408*b*e) + (3
*a*(22*A*b - a*B)*Sqrt[e*x]*(a + b*x^3)^(3/2))/(352*b*e) + ((22*A
*b - a*B)*Sqrt[e*x]*(a + b*x^3)^(5/2))/(176*b*e) + (B*Sqrt[e*x]*(
a + b*x^3)^(7/2))/(11*b*e) + (27*3^(3/4)*a^(8/3)*(22*A*b - a*B)*S
qrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[A
rcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3]
)*b^(1/3)*x)], (2 + Sqrt[3])/4])/(2816*b*e*Sqrt[(b^(1/3)*x*(a^(1/
3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
b*x^3])
```

Rubi [A] time = 0.753517, antiderivative size = 364, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{27\,3^{3/4}a^{8/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(22Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{2816be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{27a^2\sqrt{ex}\sqrt{a+bx^3}(22Ab-aB)}{1408be}+\frac{\sqrt{ex}\left(a+bx^3\right)^{5/2}(22Ab-aB)}{176be}+\frac{3a\sqrt{ex}\left(a+bx^3\right)^{3/2}(22Ab-aB)}{352be}+\frac{B\sqrt{ex}\left(a+bx^3\right)^{7/2}}{11be}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(5/2)*(A + B*x^3))/Sqrt[e*x],x]
```


```
[Out] (27*a^2*(22*A*b - a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(1408*b*e) + (3
*a*(22*A*b - a*B)*Sqrt[e*x]*(a + b*x^3)^(3/2))/(352*b*e) + ((22*A
*b - a*B)*Sqrt[e*x]*(a + b*x^3)^(5/2))/(176*b*e) + (B*Sqrt[e*x]*(
a + b*x^3)^(7/2))/(11*b*e) + (27*3^(3/4)*a^(8/3)*(22*A*b - a*B)*S
qrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[A
rcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3]
)*b^(1/3)*x)], (2 + Sqrt[3])/4])/(2816*b*e*Sqrt[(b^(1/3)*x*(a^(1/
3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
b*x^3])
```

Rubi in Sympy [A] time = 42.0096, size = 318, normalized size = 0.87

$$\frac{B\sqrt{ex}\left(a+bx^3\right)^{\frac{7}{2}}}{11be}+\frac{27\cdot 3^{\frac{3}{4}}a^{\frac{8}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(22Ab-Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{2816be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}+\frac{27a^2\sqrt{ex}\sqrt{a+bx^3}\,(22Ab-Ba)}{1408be}+\frac{3a\sqrt{ex}\left(a+bx^3\right)^{\frac{3}{2}}(22Ab-Ba)}{352be}+\frac{\sqrt{ex}\left(a+bx^3\right)^{\frac{5}{2}}(22Ab-Ba)}{176be}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(5/2)*(B*x**3+A)/(e*x)**(1/2),x)
```

```
[Out] B*sqrt(e*x)*(a + b*x**3)**(7/2)/(11*b*e) + 27*3**(3/4)*a**(8/3)*s
qrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(
22*A*b - B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) +
1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(281
6*b*e*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3
)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 27*a**2*sqrt(e*x)*sqrt
(a + b*x**3)*(22*A*b - B*a)/(1408*b*e) + 3*a*sqrt(e*x)*(a + b*x**
3)**(3/2)*(22*A*b - B*a)/(352*b*e) + sqrt(e*x)*(a + b*x**3)**(5/2
)*(22*A*b - B*a)/(176*b*e)
```

Mathematica [C] time = 0.872258, size = 255, normalized size = 0.7

$$\frac{\sqrt[3]{-a}x\left(a+bx^3\right)\left(81a^3B+2a^2b\left(517A+178Bx^3\right)+8ab^2x^3\left(77A+47Bx^3\right)+16b^3x^6\left(11A+8Bx^3\right)\right)-27i3^{3/4}a^3\sqrt[3]{b}x^2\sqrt{\frac{(-1)^{5\ldots}}{\ldots}}}{1408\sqrt[3]{-a}b\sqrt{ex}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(5/2)*(A + B*x^3))/Sqrt[e*x],x]
```

```
[Out] ((-a)^(1/3)*x*(a + b*x^3)*(81*a^3*B + 16*b^3*x^6*(11*A + 8*B*x^3)
 + 8*a*b^2*x^3*(77*A + 47*B*x^3) + 2*a^2*b*(517*A + 178*B*x^3)) -
 (27*I)*3^(3/4)*a^3*b^(1/3)*(22*A*b - a*B)*x^2*Sqrt[((-1)^(5/6)*(
(-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) +
((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5
/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)])/(1408*(-
a)^(1/3)*b*Sqrt[e*x]*Sqrt[a + b*x^3])
```

Maple [C] time = 0.045, size = 4617, normalized size = 12.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(5/2)*(B*x^3+A)/(e*x)^(1/2),x)
```

```
[Out] -1/1408*(b*x^3+a)^(1/2)*x/b^2/(-a*b^2)^(1/3)*(-81*I*B*(1/b^2*e*x*
(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x
```

```
^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a^3*b-128*I*B*(1/b^2*e*x*
(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x
^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^9*b^4-176*I*A*(1/b^2*e*
x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b
*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^6*b^4+162*B*(-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)
*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)
*a^4*e+528*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)
^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*
b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^6*b^4+3
102*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+
2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*a^2*b^2+243*B*(1
/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1
/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*a^3*b+384*B*(1/b^2*e*x*(
-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/
3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^
3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^9*b^4-1034*I*A*(1/b^2*e*x*(-b*x+
(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(
I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*
e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a^2*b^2+1068*B*(1/b^2*e*x*(-b*x
+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)
*e*x)^(1/2)*(-a*b^2)^(1/3)*x^3*a^2*b^2+1128*B*(1/b^2*e*x*(-b*x+(-
a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*
3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*
x)^(1/2)*(-a*b^2)^(1/3)*x^6*a*b^3+162*B*(-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+
2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(
I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a^4*b^2*e-162*I*B*(-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3
)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3
)*3^(1/2)*a^4*e-616*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/
2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3
)*3^(1/2)*x^3*a*b^3-356*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3
^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(
1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^
(1/3)*3^(1/2)*x^3*a^2*b^2-376*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3)
)*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a
*b^2)^(1/3)*3^(1/2)*x^6*a*b^3+1848*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1
/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(
-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*
(-a*b^2)^(1/3)*x^3*a*b^3+324*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/
2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*x*a^4*b*e-7128
*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elliptic
F((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),
((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*
(-a*b^2)^(1/3)*3^(1/2)*x*a^3*b^2*e+7128*A*(-(I*3^(1/2)-3)*x*b/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3
)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
```

```
)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)
/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x*a^3*b^2*e-3
24*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elliptic
F((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),
((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*
(-a*b^2)^(1/3)*x*a^4*b*e-3564*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2
)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a^3*b*e-3564*A*(-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3
)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a^3*b^3*e
-162*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2
)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elli
pticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/
2))*3^(1/2)*x^2*a^4*b^2*e+3564*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x
+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3
^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(
1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^(1/2)*x^2*a^3*b^3*e+3564*I*A*(-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/
2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^
(2/3)*3^(1/2)*a^3*b*e)/(e*x)^(1/2)/((b*x^3+a)*e*x)^(1/2)/(I*3^(1/
2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+
2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{5}{2}}}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/sqrt(e*x),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/sqrt(e*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bb^2x^9 + \left(2\,Bab + Ab^2\right)x^6 + \left(Ba^2 + 2\,Aab\right)x^3 + Aa^2\right)\sqrt{bx^3 + a}}{\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/sqrt(e*x),x, algorithm="fricas")
```

```
[Out] integral((B*b^2*x^9 + (2*B*a*b + A*b^2)*x^6 + (B*a^2 + 2*A*a*b)*x
^3 + A*a^2)*sqrt(b*x^3 + a)/sqrt(e*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x**3+a)**(5/2)*(B*x**3+A)/(e*x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{5}{2}}}{\sqrt{ex}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/sqrt(e*x),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/sqrt(e*x), x)
```

3.540 $\int \frac{(a+bx^3)^{5/2}(A+Bx^3)}{(ex)^{3/2}}\,dx$

Optimal. Leaf size=650

$$-\frac{27\,3^{3/4}\left(1-\sqrt{3}\right)a^{7/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+20Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{896b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$-\frac{81\sqrt[4]{3}a^{7/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+20Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{448b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{81\left(1+\sqrt{3}\right)a^2\sqrt{ex}\sqrt{a+bx^3}(aB+20Ab)}{448b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\left(a+bx^3\right)^{5/2}(aB+20Ab)}{10ae^4}$$
$$+\frac{3(ex)^{5/2}\left(a+bx^3\right)^{3/2}(aB+20Ab)}{28e^4}+\frac{27a(ex)^{5/2}\sqrt{a+bx^3}(aB+20Ab)}{224e^4}-\frac{2A\left(a+bx^3\right)^{7/2}}{ae\sqrt{ex}}$$

```
[Out] (27*a*(20*A*b + a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(224*e^4) + (81
*(1 + Sqrt[3])*a^2*(20*A*b + a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(448
*b^(2/3)*e^2*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + (3*(20*A*b +
a*B)*(e*x)^(5/2)*(a + b*x^3)^(3/2))/(28*e^4) + ((20*A*b + a*B)*(e
*x)^(5/2)*(a + b*x^3)^(5/2))/(10*a*e^4) - (2*A*(a + b*x^3)^(7/2))
/(a*e*Sqrt[e*x]) - (81*3^(1/4)*a^(7/3)*(20*A*b + a*B)*Sqrt[e*x]*(
a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*
x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(
1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*
x)], (2 + Sqrt[3])/4]])/(448*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3)
+ b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x
^3]) - (27*3^(3/4)*(1 - Sqrt[3])*a^(7/3)*(20*A*b + a*B)*Sqrt[e*x]
*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a
^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3
)*x)], (2 + Sqrt[3])/4])/(896*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3
) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b
*x^3])
```

Rubi [A] time = 1.67717, antiderivative size = 650, normalized size of antiderivative = 1., number of

steps used = 8, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{27\,3^{3/4}\left(1-\sqrt{3}\right)a^{7/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+20Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{896b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{81\sqrt[4]{3}a^{7/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+20Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{448b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}$$

$$+\frac{81\left(1+\sqrt{3}\right)a^2\sqrt{ex}\sqrt{a+bx^3}(aB+20Ab)}{448b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{(ex)^{5/2}\left(a+bx^3\right)^{5/2}(aB+20Ab)}{10ae^4}$$

$$+\frac{3(ex)^{5/2}\left(a+bx^3\right)^{3/2}(aB+20Ab)}{28e^4}+\frac{27a(ex)^{5/2}\sqrt{a+bx^3}(aB+20Ab)}{224e^4}-\frac{2A\left(a+bx^3\right)^{7/2}}{ae\sqrt{ex}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(5/2)*(A + B*x^3))/(e*x)^(3/2),x]
```

```
[Out] (27*a*(20*A*b + a*B)*(e*x)^(5/2)*Sqrt[a + b*x^3])/(224*e^4) + (81
*(1 + Sqrt[3])*a^2*(20*A*b + a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(448
*b^(2/3)*e^2*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + (3*(20*A*b +
a*B)*(e*x)^(5/2)*(a + b*x^3)^(3/2))/(28*e^4) + ((20*A*b + a*B)*(e
*x)^(5/2)*(a + b*x^3)^(5/2))/(10*a*e^4) - (2*A*(a + b*x^3)^(7/2))
/(a*e*Sqrt[e*x]) - (81*3^(1/4)*a^(7/3)*(20*A*b + a*B)*Sqrt[e*x]*(
a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*
x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(
1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*
x)], (2 + Sqrt[3])/4])/(448*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3)
+ b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x
^3]) - (27*3^(3/4)*(1 - Sqrt[3])*a^(7/3)*(20*A*b + a*B)*Sqrt[e*x]
*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3
)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a
^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3
)*x)], (2 + Sqrt[3])/4])/(896*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3
) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b
*x^3])
```

Rubi in Sympy [A] time = 94.6629, size = 598, normalized size = 0.92

$$-\frac{2A\left(a+bx^3\right)^{\frac{7}{2}}}{ae\sqrt{ex}} - \frac{81\sqrt[4]{3}a^{\frac{7}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(20Ab+Ba)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{448b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} - \frac{27\cdot 3^{\frac{3}{4}}a^{\frac{7}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(20Ab+Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{896b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} + \frac{a^2\sqrt{ex}\left(\frac{81}{224}+\frac{81\sqrt{3}}{224}\right)\sqrt{a+bx^3}(20Ab+Ba)}{2b^{\frac{2}{3}}e^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)} + \frac{27a(ex)^{\frac{5}{2}}\sqrt{a+bx^3}(20Ab+Ba)}{224e^4} + \frac{3(ex)^{\frac{5}{2}}\left(a+bx^3\right)^{\frac{3}{2}}(20Ab+Ba)}{28e^4} + \frac{(ex)^{\frac{5}{2}}\left(a+bx^3\right)^{\frac{5}{2}}(20Ab+Ba)}{10ae^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((b*x**3+a)**(5/2)*(B*x**3+A)/(e*x)**(3/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(7/2)/(a*e*sqrt(e*x)) - 81*3**(1/4)*a**(7/3)*s
qrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(
20*A*b + B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) +
1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(448
*b**(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
+ b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) - 27*3**(3/4)*a
**(7/3)*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)
*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(
a**(1/3) + b**(1/3)*x)*(20*A*b + B*a)*elliptic_f(acos((a**(1/3) +
 b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))
), sqrt(3)/4 + 1/2)/(896*b**(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3)
+ b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a +
b*x**3)) + a**2*sqrt(e*x)*(81/224 + 81*sqrt(3)/224)*sqrt(a + b*x*
*3)*(20*A*b + B*a)/(2*b**(2/3)*e**2*(a**(1/3) + b**(1/3)*x*(1 + s
qrt(3)))) + 27*a*(e*x)**(5/2)*sqrt(a + b*x**3)*(20*A*b + B*a)/(22
4*e**4) + 3*(e*x)**(5/2)*(a + b*x**3)**(3/2)*(20*A*b + B*a)/(28*e
**4) + (e*x)**(5/2)*(a + b*x**3)**(5/2)*(20*A*b + B*a)/(10*a*e**4
)
```

Mathematica [C] time = 4.40926, size = 329, normalized size = 0.51

$$\frac{x^{3/2}\left(\frac{2(a+bx^3)\left(a^2(367Bx^3-2240A)+4abx^3(155A+86Bx^3)+16b^2x^6(10A+7Bx^3)\right)}{5\sqrt{x}}-\frac{27a^2x^{5/2}(aB+20Ab)\left(-3\left(\frac{a}{x^3}+b\right)+\frac{\sqrt[6]{-1}3^{3/4}ab^{2/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\cdots}{\cdots}\right)}{\cdots}\right)}{448(ex)^{3/2}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(5/2)*(A + B*x^3))/(e*x)^(3/2),x]
```

```
[Out] (x^(3/2)*((2*(a + b*x^3)*(16*b^2*x^6*(10*A + 7*B*x^3) + 4*a*b*x^3
*(155*A + 86*B*x^3) + a^2*(-2240*A + 367*B*x^3)))/(5*Sqrt[x]) - (
27*a^2*(20*A*b + a*B)*x^(5/2)*(-3*(b + a/x^3) + ((-1)^(1/6)*3^(3/
4)*a*b^(2/3)*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*
x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]
*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))
/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin
[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1
/3)]))/((-a)^(2/3)*x)))/b))/(448*(e*x)^(3/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.058, size = 6530, normalized size = 10.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(5/2)*(B*x^3+A)/(e*x)^(3/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)\left(bx^3+a\right)^{\frac{5}{2}}}{(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bb^2x^9+\left(2\,Bab+Ab^2\right)x^6+\left(Ba^2+2\,Aab\right)x^3+Aa^2\right)\sqrt{bx^3+a}}{\sqrt{ex}ex},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*b^2*x^9 + (2*B*a*b + A*b^2)*x^6 + (B*a^2 + 2*A*a*b)*x
^3 + A*a^2)*sqrt(b*x^3 + a)/(sqrt(e*x)*e*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x**3+a)**(5/2)*(B*x**3+A)/(e*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)\left(bx^3 + a\right)^{\frac{5}{2}}}{(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(3/2), x)
```

3.541 $\int \frac{(a+bx^3)^{5/2}(A+Bx^3)}{(ex)^{5/2}}\,dx$

Optimal. Leaf size=188

$$\frac{5a^2(aB+6Ab)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{24\sqrt{b}e^{5/2}}+\frac{(ex)^{3/2}\left(a+bx^3\right)^{5/2}(aB+6Ab)}{9ae^4}+\frac{5(ex)^{3/2}\left(a+bx^3\right)^{3/2}(aB+6Ab)}{36e^4}+\frac{5a(ex)^{3/2}\sqrt{a+bx^3}(aB+6Ab)}{24e^4}-\frac{2A\left(a+bx^3\right)^{7/2}}{3ae(ex)^{3/2}}$$

```
[Out] (5*a*(6*A*b + a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(24*e^4) + (5*(6*
A*b + a*B)*(e*x)^(3/2)*(a + b*x^3)^(3/2))/(36*e^4) + ((6*A*b + a*
B)*(e*x)^(3/2)*(a + b*x^3)^(5/2))/(9*a*e^4) - (2*A*(a + b*x^3)^(7
/2))/(3*a*e*(e*x)^(3/2)) + (5*a^2*(6*A*b + a*B)*ArcTanh[(Sqrt[b]*
(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(24*Sqrt[b]*e^(5/2))
```

Rubi [A] time = 0.366636, antiderivative size = 188, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.231$

$$\frac{5a^2(aB+6Ab)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{24\sqrt{b}e^{5/2}}+\frac{(ex)^{3/2}\left(a+bx^3\right)^{5/2}(aB+6Ab)}{9ae^4}+\frac{5(ex)^{3/2}\left(a+bx^3\right)^{3/2}(aB+6Ab)}{36e^4}+\frac{5a(ex)^{3/2}\sqrt{a+bx^3}(aB+6Ab)}{24e^4}-\frac{2A\left(a+bx^3\right)^{7/2}}{3ae(ex)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(5/2)*(A + B*x^3))/(e*x)^(5/2),x]
```

```
[Out] (5*a*(6*A*b + a*B)*(e*x)^(3/2)*Sqrt[a + b*x^3])/(24*e^4) + (5*(6*
A*b + a*B)*(e*x)^(3/2)*(a + b*x^3)^(3/2))/(36*e^4) + ((6*A*b + a*
B)*(e*x)^(3/2)*(a + b*x^3)^(5/2))/(9*a*e^4) - (2*A*(a + b*x^3)^(7
/2))/(3*a*e*(e*x)^(3/2)) + (5*a^2*(6*A*b + a*B)*ArcTanh[(Sqrt[b]*
(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(24*Sqrt[b]*e^(5/2))
```

Rubi in Sympy [A] time = 33.9601, size = 177, normalized size = 0.94

$$-\frac{2A\left(a+bx^3\right)^{\frac{7}{2}}}{3ae\,(ex)^{\frac{3}{2}}}+\frac{5a^2\,(6Ab+Ba)\,\mathrm{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{24\sqrt{b}e^{\frac{5}{2}}}+\frac{5a\,(ex)^{\frac{3}{2}}\sqrt{a+bx^3}\,(6Ab+Ba)}{24e^4}+\frac{5\,(ex)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{3}{2}}(6Ab+Ba)}{36e^4}+\frac{(ex)^{\frac{3}{2}}\left(a+bx^3\right)^{\frac{5}{2}}(6Ab+Ba)}{9ae^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(5/2)*(B*x**3+A)/(e*x)**(5/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(7/2)/(3*a*e*(e*x)**(3/2)) + 5*a**2*(6*A*b + B
*a)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(24*s
qrt(b)*e**(5/2)) + 5*a*(e*x)**(3/2)*sqrt(a + b*x**3)*(6*A*b + B*a
)/(24*e**4) + 5*(e*x)**(3/2)*(a + b*x**3)**(3/2)*(6*A*b + B*a)/(3
6*e**4) + (e*x)**(3/2)*(a + b*x**3)**(5/2)*(6*A*b + B*a)/(9*a*e**
4)
```

Mathematica [A] time = 0.277901, size = 137, normalized size = 0.73

$$\frac{x\left(\sqrt{b}\left(a+bx^3\right)\left(a^2\left(33Bx^3-48A\right)+a\left(54Abx^3+26bBx^6\right)+4b^2x^6\left(3A+2Bx^3\right)\right)+15a^2x^3\sqrt{\frac{a}{x^3}+b}(aB+6Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)\right)}{72\sqrt{b}(ex)^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^3)^(5/2)*(A + B*x^3))/(e*x)^(5/2),x]
```

```
[Out] (x*(Sqrt[b]*(a + b*x^3)*(4*b^2*x^6*(3*A + 2*B*x^3) + a^2*(-48*A +
 33*B*x^3) + a*(54*A*b*x^3 + 26*b*B*x^6)) + 15*a^2*(6*A*b + a*B)*
Sqrt[b + a/x^3]*x^3*ArcTanh[Sqrt[b + a/x^3]/Sqrt[b]]))/(72*Sqrt[b
]*(e*x)^(5/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.052, size = 7544, normalized size = 40.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(5/2)*(B*x^3+A)/(e*x)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.673287, size = 1, normalized size = 0.01

$$\left[\frac{15\left(Ba^3+6Aa^2b\right)ex^2\log\left(-4\left(2b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}-\left(8b^2x^6+8abx^3+a^2\right)\sqrt{be}\right)+4\left(8Bb^2x^9+2\left(13Bab+6Ab^2\right)x^6+\cdots\right)}{288\sqrt{be}e^3x^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/288*(15*(B*a^3 + 6*A*a^2*b)*e*x^2*log(-4*(2*b^2*x^4 + a*b*x)*s
qrt(b*x^3 + a)*sqrt(e*x) - (8*b^2*x^6 + 8*a*b*x^3 + a^2)*sqrt(b*e
)) + 4*(8*B*b^2*x^9 + 2*(13*B*a*b + 6*A*b^2)*x^6 + 3*(11*B*a^2 +
18*A*a*b)*x^3 - 48*A*a^2)*sqrt(b*x^3 + a)*sqrt(b*e)*sqrt(e*x))/(s
qrt(b*e)*e^3*x^2), 1/144*(15*(B*a^3 + 6*A*a^2*b)*e*x^2*arctan(2*s
qrt(b*x^3 + a)*sqrt(-b*e)*sqrt(e*x)*x/(2*b*e*x^3 + a*e)) + 2*(8*B
*b^2*x^9 + 2*(13*B*a*b + 6*A*b^2)*x^6 + 3*(11*B*a^2 + 18*A*a*b)*x
^3 - 48*A*a^2)*sqrt(b*x^3 + a)*sqrt(-b*e)*sqrt(e*x))/(sqrt(-b*e)*
e^3*x^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(5/2)*(B*x**3+A)/(e*x)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{5}{2}}}{(ex)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(5/2), x)
```

3.542 $\int \frac{(a+bx^3)^{5/2}(A+Bx^3)}{(ex)^{7/2}}\,dx$

Optimal. Leaf size=352

$$\frac{27\ 3^{3/4}a^{5/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(5aB+16Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{640e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\left(a+bx^3\right)^{5/2}(5aB+16Ab)}{40ae^4}+\frac{3\sqrt{ex}\left(a+bx^3\right)^{3/2}(5aB+16Ab)}{80e^4}+\frac{27a\sqrt{ex}\sqrt{a+bx^3}(5aB+16Ab)}{320e^4}-\frac{2A\left(a+bx^3\right)^{7/2}}{5ae(ex)^{5/2}}$$

```
[Out] (27*a*(16*A*b + 5*a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(320*e^4) + (3*
(16*A*b + 5*a*B)*Sqrt[e*x]*(a + b*x^3)^(3/2))/(80*e^4) + ((16*A*b
 + 5*a*B)*Sqrt[e*x]*(a + b*x^3)^(5/2))/(40*a*e^4) - (2*A*(a + b*x
^3)^(7/2))/(5*a*e*(e*x)^(5/2)) + (27*3^(3/4)*a^(5/3)*(16*A*b + 5*
a*B)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Ellip
ticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(640*e^4*Sqrt[(b^(1/3)*x*(
a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt
[a + b*x^3])
```

Rubi [A] time = 0.745551, antiderivative size = 352, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$

$$\frac{27\ 3^{3/4}a^{5/3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(5aB+16Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{640e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\sqrt{ex}\left(a+bx^3\right)^{5/2}(5aB+16Ab)}{40ae^4}+\frac{3\sqrt{ex}\left(a+bx^3\right)^{3/2}(5aB+16Ab)}{80e^4}+\frac{27a\sqrt{ex}\sqrt{a+bx^3}(5aB+16Ab)}{320e^4}-\frac{2A\left(a+bx^3\right)^{7/2}}{5ae(ex)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^3)^(5/2)*(A + B*x^3))/(e*x)^(7/2),x]
```


```
[Out] (27*a*(16*A*b + 5*a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(320*e^4) + (3*
(16*A*b + 5*a*B)*Sqrt[e*x]*(a + b*x^3)^(3/2))/(80*e^4) + ((16*A*b
 + 5*a*B)*Sqrt[e*x]*(a + b*x^3)^(5/2))/(40*a*e^4) - (2*A*(a + b*x
^3)^(7/2))/(5*a*e*(e*x)^(5/2)) + (27*3^(3/4)*a^(5/3)*(16*A*b + 5*
a*B)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Ellip
ticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(640*e^4*Sqrt[(b^(1/3)*x*(
a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt
[a + b*x^3])
```

Rubi in Sympy [A] time = 42.1042, size = 325, normalized size = 0.92

$$-\frac{2A\left(a+bx^3\right)^{\frac{7}{2}}}{5ae\left(ex\right)^{\frac{5}{2}}}+\frac{27\cdot 3^{\frac{3}{4}}a^{\frac{5}{3}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(16Ab+5Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{640e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}+\frac{27a\sqrt{ex}\sqrt{a+bx^3}\left(16Ab+5Ba\right)}{320e^4}+\frac{3\sqrt{ex}\left(a+bx^3\right)^{\frac{3}{2}}\left(16Ab+5Ba\right)}{80e^4}+\frac{\sqrt{ex}\left(a+bx^3\right)^{\frac{5}{2}}\left(16Ab+5Ba\right)}{40ae^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a)**(5/2)*(B*x**3+A)/(e*x)**(7/2),x)
```

```
[Out] -2*A*(a + b*x**3)**(7/2)/(5*a*e*(e*x)**(5/2)) + 27*3**(3/4)*a**(5
/3)*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**
2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)
*x)*(16*A*b + 5*B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqr
t(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/
2)/(640*e**4*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) +
b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 27*a*sqrt(e*x)*
sqrt(a + b*x**3)*(16*A*b + 5*B*a)/(320*e**4) + 3*sqrt(e*x)*(a + b
*x**3)**(3/2)*(16*A*b + 5*B*a)/(80*e**4) + sqrt(e*x)*(a + b*x**3)
**(5/2)*(16*A*b + 5*B*a)/(40*a*e**4)
```

Mathematica [C] time = 0.79504, size = 242, normalized size = 0.69

$$\frac{x\left(\sqrt[3]{-a}\left(a+bx^3\right)\left(a^2\left(235Bx^3-128A\right)+4abx^3\left(92A+35Bx^3\right)+8b^2x^6\left(8A+5Bx^3\right)\right)-27i3^{3/4}a^2\sqrt[3]{b}x^4\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right.}{\sqrt[3]{b}x}}\right.}{320\sqrt[3]{-a}(ex)^{7/2}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x^3)^(5/2)*(A + B*x^3))/(e*x)^(7/2),x]
```

```
[Out] (x*((-a)^(1/3)*(a + b*x^3)*(8*b^2*x^6*(8*A + 5*B*x^3) + 4*a*b*x^3
*(92*A + 35*B*x^3) + a^2*(-128*A + 235*B*x^3)) - (27*I)*3^(3/4)*a
^2*b^(1/3)*(16*A*b + 5*a*B)*x^4*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^
(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/
b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(
1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/(320*(-a)^(1/3)*(e*x)^
(7/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.053, size = 4422, normalized size = 12.6

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a)^(5/2)*(B*x^3+A)/(e*x)^(7/2),x)
```

```
[Out] -1/320*(b*x^3+a)^(1/2)*(-64*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^
2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b
```

```
^2)^(1/3)*3^(1/2)*x^6*b^3-2592*x^3*a^2*A*(-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/
(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*b*e-810*x^5*a^
3*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a
*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF
((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(
(I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*b
^2*e-810*x^3*a^3*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))
/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^
(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/
2)-3))^(1/2))*(-a*b^2)^(2/3)*e-368*I*x^3*a*A*(1/b^2*e*x*(-b*x+(-a
*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3
^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x
)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*b^2+810*I*x^3*a^3*B*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3
^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1
/2)*e-5184*I*x^4*a^2*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3
^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*b^2*e+1104*x^3*a*A*(1/b^
2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*b^2+705*x^3*a^2*B*(1/b^2*e*
x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b
*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*b+5184*x^4*a^2*A*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3
^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*b^2*
e+1620*x^4*a^3*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(
I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1
/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)
-3))^(1/2))*(-a*b^2)^(1/3)*b*e+420*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1
/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(
-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*
(-a*b^2)^(1/3)*x^6*a*b^2+192*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2
)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^
2)^(1/3)*x^6*b^3-384*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)
*a^2*b+120*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)
^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*
b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^9*b^3-2
592*x^5*a^2*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3
^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3)
)^(1/2))*b^3*e+2592*I*x^3*a^2*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
```

```
a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2
)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2)*b*e+810*I*x^5*a
^3*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elliptic
F((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),
((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*
3^(1/2)*b^2*e-1620*I*x^4*a^3*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a
*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/
2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)
+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*b*e-140*I*B*(1/b
^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*
b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2
)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^6*a*b^2-40*I*B*(
1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(
1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^9*b^3-235*I*x
^3*a^2*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)
^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*b+128
*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a^2*b+259
2*I*x^5*a^2*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3
^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3)
)^(1/2))*3^(1/2)*b^3*e)/x^2/b/(-a*b^2)^(1/3)/e^3/(e*x)^(1/2)/((b*
x^3+a)*e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^
2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{5}{2}}}{(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(7/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(7/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bb^2x^9 + \left(2\,Bab + Ab^2\right)x^6 + \left(Ba^2 + 2\,Aab\right)x^3 + Aa^2\right)\sqrt{bx^3 + a}}{\sqrt{ex}e^3x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(7/2),x, algorithm="fricas")
```

```
[Out] integral((B*b^2*x^9 + (2*B*a*b + A*b^2)*x^6 + (B*a^2 + 2*A*a*b)*x
^3 + A*a^2)*sqrt(b*x^3 + a)/(sqrt(e*x)*e^3*x^3), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a)**(5/2)*(B*x**3+A)/(e*x)**(7/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{5}{2}}}{(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(b*x^3 + a)^(5/2)/(e*x)^(7/2), x)
```

3.543 $\int \frac{(ex)^{7/2}(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=121

$$-\frac{ae^{7/2}(4Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{12b^{5/2}}+\frac{e^2(ex)^{3/2}\sqrt{a+bx^3}(4Ab-3aB)}{12b^2}+\frac{B(ex)^{9/2}\sqrt{a+bx^3}}{6be}$$

```
[Out] ((4*A*b - 3*a*B)*e^2*(e*x)^(3/2)*Sqrt[a + b*x^3])/(12*b^2) + (B*(
e*x)^(9/2)*Sqrt[a + b*x^3])/(6*b*e) - (a*(4*A*b - 3*a*B)*e^(7/2)*
ArcTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(12*b^(
5/2))
```

Rubi [A] time = 0.271242, antiderivative size = 121, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{ae^{7/2}(4Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{12b^{5/2}}+\frac{e^2(ex)^{3/2}\sqrt{a+bx^3}(4Ab-3aB)}{12b^2}+\frac{B(ex)^{9/2}\sqrt{a+bx^3}}{6be}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(7/2)*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] ((4*A*b - 3*a*B)*e^2*(e*x)^(3/2)*Sqrt[a + b*x^3])/(12*b^2) + (B*(
e*x)^(9/2)*Sqrt[a + b*x^3])/(6*b*e) - (a*(4*A*b - 3*a*B)*e^(7/2)*
ArcTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(12*b^(
5/2))
```

Rubi in Sympy [A] time = 23.5521, size = 110, normalized size = 0.91

$$\frac{B(ex)^{\frac{9}{2}}\sqrt{a+bx^3}}{6be}-\frac{ae^{\frac{7}{2}}(4Ab-3Ba)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{12b^{\frac{5}{2}}}+\frac{e^2(ex)^{\frac{3}{2}}\sqrt{a+bx^3}(4Ab-3Ba)}{12b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(7/2)*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] B*(e*x)**(9/2)*sqrt(a + b*x**3)/(6*b*e) - a*e**(7/2)*(4*A*b - 3*B
*a)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(12*b
**(5/2)) + e**2*(e*x)**(3/2)*sqrt(a + b*x**3)*(4*A*b - 3*B*a)/(12
*b**2)
```

Mathematica [A] time = 0.219016, size = 100, normalized size = 0.83

$$\frac{e^2(ex)^{3/2}\left(\sqrt{b}\left(a+bx^3\right)\left(-3aB+4Ab+2bBx^3\right)+a\sqrt{\frac{a}{x^3}+b}(3aB-4Ab)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)\right)}{12b^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^(7/2)*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (e^2*(e*x)^(3/2)*(Sqrt[b]*(a + b*x^3)*(4*A*b - 3*a*B + 2*b*B*x^3)
 + a*(-4*A*b + 3*a*B)*Sqrt[b + a/x^3]*ArcTanh[Sqrt[b + a/x^3]/Sqr
```

```
t[b]]))/(12*b^(5/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.067, size = 6861, normalized size = 56.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(7/2)*(B*x^3+A)/(b*x^3+a)^(1/2),x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(7/2)/sqrt(b*x^3 + a),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.64966, size = 1, normalized size = 0.01

$$\left[-\frac{\left(3\,Ba^2-4\,Aab\right)e^3\sqrt{\frac{e}{b}}\log\left(-8\,b^2ex^6-8\,abex^3-a^2e+4\left(2\,b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)-4\left(2\,Bbe^3x^4-\left(3\,Ba-4\,Ab\right)\right.}{48\,b^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(7/2)/sqrt(b*x^3 + a),x, algorithm="fricas")

[Out] [-1/48*((3*B*a^2 - 4*A*a*b)*e^3*sqrt(e/b)*log(-8*b^2*e*x^6 - 8*a*
b*e*x^3 - a^2*e + 4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3 + a)*sqrt(e*x)
*sqrt(e/b)) - 4*(2*B*b*e^3*x^4 - (3*B*a - 4*A*b)*e^3*x)*sqrt(b*x^
3 + a)*sqrt(e*x))/b^2, 1/24*((3*B*a^2 - 4*A*a*b)*e^3*sqrt(-e/b)*a
rctan(2*sqrt(b*x^3 + a)*sqrt(e*x)*x/((2*b*x^3 + a)*sqrt(-e/b))) +
 2*(2*B*b*e^3*x^4 - (3*B*a - 4*A*b)*e^3*x)*sqrt(b*x^3 + a)*sqrt(e
*x))/b^2]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(7/2)*(B*x**3+A)/(b*x**3+a)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(7/2)/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] Timed out
```

3.544 $\int \frac{(ex)^{5/2}(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=286

$$-\frac{a^{2/3}e^2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(10Ab-7aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{40\sqrt[4]{3}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{e^2\sqrt{ex}\sqrt{a+bx^3}(10Ab-7aB)}{20b^2}+\frac{B(ex)^{7/2}\sqrt{a+bx^3}}{5be}$$

```
[Out] ((10*A*b - 7*a*B)*e^2*Sqrt[e*x]*Sqrt[a + b*x^3])/(20*b^2) + (B*(e
*x)^(7/2)*Sqrt[a + b*x^3])/(5*b*e) - (a^(2/3)*(10*A*b - 7*a*B)*e^
2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)
*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Elliptic
F[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt
[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(40*3^(1/4)*b^2*Sqrt[(b^(1/3)
*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*
Sqrt[a + b*x^3])
```

Rubi [A] time = 0.563975, antiderivative size = 286, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$-\frac{a^{2/3}e^2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(10Ab-7aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{40\sqrt[4]{3}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{e^2\sqrt{ex}\sqrt{a+bx^3}(10Ab-7aB)}{20b^2}+\frac{B(ex)^{7/2}\sqrt{a+bx^3}}{5be}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(5/2)*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] ((10*A*b - 7*a*B)*e^2*Sqrt[e*x]*Sqrt[a + b*x^3])/(20*b^2) + (B*(e
*x)^(7/2)*Sqrt[a + b*x^3])/(5*b*e) - (a^(2/3)*(10*A*b - 7*a*B)*e^
2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)
*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Elliptic
F[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt
[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(40*3^(1/4)*b^2*Sqrt[(b^(1/3)
*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*
Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 29.6321, size = 257, normalized size = 0.9

$$\frac{B\left(ex\right)^{\frac{7}{2}}\sqrt{a+bx^3}}{5be}-\frac{3^{\frac{3}{4}}a^{\frac{2}{3}}e^2\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(10Ab-7Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{120b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}+\frac{e^2\sqrt{ex}\sqrt{a+bx^3}\left(10Ab-7Ba\right)}{20b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((e*x)**(5/2)*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] B*(e*x)**(7/2)*sqrt(a + b*x**3)/(5*b*e) - 3**(3/4)*a**(2/3)*e**2*
sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(
a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*
(10*A*b - 7*B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3)
 + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(
120*b**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(
1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + e**2*sqrt(e*x)*sqrt
(a + b*x**3)*(10*A*b - 7*B*a)/(20*b**2)
```

Mathematica [C]   time = 0.714602, size = 210, normalized size = 0.73

$$\frac{e^2\sqrt{ex}\left(-3\sqrt[3]{-a}\left(a+bx^3\right)\left(7aB-10Ab-4bBx^3\right)+i3^{3/4}a\sqrt[3]{b}x\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(10Ab-7aB)F\left(\sin^{-1}\right.\right.}{60\sqrt[3]{-a}b^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[((e*x)^(5/2)*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (e^2*Sqrt[e*x]*(-3*(-a)^(1/3)*(a + b*x^3)*(-10*A*b + 7*a*B - 4*b*
B*x^3) + I*3^(3/4)*a*b^(1/3)*(10*A*b - 7*a*B)*x*Sqrt[((-1)^(5/6)*
((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) +
 ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(
5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/(60*(-
a)^(1/3)*b^2*Sqrt[a + b*x^3])
```

Maple [C]   time = 0.07, size = 3723, normalized size = 13.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((e*x)^(5/2)*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] 1/20*e^2*(e*x)^(1/2)*(b*x^3+a)^(1/2)/b^3/(-a*b^2)^(1/3)*(20*I*A*(
-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)
^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^
(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^
2)^(2/3)*3^(1/2)*a*b*e+20*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*
b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+
1)/(I*3^(1/2)-3))^(1/2))*3^(1/2)*x^2*a*b^3*e-14*I*B*(-(I*3^(1/2)-
3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*
3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^(1/2)*x^2*a^2*b^
2*e+28*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1
/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*
```

```
b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*El
lipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(
1/2))*(-a*b^2)^(1/3)*3^(1/2)*x*a^2*b*e-14*I*B*(-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^
(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2
)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2)*a
^2*e-20*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/
2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ell
ipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1
/2))*x^2*a*b^3*e-7*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)
*3^(1/2)*a*b+14*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/
(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(
1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2
)-3))^(1/2))*x^2*a^2*b^2*e+40*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2
)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x*a*b^2*e-28*B*(-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3
)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3
)*x*a^2*b*e+4*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1
/2)*x^3*b^2-20*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(
I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1
/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)
-3))^(1/2))*(-a*b^2)^(2/3)*a*b*e+14*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*
3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a^2*e-12*B*(1/b^2
*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^
2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*
((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^3*b^2-40*I*A*(-(I*3^(1/2)-
3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*
3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(
1/2)*x*a*b^2*e+10*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*
3^(1/2)*b^2-30*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*b^2+2
1*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*a*b)/((b*x^3+a)*e*
x)^(1/2)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-
```

```
2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{5}{2}}}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(5/2)/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(5/2)/sqrt(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Be^2x^5 + Ae^2x^2)\sqrt{ex}}{\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(5/2)/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*e^2*x^5 + A*e^2*x^2)*sqrt(e*x)/sqrt(b*x^3 + a), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**(5/2)*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{5}{2}}}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(5/2)/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(5/2)/sqrt(b*x^3 + a), x)
```

3.545 $\int \frac{(ex)^{3/2}(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=543

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(8Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{16\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt[3]{a}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(8Ab-5aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{8b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\left(1+\sqrt{3}\right)e\sqrt{ex}\sqrt{a+bx^3}(8Ab-5aB)}{8b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{B(ex)^{5/2}\sqrt{a+bx^3}}{4be}$$

```
[Out] (B*(e*x)^(5/2)*Sqrt[a + b*x^3])/(4*b*e) + ((1 + Sqrt[3])*(8*A*b -
 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(8*b^(5/3)*(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)) - (3^(1/4)*a^(1/3)*(8*A*b - 5*a*B)*e*Sqrt[e*x
]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(
a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)], (2 + Sqrt[3])/4])/(8*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b
^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]
) - ((1 - Sqrt[3])*a^(1/3)*(8*A*b - 5*a*B)*e*Sqrt[e*x]*(a^(1/3) +
 b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(
1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1
 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
 Sqrt[3])/4])/(16*3^(1/4)*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1
/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 1.20085, antiderivative size = 543, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(8Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{16\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt[3]{a}e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(8Ab-5aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{8b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\left(1+\sqrt{3}\right)e\sqrt{ex}\sqrt{a+bx^3}(8Ab-5aB)}{8b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{B(ex)^{5/2}\sqrt{a+bx^3}}{4be}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(3/2)*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (B*(e*x)^(5/2)*Sqrt[a + b*x^3])/(4*b*e) + ((1 + Sqrt[3])*(8*A*b -
 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(8*b^(5/3)*(a^(1/3) + (1 + S
```

```
qrt[3])*b^(1/3)*x)) - (3^(1/4)*a^(1/3)*(8*A*b - 5*a*B)*e*Sqrt[e*x
]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(
a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)], (2 + Sqrt[3])/4])/(8*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b
^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]
) - ((1 - Sqrt[3])*a^(1/3)*(8*A*b - 5*a*B)*e*Sqrt[e*x]*(a^(1/3) +
 b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(
1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1
 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
 Sqrt[3])/4])/(16*3^(1/4)*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1
/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 60.507, size = 491, normalized size = 0.9

$$\frac{B(ex)^{\frac{5}{2}}\sqrt{a+bx^3}}{4be} - \frac{\sqrt[4]{3}\sqrt[3]{a}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(8Ab-5Ba)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{8b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} - \frac{3^{\frac{3}{4}}\sqrt[3]{a}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(8Ab-5Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{48b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}} + \frac{e\sqrt{ex}\left(\frac{1}{4}+\frac{\sqrt{3}}{4}\right)\sqrt{a+bx^3}(8Ab-5Ba)}{2b^{\frac{5}{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((e*x)**(3/2)*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] B*(e*x)**(5/2)*sqrt(a + b*x**3)/(4*b*e) - 3**(1/4)*a**(1/3)*e*sqr
t(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**
(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(8*
A*b - 5*B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1
))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(8*b*
*(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/
3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) - 3**(3/4)*a**(1/3)*e*s
qrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3)
+ b**(1/3)*x)*(8*A*b - 5*B*a)*elliptic_f(acos((a**(1/3) + b**(1/3
)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(
3)/4 + 1/2)/(48*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/
(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + e*s
qrt(e*x)*(1/4 + sqrt(3)/4)*sqrt(a + b*x**3)*(8*A*b - 5*B*a)/(2*b*
*(5/3)*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3))))
```

Mathematica [C] time = 3.80977, size = 263, normalized size = 0.48

$$\frac{x(ex)^{3/2}\left(6bB\left(a+bx^3\right)-(8Ab-5aB)\left(-3\left(\frac{a}{x^3}+b\right)+\frac{\sqrt[6]{-1}3^{3/4}ab^{2/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\sqrt{-\frac{i\sqrt[3]{-}}{\sqrt[3]{b}}}\right.\right.\right.}{(-a)^{2/3}x}\right.\right.}{24b^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((e*x)^(3/2)*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (x*(e*x)^(3/2)*(6*b*B*(a + b*x^3) - (8*A*b - 5*a*B)*(-3*(b + a/x^
3) + ((-1)^(1/6)*3^(3/4)*a*b^(2/3)*Sqrt[((-1)^(5/6)*((-a)^(1/3) -
 b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*
x)/b^(1/3) + x^2)/x^2]*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^
(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)] + (-1)^
(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)
*x)]/3^(1/4)], (-1)^(1/3)]))/((-a)^(2/3)*x))))/(24*b^2*Sqrt[a + b
*x^3])
```

Maple [C] time = 0.066, size = 4914, normalized size = 9.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(3/2)*(B*x^3+A)/(b*x^3+a)^(1/2),x)
```

```
[Out] 1/4*e*(e*x)^(1/2)*(b*x^3+a)^(1/2)*(-5*I*B*(-a*b^2)^(1/3)*3^(1/2)*
x^2*a*b*e+24*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*
3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3
)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3
))^(1/2))*a*b^2*e+10*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3
^(1/2)-3))^(1/2))*a^2*b*e-15*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a
*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/
2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)
+1)/(I*3^(1/2)-3))^(1/2))*a^2*b*e-16*A*(-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I
*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a*b^2*e-8*I*A*(-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2
)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1
/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^(1/2)*a*b^2*e+5*I*B*
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
```

```
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2
)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(
I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3
^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^(1/
2)*a^2*b*e-10*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I
*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-
3))^(1/2))*(-a*b^2)^(1/3)*x^2*a*b*e+15*B*(-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/
(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x^2*a*b*e+8*I*
A*3^(1/2)*x^3*b^3*e+8*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)
^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-
a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(
I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*x^2*b^2*e-16*I*A*(-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/
2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^
(2/3)*3^(1/2)*x*b*e+10*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2
)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(
-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/
(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2)*x*a*e+15*B*(-a*b^2)^
(1/3)*x^2*a*b*e+8*I*A*(-a*b^2)^(1/3)*3^(1/2)*x^2*b^2*e+8*I*A*(-a*
b^2)^(2/3)*3^(1/2)*x*b*e-5*I*B*3^(1/2)*x^3*a*b^2*e+I*B*(1/b^2*e*x
*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*
x^3+a)*e*x)^(1/2)*3^(1/2)*x^2*b^2-5*I*B*(-a*b^2)^(2/3)*3^(1/2)*x*
a*e-24*A*x^3*b^3*e+16*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x^2*b^2*e-24*A*(-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(
1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x^2*b^
2*e-32*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2
)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elli
pticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/
2))*(-a*b^2)^(2/3)*x*b*e+48*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*
b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+
1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*x*b*e+20*B*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3
```

```
^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*x*a*
e-30*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipt
icE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2)
)*(-a*b^2)^(2/3)*x*a*e-5*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1
)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*x^2*a*b*e+15*B*x^3
*a*b^2*e-3*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)
^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*
b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*x^2*b^2-24*A*(-a*b^2)^(1
/3)*x^2*b^2*e-24*A*(-a*b^2)^(2/3)*x*b*e+15*B*(-a*b^2)^(2/3)*x*a*e
)/b^3/((b*x^3+a)*e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^
2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{3}{2}}}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(3/2)/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(3/2)/sqrt(b*x^3 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bex^4 + Aex)\sqrt{ex}}{\sqrt{bx^3 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(3/2)/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] integral((B*e*x^4 + A*e*x)*sqrt(e*x)/sqrt(b*x^3 + a), x)
```

Sympy [A] time = 68.0645, size = 94, normalized size = 0.17

$$\frac{Ae^{\frac{3}{2}}x^{\frac{5}{2}}\,\Gamma\left(\frac{5}{6}\right)\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{5}{6}\\ \frac{11}{6}\end{matrix}\middle|\,\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{11}{6}\right)} + \frac{Be^{\frac{3}{2}}x^{\frac{11}{2}}\,\Gamma\left(\frac{11}{6}\right)\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{11}{6}\\ \frac{17}{6}\end{matrix}\middle|\,\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\,\Gamma\left(\frac{17}{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(3/2)*(B*x**3+A)/(b*x**3+a)**(1/2),x)
```

```
[Out] A*e**(3/2)*x**(5/2)*gamma(5/6)*hyper((1/2, 5/6), (11/6,), b*x**3*
exp_polar(I*pi)/a)/(3*sqrt(a)*gamma(11/6)) + B*e**(3/2)*x**(11/2)
*gamma(11/6)*hyper((1/2, 11/6), (17/6,), b*x**3*exp_polar(I*pi)/a
)/(3*sqrt(a)*gamma(17/6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{3}{2}}}{\sqrt{bx^3 + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^(3/2)/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(3/2)/sqrt(b*x^3 + a), x)
```

3.546 $\int \frac{\sqrt{ex}(A+Bx^3)}{\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=83

$$\frac{\sqrt{e}(2Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3b^{3/2}}+\frac{B(ex)^{3/2}\sqrt{a+bx^3}}{3be}$$

```
[Out] (B*(e*x)^(3/2)*Sqrt[a + b*x^3])/(3*b*e) + ((2*A*b - a*B)*Sqrt[e]*
ArcTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*b^(3
/2))
```

Rubi [A] time = 0.202006, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$\frac{\sqrt{e}(2Ab-aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3b^{3/2}}+\frac{B(ex)^{3/2}\sqrt{a+bx^3}}{3be}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[e*x]*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (B*(e*x)^(3/2)*Sqrt[a + b*x^3])/(3*b*e) + ((2*A*b - a*B)*Sqrt[e]*
ArcTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*b^(3
/2))
```

Rubi in Sympy [A] time = 19.0747, size = 73, normalized size = 0.88

$$\frac{B\,(ex)^{\frac{3}{2}}\,\sqrt{a+bx^3}}{3be}+\frac{2\sqrt{e}\left(Ab-\frac{Ba}{2}\right)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{3b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((B*x**3+A)*(e*x)**(1/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] B*(e*x)**(3/2)*sqrt(a + b*x**3)/(3*b*e) + 2*sqrt(e)*(A*b - B*a/2)
*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(3*b**(3
/2))
```

Mathematica [A] time = 0.170303, size = 82, normalized size = 0.99

$$\frac{x\sqrt{ex}\left(\sqrt{\frac{a}{x^3}+b}(2Ab-aB)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)+\sqrt{b}B\left(a+bx^3\right)\right)}{3b^{3/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[e*x]*(A + B*x^3))/Sqrt[a + b*x^3],x]
```

```
[Out] (x*Sqrt[e*x]*(Sqrt[b]*B*(a + b*x^3) + (2*A*b - a*B)*Sqrt[b + a/x^
3]*ArcTanh[Sqrt[b + a/x^3]/Sqrt[b]]))/(3*b^(3/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.04, size = 6424, normalized size = 77.4

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(e*x)^(1/2)/(b*x^3+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(e*x)/sqrt(b*x^3 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.634202, size = 1, normalized size = 0.01

$$\left[\frac{4\sqrt{bx^3+a}\sqrt{ex}Bx-(Ba-2Ab)\sqrt{\frac{e}{b}}\log\left(-8\,b^2ex^6-8\,abex^3-a^2e-4\left(2\,b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)}{12\,b}, \frac{2\sqrt{bx^3+a}\sqrt{ex}B}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(e*x)/sqrt(b*x^3 + a),x, algorithm="fricas")
```

```
[Out] [1/12*(4*sqrt(b*x^3 + a)*sqrt(e*x)*B*x - (B*a - 2*A*b)*sqrt(e/b)*
log(-8*b^2*e*x^6 - 8*a*b*e*x^3 - a^2*e - 4*(2*b^2*x^4 + a*b*x)*sq
rt(b*x^3 + a)*sqrt(e*x)*sqrt(e/b)))/b, 1/6*(2*sqrt(b*x^3 + a)*sqr
t(e*x)*B*x - (B*a - 2*A*b)*sqrt(-e/b)*arctan(2*sqrt(b*x^3 + a)*sq
rt(e*x)*x/((2*b*x^3 + a)*sqrt(-e/b))))/b]
```

Sympy [A] time = 8.51888, size = 107, normalized size = 1.29

$$\frac{2A\sqrt{e}\operatorname{asinh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{\sqrt{a}e^{\frac{3}{2}}}\right)}{3\sqrt{b}}+\frac{B\sqrt{a}\,(ex)^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}{3be}-\frac{Ba\sqrt{e}\operatorname{asinh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{\sqrt{a}e^{\frac{3}{2}}}\right)}{3b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(e*x)**(1/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] 2*A*sqrt(e)*asinh(sqrt(b)*(e*x)**(3/2)/(sqrt(a)*e**(3/2)))/(3*sqr
t(b)) + B*sqrt(a)*(e*x)**(3/2)*sqrt(1 + b*x**3/a)/(3*b*e) - B*a*s
qrt(e)*asinh(sqrt(b)*(e*x)**(3/2)/(sqrt(a)*e**(3/2)))/(3*b**(3/2)
)
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*sqrt(e*x)/sqrt(b*x^3 + a),x, algorithm="giac")
```

```
[Out] Timed out
```

3.547 $\int \frac{A+Bx^3}{\sqrt{ex}\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=249

$$\frac{\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{4\sqrt[4]{3}\sqrt[3]{a}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{B\sqrt{ex}\sqrt{a+bx^3}}{2be}$$

```
[Out] (B*Sqrt[e*x]*Sqrt[a + b*x^3])/(2*b*e) + ((4*A*b - a*B)*Sqrt[e*x]*
(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)
*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^
(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)
*x)], (2 + Sqrt[3])/4])/(4*3^(1/4)*a^(1/3)*b*e*Sqrt[(b^(1/3)*x*(a
^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[
a + b*x^3])
```

Rubi [A] time = 0.472859, antiderivative size = 249, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$\frac{\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{4\sqrt[4]{3}\sqrt[3]{a}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{B\sqrt{ex}\sqrt{a+bx^3}}{2be}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(Sqrt[e*x]*Sqrt[a + b*x^3]),x]
```

```
[Out] (B*Sqrt[e*x]*Sqrt[a + b*x^3])/(2*b*e) + ((4*A*b - a*B)*Sqrt[e*x]*
(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)
*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^
(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)
*x)], (2 + Sqrt[3])/4])/(4*3^(1/4)*a^(1/3)*b*e*Sqrt[(b^(1/3)*x*(a
^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[
a + b*x^3])
```

Rubi in Sympy [A] time = 22.7388, size = 216, normalized size = 0.87

$$\frac{B\sqrt{ex}\sqrt{a+bx^3}}{2be}+\frac{3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(4Ab-Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{12\sqrt[3]{a}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(1/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] B*sqrt(e*x)*sqrt(a + b*x**3)/(2*b*e) + 3**(3/4)*sqrt(e*x)*sqrt((a
**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/
3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(4*A*b - B*a)*ell
iptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b
```

```
**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(12*a**(1/3)*b*e*sqrt
(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + s
qrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 1.942, size = 184, normalized size = 0.74

$$\frac{x\left(3B\left(a+bx^3\right)+\frac{i3^{3/4}\sqrt[3]{b}x\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(aB-4Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{\sqrt[3]{-a}}\right)}{6b\sqrt{ex}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(Sqrt[e*x]*Sqrt[a + b*x^3]),x]
```

```
[Out] (x*(3*B*(a + b*x^3) + (I*3^(3/4)*b^(1/3)*(-4*A*b + a*B)*x*Sqrt[((
-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)
/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sq
rt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)
])/(-a)^(1/3)))/(6*b*Sqrt[e*x]*Sqrt[a + b*x^3])
```

Maple [C] time = 0.04, size = 3275, normalized size = 13.2

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(1/2)/(b*x^3+a)^(1/2),x)
```

```
[Out] -1/2*(b*x^3+a)^(1/2)*x/b^2/(-a*b^2)^(1/3)*(8*I*A*(-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(
1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^(1/2)*x^2*b^3*e-2*I
*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*
b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF(
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((
I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^
(1/2)*x^2*a*b^2*e-16*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I
*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*3^(1/2)*x*b^2*e+4*I*B*(-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3
)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3
)*3^(1/2)*x*a*b*e+8*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
```

```
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2)*b*e-8*A*(-(I*3^(1/2)-3)
*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*
b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^
(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*b^3*e-2*I*B*(-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/
2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^
(2/3)*3^(1/2)*a*e+2*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/
3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^
(1/2)-3))^(1/2))*x^2*a*b^2*e+16*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+
(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1
/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)*x*b^2*e-4*B*(-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)
*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(1/3)
*x*a*b*e-8*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^
(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))
^(1/2))*(-a*b^2)^(2/3)*b*e+2*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a
*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/
2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)
+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*a*e-I*B*(1/b^2*e*x*(-b*x
+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)
*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*b+3*B*(1/b^2*e*x*(-b*x+(-a*b^2
)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/
2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1
/2)*(-a*b^2)^(1/3)*b)/(e*x)^(1/2)/((b*x^3+a)*e*x)^(1/2)/(I*3^(1/2
)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}\sqrt{ex}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*sqrt(e*x)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*sqrt(e*x)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + a}\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*sqrt(e*x)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(sqrt(b*x^3 + a)*sqrt(e*x)), x)
```

Sympy [A] time = 5.06452, size = 94, normalized size = 0.38

$$\frac{A\sqrt{x}\,\Gamma\left(\frac{1}{6}\right)\,{}_2F_1\left(\begin{matrix}\frac{1}{6}, \frac{1}{2}\\ \frac{7}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\sqrt{e}\,\Gamma\left(\frac{7}{6}\right)} + \frac{Bx^{\frac{7}{2}}\,\Gamma\left(\frac{7}{6}\right)\,{}_2F_1\left(\begin{matrix}\frac{1}{2}, \frac{7}{6}\\ \frac{13}{6}\end{matrix}\middle|\frac{bx^3e^{i\pi}}{a}\right)}{3\sqrt{a}\sqrt{e}\,\Gamma\left(\frac{13}{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/(e*x)**(1/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] A*sqrt(x)*gamma(1/6)*hyper((1/6, 1/2), (7/6,), b*x**3*exp_polar(I
*pi)/a)/(3*sqrt(a)*sqrt(e)*gamma(7/6)) + B*x**(7/2)*gamma(7/6)*hy
per((1/2, 7/6), (13/6,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*sqr
t(e)*gamma(13/6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*sqrt(e*x)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*sqrt(e*x)), x)
```

3.548 $\int \frac{A+Bx^3}{(ex)^{3/2}\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=542

$$-\frac{\left(1-\sqrt{3}\right)\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{2\sqrt[4]{3}a^{2/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+2Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{a^{2/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\left(1+\sqrt{3}\right)\sqrt{ex}\sqrt{a+bx^3}(aB+2Ab)}{ab^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}-\frac{2A\sqrt{a+bx^3}}{ae\sqrt{ex}}$$

```
[Out] (-2*A*Sqrt[a + b*x^3])/(a*e*Sqrt[e*x]) + ((1 + Sqrt[3])*(2*A*b +
a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(a*b^(2/3)*e^2*(a^(1/3) + (1 + Sq
rt[3])*b^(1/3)*x)) - (3^(1/4)*(2*A*b + a*B)*Sqrt[e*x]*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1
- Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
Sqrt[3])/4])/(a^(2/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1
/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]) -
 ((1 - Sqrt[3])*(2*A*b + a*B)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqr
t[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqr
t[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(
1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(
2*3^(1/4)*a^(2/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*
x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 1.18717, antiderivative size = 542, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$

$$-\frac{\left(1-\sqrt{3}\right)\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{2\sqrt[4]{3}a^{2/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\sqrt[4]{3}\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+2Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{a^{2/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{\left(1+\sqrt{3}\right)\sqrt{ex}\sqrt{a+bx^3}(aB+2Ab)}{ab^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}-\frac{2A\sqrt{a+bx^3}}{ae\sqrt{ex}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/((e*x)^(3/2)*Sqrt[a + b*x^3]),x]
```

```
[Out] (-2*A*Sqrt[a + b*x^3])/(a*e*Sqrt[e*x]) + ((1 + Sqrt[3])*(2*A*b +
a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(a*b^(2/3)*e^2*(a^(1/3) + (1 + Sq
```

```
rt[3])*b^(1/3)*x)) - (3^(1/4)*(2*A*b + a*B)*Sqrt[e*x]*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1
- Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
Sqrt[3])/4])/(a^(2/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1
/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]) -
 ((1 - Sqrt[3])*(2*A*b + a*B)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqr
t[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqr
t[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(
1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(
2*3^(1/4)*a^(2/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*
x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 63.085, size = 490, normalized size = 0.9

$$-\frac{2A\sqrt{a+bx^3}}{ae\sqrt{ex}}+\frac{\sqrt{ex}\left(2+2\sqrt{3}\right)\sqrt{a+bx^3}\left(Ab+\frac{Ba}{2}\right)}{ab^{\frac{2}{3}}e^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}-\frac{2\sqrt[4]{3}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab+\frac{Ba}{2}\right)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{a^{\frac{2}{3}}b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}-\frac{3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab+\frac{Ba}{2}\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{3a^{\frac{2}{3}}b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(3/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] -2*A*sqrt(a + b*x**3)/(a*e*sqrt(e*x)) + sqrt(e*x)*(2 + 2*sqrt(3))
*sqrt(a + b*x**3)*(A*b + B*a/2)/(a*b**(2/3)*e**2*(a**(1/3) + b**(
1/3)*x*(1 + sqrt(3)))) - 2*3**(1/4)*sqrt(e*x)*sqrt((a**(2/3) - a*
*(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sq
rt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(A*b + B*a/2)*elliptic_e(acos
((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1
 + sqrt(3)))), sqrt(3)/4 + 1/2)/(a**(2/3)*b**(2/3)*e**2*sqrt(b**(
1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3
)))**2)*sqrt(a + b*x**3)) - 3**(3/4)*sqrt(e*x)*sqrt((a**(2/3) - a
**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + s
qrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3) + b**(1/3)*x)*(A*b + B*a/2)
*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3)
 + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(3*a**(2/3)*b**(2
/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(
1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [A] time = 2.33279, size = 355, normalized size = 0.65

$$\frac{x\left(\frac{(aB+2Ab)\left(-(-1)^{2/3}a^{2/3}\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\left(\left(1+\sqrt[3]{-1}\right)E\left(\sin^{-1}\left(\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}\right)\middle|\frac{\sqrt[3]{-1}}{-1+\sqrt[3]{-1}}\right)-\left(1+\cdots\right.\right.}{\left((-1)^{2/3}-1\right)\sqrt[3]{a}b}\cdots\right)}{a(ex)^{3/2}\sqrt{a+bx^3}\cdots}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/((e*x)^(3/2)*Sqrt[a + b*x^3]),x]
```

```
[Out] (x*(-2*A*(a + b*x^3) + ((2*A*b + a*B)*(-((-1 + (-1)^(2/3))*a^(1/3
)*b^(1/3)*x*((-1)^(1/3)*a^(1/3) - b^(1/3)*x)*((-1)^(2/3)*a^(1/3)
+ b^(1/3)*x)) - (-1)^(2/3)*a^(2/3)*(a^(1/3) + b^(1/3)*x)^2*Sqrt[(
(1 + (-1)^(1/3))*b^(1/3)*x*(a^(1/3) - (-1)^(1/3)*b^(1/3)*x))/(a^(
1/3) + b^(1/3)*x)^2]*Sqrt[(a^(1/3) + (-1)^(2/3)*b^(1/3)*x)/(a^(1/
3) + b^(1/3)*x)]*((1 + (-1)^(1/3))*EllipticE[ArcSin[Sqrt[((1 + (-
1)^(1/3))*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]], (-1)^(1/3)/(-1 + (-
1)^(1/3))] - (1 + (-1)^(2/3))*EllipticF[ArcSin[Sqrt[((1 + (-1)^(1
/3))*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]], (-1)^(1/3)/(-1 + (-1)^(1
/3))])))/((-1 + (-1)^(2/3))*a^(1/3)*b)))/(a*(e*x)^(3/2)*Sqrt[a +
b*x^3])
```

Maple [C] time = 0.048, size = 5385, normalized size = 9.9

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(3/2)/(b*x^3+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}\,(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(3/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + a}\sqrt{ex}ex}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(3/2)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(sqrt(b*x^3 + a)*sqrt(e*x)*e*x), x)
```

Sympy [A] time = 9.40413, size = 97, normalized size = 0.18

$$\frac{A\,\Gamma\left(-\frac{1}{6}\right) {}_2F_1\left(\begin{matrix} -\frac{1}{6}, \frac{1}{2} \\ \frac{5}{6} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3\sqrt{a}e^{\frac{3}{2}}\sqrt{x}\,\Gamma\left(\frac{5}{6}\right)} + \frac{Bx^{\frac{5}{2}}\,\Gamma\left(\frac{5}{6}\right) {}_2F_1\left(\begin{matrix} \frac{1}{2}, \frac{5}{6} \\ \frac{11}{6} \end{matrix}\middle| \frac{bx^3 e^{i\pi}}{a}\right)}{3\sqrt{a}e^{\frac{3}{2}}\,\Gamma\left(\frac{11}{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(e*x)**(3/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] A*gamma(-1/6)*hyper((-1/6, 1/2), (5/6,), b*x**3*exp_polar(I*pi)/a
)/(3*sqrt(a)*e**(3/2)*sqrt(x)*gamma(5/6)) + B*x**(5/2)*gamma(5/6)
*hyper((1/2, 5/6), (11/6,), b*x**3*exp_polar(I*pi)/a)/(3*sqrt(a)*
e**(3/2)*gamma(11/6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}\,(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(3/2)), x)
```

3.549 $\int \frac{A+Bx^3}{(ex)^{5/2}\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=75

$$\frac{2B\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3\sqrt{b}e^{5/2}}-\frac{2A\sqrt{a+bx^3}}{3ae(ex)^{3/2}}$$

```
[Out] (-2*A*Sqrt[a + b*x^3])/(3*a*e*(e*x)^(3/2)) + (2*B*ArcTanh[(Sqrt[b
]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*Sqrt[b]*e^(5/2))
```

Rubi [A] time = 0.180541, antiderivative size = 75, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$\frac{2B\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3\sqrt{b}e^{5/2}}-\frac{2A\sqrt{a+bx^3}}{3ae(ex)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/((e*x)^(5/2)*Sqrt[a + b*x^3]),x]
```

```
[Out] (-2*A*Sqrt[a + b*x^3])/(3*a*e*(e*x)^(3/2)) + (2*B*ArcTanh[(Sqrt[b
]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*Sqrt[b]*e^(5/2))
```

Rubi in Sympy [A] time = 18.5962, size = 68, normalized size = 0.91

$$-\frac{2A\sqrt{a+bx^3}}{3ae\,(ex)^{\frac{3}{2}}}+\frac{2B\,\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{3\sqrt{b}e^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(5/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] -2*A*sqrt(a + b*x**3)/(3*a*e*(e*x)**(3/2)) + 2*B*atanh(sqrt(b)*(e
*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(3*sqrt(b)*e**(5/2))
```

Mathematica [A] time = 0.0992382, size = 65, normalized size = 0.87

$$\frac{2x\left(\frac{Bx^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)}{\sqrt{b}}-\frac{A\sqrt{a+bx^3}}{a}\right)}{3(ex)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/((e*x)^(5/2)*Sqrt[a + b*x^3]),x]
```

```
[Out] (2*x*(-((A*Sqrt[a + b*x^3])/a) + (B*x^(3/2)*ArcTanh[(Sqrt[b]*x^(3
/2))/Sqrt[a + b*x^3]])/Sqrt[b]))/(3*(e*x)^(5/2))
```

Maple [C] time = 0.042, size = 3397, normalized size = 45.3

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(5/2)/(b*x^3+a)^(1/2),x)
```

```
[Out] -2/3*(b*x^3+a)^(1/2)/x/b^2*(6*I*B*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3
)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)
/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^4*a*b^2*e-6*I*B*3^(1/2)*(-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*
3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^
(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(
1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/
(I*3^(1/2)-3))^(1/2))*x^4*a*b^2*e-12*I*B*(-a*b^2)^(1/3)*3^(1/2)*(
-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)
^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^
(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*a*
b*e+12*I*B*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+
(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(
1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*a*b
*e+6*I*B*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2
)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a*e-6*B*(-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I
*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^4*a*b^2*e-6*I*B*(-a*b^2)^(2/3
)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/
2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ell
ipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I
*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a*e+6*B*(-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^
(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2
)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1
/2))*x^4*a*b^2*e+12*B*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3
^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*a*b*e-12*B*(-a*b^2)^(1/3)*(-(
I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3
^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(
1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*
3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1
/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(
I*3^(1/2)-3))^(1/2))*x^3*a*b*e-6*B*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)
*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3
```

```
)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*
b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^
(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a*e+6*B*(-a*b^2)
^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipt
icPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^
(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a*e+I*A*(1/b^2*e*x*(-b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^
(1/2)*3^(1/2)*b^2-3*A*((b*x^3+a)*e*x)^(1/2)*(1/b^2*e*x*(-b*x+(-a*
b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*b^2)/e^2/(e*x)^
(1/2)/((b*x^3+a)*e*x)^(1/2)/a/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*
b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(5/2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.384102, size = 1, normalized size = 0.01

$$\left[\frac{Baex^2\log\left(-4\left(2b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}-\left(8b^2x^6+8abx^3+a^2\right)\sqrt{be}\right)-4\sqrt{bx^3+a}\sqrt{be}\sqrt{ex}A}{6\sqrt{be}ae^3x^2}, \frac{Baex^2\arctan\left(\frac{2\sqrt{bx^3+a}}{2be}\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(5/2)),x, algorithm="fricas")
```

```
[Out] [1/6*(B*a*e*x^2*log(-4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^3 + a)*sqrt(e
*x) - (8*b^2*x^6 + 8*a*b*x^3 + a^2)*sqrt(b*e)) - 4*sqrt(b*x^3 + a
)*sqrt(b*e)*sqrt(e*x)*A)/(sqrt(b*e)*a*e^3*x^2), 1/3*(B*a*e*x^2*ar
ctan(2*sqrt(b*x^3 + a)*sqrt(-b*e)*sqrt(e*x)*x/(2*b*e*x^3 + a*e))
- 2*sqrt(b*x^3 + a)*sqrt(-b*e)*sqrt(e*x)*A)/(sqrt(-b*e)*a*e^3*x^2
)]
```

Sympy [A] time = 58.6247, size = 60, normalized size = 0.8

$$-\frac{2A\sqrt{b}\sqrt{\frac{a}{bx^3}+1}}{3ae^{\frac{5}{2}}}+\frac{2B\operatorname{asinh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3\sqrt{b}e^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/(e*x)**(5/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] -2*A*sqrt(b)*sqrt(a/(b*x**3) + 1)/(3*a*e**(5/2)) + 2*B*asinh(sqrt
(b)*x**(3/2)/sqrt(a))/(3*sqrt(b)*e**(5/2))
```

GIAC/XCAS [A] time = 0.236408, size = 146, normalized size = 1.95

$$-\frac{2}{3}\left(\frac{B\arctan\left(\frac{\sqrt{be+\frac{ae}{x^3}}}{\sqrt{-be}}\right)e^{(-1)}}{\sqrt{-be}}+\frac{\sqrt{be+\frac{ae}{x^3}}Ae^{(-2)}}{a}-\frac{\left(Ba\arctan\left(\frac{\sqrt{b}e^{\frac{1}{2}}}{\sqrt{-be}}\right)e+\sqrt{-be}A\sqrt{b}e^{\frac{1}{2}}\right)e^{(-2)}}{\sqrt{-be}a}\right)e^{(-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(5/2)),x, algorithm="giac")
```

```
[Out] -2/3*(B*arctan(sqrt(b*e + a*e/x^3)/sqrt(-b*e))*e^(-1)/sqrt(-b*e)
+ sqrt(b*e + a*e/x^3)*A*e^(-2)/a - (B*a*arctan(sqrt(b)*e^(1/2)/sq
rt(-b*e))*e + sqrt(-b*e)*A*sqrt(b)*e^(1/2))*e^(-2)/(sqrt(-b*e)*a)
)*e^(-1)
```

3.550 $\int \frac{A+Bx^3}{(ex)^{7/2}\sqrt{a+bx^3}}\,dx$

Optimal. Leaf size=246

$$-\frac{\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(2Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{5\sqrt[4]{3}a^{4/3}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2A\sqrt{a+bx^3}}{5ae(ex)^{5/2}}$$

```
[Out] (-2*A*Sqrt[a + b*x^3])/(5*a*e*(e*x)^(5/2)) - ((2*A*b - 5*a*B)*Sqr
t[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[Arc
Cos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*
b^(1/3)*x)], (2 + Sqrt[3])/4])/(5*3^(1/4)*a^(4/3)*e^4*Sqrt[(b^(1/
3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.460606, antiderivative size = 246, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$-\frac{\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(2Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{5\sqrt[4]{3}a^{4/3}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2A\sqrt{a+bx^3}}{5ae(ex)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/((e*x)^(7/2)*Sqrt[a + b*x^3]),x]
```

```
[Out] (-2*A*Sqrt[a + b*x^3])/(5*a*e*(e*x)^(5/2)) - ((2*A*b - 5*a*B)*Sqr
t[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x +
b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[Arc
Cos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*
b^(1/3)*x)], (2 + Sqrt[3])/4])/(5*3^(1/4)*a^(4/3)*e^4*Sqrt[(b^(1/
3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 23.5536, size = 223, normalized size = 0.91

$$-\frac{2A\sqrt{a+bx^3}}{5ae\,(ex)^{\frac{5}{2}}}-\frac{2\cdot 3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab-\frac{5Ba}{2}\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{15a^{\frac{4}{3}}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(7/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] -2*A*sqrt(a + b*x**3)/(5*a*e*(e*x)**(5/2)) - 2*3**(3/4)*sqrt(e*x)
*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)
+ b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(A*b - 5*
B*a/2)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a*
*(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(15*a**(4/3
)*e**4*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/
3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 1.76565, size = 187, normalized size = 0.76

$$\frac{2x\left(-3A\left(a+bx^3\right)+\frac{i3^{3/4}\sqrt[3]{b}x^4\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(2Ab-5aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{\sqrt[3]{-a}}\right)}{15a(ex)^{7/2}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/((e*x)^(7/2)*Sqrt[a + b*x^3]),x]
```

```
[Out] (2*x*(-3*A*(a + b*x^3) + (I*3^(3/4)*b^(1/3)*(2*A*b - 5*a*B)*x^4*S
qrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)
^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[Arc
Sin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)
^(1/3)])/(-a)^(1/3)))/(15*a*(e*x)^(7/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.043, size = 3303, normalized size = 13.4

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(7/2)/(b*x^3+a)^(1/2),x)
```

```
[Out] 2/5*(b*x^3+a)^(1/2)*(-I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1
/3)*3^(1/2)*b-4*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/
(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(
1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2
)-3))^(1/2))*x^5*b^3*e+10*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^
2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*
(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)
/(I*3^(1/2)-3))^(1/2))*x^5*a*b^2*e+10*B*(-a*b^2)^(2/3)*(-(I*3^(1/
2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-
3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*
(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*a*e+20*I*x^
4*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a
```

```
*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF
((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(
(I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(
-a*b^2)^(1/3)*3^(1/2)*a*b*e+4*I*x^3*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*
3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b^2)^(2/3)*3^(1/2)*b*e-8*I*x
^4*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elliptic
F((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),
((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*
(-a*b^2)^(1/3)*3^(1/2)*b^2*e+3*A*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(
1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3)))^(1/2)*b+4*I*x^5*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3
^(1/2)-3))^(1/2))*3^(1/2)*b^3*e-10*I*x^5*B*(-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*3^(1/2)*a*b^2*e-10*I*x^3*B*
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2
)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(
I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3
^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-a*b
^2)^(2/3)*3^(1/2)*a*e+8*A*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/
(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^4*b^2*e-20*B*(-a*b^2)^(1/3)
*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^
2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*
3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^4*
a*b*e-4*A*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I
*3^(1/2)-3))^(1/2))*x^3*b*e)/x^2/(-a*b^2)^(1/3)/b/a/e^3/(e*x)^(1/
2)/((b*x^3+a)*e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}\,(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(7/2)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(7/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\sqrt{bx^3 + a}\sqrt{ex}e^3x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(7/2)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/(sqrt(b*x^3 + a)*sqrt(e*x)*e^3*x^3), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/(e*x)**(7/2)/(b*x**3+a)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\sqrt{bx^3 + a}\,(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(7/2)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/(sqrt(b*x^3 + a)*(e*x)^(7/2)), x)
```

3.551 $\int \frac{(ex)^{7/2}(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=120

$$\frac{e^{7/2}(2Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3b^{5/2}}-\frac{e^2(ex)^{3/2}(2Ab-3aB)}{3b^2\sqrt{a+bx^3}}+\frac{B(ex)^{9/2}}{3be\sqrt{a+bx^3}}$$

```
[Out] -((2*A*b - 3*a*B)*e^2*(e*x)^(3/2))/(3*b^2*Sqrt[a + b*x^3]) + (B*(
e*x)^(9/2))/(3*b*e*Sqrt[a + b*x^3]) + ((2*A*b - 3*a*B)*e^(7/2)*Ar
cTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*b^(5/2
))
```

Rubi [A] time = 0.261849, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{e^{7/2}(2Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3b^{5/2}}-\frac{e^2(ex)^{3/2}(2Ab-3aB)}{3b^2\sqrt{a+bx^3}}+\frac{B(ex)^{9/2}}{3be\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(7/2)*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] -((2*A*b - 3*a*B)*e^2*(e*x)^(3/2))/(3*b^2*Sqrt[a + b*x^3]) + (B*(
e*x)^(9/2))/(3*b*e*Sqrt[a + b*x^3]) + ((2*A*b - 3*a*B)*e^(7/2)*Ar
cTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*b^(5/2
))
```

Rubi in Sympy [A] time = 24.4732, size = 112, normalized size = 0.93

$$\frac{B\,(ex)^{\frac{9}{2}}}{3be\sqrt{a+bx^3}}-\frac{2e^2\,(ex)^{\frac{3}{2}}\left(Ab-\frac{3Ba}{2}\right)}{3b^2\sqrt{a+bx^3}}+\frac{2e^{\frac{7}{2}}\left(Ab-\frac{3Ba}{2}\right)\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{3b^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(7/2)*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] B*(e*x)**(9/2)/(3*b*e*sqrt(a + b*x**3)) - 2*e**2*(e*x)**(3/2)*(A*
b - 3*B*a/2)/(3*b**2*sqrt(a + b*x**3)) + 2*e**(7/2)*(A*b - 3*B*a/
2)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(3*b**
(5/2))
```

Mathematica [A] time = 0.228545, size = 91, normalized size = 0.76

$$\frac{e^2(ex)^{3/2}\left(\sqrt{b}\left(3aB-2Ab+bBx^3\right)+\sqrt{\frac{a}{x^3}+b}(2Ab-3aB)\tanh^{-1}\left(\frac{\sqrt{\frac{a}{x^3}+b}}{\sqrt{b}}\right)\right)}{3b^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^(7/2)*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (e^2*(e*x)^(3/2)*(Sqrt[b]*(-2*A*b + 3*a*B + b*B*x^3) + (2*A*b - 3
*a*B)*Sqrt[b + a/x^3]*ArcTanh[Sqrt[b + a/x^3]/Sqrt[b]]))/(3*b^(5/
```

```
2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.079, size = 7016, normalized size = 58.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(7/2)*(B*x^3+A)/(b*x^3+a)^(3/2),x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(7/2)/(b*x^3 + a)^(3/2),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.652507, size = 1, normalized size = 0.01

$$\left[-\frac{\left(\left(3\,Bab-2\,Ab^{2}\right)e^{3}x^{3}+\left(3\,Ba^{2}-2\,Aab\right)e^{3}\right)\sqrt{\frac{e}{b}}\log\left(-8\,b^{2}ex^{6}-8\,abex^{3}-a^{2}e-4\left(2\,b^{2}x^{4}+abx\right)\sqrt{bx^{3}+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)-4\,(}{12\left(b^{3}x^{3}+ab^{2}\right)}\right.$$

$$\left.-\frac{\left(\left(3\,Bab-2\,Ab^{2}\right)e^{3}x^{3}+\left(3\,Ba^{2}-2\,Aab\right)e^{3}\right)\sqrt{-\frac{e}{b}}\arctan\left(\frac{2\sqrt{bx^{3}+a}\sqrt{ex}x}{\left(2\,bx^{3}+a\right)\sqrt{-\frac{e}{b}}}\right)-2\left(Bbe^{3}x^{4}+\left(3\,Ba-2\,Ab\right)e^{3}x\right)\sqrt{bx^{3}+a}\sqrt{ex}}{6\left(b^{3}x^{3}+ab^{2}\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(7/2)/(b*x^3 + a)^(3/2),x, algorithm="fricas")

[Out] [-1/12*(((3*B*a*b - 2*A*b^2)*e^3*x^3 + (3*B*a^2 - 2*A*a*b)*e^3)*s
qrt(e/b)*log(-8*b^2*e*x^6 - 8*a*b*e*x^3 - a^2*e - 4*(2*b^2*x^4 +
a*b*x)*sqrt(b*x^3 + a)*sqrt(e*x)*sqrt(e/b)) - 4*(B*b*e^3*x^4 + (3
*B*a - 2*A*b)*e^3*x)*sqrt(b*x^3 + a)*sqrt(e*x))/(b^3*x^3 + a*b^2)
, -1/6*(((3*B*a*b - 2*A*b^2)*e^3*x^3 + (3*B*a^2 - 2*A*a*b)*e^3)*s
qrt(-e/b)*arctan(2*sqrt(b*x^3 + a)*sqrt(e*x)*x/((2*b*x^3 + a)*sqr
t(-e/b))) - 2*(B*b*e^3*x^4 + (3*B*a - 2*A*b)*e^3*x)*sqrt(b*x^3 +
a)*sqrt(e*x))/(b^3*x^3 + a*b^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(7/2)*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(7/2)/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] Timed out
```

3.552 $\int \frac{(ex)^{5/2}(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=286

$$\frac{e^2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-7aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{12\sqrt[4]{3}\sqrt[3]{a}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{e^2\sqrt{ex}(4Ab-7aB)}{6b^2\sqrt{a+bx^3}} + \frac{B(ex)^{7/2}}{2be\sqrt{a+bx^3}}$$

```
[Out] -((4*A*b - 7*a*B)*e^2*Sqrt[e*x])/(6*b^2*Sqrt[a + b*x^3]) + (B*(e*
x)^(7/2))/(2*b*e*Sqrt[a + b*x^3]) + ((4*A*b - 7*a*B)*e^2*Sqrt[e*x
]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(
a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)], (2 + Sqrt[3])/4])/(12*3^(1/4)*a^(1/3)*b^2*Sqrt[(b^(1/3)*x
*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sq
rt[a + b*x^3])
```

Rubi [A] time = 0.557365, antiderivative size = 286, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{e^2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-7aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{12\sqrt[4]{3}\sqrt[3]{a}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{e^2\sqrt{ex}(4Ab-7aB)}{6b^2\sqrt{a+bx^3}} + \frac{B(ex)^{7/2}}{2be\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(5/2)*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] -((4*A*b - 7*a*B)*e^2*Sqrt[e*x])/(6*b^2*Sqrt[a + b*x^3]) + (B*(e*
x)^(7/2))/(2*b*e*Sqrt[a + b*x^3]) + ((4*A*b - 7*a*B)*e^2*Sqrt[e*x
]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(
a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)], (2 + Sqrt[3])/4])/(12*3^(1/4)*a^(1/3)*b^2*Sqrt[(b^(1/3)*x
*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sq
rt[a + b*x^3])
```

Rubi in Sympy [A] time = 30.2851, size = 257, normalized size = 0.9

$$\frac{B\left(ex\right)^{\frac{7}{2}}}{2be\sqrt{a+bx^3}} - \frac{e^2\sqrt{ex}\left(4Ab-7Ba\right)}{6b^2\sqrt{a+bx^3}} + \frac{3^{\frac{3}{4}}e^2\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(4Ab-7Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{36\sqrt[3]{a}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(5/2)*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] B*(e*x)**(7/2)/(2*b*e*sqrt(a + b*x**3)) - e**2*sqrt(e*x)*(4*A*b -
 7*B*a)/(6*b**2*sqrt(a + b*x**3)) + 3**(3/4)*e**2*sqrt(e*x)*sqrt(
(a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(
1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(4*A*b - 7*B*a)
*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3)
 + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(36*a**(1/3)*b**2
*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(
1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.606702, size = 202, normalized size = 0.71

$$\frac{e^2\sqrt{ex}\left(3\sqrt[3]{-a}\left(7aB-4Ab+3bBx^3\right)-i3^{3/4}\sqrt[3]{b}x\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(4Ab-7aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1}}{\sqrt[4]{3}}\right.\right.\right.}{18\sqrt[3]{-a}b^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((e*x)^(5/2)*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (e^2*Sqrt[e*x]*(3*(-a)^(1/3)*(-4*A*b + 7*a*B + 3*b*B*x^3) - I*3^(
3/4)*b^(1/3)*(4*A*b - 7*a*B)*x*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(
1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b
^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1
/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/(18*(-a)^(1/3)*b^2*Sqrt
[a + b*x^3])
```

Maple [C] time = 0.073, size = 3760, normalized size = 13.2

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(5/2)*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] -1/6/x*e^2*(e*x)^(1/2)*(8*I*A*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*
3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*x^2*b^3+28
*I*B*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^
2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*
(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)
/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*x*a*b-7*I*B*(-a*b^2)
^(1/3)*3^(1/2)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3)))^(1/2)*x*a*b-3*I*B*(-a*b^2)^(1/3)*3^(1/2)*(1/b^2*e*
x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^4
*b^2-14*I*B*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3)
)/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)
^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
```

^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1
/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*x^2*a*b^2-8*A*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3
^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/
2)*x^2*b^3-14*I*B*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/
(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*a+8*I*A
*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*b+14*B*(-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2
)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1
/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*
x^2*a*b^2+16*A*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*
b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+
1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*x*b^2-28*B*(-a*b^2
)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)
+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellip
ticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2
))*((b*x^3+a)*e*x)^(1/2)*x*a*b-8*A*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)
*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*
b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^
(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2
)*b+14*B*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*a+9*B*(-a*b^2)^(1/3)*(1/
b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a
b^2)^(1/3))(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/
2)*x^4*b^2+4*I*A*(-a*b^2)^(1/3)*3^(1/2)*(1/b^2*e*x*(-b*x+(-a*b^2)
^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2
)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x*b^2-16*I*A*(-a*b^
2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(
I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1
/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)
-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*x*b^2-12*A*(-a*b^2)^(1/3)*(1/b^
2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
*x*b^2+21*B*(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^
(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1
/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x*a*b)/(b*x^3+a)^(1/2)/b^3/(-a*b
^2)^(1/3)/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/

```
2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)
-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{5}{2}}}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(3/2),x, algorithm="maxima")

[Out] integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Be^2x^5 + Ae^2x^2)\sqrt{ex}}{(bx^3 + a)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(3/2),x, algorithm="fricas")

[Out] integral((B*e^2*x^5 + A*e^2*x^2)*sqrt(e*x)/(b*x^3 + a)^(3/2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(5/2)*(B*x**3+A)/(b*x**3+a)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{5}{2}}}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(3/2),x, algorithm="giac")

[Out] integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(3/2), x)
```

3.553 $\int \frac{(ex)^{3/2}(A+Bx^3)}{(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=553

$$\frac{\left(1-\sqrt{3}\right)e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(2Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{6\sqrt[4]{3}a^{2/3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(2Ab-5aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{3^{3/4}a^{2/3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\left(1+\sqrt{3}\right)e\sqrt{ex}\sqrt{a+bx^3}(2Ab-5aB)}{3ab^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{2(ex)^{5/2}(Ab-aB)}{3abe\sqrt{a+bx^3}}$$

```
[Out] (2*(A*b - a*B)*(e*x)^(5/2))/(3*a*b*e*Sqrt[a + b*x^3]) - ((1 + Sqr
t[3])*(2*A*b - 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(3*a*b^(5/3)*(
a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + ((2*A*b - 5*a*B)*e*Sqrt[e*x
]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(
a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)], (2 + Sqrt[3])/4])/(3^(3/4)*a^(2/3)*b^(5/3)*Sqrt[(b^(1/3)*
x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*S
qrt[a + b*x^3]) + ((1 - Sqrt[3])*(2*A*b - 5*a*B)*e*Sqrt[e*x]*(a^(
1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3
) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)]
, (2 + Sqrt[3])/4])/(6*3^(1/4)*a^(2/3)*b^(5/3)*Sqrt[(b^(1/3)*x*(a
^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[
a + b*x^3])
```

Rubi [A] time = 1.20035, antiderivative size = 553, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$\frac{\left(1-\sqrt{3}\right)e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(2Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{6\sqrt[4]{3}a^{2/3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(2Ab-5aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{3^{3/4}a^{2/3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{\left(1+\sqrt{3}\right)e\sqrt{ex}\sqrt{a+bx^3}(2Ab-5aB)}{3ab^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{2(ex)^{5/2}(Ab-aB)}{3abe\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(3/2)*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(A*b - a*B)*(e*x)^(5/2))/(3*a*b*e*Sqrt[a + b*x^3]) - ((1 + Sqr
t[3])*(2*A*b - 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(3*a*b^(5/3)*(
a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + ((2*A*b - 5*a*B)*e*Sqrt[e*x
]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/
3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(
a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)], (2 + Sqrt[3])/4])/(3^(3/4)*a^(2/3)*b^(5/3)*Sqrt[(b^(1/3)*
x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*S
qrt[a + b*x^3]) + ((1 - Sqrt[3])*(2*A*b - 5*a*B)*e*Sqrt[e*x]*(a^(
1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2
)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3
) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)]
, (2 + Sqrt[3])/4])/(6*3^(1/4)*a^(2/3)*b^(5/3)*Sqrt[(b^(1/3)*x*(a
^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[
a + b*x^3])
```

Rubi in Sympy [A] time = 63.85, size = 503, normalized size = 0.91

$$\frac{2\left(ex\right)^{\frac{5}{2}}\left(Ab-Ba\right)}{3abe\sqrt{a+bx^{3}}}-\frac{e\sqrt{ex}\left(\frac{2}{3}+\frac{2\sqrt{3}}{3}\right)\sqrt{a+bx^{3}}\left(2Ab-5Ba\right)}{2ab^{\frac{5}{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}+\frac{\sqrt[4]{3}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(2Ab-5Ba\right)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{3a^{\frac{2}{3}}b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\sqrt{a+bx^{3}}}+\frac{3^{\frac{3}{4}}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(2Ab-5Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{18a^{\frac{2}{3}}b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\sqrt{a+bx^{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(3/2)*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*(e*x)**(5/2)*(A*b - B*a)/(3*a*b*e*sqrt(a + b*x**3)) - e*sqrt(e*
x)*(2/3 + 2*sqrt(3)/3)*sqrt(a + b*x**3)*(2*A*b - 5*B*a)/(2*a*b**(
5/3)*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))) + 3**(1/4)*e*sqrt(e*x
)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)
 + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(2*A*b -
 5*B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(3*a**(2/3
)*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b*
*(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 3**(3/4)*e*sqrt(e
*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/
3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3) + b**
(1/3)*x)*(2*A*b - 5*B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(
-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4
+ 1/2)/(18*a**(2/3)*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)
*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 5.23835, size = 266, normalized size = 0.48

$$\frac{x(ex)^{3/2}\left(6b(Ab-aB)-(5aB-2Ab)\left(-3\left(\frac{a}{x^3}+b\right)+\frac{\sqrt[6]{-1}3^{3/4}ab^{2/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}}\right.\right.\right.}{(-a)^{2/3}x}\right)\right)}{9ab^2\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((e*x)^(3/2)*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (x*(e*x)^(3/2)*(6*b*(A*b - a*B) - (-2*A*b + 5*a*B)*(-3*(b + a/x^3
) + ((-1)^(1/6)*3^(3/4)*a*b^(2/3)*Sqrt[((-1)^(5/6)*((-a)^(1/3) -
b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x
)/b^(1/3) + x^2)/x^2]*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(
5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)] + (-1)^(
1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*
x)]/3^(1/4)], (-1)^(1/3)]))/((-a)^(2/3)*x))))/(9*a*b^2*Sqrt[a + b
*x^3])
```

Maple [C] time = 0.076, size = 5392, normalized size = 9.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(3/2)*(B*x^3+A)/(b*x^3+a)^(3/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{3}{2}}}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Bex^4 + Aex)\sqrt{ex}}{(bx^3 + a)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((B*e*x^4 + A*e*x)*sqrt(e*x)/(b*x^3 + a)^(3/2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(3/2)*(B*x**3+A)/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{3}{2}}}{(bx^3 + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(3/2), x)
```

3.554 $\int \frac{\sqrt{ex}\left(A+Bx^3\right)}{\left(a+bx^3\right)^{3/2}}\,dx$

Optimal. Leaf size=85

$$\frac{2(ex)^{3/2}(Ab-aB)}{3abe\sqrt{a+bx^3}}+\frac{2B\sqrt{e}\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3b^{3/2}}$$

```
[Out] (2*(A*b - a*B)*(e*x)^(3/2))/(3*a*b*e*Sqrt[a + b*x^3]) + (2*B*Sqrt
[e]*ArcTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*
b^(3/2))
```

Rubi [A] time = 0.194777, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$

$$\frac{2(ex)^{3/2}(Ab-aB)}{3abe\sqrt{a+bx^3}}+\frac{2B\sqrt{e}\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[e*x]*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*(A*b - a*B)*(e*x)^(3/2))/(3*a*b*e*Sqrt[a + b*x^3]) + (2*B*Sqrt
[e]*ArcTanh[(Sqrt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*
b^(3/2))
```

Rubi in Sympy [A] time = 19.5298, size = 75, normalized size = 0.88

$$\frac{2B\sqrt{e}\,\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{3b^{\frac{3}{2}}}+\frac{2\,(ex)^{\frac{3}{2}}\,(Ab-Ba)}{3abe\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(e*x)**(1/2)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*B*sqrt(e)*atanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)
))/(3*b**(3/2)) + 2*(e*x)**(3/2)*(A*b - B*a)/(3*a*b*e*sqrt(a + b*
x**3))
```

Mathematica [A] time = 0.155037, size = 80, normalized size = 0.94

$$\frac{2\sqrt{ex}\left(\frac{\sqrt{b}x^{3/2}(Ab-aB)}{a\sqrt{a+bx^3}}+B\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)\right)}{3b^{3/2}\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[e*x]*(A + B*x^3))/(a + b*x^3)^(3/2),x]
```

```
[Out] (2*Sqrt[e*x]*((Sqrt[b]*(A*b - a*B)*x^(3/2))/(a*Sqrt[a + b*x^3]) +
 B*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a + b*x^3]]))/(3*b^(3/2)*Sqrt[x
])
```

Maple [C] time = 0.041, size = 3654, normalized size = 43.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(e*x)^(1/2)/(b*x^3+a)^(3/2),x)
```

```
[Out] 2/3*(e*x)^(1/2)/(b*x^3+a)^(1/2)/b^3*(-6*I*B*(-(I*3^(1/2)-3)*x*b/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1
/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-
1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*3^(1
/2)*x^2*a*b^2+I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3)))^(1/2)*3^(1/2)*x^2*b^3-I*B*(1/b^2*e*x*(-b*x+(-a*
b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*3^(1/2)*x^2*a*b
^2+12*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/
2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ell
ipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1
/2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x*a*b-12*I*B*(-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*
3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^
(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(
1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/
(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2
)*x*a*b+6*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(
1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*E
llipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^
(1/2))*((b*x^3+a)*e*x)^(1/2)*x^2*a*b^2+6*I*B*(-(I*3^(1/2)-3)*x*b/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(
1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)
-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/
2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(2/3)*3^(1/2)*a-6*B*(-(I*3^(1/
2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/
(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/
2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*x^2*a*b^2-12*B*(-a*b^2)^(1/3)
*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^
2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*
3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*
x^3+a)*e*x)^(1/2)*x*a*b+12*B*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1
/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-
3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2
))*((b*x^3+a)*e*x)^(1/2)*x*a*b-6*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x
```

```
+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3
^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(2
/3)*3^(1/2)*a+6*B*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/
2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*a-6*B*(-a*b^2)^
(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(
-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipti
cPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(
1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*a+6*I*B*(-(I*
3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2
)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*3^(1/2)*x^2*a*b^2-3*A*(1
/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1
/2)*x^2*b^3+3*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b
^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(
-a*b^2)^(1/3)))^(1/2)*x^2*a*b^2)/x/(I*3^(1/2)-3)/(1/b^2*e*x*(-b*x
+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)/a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$B\sqrt{e}\int \frac{x^{\frac{7}{2}}}{(bx^3+a)^{\frac{3}{2}}}\,dx + \frac{2A\sqrt{e}x^{\frac{3}{2}}}{3\sqrt{bx^3+a}a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(e*x)/(b*x^3 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] B*sqrt(e)*integrate(x^(7/2)/(b*x^3 + a)^(3/2), x) + 2/3*A*sqrt(e)
*x^(3/2)/(sqrt(b*x^3 + a)*a)
```

Fricas [A] time = 0.386239, size = 1, normalized size = 0.01

$$\left[-\frac{4\sqrt{bx^3+a}(Ba-Ab)\sqrt{ex}x - \left(Babx^3+Ba^2\right)\sqrt{\frac{e}{b}}\log\left(-8\,b^2ex^6 - 8\,abex^3 - a^2e - 4\left(2\,b^2x^4+abx\right)\sqrt{bx^3+a}\sqrt{ex}\sqrt{\frac{e}{b}}\right)}{6\left(ab^2x^3+a^2b\right)},\right.$$
$$\left.-\frac{2\sqrt{bx^3+a}(Ba-Ab)\sqrt{ex}x - \left(Babx^3+Ba^2\right)\sqrt{-\frac{e}{b}}\arctan\left(\frac{2\sqrt{bx^3+a}\sqrt{ex}x}{(2\,bx^3+a)\sqrt{-\frac{e}{b}}}\right)}{3\left(ab^2x^3+a^2b\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(e*x)/(b*x^3 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] [-1/6*(4*sqrt(b*x^3 + a)*(B*a - A*b)*sqrt(e*x)*x - (B*a*b*x^3 + B
*a^2)*sqrt(e/b)*log(-8*b^2*e*x^6 - 8*a*b*e*x^3 - a^2*e - 4*(2*b^2
```

```
*x^4 + a*b*x)*sqrt(b*x^3 + a)*sqrt(e*x)*sqrt(e/b)))/(a*b^2*x^3 +
a^2*b), -1/3*(2*sqrt(b*x^3 + a)*(B*a - A*b)*sqrt(e*x)*x - (B*a*b*
x^3 + B*a^2)*sqrt(-e/b)*arctan(2*sqrt(b*x^3 + a)*sqrt(e*x)*x/((2*
b*x^3 + a)*sqrt(-e/b))))/(a*b^2*x^3 + a^2*b)]
```

Sympy [A] time = 57.2654, size = 95, normalized size = 1.12

$$\frac{2A\sqrt{e}x^{\frac{3}{2}}}{3a^{\frac{3}{2}}\sqrt{1+\frac{bx^3}{a}}}+B\left(\frac{2\sqrt{e}\operatorname{asinh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{a}}\right)}{3b^{\frac{3}{2}}}-\frac{2\sqrt{e}x^{\frac{3}{2}}}{3\sqrt{a}b\sqrt{1+\frac{bx^3}{a}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(e*x)**(1/2)/(b*x**3+a)**(3/2),x)
```

```
[Out] 2*A*sqrt(e)*x**(3/2)/(3*a**(3/2)*sqrt(1 + b*x**3/a)) + B*(2*sqrt(
e)*asinh(sqrt(b)*x**(3/2)/sqrt(a))/(3*b**(3/2)) - 2*sqrt(e)*x**(3
/2)/(3*sqrt(a)*b*sqrt(1 + b*x**3/a)))
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(e*x)/(b*x^3 + a)^(3/2),x, algorithm="giac")
```

```
[Out] Timed out
```

3.555 $\int \frac{A+Bx^3}{\sqrt{ex}(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=258

$$\frac{\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{3\sqrt[4]{3}a^{4/3}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{ex}(Ab-aB)}{3abe\sqrt{a+bx^3}}$$

```
[Out] (2*(A*b - a*B)*Sqrt[e*x])/(3*a*b*e*Sqrt[a + b*x^3]) + ((2*A*b + a
*B)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/
3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Ellipt
icF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sq
rt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(3*3^(1/4)*a^(4/3)*b*e*Sqrt
[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.479895, antiderivative size = 258, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$\frac{\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{3\sqrt[4]{3}a^{4/3}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{ex}(Ab-aB)}{3abe\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(Sqrt[e*x]*(a + b*x^3)^(3/2)),x]
```

```
[Out] (2*(A*b - a*B)*Sqrt[e*x])/(3*a*b*e*Sqrt[a + b*x^3]) + ((2*A*b + a
*B)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/
3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Ellipt
icF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sq
rt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(3*3^(1/4)*a^(4/3)*b*e*Sqrt
[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 24.7584, size = 226, normalized size = 0.88

$$\frac{2\sqrt{ex}\,(Ab-Ba)}{3abe\sqrt{a+bx^3}}+\frac{2\cdot 3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab+\frac{Ba}{2}\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{9a^{\frac{4}{3}}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)**(3/2)/(e*x)**(1/2),x)
```

```
[Out] 2*sqrt(e*x)*(A*b - B*a)/(3*a*b*e*sqrt(a + b*x**3)) + 2*3**(3/4)*s
qrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(
A*b + B*a/2)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1
```

```
))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(9*a*
*(4/3)*b*e*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b*
*(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.770515, size = 193, normalized size = 0.75

$$-\frac{6\sqrt[3]{-a}x(Ab-aB)-2i3^{3/4}\sqrt[3]{b}x^2\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(aB+2Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{9(-a)^{4/3}b\sqrt{ex}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(Sqrt[e*x]*(a + b*x^3)^(3/2)),x]
```

```
[Out] -(6*(-a)^(1/3)*(A*b - a*B)*x - (2*I)*3^(3/4)*b^(1/3)*(2*A*b + a*B
)*x^2*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/3)*x))/(b^(1/3)*x)]*Sqr
t[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*Ellipt
icF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)
], (-1)^(1/3)])/(9*(-a)^(4/3)*b*Sqrt[e*x]*Sqrt[a + b*x^3])
```

Maple [C] time = 0.049, size = 3565, normalized size = 13.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)^(3/2)/(e*x)^(1/2),x)
```

```
[Out] -2/3/(b*x^3+a)^(1/2)/b^2/(-a*b^2)^(1/3)/a*(2*I*B*(-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(
1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)
*3^(1/2)*x^2*a*b^2-4*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I
*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*
x*a*b+I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1
/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2
)^(1/3)))^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x*a*b-I*A*(1/b^2*e*x*(-b*x
+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(-a*b^2)^(
1/3)*3^(1/2)*x*b^2+4*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I
*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*3^(1/2)*x^2*b^3-4*A*(-(
I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3
^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(
1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3
^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1
/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+
a)*e*x)^(1/2)*x^2*b^3-8*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^
```

```
2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*
(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)
/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/
2)*x*b^2-2*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^
(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))
^(1/2))*((b*x^3+a)*e*x)^(1/2)*x^2*a*b^2+8*A*(-a*b^2)^(1/3)*(-(I*3
^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)
+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*
e*x)^(1/2)*x*b^2+4*B*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*
x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*
3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^
(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*x*a*b-4*A*(-
a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^
(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))
^(1/2))*((b*x^3+a)*e*x)^(1/2)*b-2*B*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3
^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/
2)*a+4*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1
/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*El
lipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(
1/2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(2/3)*3^(1/2)*b+2*I*B*(-(I*3
^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)
+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*
e*x)^(1/2)*(-a*b^2)^(2/3)*3^(1/2)*a+3*A*(-a*b^2)^(1/3)*(1/b^2*e*x
*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x*b^
2-3*B*(-a*b^2)^(1/3)*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3)))^(1/2)*x*a*b)/(e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^
2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} \sqrt{ex}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*sqrt(e*x)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*sqrt(e*x)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}}\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*sqrt(e*x)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b*x^3 + a)^(3/2)*sqrt(e*x)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(b*x**3+a)**(3/2)/(e*x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}}\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*sqrt(e*x)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*sqrt(e*x)), x)
```

3.556 $\int \frac{A+Bx^3}{(ex)^{3/2}(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=585

$$-\frac{\left(1-\sqrt{3}\right)\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{3\sqrt[4]{3}a^{5/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{3^{3/4}a^{5/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\left(1+\sqrt{3}\right)\sqrt{ex}\sqrt{a+bx^3}(4Ab-aB)}{3a^2b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}-\frac{2(ex)^{5/2}(4Ab-aB)}{3a^2e^4\sqrt{a+bx^3}}-\frac{2A}{ae\sqrt{ex}\sqrt{a+bx^3}}$$

```
[Out] (-2*A)/(a*e*Sqrt[e*x]*Sqrt[a + b*x^3]) - (2*(4*A*b - a*B)*(e*x)^(
5/2))/(3*a^2*e^4*Sqrt[a + b*x^3]) + (2*(1 + Sqrt[3])*(4*A*b - a*B
)*Sqrt[e*x]*Sqrt[a + b*x^3])/(3*a^2*b^(2/3)*e^2*(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)) - (2*(4*A*b - a*B)*Sqrt[e*x]*(a^(1/3) + b^(1/
3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) +
 (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqr
t[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[
3])/4])/(3^(3/4)*a^(5/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b
^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]
) - ((1 - Sqrt[3])*(4*A*b - a*B)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*
Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 +
Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*
b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4]
)/(3*3^(1/4)*a^(5/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/
3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 1.3305, antiderivative size = 585, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.231$

$$-\frac{\left(1-\sqrt{3}\right)\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{3\sqrt[4]{3}a^{5/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(4Ab-aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{3^{3/4}a^{5/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\left(1+\sqrt{3}\right)\sqrt{ex}\sqrt{a+bx^3}(4Ab-aB)}{3a^2b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}-\frac{2(ex)^{5/2}(4Ab-aB)}{3a^2e^4\sqrt{a+bx^3}}-\frac{2A}{ae\sqrt{ex}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/((e*x)^(3/2)*(a + b*x^3)^(3/2)),x]
```

```
[Out] (-2*A)/(a*e*Sqrt[e*x]*Sqrt[a + b*x^3]) - (2*(4*A*b - a*B)*(e*x)^(
5/2))/(3*a^2*e^4*Sqrt[a + b*x^3]) + (2*(1 + Sqrt[3])*(4*A*b - a*B
)*Sqrt[e*x]*Sqrt[a + b*x^3])/(3*a^2*b^(2/3)*e^2*(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)) - (2*(4*A*b - a*B)*Sqrt[e*x]*(a^(1/3) + b^(1/
3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) +
 (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqr
t[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[
3])/4])/(3^(3/4)*a^(5/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b
^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3]
) - ((1 - Sqrt[3])*(4*A*b - a*B)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*
Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 +
Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*
b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4]
)/(3*3^(1/4)*a^(5/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/
3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 75.25, size = 534, normalized size = 0.91

$$-\frac{2A}{ae\sqrt{ex}\sqrt{a+bx^3}}-\frac{2(ex)^{\frac{5}{2}}(4Ab-Ba)}{3a^2e^4\sqrt{a+bx^3}}+\frac{\sqrt{ex}\left(\frac{4}{3}+\frac{4\sqrt{3}}{3}\right)\sqrt{a+bx^3}(4Ab-Ba)}{2a^2b^{\frac{2}{3}}e^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}-\frac{2\sqrt[4]{3}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(4Ab-Ba)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{3a^{\frac{5}{3}}b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}-\frac{3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(4Ab-Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{9a^{\frac{5}{3}}b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(3/2)/(b*x**3+a)**(3/2),x)
```

```
[Out] -2*A/(a*e*sqrt(e*x)*sqrt(a + b*x**3)) - 2*(e*x)**(5/2)*(4*A*b - B
*a)/(3*a**2*e**4*sqrt(a + b*x**3)) + sqrt(e*x)*(4/3 + 4*sqrt(3)/3
)*sqrt(a + b*x**3)*(4*A*b - B*a)/(2*a**2*b**(2/3)*e**2*(a**(1/3)
+ b**(1/3)*x*(1 + sqrt(3)))) - 2*3**(1/4)*sqrt(e*x)*sqrt((a**(2/3
) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(
1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(4*A*b - B*a)*elliptic_
e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3
)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(3*a**(5/3)*b**(2/3)*e**2*s
qrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1
+ sqrt(3)))**2)*sqrt(a + b*x**3)) - 3**(3/4)*sqrt(e*x)*sqrt((a**(
2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*
x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3) + b**(1/3)*x)*(4*A*
b - B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(
a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(9*a**(5/
3)*b**(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3
) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [A] time = 3.03668, size = 372, normalized size = 0.64

$$\frac{2x\left(\frac{(4Ab-aB)\left(-(-1)^{2/3}a^{2/3}\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\left(\left(1+\sqrt[3]{-1}\right)E\left(\sin^{-1}\left(\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}\right)|\frac{\sqrt[3]{-1}}{-1+\sqrt[3]{-1}}\right)-(1\cdots}{((-1)^{2/3}-1)\sqrt[3]{a}b}\cdots}{3a^2(ex)^{3\cdots}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/((e*x)^(3/2)*(a + b*x^3)^(3/2)),x]
```

```
[Out] (2*x*(-((A*b - a*B)*x^3) - 3*A*(a + b*x^3) + ((4*A*b - a*B)*(-((-
1 + (-1)^(2/3))*a^(1/3)*b^(1/3)*x*((-1)^(1/3)*a^(1/3) - b^(1/3)*x
)*((-1)^(2/3)*a^(1/3) + b^(1/3)*x)) - (-1)^(2/3)*a^(2/3)*(a^(1/3)
 + b^(1/3)*x)^2*Sqrt[((1 + (-1)^(1/3))*b^(1/3)*x*(a^(1/3) - (-1)^
(1/3)*b^(1/3)*x))/(a^(1/3) + b^(1/3)*x)^2]*Sqrt[(a^(1/3) + (-1)^(
2/3)*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]*((1 + (-1)^(1/3))*Elliptic
E[ArcSin[Sqrt[((1 + (-1)^(1/3))*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]
], (-1)^(1/3)/(-1 + (-1)^(1/3))] - (1 + (-1)^(2/3))*EllipticF[Arc
Sin[Sqrt[((1 + (-1)^(1/3))*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]], (-
1)^(1/3)/(-1 + (-1)^(1/3))])))/((-1 + (-1)^(2/3))*a^(1/3)*b)))/(3
*a^2*(e*x)^(3/2)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.053, size = 5563, normalized size = 9.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(3/2)/(b*x^3+a)^(3/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}}\,(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(3/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(bex^4 + aex)\sqrt{bx^3 + a}\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(3/2)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b*e*x^4 + a*e*x)*sqrt(b*x^3 + a)*sqrt(e*x)
), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(e*x)**(3/2)/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\left(bx^3 + a\right)^{\frac{3}{2}} \left(ex\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(3/2)), x)
```

3.557 $\int \frac{A+Bx^3}{(ex)^{5/2}(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=67

$$-\frac{2(ex)^{3/2}(2Ab-aB)}{3a^2e^4\sqrt{a+bx^3}}-\frac{2A}{3ae(ex)^{3/2}\sqrt{a+bx^3}}$$

```
[Out] (-2*A)/(3*a*e*(e*x)^(3/2)*Sqrt[a + b*x^3]) - (2*(2*A*b - a*B)*(e*
x)^(3/2))/(3*a^2*e^4*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.110773, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$-\frac{2(ex)^{3/2}(2Ab-aB)}{3a^2e^4\sqrt{a+bx^3}}-\frac{2A}{3ae(ex)^{3/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In] Int[(A + B*x^3)/((e*x)^(5/2)*(a + b*x^3)^(3/2)),x]
```

```
[Out] (-2*A)/(3*a*e*(e*x)^(3/2)*Sqrt[a + b*x^3]) - (2*(2*A*b - a*B)*(e*
x)^(3/2))/(3*a^2*e^4*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 9.81044, size = 61, normalized size = 0.91

$$-\frac{2A}{3ae\,(ex)^{\frac{3}{2}}\,\sqrt{a+bx^3}}-\frac{4\,(ex)^{\frac{3}{2}}\,\left(Ab-\frac{Ba}{2}\right)}{3a^2e^4\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((B*x**3+A)/(e*x)**(5/2)/(b*x**3+a)**(3/2),x)
```

```
[Out] -2*A/(3*a*e*(e*x)**(3/2)*sqrt(a + b*x**3)) - 4*(e*x)**(3/2)*(A*b
- B*a/2)/(3*a**2*e**4*sqrt(a + b*x**3))
```

Mathematica [A] time = 0.0706414, size = 45, normalized size = 0.67

$$\frac{x\left(-2aA+2aBx^3-4Abx^3\right)}{3a^2(ex)^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(A + B*x^3)/((e*x)^(5/2)*(a + b*x^3)^(3/2)),x]
```

```
[Out] (x*(-2*a*A - 4*A*b*x^3 + 2*a*B*x^3))/(3*a^2*(e*x)^(5/2)*Sqrt[a +
b*x^3])
```

Maple [A] time = 0.009, size = 39, normalized size = 0.6

$$-\frac{2\,x\left(2\,Ax^3b-Bax^3+Aa\right)}{3\,a^2}\frac{1}{\sqrt{bx^3+a}}(ex)^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(5/2)/(b*x^3+a)^(3/2),x)
```

```
[Out] -2/3*x*(2*A*b*x^3-B*a*x^3+A*a)/(b*x^3+a)^(1/2)/a^2/(e*x)^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} (ex)^{\frac{5}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(5/2)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(5/2)), x)
```

Fricas [A] time = 0.214847, size = 77, normalized size = 1.15

$$\frac{2 \left((Ba - 2\,Ab)x^3 - Aa \right) \sqrt{bx^3 + a}\sqrt{ex}}{3\left(a^2be^3x^5 + a^3e^3x^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(5/2)),x, algorithm="fricas")
```

```
[Out] 2/3*((B*a - 2*A*b)*x^3 - A*a)*sqrt(b*x^3 + a)*sqrt(e*x)/(a^2*b*e^
3*x^5 + a^3*e^3*x^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(e*x)**(5/2)/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} (ex)^{\frac{5}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(5/2)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(5/2)), x)
```

3.558 $\int \frac{A+Bx^3}{(ex)^{7/2}(a+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=283

$$-\frac{2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(8Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{15\sqrt[4]{3}a^{7/3}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{ex}(8Ab-5aB)}{15a^2e^4\sqrt{a+bx^3}}-\frac{2A}{5ae(ex)^{5/2}\sqrt{a+bx^3}}$$

```
[Out] (-2*A)/(5*a*e*(e*x)^(5/2)*Sqrt[a + b*x^3]) - (2*(8*A*b - 5*a*B)*S
qrt[e*x])/(15*a^2*e^4*Sqrt[a + b*x^3]) - (2*(8*A*b - 5*a*B)*Sqrt[
e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCo
s[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)], (2 + Sqrt[3])/4])/(15*3^(1/4)*a^(7/3)*e^4*Sqrt[(b^(1/3
)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]
*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.560776, antiderivative size = 283, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$

$$-\frac{2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(8Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{15\sqrt[4]{3}a^{7/3}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\sqrt{ex}(8Ab-5aB)}{15a^2e^4\sqrt{a+bx^3}}-\frac{2A}{5ae(ex)^{5/2}\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/((e*x)^(7/2)*(a + b*x^3)^(3/2)),x]
```

```
[Out] (-2*A)/(5*a*e*(e*x)^(5/2)*Sqrt[a + b*x^3]) - (2*(8*A*b - 5*a*B)*S
qrt[e*x])/(15*a^2*e^4*Sqrt[a + b*x^3]) - (2*(8*A*b - 5*a*B)*Sqrt[
e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCo
s[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)], (2 + Sqrt[3])/4])/(15*3^(1/4)*a^(7/3)*e^4*Sqrt[(b^(1/3
)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]
*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 30.3143, size = 260, normalized size = 0.92

$$-\frac{2A}{5ae\left(ex\right)^{\frac{5}{2}}\sqrt{a+bx^3}}-\frac{2\sqrt{ex}\left(8Ab-5Ba\right)}{15a^2e^4\sqrt{a+bx^3}}-\frac{2\cdot 3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(8Ab-5Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{45a^{\frac{7}{3}}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(7/2)/(b*x**3+a)**(3/2),x)
```

```
[Out] -2*A/(5*a*e*(e*x)**(5/2)*sqrt(a + b*x**3)) - 2*sqrt(e*x)*(8*A*b -
 5*B*a)/(15*a**2*e**4*sqrt(a + b*x**3)) - 2*3**(3/4)*sqrt(e*x)*sq
rt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b
**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(8*A*b - 5*B
*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1
/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(45*a**(7/3)*e
**4*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*
x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.648667, size = 202, normalized size = 0.71

$$\frac{x\left(-6\sqrt[3]{-a}\left(3aA-5aBx^3+8Abx^3\right)+4i3^{3/4}\sqrt[3]{b}x^4\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-a}-\sqrt[3]{b}x\right)}{\sqrt[3]{b}x}}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}(8Ab-5aB)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-}}{\sqrt[4]{3}}\right.\right.\right.}{45(-a)^{7/3}(ex)^{7/2}\sqrt{a+bx^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/((e*x)^(7/2)*(a + b*x^3)^(3/2)),x]
```

```
[Out] (x*(-6*(-a)^(1/3)*(3*a*A + 8*A*b*x^3 - 5*a*B*x^3) + (4*I)*3^(3/4)
*b^(1/3)*(8*A*b - 5*a*B)*x^4*Sqrt[((-1)^(5/6)*((-a)^(1/3) - b^(1/
3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(
1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3
))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/(45*(-a)^(7/3)*(e*x)^(7/2
)*Sqrt[a + b*x^3])
```

Maple [C] time = 0.05, size = 3783, normalized size = 13.4

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(7/2)/(b*x^3+a)^(3/2),x)
```

```
[Out] 2/15/x^2*(32*I*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(
I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1
/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)
-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*3^(1/2)*x^4*b^3+32*I*A*(-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3
)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*
x)^(1/2)*(-a*b^2)^(2/3)*3^(1/2)*x^2*b+40*I*B*(-(I*3^(1/2)-3)*x*b/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(
1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)
-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*(-a
*b^2)^(1/3)*3^(1/2)*x^3*a*b-20*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x
+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3
```

```
^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(
1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*3^(1/2)*x^4*a
*b^2+5*I*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(
1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^
2)^(1/3)))^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^3*a*b-32*A*(-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)
*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I
*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(
1/2)*x^4*b^3-3*I*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3)))^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*a*b+20*B*(-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2
)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3
)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*
x)^(1/2)*x^4*a*b^2+64*A*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^3*b^2-4
0*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a
*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF
((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(
(I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(
(b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(1/3)*x^3*a*b-32*A*(-(I*3^(1/2)-3)*
x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b
/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(
1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)
*(-a*b^2)^(2/3)*x^2*b+20*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2
)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(
-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/
(I*3^(1/2)-3))^(1/2))*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(2/3)*x^2*a-
20*I*B*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipt
icF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2)
)*((b*x^3+a)*e*x)^(1/2)*(-a*b^2)^(2/3)*3^(1/2)*x^2*a-64*I*A*(-(I*
3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2
)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*((b*x^3+a)
*e*x)^(1/2)*(-a*b^2)^(1/3)*3^(1/2)*x^3*b^2+24*A*(1/b^2*e*x*(-b*x+
(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(
I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(-a*b^2)^(1
/3)*x^3*b^2-15*B*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3)))^(1/2)*(-a*b^2)^(1/3)*x^3*a*b-8*I*A*(1/b^2*e*x*(-
b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3
))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(-a*b^2
)^(1/3)*3^(1/2)*x^3*b^2+9*A*(1/b^2*e*x*(-b*x+(-a*b^2)^(1/3))*(I*3
^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(
1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(-a*b^2)^(1/3)*a*b)/(b*x^3+a)^(
1/2)/(-a*b^2)^(1/3)/b/a^2/e^3/(e*x)^(1/2)/(I*3^(1/2)-3)/(1/b^2*e*
```

```
x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} (ex)^{\frac{7}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(7/2)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(7/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(be^3x^6 + ae^3x^3)\sqrt{bx^3 + a}\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(7/2)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b*e^3*x^6 + a*e^3*x^3)*sqrt(b*x^3 + a)*sqr
t(e*x)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(e*x)**(7/2)/(b*x**3+a)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} (ex)^{\frac{7}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(7/2)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(3/2)*(e*x)^(7/2)), x)
```

3.559 $\int \frac{(ex)^{7/2}(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=114

$$\frac{2(ex)^{9/2}(Ab-aB)}{9abe\,(a+bx^3)^{3/2}}+\frac{2Be^{7/2}\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3b^{5/2}}-\frac{2Be^2(ex)^{3/2}}{3b^2\sqrt{a+bx^3}}$$

```
[Out] (2*(A*b - a*B)*(e*x)^(9/2))/(9*a*b*e*(a + b*x^3)^(3/2)) - (2*B*e^
2*(e*x)^(3/2))/(3*b^2*Sqrt[a + b*x^3]) + (2*B*e^(7/2)*ArcTanh[(Sq
rt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*b^(5/2))
```

Rubi [A] time = 0.232017, antiderivative size = 114, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{2(ex)^{9/2}(Ab-aB)}{9abe\,(a+bx^3)^{3/2}}+\frac{2Be^{7/2}\tanh^{-1}\left(\frac{\sqrt{b}(ex)^{3/2}}{e^{3/2}\sqrt{a+bx^3}}\right)}{3b^{5/2}}-\frac{2Be^2(ex)^{3/2}}{3b^2\sqrt{a+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(7/2)*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*(A*b - a*B)*(e*x)^(9/2))/(9*a*b*e*(a + b*x^3)^(3/2)) - (2*B*e^
2*(e*x)^(3/2))/(3*b^2*Sqrt[a + b*x^3]) + (2*B*e^(7/2)*ArcTanh[(Sq
rt[b]*(e*x)^(3/2))/(e^(3/2)*Sqrt[a + b*x^3])])/(3*b^(5/2))
```

Rubi in Sympy [A] time = 24.381, size = 104, normalized size = 0.91

$$-\frac{2Be^2\,(ex)^{\frac{3}{2}}}{3b^2\sqrt{a+bx^3}}+\frac{2Be^{\frac{7}{2}}\operatorname{atanh}\left(\frac{\sqrt{b}(ex)^{\frac{3}{2}}}{e^{\frac{3}{2}}\sqrt{a+bx^3}}\right)}{3b^{\frac{5}{2}}}+\frac{2\,(ex)^{\frac{9}{2}}\,(Ab-Ba)}{9abe\,(a+bx^3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(7/2)*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] -2*B*e**2*(e*x)**(3/2)/(3*b**2*sqrt(a + b*x**3)) + 2*B*e**(7/2)*a
tanh(sqrt(b)*(e*x)**(3/2)/(e**(3/2)*sqrt(a + b*x**3)))/(3*b**(5/2
)) + 2*(e*x)**(9/2)*(A*b - B*a)/(9*a*b*e*(a + b*x**3)**(3/2))
```

Mathematica [A] time = 0.321678, size = 99, normalized size = 0.87

$$\frac{2e^3\sqrt{ex}\left(\frac{\sqrt{b}x^{3/2}(-3a^2B-4abBx^3+Ab^2x^3)}{a(a+bx^3)^{3/2}}+3B\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)\right)}{9b^{5/2}\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^(7/2)*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*e^3*Sqrt[e*x]*((Sqrt[b]*x^(3/2)*(-3*a^2*B + A*b^2*x^3 - 4*a*b*
B*x^3))/(a*(a + b*x^3)^(3/2)) + 3*B*ArcTanh[(Sqrt[b]*x^(3/2))/Sqr
t[a + b*x^3]]))/(9*b^(5/2)*Sqrt[x])
```

Maple [C] time = 0.086, size = 7081, normalized size = 62.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(7/2)*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3 + A\right)(ex)^{\frac{7}{2}}}{\left(bx^3 + a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(7/2)/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(7/2)/(b*x^3 + a)^(5/2), x)
```

Fricas [A] time = 0.401526, size = 1, normalized size = 0.01

$$\left[\frac{3\left(Bab^2e^3x^6 + 2\,Ba^2be^3x^3 + Ba^3e^3\right)\sqrt{\frac{e}{b}}\log\left(-8\,b^2ex^6 - 8\,abex^3 - a^2e - 4\left(2\,b^2x^4 + abx\right)\sqrt{bx^3 + a}\sqrt{ex}\sqrt{\frac{e}{b}}\right) - 4\left(\left(4\,Bab - \right.\right.}{18\left(ab^4x^6 + 2\,a^2b^3x^3 + a^3b^2\right)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(7/2)/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/18*(3*(B*a*b^2*e^3*x^6 + 2*B*a^2*b*e^3*x^3 + B*a^3*e^3)*sqrt(e
/b)*log(-8*b^2*e*x^6 - 8*a*b*e*x^3 - a^2*e - 4*(2*b^2*x^4 + a*b*x
)*sqrt(b*x^3 + a)*sqrt(e*x)*sqrt(e/b)) - 4*((4*B*a*b - A*b^2)*e^3
*x^4 + 3*B*a^2*e^3*x)*sqrt(b*x^3 + a)*sqrt(e*x))/(a*b^4*x^6 + 2*a
^2*b^3*x^3 + a^3*b^2), 1/9*(3*(B*a*b^2*e^3*x^6 + 2*B*a^2*b*e^3*x^
3 + B*a^3*e^3)*sqrt(-e/b)*arctan(2*sqrt(b*x^3 + a)*sqrt(e*x)*x/((
2*b*x^3 + a)*sqrt(-e/b))) - 2*((4*B*a*b - A*b^2)*e^3*x^4 + 3*B*a^
2*e^3*x)*sqrt(b*x^3 + a)*sqrt(e*x))/(a*b^4*x^6 + 2*a^2*b^3*x^3 +
a^3*b^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(7/2)*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^(7/2)/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] Timed out
```

3.560 $\int \frac{(ex)^{5/2}(A+Bx^3)}{(a+bx^3)^{5/2}} dx$

Optimal. Leaf size=299

$$\frac{e^2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(7aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{27\sqrt[4]{3}a^{4/3}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{2e^2\sqrt{ex}(7aB+2Ab)}{27ab^2\sqrt{a+bx^3}} + \frac{2(ex)^{7/2}(Ab-aB)}{9abe\left(a+bx^3\right)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*(e*x)^(7/2))/(9*a*b*e*(a + b*x^3)^(3/2)) - (2*(2*A
*b + 7*a*B)*e^2*Sqrt[e*x])/(27*a*b^2*Sqrt[a + b*x^3]) + ((2*A*b +
 7*a*B)*e^2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/
3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) +
 (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(27*3^(1/4)*a^(4/3)
*b^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[
3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.573357, antiderivative size = 299, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{e^2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(7aB+2Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{27\sqrt[4]{3}a^{4/3}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}} - \frac{2e^2\sqrt{ex}(7aB+2Ab)}{27ab^2\sqrt{a+bx^3}} + \frac{2(ex)^{7/2}(Ab-aB)}{9abe\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(5/2)*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*(A*b - a*B)*(e*x)^(7/2))/(9*a*b*e*(a + b*x^3)^(3/2)) - (2*(2*A
*b + 7*a*B)*e^2*Sqrt[e*x])/(27*a*b^2*Sqrt[a + b*x^3]) + ((2*A*b +
 7*a*B)*e^2*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/
3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) +
 (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(27*3^(1/4)*a^(4/3)
*b^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[
3])*b^(1/3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 33.3658, size = 270, normalized size = 0.9

$$\frac{2\,(ex)^{\frac{7}{2}}\,(Ab-Ba)}{9abe\,(a+bx^3)^{\frac{3}{2}}} - \frac{4e^2\sqrt{ex}\left(Ab+\frac{7Ba}{2}\right)}{27ab^2\sqrt{a+bx^3}} + \frac{2\cdot 3^{\frac{3}{4}}e^2\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(Ab+\frac{7Ba}{2}\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{81a^{\frac{4}{3}}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(5/2)*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*(e*x)**(7/2)*(A*b - B*a)/(9*a*b*e*(a + b*x**3)**(3/2)) - 4*e**2
*sqrt(e*x)*(A*b + 7*B*a/2)/(27*a*b**2*sqrt(a + b*x**3)) + 2*3**(3
/4)*e**2*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**
(1/3)*x)*(A*b + 7*B*a/2)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(
-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4
+ 1/2)/(81*a**(4/3)*b**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/
(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.585361, size = 216, normalized size = 0.72

$$\frac{2ie^2\sqrt{ex}\left(3^{3/4}\sqrt[3]{b}x\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}\left(a+bx^3\right)(7aB+2Ab)F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-3i\sqrt[3]{-\cdots}\right.}{81(-a)^{4/3}b^2\left(a+bx^3\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((e*x)^(5/2)*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (((2*I)/81)*e^2*Sqrt[e*x]*((-3*I)*(-a)^(1/3)*(7*a^2*B - A*b^2*x^3
 + 2*a*b*(A + 5*B*x^3)) + 3^(3/4)*b^(1/3)*(2*A*b + 7*a*B)*Sqrt[(-
1)^(5/6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*x*Sqrt[((-a)^(2/3)/b^(2/3
) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*(a + b*x^3)*EllipticF[ArcS
in[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^
(1/3)]))/((-a)^(4/3)*b^2*(a + b*x^3)^(3/2))
```

Maple [C] time = 0.086, size = 7083, normalized size = 23.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(5/2)*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)(ex)^{\frac{5}{2}}}{\left(bx^3+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Be^2x^5+Ae^2x^2\right)\sqrt{ex}}{\left(b^2x^6+2\,abx^3+a^2\right)\sqrt{bx^3+a}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*e^2*x^5 + A*e^2*x^2)*sqrt(e*x)/((b^2*x^6 + 2*a*b*x^3
+ a^2)*sqrt(b*x^3 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(5/2)*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{5}{2}}}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(5/2)/(b*x^3 + a)^(5/2), x)
```

3.561 $\int \frac{(ex)^{3/2}(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=596

$$\frac{\left(1-\sqrt{3}\right)e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(5aB+4Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{27\sqrt[4]{3}a^{5/3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(5aB+4Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{9\,3^{3/4}a^{5/3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\left(1+\sqrt{3}\right)e\sqrt{ex}\sqrt{a+bx^3}(5aB+4Ab)}{27a^2b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{2(ex)^{5/2}(5aB+4Ab)}{27a^2be\sqrt{a+bx^3}}+\frac{2(ex)^{5/2}(Ab-aB)}{9abe\left(a+bx^3\right)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*(e*x)^(5/2))/(9*a*b*e*(a + b*x^3)^(3/2)) + (2*(4*A
*b + 5*a*B)*(e*x)^(5/2))/(27*a^2*b*e*Sqrt[a + b*x^3]) - (2*(1 + S
qrt[3])*(4*A*b + 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(27*a^2*b^(5
/3)*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + (2*(4*A*b + 5*a*B)*e*S
qrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[A
rcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3]
)*b^(1/3)*x)], (2 + Sqrt[3])/4])/(9*3^(3/4)*a^(5/3)*b^(5/3)*Sqrt[
(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3
)*x)^2]*Sqrt[a + b*x^3]) + ((1 - Sqrt[3])*(4*A*b + 5*a*B)*e*Sqrt[
e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCo
s[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)], (2 + Sqrt[3])/4])/(27*3^(1/4)*a^(5/3)*b^(5/3)*Sqrt[(b^
(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x
)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 1.33519, antiderivative size = 596, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.231$

$$\frac{\left(1-\sqrt{3}\right)e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(5aB+4Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{27\sqrt[4]{3}a^{5/3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2e\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(5aB+4Ab)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{9\,3^{3/4}a^{5/3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{2\left(1+\sqrt{3}\right)e\sqrt{ex}\sqrt{a+bx^3}(5aB+4Ab)}{27a^2b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}+\frac{2(ex)^{5/2}(5aB+4Ab)}{27a^2be\sqrt{a+bx^3}}+\frac{2(ex)^{5/2}(Ab-aB)}{9abe\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[((e*x)^(3/2)*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*(A*b - a*B)*(e*x)^(5/2))/(9*a*b*e*(a + b*x^3)^(3/2)) + (2*(4*A
*b + 5*a*B)*(e*x)^(5/2))/(27*a^2*b*e*Sqrt[a + b*x^3]) - (2*(1 + S
qrt[3])*(4*A*b + 5*a*B)*e*Sqrt[e*x]*Sqrt[a + b*x^3])/(27*a^2*b^(5
/3)*(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)) + (2*(4*A*b + 5*a*B)*e*S
qrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[A
rcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3]
)*b^(1/3)*x)], (2 + Sqrt[3])/4])/(9*3^(3/4)*a^(5/3)*b^(5/3)*Sqrt[
(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3
)*x)^2]*Sqrt[a + b*x^3]) + ((1 - Sqrt[3])*(4*A*b + 5*a*B)*e*Sqrt[
e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^
(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCo
s[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)], (2 + Sqrt[3])/4])/(27*3^(1/4)*a^(5/3)*b^(5/3)*Sqrt[(b^
(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x
)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 75.3202, size = 544, normalized size = 0.91

$$\frac{2(ex)^{\frac{5}{2}}(Ab-Ba)}{9abe(a+bx^3)^{\frac{3}{2}}}+\frac{2(ex)^{\frac{5}{2}}(4Ab+5Ba)}{27a^2be\sqrt{a+bx^3}}-\frac{e\sqrt{ex}\left(\frac{4}{27}+\frac{4\sqrt{3}}{27}\right)\sqrt{a+bx^3}\,(4Ab+5Ba)}{2a^2b^{\frac{5}{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}$$
$$+\frac{2\sqrt[4]{3}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(4Ab+5Ba)E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{27a^{\frac{5}{3}}b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$
$$+\frac{3^{\frac{3}{4}}e\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(4Ab+5Ba)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{81a^{\frac{5}{3}}b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(3/2)*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*(e*x)**(5/2)*(A*b - B*a)/(9*a*b*e*(a + b*x**3)**(3/2)) + 2*(e*x
)**(5/2)*(4*A*b + 5*B*a)/(27*a**2*b*e*sqrt(a + b*x**3)) - e*sqrt(
e*x)*(4/27 + 4*sqrt(3)/27)*sqrt(a + b*x**3)*(4*A*b + 5*B*a)/(2*a*
*2*b**(5/3)*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))) + 2*3**(1/4)*e
*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)
*(4*A*b + 5*B*a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3)
 + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(
27*a**(5/3)*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**
(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) + 3**(3/4
)*e*sqrt(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**
2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(
1/3) + b**(1/3)*x)*(4*A*b + 5*B*a)*elliptic_f(acos((a**(1/3) + b*
*(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))),
sqrt(3)/4 + 1/2)/(81*a**(5/3)*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3)
+ b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a +
b*x**3))
```

Mathematica [C] time = 2.59128, size = 307, normalized size = 0.52

$$\frac{2e^2\left(3(-a)^{2/3}bx^3\left(2a^2B+ab\left(7A+5Bx^3\right)+4Ab^2x^3\right)-\left(a+bx^3\right)(5aB+4Ab)\left(3(-a)^{2/3}\left(a+bx^3\right)+(-1)^{2/3}3^{3/4}ab^{2/3}x^2\sqrt{\frac{(-}{}}\right.\right.}{81(-a)^{8/3}b^2\sqrt{e}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((e*x)^(3/2)*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*e^2*(3*(-a)^(2/3)*b*x^3*(2*a^2*B + 4*A*b^2*x^3 + a*b*(7*A + 5*
B*x^3)) - (4*A*b + 5*a*B)*(a + b*x^3)*(3*(-a)^(2/3)*(a + b*x^3) +
 (-1)^(2/3)*3^(3/4)*a*b^(2/3)*x^2*Sqrt[((-1)^(5/6)*((-a)^(1/3) -
b^(1/3)*x))/(b^(1/3)*x)]*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x
)/b^(1/3) + x^2)/x^2]*(Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6)
- (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)] + (-1)^(5/6)*
EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3
^(1/4)], (-1)^(1/3)]))))/(81*(-a)^(8/3)*b^2*Sqrt[e*x]*(a + b*x^3)
^(3/2))
```

Maple [C] time = 0.107, size = 10786, normalized size = 18.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(3/2)*(B*x^3+A)/(b*x^3+a)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Bx^3+A\right)(ex)^{\frac{3}{2}}}{\left(bx^3+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Bex^4+Aex\right)\sqrt{ex}}{\left(b^2x^6+2\,abx^3+a^2\right)\sqrt{bx^3+a}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((B*e*x^4 + A*e*x)*sqrt(e*x)/((b^2*x^6 + 2*a*b*x^3 + a^2)
*sqrt(b*x^3 + a)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(3/2)*(B*x**3+A)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)(ex)^{\frac{3}{2}}}{(bx^3 + a)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)*(e*x)^(3/2)/(b*x^3 + a)^(5/2), x)
```

3.562 $\int \frac{\sqrt{ex}\,(A+Bx^3)}{(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=79

$$\frac{2(ex)^{3/2}(aB+2Ab)}{9a^2be\sqrt{a+bx^3}}+\frac{2(ex)^{3/2}(Ab-aB)}{9abe\,(a+bx^3)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*(e*x)^(3/2))/(9*a*b*e*(a + b*x^3)^(3/2)) + (2*(2*A
*b + a*B)*(e*x)^(3/2))/(9*a^2*b*e*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.121499, antiderivative size = 79, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$\frac{2(ex)^{3/2}(aB+2Ab)}{9a^2be\sqrt{a+bx^3}}+\frac{2(ex)^{3/2}(Ab-aB)}{9abe\,(a+bx^3)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[e*x]*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*(A*b - a*B)*(e*x)^(3/2))/(9*a*b*e*(a + b*x^3)^(3/2)) + (2*(2*A
*b + a*B)*(e*x)^(3/2))/(9*a^2*b*e*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 11.3027, size = 66, normalized size = 0.84

$$\frac{2\,(ex)^{\frac{3}{2}}\,(Ab-Ba)}{9abe\,(a+bx^3)^{\frac{3}{2}}}+\frac{4\,(ex)^{\frac{3}{2}}\,\left(Ab+\frac{Ba}{2}\right)}{9a^2be\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)*(e*x)**(1/2)/(b*x**3+a)**(5/2),x)
```

```
[Out] 2*(e*x)**(3/2)*(A*b - B*a)/(9*a*b*e*(a + b*x**3)**(3/2)) + 4*(e*x
)**(3/2)*(A*b + B*a/2)/(9*a**2*b*e*sqrt(a + b*x**3))
```

Mathematica [A] time = 0.0583899, size = 44, normalized size = 0.56

$$\frac{2x\sqrt{ex}\,\left(3aA+aBx^3+2Abx^3\right)}{9a^2\,(a+bx^3)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[e*x]*(A + B*x^3))/(a + b*x^3)^(5/2),x]
```

```
[Out] (2*x*Sqrt[e*x]*(3*a*A + 2*A*b*x^3 + a*B*x^3))/(9*a^2*(a + b*x^3)^
(3/2))
```

Maple [A] time = 0.01, size = 39, normalized size = 0.5

$$\frac{2\,x\,\left(2\,Ax^3b+Bax^3+3\,Aa\right)}{9\,a^2}\sqrt{ex}\,\left(bx^3+a\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)*(e*x)^(1/2)/(b*x^3+a)^(5/2),x)
```

```
[Out] 2/9*x*(2*A*b*x^3+B*a*x^3+3*A*a)*(e*x)^(1/2)/(b*x^3+a)^(3/2)/a^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Bx^3 + A)\sqrt{ex}}{(bx^3 + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(e*x)/(b*x^3 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)*sqrt(e*x)/(b*x^3 + a)^(5/2), x)
```

Fricas [A] time = 0.214467, size = 80, normalized size = 1.01

$$\frac{2\left((Ba + 2\,Ab)x^4 + 3\,Aax\right)\sqrt{bx^3 + a}\sqrt{ex}}{9\,(a^2b^2x^6 + 2\,a^3bx^3 + a^4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(e*x)/(b*x^3 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] 2/9*((B*a + 2*A*b)*x^4 + 3*A*a*x)*sqrt(b*x^3 + a)*sqrt(e*x)/(a^2*
b^2*x^6 + 2*a^3*b*x^3 + a^4)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)*(e*x)**(1/2)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.233009, size = 86, normalized size = 1.09

$$\frac{2\,x^{\frac{3}{2}}\left(\frac{3\,Ae^5}{a} + \frac{(Ba^5b^5e^{21} + 2\,Aa^4b^6e^{21})\,x^3e^{(-16)}}{a^6b^5}\right)e^{\frac{3}{2}}}{9\,(bx^3e^4 + ae^4)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)*sqrt(e*x)/(b*x^3 + a)^(5/2),x, algorithm="giac")
```

```
[Out] 2/9*x^(3/2)*(3*A*e^5/a + (B*a^5*b^5*e^21 + 2*A*a^4*b^6*e^21)*x^3*
e^(-16)/(a^6*b^5))*e^(3/2)/(b*x^3*e^4 + a*e^4)^(3/2)
```

3.563 $\int \frac{A+Bx^3}{\sqrt{ex}(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=297

$$\frac{2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+8Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{27\sqrt[4]{3}a^{7/3}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{ex}(aB+8Ab)}{27a^2be\sqrt{a+bx^3}}+\frac{2\sqrt{ex}(Ab-aB)}{9abe\left(a+bx^3\right)^{3/2}}$$

```
[Out] (2*(A*b - a*B)*Sqrt[e*x])/(9*a*b*e*(a + b*x^3)^(3/2)) + (2*(8*A*b
 + a*B)*Sqrt[e*x])/(27*a^2*b*e*Sqrt[a + b*x^3]) + (2*(8*A*b + a*B
)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)
*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Elliptic
F[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt
[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(27*3^(1/4)*a^(7/3)*b*e*Sqrt[
(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3
)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.565159, antiderivative size = 297, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$

$$\frac{2\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(aB+8Ab)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{27\sqrt[4]{3}a^{7/3}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{2\sqrt{ex}(aB+8Ab)}{27a^2be\sqrt{a+bx^3}}+\frac{2\sqrt{ex}(Ab-aB)}{9abe\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/(Sqrt[e*x]*(a + b*x^3)^(5/2)),x]
```

```
[Out] (2*(A*b - a*B)*Sqrt[e*x])/(9*a*b*e*(a + b*x^3)^(3/2)) + (2*(8*A*b
 + a*B)*Sqrt[e*x])/(27*a^2*b*e*Sqrt[a + b*x^3]) + (2*(8*A*b + a*B
)*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)
*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Elliptic
F[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt
[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(27*3^(1/4)*a^(7/3)*b*e*Sqrt[
(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3
)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 31.817, size = 262, normalized size = 0.88

$$\frac{2\sqrt{ex}\left(Ab-Ba\right)}{9abe\left(a+bx^3\right)^{\frac{3}{2}}}+\frac{2\sqrt{ex}\left(8Ab+Ba\right)}{27a^2be\sqrt{a+bx^3}}+\frac{2\cdot 3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(8Ab+Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{81a^{\frac{7}{3}}be\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(b*x**3+a)**(5/2)/(e*x)**(1/2),x)
```

```
[Out] 2*sqrt(e*x)*(A*b - B*a)/(9*a*b*e*(a + b*x**3)**(3/2)) + 2*sqrt(e*
x)*(8*A*b + B*a)/(27*a**2*b*e*sqrt(a + b*x**3)) + 2*3**(3/4)*sqrt
(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(
1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(8*A
*b + B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/
(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(81*a**(
7/3)*b*e*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(
1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.564062, size = 214, normalized size = 0.72

$$\frac{2\left(3\sqrt[3]{-a}x\left(\left(a+bx^3\right)(aB+8Ab)+3a(Ab-aB)\right)-2i3^{3/4}\sqrt[3]{b}x^2\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}\left(a+bx^3\right)(aB+8A}{81(-a)^{7/3}b\sqrt{ex}\left(a+bx^3\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/(Sqrt[e*x]*(a + b*x^3)^(5/2)),x]
```

```
[Out] (2*(3*(-a)^(1/3)*x*(3*a*(A*b - a*B) + (8*A*b + a*B)*(a + b*x^3))
- (2*I)*3^(3/4)*b^(1/3)*(8*A*b + a*B)*Sqrt[(-1)^(5/6)*(-1 + (-a)^
(1/3)/(b^(1/3)*x))]*x^2*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)
/b^(1/3) + x^2)/x^2]*(a + b*x^3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6
) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/(81*(-a)^
(7/3)*b*Sqrt[e*x]*(a + b*x^3)^(3/2))
```

Maple [C] time = 0.057, size = 7077, normalized size = 23.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(b*x^3+a)^(5/2)/(e*x)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\left(bx^3 + a\right)^{\frac{5}{2}}\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*sqrt(e*x)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*sqrt(e*x)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{\left(b^2x^6 + 2\,abx^3 + a^2\right)\sqrt{bx^3 + a}\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*sqrt(e*x)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b^2*x^6 + 2*a*b*x^3 + a^2)*sqrt(b*x^3 + a)
*sqrt(e*x)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x**3+A)/(b*x**3+a)**(5/2)/(e*x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}}\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*sqrt(e*x)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*sqrt(e*x)), x)
```

3.564 $\int \frac{A+Bx^3}{(ex)^{3/2}(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=624

$$-\frac{4\left(1-\sqrt{3}\right)\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(10Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{27\sqrt[4]{3}a^{8/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{8\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(10Ab-aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{9\ 3^{3/4}a^{8/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{8\left(1+\sqrt{3}\right)\sqrt{ex}\sqrt{a+bx^3}(10Ab-aB)}{27a^3b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}-\frac{8(ex)^{5/2}(10Ab-aB)}{27a^3e^4\sqrt{a+bx^3}}-\frac{2(ex)^{5/2}(10Ab-aB)}{9a^2e^4\left(a+bx^3\right)^{3/2}}-\frac{2A}{ae\sqrt{ex}\left(a+bx^3\right)^{3/2}}$$

```
[Out] (-2*A)/(a*e*Sqrt[e*x]*(a + b*x^3)^(3/2)) - (2*(10*A*b - a*B)*(e*x
)^(5/2))/(9*a^2*e^4*(a + b*x^3)^(3/2)) - (8*(10*A*b - a*B)*(e*x)^
(5/2))/(27*a^3*e^4*Sqrt[a + b*x^3]) + (8*(1 + Sqrt[3])*(10*A*b -
a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(27*a^3*b^(2/3)*e^2*(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)) - (8*(10*A*b - a*B)*Sqrt[e*x]*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1
- Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
Sqrt[3])/4])/(9*3^(3/4)*a^(8/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1
/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
 b*x^3]) - (4*(1 - Sqrt[3])*(10*A*b - a*B)*Sqrt[e*x]*(a^(1/3) + b
^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 -
 Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + S
qrt[3])/4])/(27*3^(1/4)*a^(8/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1
/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
 b*x^3])
```

Rubi [A] time = 1.48848, antiderivative size = 624, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{4\left(1-\sqrt{3}\right)\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(10Ab-aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{27\sqrt[4]{3}a^{8/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{8\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(10Ab-aB)E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{9\ 3^{3/4}a^{8/3}b^{2/3}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}+\frac{8\left(1+\sqrt{3}\right)\sqrt{ex}\sqrt{a+bx^3}(10Ab-aB)}{27a^3b^{2/3}e^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)}-\frac{8(ex)^{5/2}(10Ab-aB)}{27a^3e^4\sqrt{a+bx^3}}-\frac{2(ex)^{5/2}(10Ab-aB)}{9a^2e^4\left(a+bx^3\right)^{3/2}}-\frac{2A}{ae\sqrt{ex}\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(A + B*x^3)/((e*x)^(3/2)*(a + b*x^3)^(5/2)),x]
```

```
[Out] (-2*A)/(a*e*Sqrt[e*x]*(a + b*x^3)^(3/2)) - (2*(10*A*b - a*B)*(e*x
)^(5/2))/(9*a^2*e^4*(a + b*x^3)^(3/2)) - (8*(10*A*b - a*B)*(e*x)^
(5/2))/(27*a^3*e^4*Sqrt[a + b*x^3]) + (8*(1 + Sqrt[3])*(10*A*b -
a*B)*Sqrt[e*x]*Sqrt[a + b*x^3])/(27*a^3*b^(2/3)*e^2*(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)) - (8*(10*A*b - a*B)*Sqrt[e*x]*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1
- Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
Sqrt[3])/4])/(9*3^(3/4)*a^(8/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1
/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
 b*x^3]) - (4*(1 - Sqrt[3])*(10*A*b - a*B)*Sqrt[e*x]*(a^(1/3) + b
^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 -
 Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + S
qrt[3])/4])/(27*3^(1/4)*a^(8/3)*b^(2/3)*e^2*Sqrt[(b^(1/3)*x*(a^(1
/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a +
 b*x^3])
```

Rubi in Sympy [A] time = 86.4614, size = 571, normalized size = 0.92

$$-\frac{2A}{ae\sqrt{ex}\,(a+bx^3)^{\frac{3}{2}}}-\frac{2\,(ex)^{\frac{5}{2}}\,(10Ab-Ba)}{9a^2e^4\,(a+bx^3)^{\frac{3}{2}}}-\frac{8\,(ex)^{\frac{5}{2}}\,(10Ab-Ba)}{27a^3e^4\sqrt{a+bx^3}}+\frac{\sqrt{ex}\left(\frac{16}{27}+\frac{16\sqrt{3}}{27}\right)\sqrt{a+bx^3}\,(10Ab-Ba)}{2a^3b^{\frac{2}{3}}e^2\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}$$

$$-\frac{8\sqrt[4]{3}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(10Ab-Ba)\,E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{27a^{\frac{8}{3}}b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

$$-\frac{4\cdot 3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)(10Ab-Ba)\,F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{81a^{\frac{8}{3}}b^{\frac{2}{3}}e^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(3/2)/(b*x**3+a)**(5/2),x)
```

```
[Out] -2*A/(a*e*sqrt(e*x)*(a + b*x**3)**(3/2)) - 2*(e*x)**(5/2)*(10*A*b
 - B*a)/(9*a**2*e**4*(a + b*x**3)**(3/2)) - 8*(e*x)**(5/2)*(10*A*
b - B*a)/(27*a**3*e**4*sqrt(a + b*x**3)) + sqrt(e*x)*(16/27 + 16*
sqrt(3)/27)*sqrt(a + b*x**3)*(10*A*b - B*a)/(2*a**3*b**(2/3)*e**2
*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))) - 8*3**(1/4)*sqrt(e*x)*sq
rt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b
**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(10*A*b - B*
a)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/
3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(27*a**(8/3)*b*
*(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b
**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3)) - 4*3**(3/4)*sqrt(
e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1
/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3) + b*
*(1/3)*x)*(10*A*b - B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(
-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4
+ 1/2)/(81*a**(8/3)*b**(2/3)*e**2*sqrt(b**(1/3)*x*(a**(1/3) + b**
(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**
3))
```

Mathematica [A] time = 4.27213, size = 401, normalized size = 0.64

$$2x\left(\frac{4(10Ab-aB)\left(-(-1)^{2/3}a^{2/3}\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\left(\left(1+\sqrt[3]{-1}\right)E\left(\sin^{-1}\left(\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}\right)|\frac{\sqrt[3]{-1}}{-1+\sqrt[3]{-1}}\right)-\right.\right.}{\left((-1)^{2/3}-1\right)\sqrt[3]{a}b}\right.$$

$$\overline{27a^3(}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/((e*x)^(3/2)*(a + b*x^3)^(5/2)),x]
```

```
[Out] (2*x*((-40*A*b^2*x^6 + a^2*(-27*A + 7*B*x^3) + a*(-70*A*b*x^3 + 4
*b*B*x^6))/(a + b*x^3) + (4*(10*A*b - a*B)*(-((-1 + (-1)^(2/3))*a
^(1/3)*b^(1/3)*x*((-1)^(1/3)*a^(1/3) - b^(1/3)*x)*((-1)^(2/3)*a^(
1/3) + b^(1/3)*x)) - (-1)^(2/3)*a^(2/3)*(a^(1/3) + b^(1/3)*x)^2*S
qrt[((1 + (-1)^(1/3))*b^(1/3)*x*(a^(1/3) - (-1)^(1/3)*b^(1/3)*x))
/(a^(1/3) + b^(1/3)*x)^2]*Sqrt[(a^(1/3) + (-1)^(2/3)*b^(1/3)*x)/(
a^(1/3) + b^(1/3)*x)]*((1 + (-1)^(1/3))*EllipticE[ArcSin[Sqrt[((1
 + (-1)^(1/3))*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]], (-1)^(1/3)/(-1
 + (-1)^(1/3))] - (1 + (-1)^(2/3))*EllipticF[ArcSin[Sqrt[((1 + (-
1)^(1/3))*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]], (-1)^(1/3)/(-1 + (-
1)^(1/3))])))/((-1 + (-1)^(2/3))*a^(1/3)*b)))/(27*a^3*(e*x)^(3/2)
*Sqrt[a + b*x^3])
```

Maple [C] time = 0.08, size = 10961, normalized size = 17.6

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(3/2)/(b*x^3+a)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}}\,(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(3/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(b^2ex^7 + 2\,abex^4 + a^2ex)\sqrt{bx^3 + a}\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(3/2)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b^2*e*x^7 + 2*a*b*e*x^4 + a^2*e*x)*sqrt(b*
x^3 + a)*sqrt(e*x)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(e*x)**(3/2)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} (ex)^{\frac{3}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(3/2)), x)
```

3.565 $\int \frac{A+Bx^3}{(ex)^{5/2}(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=104

$$-\frac{4(ex)^{3/2}(4Ab-aB)}{9a^3e^4\sqrt{a+bx^3}}-\frac{2(ex)^{3/2}(4Ab-aB)}{9a^2e^4\left(a+bx^3\right)^{3/2}}-\frac{2A}{3ae(ex)^{3/2}\left(a+bx^3\right)^{3/2}}$$

```
[Out] (-2*A)/(3*a*e*(e*x)^(3/2)*(a + b*x^3)^(3/2)) - (2*(4*A*b - a*B)*(
e*x)^(3/2))/(9*a^2*e^4*(a + b*x^3)^(3/2)) - (4*(4*A*b - a*B)*(e*x
)^(3/2))/(9*a^3*e^4*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.15937, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$-\frac{4(ex)^{3/2}(4Ab-aB)}{9a^3e^4\sqrt{a+bx^3}}-\frac{2(ex)^{3/2}(4Ab-aB)}{9a^2e^4\left(a+bx^3\right)^{3/2}}-\frac{2A}{3ae(ex)^{3/2}\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/((e*x)^(5/2)*(a + b*x^3)^(5/2)),x]
```

```
[Out] (-2*A)/(3*a*e*(e*x)^(3/2)*(a + b*x^3)^(3/2)) - (2*(4*A*b - a*B)*(
e*x)^(3/2))/(9*a^2*e^4*(a + b*x^3)^(3/2)) - (4*(4*A*b - a*B)*(e*x
)^(3/2))/(9*a^3*e^4*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 14.19, size = 97, normalized size = 0.93

$$-\frac{2A}{3ae\,(ex)^{\frac{3}{2}}\,(a+bx^3)^{\frac{3}{2}}}-\frac{2\,(ex)^{\frac{3}{2}}\,(4Ab-Ba)}{9a^2e^4\,(a+bx^3)^{\frac{3}{2}}}-\frac{4\,(ex)^{\frac{3}{2}}\,(4Ab-Ba)}{9a^3e^4\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(5/2)/(b*x**3+a)**(5/2),x)
```

```
[Out] -2*A/(3*a*e*(e*x)**(3/2)*(a + b*x**3)**(3/2)) - 2*(e*x)**(3/2)*(4
*A*b - B*a)/(9*a**2*e**4*(a + b*x**3)**(3/2)) - 4*(e*x)**(3/2)*(4
*A*b - B*a)/(9*a**3*e**4*sqrt(a + b*x**3))
```

Mathematica [A] time = 0.0997221, size = 65, normalized size = 0.62

$$\frac{x\left(-6a^2\left(A-Bx^3\right)+4abx^3\left(Bx^3-6A\right)-16Ab^2x^6\right)}{9a^3(ex)^{5/2}\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x^3)/((e*x)^(5/2)*(a + b*x^3)^(5/2)),x]
```

```
[Out] (x*(-16*A*b^2*x^6 - 6*a^2*(A - B*x^3) + 4*a*b*x^3*(-6*A + B*x^3))
)/(9*a^3*(e*x)^(5/2)*(a + b*x^3)^(3/2))
```

Maple [A] time = 0.009, size = 62, normalized size = 0.6

$$-\frac{2\,x\left(8\,Ab^2x^6-2\,Babx^6+12\,aAbx^3-3\,Ba^2x^3+3\,Aa^2\right)}{9\,a^3}\left(bx^3+a\right)^{-\frac{3}{2}}(ex)^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(5/2)/(b*x^3+a)^(5/2),x)
```

```
[Out] -2/9*x*(8*A*b^2*x^6-2*B*a*b*x^6+12*A*a*b*x^3-3*B*a^2*x^3+3*A*a^2)
/(b*x^3+a)^(3/2)/a^3/(e*x)^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} (ex)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(5/2)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(5/2)), x)
```

Fricas [A] time = 0.214399, size = 126, normalized size = 1.21

$$\frac{2\left(2\left(Bab - 4Ab^2\right)x^6 + 3\left(Ba^2 - 4Aab\right)x^3 - 3Aa^2\right)\sqrt{bx^3 + a}\sqrt{ex}}{9\left(a^3b^2e^3x^8 + 2a^4be^3x^5 + a^5e^3x^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(5/2)),x, algorithm="fricas")
```

```
[Out] 2/9*(2*(B*a*b - 4*A*b^2)*x^6 + 3*(B*a^2 - 4*A*a*b)*x^3 - 3*A*a^2)
*sqrt(b*x^3 + a)*sqrt(e*x)/(a^3*b^2*e^3*x^8 + 2*a^4*b*e^3*x^5 + a
^5*e^3*x^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(e*x)**(5/2)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} (ex)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(5/2)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(5/2)), x)
```

3.566 $\int \frac{A+Bx^3}{(ex)^{7/2}(a+bx^3)^{5/2}}\,dx$

Optimal. Leaf size=320

$$-\frac{16\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(14Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{135\sqrt[4]{3}a^{10/3}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{16\sqrt{ex}(14Ab-5aB)}{135a^3e^4\sqrt{a+bx^3}}-\frac{2\sqrt{ex}(14Ab-5aB)}{45a^2e^4\left(a+bx^3\right)^{3/2}}-\frac{2A}{5ae(ex)^{5/2}\left(a+bx^3\right)^{3/2}}$$

```
[Out] (-2*A)/(5*a*e*(e*x)^(5/2)*(a + b*x^3)^(3/2)) - (2*(14*A*b - 5*a*B
)*Sqrt[e*x])/(45*a^2*e^4*(a + b*x^3)^(3/2)) - (16*(14*A*b - 5*a*B
)*Sqrt[e*x])/(135*a^3*e^4*Sqrt[a + b*x^3]) - (16*(14*A*b - 5*a*B)
*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*
x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF
[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[
3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(135*3^(1/4)*a^(10/3)*e^4*Sqrt
[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi [A] time = 0.649666, antiderivative size = 320, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$

$$-\frac{16\sqrt{ex}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}(14Ab-5aB)F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{135\sqrt[4]{3}a^{10/3}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{a+bx^3}}-\frac{16\sqrt{ex}(14Ab-5aB)}{135a^3e^4\sqrt{a+bx^3}}-\frac{2\sqrt{ex}(14Ab-5aB)}{45a^2e^4\left(a+bx^3\right)^{3/2}}-\frac{2A}{5ae(ex)^{5/2}\left(a+bx^3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x^3)/((e*x)^(7/2)*(a + b*x^3)^(5/2)),x]
```


```
[Out] (-2*A)/(5*a*e*(e*x)^(5/2)*(a + b*x^3)^(3/2)) - (2*(14*A*b - 5*a*B
)*Sqrt[e*x])/(45*a^2*e^4*(a + b*x^3)^(3/2)) - (16*(14*A*b - 5*a*B
)*Sqrt[e*x])/(135*a^3*e^4*Sqrt[a + b*x^3]) - (16*(14*A*b - 5*a*B)
*Sqrt[e*x]*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*
x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF
[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[
3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(135*3^(1/4)*a^(10/3)*e^4*Sqrt
[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*Sqrt[a + b*x^3])
```

Rubi in Sympy [A] time = 37.6652, size = 298, normalized size = 0.93

$$-\frac{2A}{5ae\left(ex\right)^{\frac{5}{2}}\left(a+bx^3\right)^{\frac{3}{2}}}-\frac{2\sqrt{ex}\left(14Ab-5Ba\right)}{45a^2e^4\left(a+bx^3\right)^{\frac{3}{2}}}-\frac{16\sqrt{ex}\left(14Ab-5Ba\right)}{135a^3e^4\sqrt{a+bx^3}}-\frac{16\cdot 3^{\frac{3}{4}}\sqrt{ex}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\left(14Ab-5Ba\right)F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{405a^{\frac{10}{3}}e^4\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\sqrt{a+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x**3+A)/(e*x)**(7/2)/(b*x**3+a)**(5/2),x)
```

```
[Out] -2*A/(5*a*e*(e*x)**(5/2)*(a + b*x**3)**(3/2)) - 2*sqrt(e*x)*(14*A
*b - 5*B*a)/(45*a**2*e**4*(a + b*x**3)**(3/2)) - 16*sqrt(e*x)*(14
*A*b - 5*B*a)/(135*a**3*e**4*sqrt(a + b*x**3)) - 16*3**(3/4)*sqrt
(e*x)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(
1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*(14*
A*b - 5*B*a)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1
))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(405*
a**(10/3)*e**4*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
+ b**(1/3)*x*(1 + sqrt(3)))**2)*sqrt(a + b*x**3))
```

Mathematica [C] time = 0.635807, size = 232, normalized size = 0.72

$$-\frac{2i\sqrt{ex}\left(3i\sqrt[3]{-a}\left(a^2\left(27A-55Bx^3\right)+2abx^3\left(77A-20Bx^3\right)+112Ab^2x^6\right)+16\,3^{3/4}\sqrt[3]{b}x^4\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-}}{\sqrt[3]{}}}{x^2}}\right.}{405(-a)^{10/3}e^4x^3\left(a+bx^3\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x^3)/((e*x)^(7/2)*(a + b*x^3)^(5/2)),x]
```

```
[Out] (((-2*I)/405)*Sqrt[e*x]*((3*I)*(-a)^(1/3)*(112*A*b^2*x^6 + a^2*(2
7*A - 55*B*x^3) + 2*a*b*x^3*(77*A - 20*B*x^3)) + 16*3^(3/4)*b^(1/
3)*(14*A*b - 5*a*B)*Sqrt[(-1)^(5/6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))
]*x^4*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^
2]*(a + b*x^3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))
/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/((-a)^(10/3)*e^4*x^3*(a + b
*x^3)^(3/2))
```

Maple [C] time = 0.063, size = 7299, normalized size = 22.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x^3+A)/(e*x)^(7/2)/(b*x^3+a)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{\left(bx^3 + a\right)^{\frac{5}{2}}\left(ex\right)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(7/2)),x, algorithm="maxima")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(7/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Bx^3 + A}{(b^2e^3x^9 + 2\,abe^3x^6 + a^2e^3x^3)\sqrt{bx^3 + a}\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(7/2)),x, algorithm="fricas")
```

```
[Out] integral((B*x^3 + A)/((b^2*e^3*x^9 + 2*a*b*e^3*x^6 + a^2*e^3*x^3)
*sqrt(b*x^3 + a)*sqrt(e*x)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x**3+A)/(e*x)**(7/2)/(b*x**3+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}}\,(ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(7/2)),x, algorithm="giac")
```

```
[Out] integrate((B*x^3 + A)/((b*x^3 + a)^(5/2)*(e*x)^(7/2)), x)
```

3.567 $\int \frac{x^{14}}{\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=127

$$\frac{1}{11}\left(1-x^3\right)^{11/3} -\frac{1}{4}\left(1-x^3\right)^{8/3}+\frac{2}{5}\left(1-x^3\right)^{5/3}-\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

```
[Out] (2*(1 - x^3)^(5/3))/5 - (1 - x^3)^(8/3)/4 + (1 - x^3)^(11/3)/11 +
 ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3])
- Log[1 + x^3]/(6*2^(1/3)) + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^
(1/3))
```

Rubi [A] time = 0.233371, antiderivative size = 127, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$\frac{1}{11}\left(1-x^3\right)^{11/3} -\frac{1}{4}\left(1-x^3\right)^{8/3}+\frac{2}{5}\left(1-x^3\right)^{5/3}-\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^14/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (2*(1 - x^3)^(5/3))/5 - (1 - x^3)^(8/3)/4 + (1 - x^3)^(11/3)/11 +
 ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3])
- Log[1 + x^3]/(6*2^(1/3)) + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^
(1/3))
```

Rubi in Sympy [A] time = 12.7424, size = 104, normalized size = 0.82

$$\frac{\left(-x^3+1\right)^{\frac{11}{3}}}{11}-\frac{\left(-x^3+1\right)^{\frac{8}{3}}}{4}+\frac{2\left(-x^3+1\right)^{\frac{5}{3}}}{5}-\frac{2^{\frac{2}{3}}\log\left(x^3+1\right)}{12}+\frac{2^{\frac{2}{3}}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}+\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**14/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] (-x**3 + 1)**(11/3)/11 - (-x**3 + 1)**(8/3)/4 + 2*(-x**3 + 1)**(5
/3)/5 - 2**(2/3)*log(x**3 + 1)/12 + 2**(2/3)*log(-(-x**3 + 1)**(1
/3) + 2**(1/3))/4 + 2**(2/3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**
3 + 1)**(1/3)/3 + 1/3))/6
```

Mathematica [C] time = 0.0733497, size = 74, normalized size = 0.58

$$\frac{\left(x^3-1\right)^2\left(20x^6+15x^3+53\right)-220\sqrt[3]{\frac{x^3-1}{x^3+1}}\,{}_2F_1\left(\frac{1}{3},\frac{1}{3};\frac{4}{3};\frac{2}{x^3+1}\right)}{220\sqrt[3]{1-x^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^14/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] ((-1 + x^3)^2*(53 + 15*x^3 + 20*x^6) - 220*((-1 + x^3)/(1 + x^3))
^(1/3)*Hypergeometric2F1[1/3, 1/3, 4/3, 2/(1 + x^3)])/(220*(1 - x
^3)^(1/3))
```

Maple [F] time = 0.085, size = 0, normalized size = 0.

$$\int \frac{x^{14}}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^14/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(x^14/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [A] time = 1.67377, size = 161, normalized size = 1.27

$$\frac{1}{11}\left(-x^3+1\right)^{\frac{11}{3}} - \frac{1}{4}\left(-x^3+1\right)^{\frac{8}{3}} + \frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^3+1\right)^{\frac{1}{3}}\right)\right) + \frac{2}{5}\left(-x^3+1\right)^{\frac{5}{3}} - \frac{1}{12}\cdot 2^{\frac{2}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{2}{3}}\right) + \frac{1}{6}\cdot 2^{\frac{2}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^14/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] 1/11*(-x^3 + 1)^(11/3) - 1/4*(-x^3 + 1)^(8/3) + 1/6*sqrt(3)*2^(2/
3)*arctan(1/6*sqrt(3)*2^(2/3)*(2^(1/3) + 2*(-x^3 + 1)^(1/3))) + 2
/5*(-x^3 + 1)^(5/3) - 1/12*2^(2/3)*log(2^(2/3) + 2^(1/3)*(-x^3 +
1)^(1/3) + (-x^3 + 1)^(2/3)) + 1/6*2^(2/3)*log(-2^(1/3) + (-x^3 +
 1)^(1/3))
```

Fricas [A] time = 0.214159, size = 167, normalized size = 1.31

$$-\frac{1}{3960}\sqrt{3}2^{\frac{2}{3}}\left(3\sqrt{3}2^{\frac{1}{3}}\left(20x^9-5x^6+38x^3-53\right)\left(-x^3+1\right)^{\frac{2}{3}} + 110\sqrt{3}\log\left(2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{2}{3}}+2\right) - 220\sqrt{3}\log$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^14/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] -1/3960*sqrt(3)*2^(2/3)*(3*sqrt(3)*2^(1/3)*(20*x^9 - 5*x^6 + 38*x
^3 - 53)*(-x^3 + 1)^(2/3) + 110*sqrt(3)*log(2^(2/3)*(-x^3 + 1)^(1
/3) + 2^(1/3)*(-x^3 + 1)^(2/3) + 2) - 220*sqrt(3)*log(2^(2/3)*(-x
^3 + 1)^(1/3) - 2) - 660*arctan(1/3*sqrt(3)*2^(2/3)*(-x^3 + 1)^(1
/3) + 1/3*sqrt(3)))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{14}}{\sqrt[3]{-(x-1)(x^2+x+1)}(x+1)(x^2-x+1)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**14/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(x**14/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 -
x + 1)), x)
```

GIAC/XCAS [F(-2)]   time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^14/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.568 $\int \frac{x^{11}}{\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=128

$$-\frac{1}{8}\left(1-x^3\right)^{8/3}+\frac{1}{5}\left(1-x^3\right)^{5/3}-\frac{1}{2}\left(1-x^3\right)^{2/3}+\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

```
[Out] -(1 - x^3)^(2/3)/2 + (1 - x^3)^(5/3)/5 - (1 - x^3)^(8/3)/8 - ArcT
an[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) + Log
[1 + x^3]/(6*2^(1/3)) - Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(1/3)
)
```

Rubi [A] time = 0.210563, antiderivative size = 128, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{1}{8}\left(1-x^3\right)^{8/3}+\frac{1}{5}\left(1-x^3\right)^{5/3}-\frac{1}{2}\left(1-x^3\right)^{2/3}+\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(2/3)/2 + (1 - x^3)^(5/3)/5 - (1 - x^3)^(8/3)/8 - ArcT
an[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) + Log
[1 + x^3]/(6*2^(1/3)) - Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(1/3)
)
```

Rubi in Sympy [A] time = 11.5524, size = 102, normalized size = 0.8

$$-\frac{\left(-x^3+1\right)^{\frac{8}{3}}}{8}+\frac{\left(-x^3+1\right)^{\frac{5}{3}}}{5}-\frac{\left(-x^3+1\right)^{\frac{2}{3}}}{2}+\frac{2^{\frac{2}{3}}\log\left(x^3+1\right)}{12}-\frac{2^{\frac{2}{3}}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}-\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -(-x**3 + 1)**(8/3)/8 + (-x**3 + 1)**(5/3)/5 - (-x**3 + 1)**(2/3)
/2 + 2**(2/3)*log(x**3 + 1)/12 - 2**(2/3)*log(-(-x**3 + 1)**(1/3)
 + 2**(1/3))/4 - 2**(2/3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**3 +
 1)**(1/3)/3 + 1/3))/6
```

Mathematica [C] time = 0.0498002, size = 70, normalized size = 0.55

$$\frac{40\sqrt[3]{\frac{x^3-1}{x^3+1}}\,{}_2F_1\left(\frac{1}{3},\frac{1}{3};\frac{4}{3};\frac{2}{x^3+1}\right)+5x^9-7x^6+19x^3-17}{40\sqrt[3]{1-x^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-17 + 19*x^3 - 7*x^6 + 5*x^9 + 40*((-1 + x^3)/(1 + x^3))^(1/3)*H
ypergeometric2F1[1/3, 1/3, 4/3, 2/(1 + x^3)])/(40*(1 - x^3)^(1/3)
)
```

Maple [F] time = 0.068, size = 0, normalized size = 0.

$$\int \frac{x^{11}}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(x^11/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [A] time = 1.51185, size = 161, normalized size = 1.26

$$-\frac{1}{8}\left(-x^3+1\right)^{\frac{8}{3}}-\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^3+1\right)^{\frac{1}{3}}\right)\right)+\frac{1}{5}\left(-x^3+1\right)^{\frac{5}{3}}+\frac{1}{12}\cdot 2^{\frac{2}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{2}{3}}\right)-\frac{1}{6}\cdot 2^{\frac{2}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}\right)-\frac{1}{2}\left(-x^3+1\right)^{\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] -1/8*(-x^3 + 1)^(8/3) - 1/6*sqrt(3)*2^(2/3)*arctan(1/6*sqrt(3)*2^
(2/3)*(2^(1/3) + 2*(-x^3 + 1)^(1/3))) + 1/5*(-x^3 + 1)^(5/3) + 1/
12*2^(2/3)*log(2^(2/3) + 2^(1/3)*(-x^3 + 1)^(1/3) + (-x^3 + 1)^(2
/3)) - 1/6*2^(2/3)*log(-2^(1/3) + (-x^3 + 1)^(1/3)) - 1/2*(-x^3 +
 1)^(2/3)
```

Fricas [A] time = 0.214583, size = 196, normalized size = 1.53

$$-\frac{1}{720}\sqrt{3}2^{\frac{2}{3}}\left(3\sqrt{3}2^{\frac{1}{3}}\left(5x^6-2x^3+17\right)\left(-x^3+1\right)^{\frac{2}{3}}+20\sqrt{3}(-1)^{\frac{1}{3}}\log\left(2^{\frac{2}{3}}(-1)^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{2}{3}}-2(-1)^{\frac{1}{3}}\right)-40$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] -1/720*sqrt(3)*2^(2/3)*(3*sqrt(3)*2^(1/3)*(5*x^6 - 2*x^3 + 17)*(-
x^3 + 1)^(2/3) + 20*sqrt(3)*(-1)^(1/3)*log(2^(2/3)*(-1)^(2/3)*(-x
^3 + 1)^(1/3) + 2^(1/3)*(-x^3 + 1)^(2/3) - 2*(-1)^(1/3)) - 40*sqr
t(3)*(-1)^(1/3)*log(2^(2/3)*(-x^3 + 1)^(1/3) - 2*(-1)^(2/3)) - 12
0*(-1)^(1/3)*arctan(-1/3*(-1)^(1/3)*(sqrt(3)*2^(2/3)*(-x^3 + 1)^(
1/3) + sqrt(3)*(-1)^(2/3))))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{11}}{\sqrt[3]{-(x-1)\left(x^2+x+1\right)}\,(x+1)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(x**11/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 -
x + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.569 $\int \frac{x^8}{\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=97

$$\frac{1}{5}\left(1-x^3\right)^{5/3}-\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

```
[Out] (1 - x^3)^(5/3)/5 + ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]
/(2^(1/3)*Sqrt[3]) - Log[1 + x^3]/(6*2^(1/3)) + Log[2^(1/3) - (1
- x^3)^(1/3)]/(2*2^(1/3))
```

Rubi [A] time = 0.190734, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$\frac{1}{5}\left(1-x^3\right)^{5/3}-\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (1 - x^3)^(5/3)/5 + ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]
/(2^(1/3)*Sqrt[3]) - Log[1 + x^3]/(6*2^(1/3)) + Log[2^(1/3) - (1
- x^3)^(1/3)]/(2*2^(1/3))
```

Rubi in Sympy [A] time = 10.9473, size = 82, normalized size = 0.85

$$\frac{\left(-x^3+1\right)^{\frac{5}{3}}}{5}-\frac{2^{\frac{2}{3}}\log\left(x^3+1\right)}{12}+\frac{2^{\frac{2}{3}}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}+\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] (-x**3 + 1)**(5/3)/5 - 2**(2/3)*log(x**3 + 1)/12 + 2**(2/3)*log(-
(-x**3 + 1)**(1/3) + 2**(1/3))/4 + 2**(2/3)*sqrt(3)*atan(sqrt(3)*
(2**(2/3)*(-x**3 + 1)**(1/3)/3 + 1/3))/6
```

Mathematica [C] time = 0.0496876, size = 61, normalized size = 0.63

$$\frac{\left(x^3-1\right)^2-5\sqrt[3]{\frac{x^3-1}{x^3+1}}\,{}_2F_1\left(\frac{1}{3},\frac{1}{3};\frac{4}{3};\frac{2}{x^3+1}\right)}{5\sqrt[3]{1-x^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] ((-1 + x^3)^2 - 5*((-1 + x^3)/(1 + x^3))^(1/3)*Hypergeometric2F1[
1/3, 1/3, 4/3, 2/(1 + x^3)])/(5*(1 - x^3)^(1/3))
```

Maple [F] time = 0.029, size = 0, normalized size = 0.

$$\int \frac{x^8}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(x^8/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [A] time = 1.55926, size = 131, normalized size = 1.35

$$\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^3+1\right)^{\frac{1}{3}}\right)\right)+\frac{1}{5}\left(-x^3+1\right)^{\frac{5}{3}}-\frac{1}{12}\cdot 2^{\frac{2}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{2}{3}}\right)+\frac{1}{6}\cdot 2^{\frac{2}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] 1/6*sqrt(3)*2^(2/3)*arctan(1/6*sqrt(3)*2^(2/3)*(2^(1/3) + 2*(-x^3
 + 1)^(1/3))) + 1/5*(-x^3 + 1)^(5/3) - 1/12*2^(2/3)*log(2^(2/3) +
 2^(1/3)*(-x^3 + 1)^(1/3) + (-x^3 + 1)^(2/3)) + 1/6*2^(2/3)*log(-
2^(1/3) + (-x^3 + 1)^(1/3))
```

Fricas [A] time = 0.215305, size = 151, normalized size = 1.56

$$-\frac{1}{180}\sqrt{3}2^{\frac{2}{3}}\left(6\sqrt{3}2^{\frac{1}{3}}\left(x^3-1\right)\left(-x^3+1\right)^{\frac{2}{3}}+5\sqrt{3}\log\left(2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{2}{3}}+2\right)-10\sqrt{3}\log\left(2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}-2\right)-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] -1/180*sqrt(3)*2^(2/3)*(6*sqrt(3)*2^(1/3)*(x^3 - 1)*(-x^3 + 1)^(2
/3) + 5*sqrt(3)*log(2^(2/3)*(-x^3 + 1)^(1/3) + 2^(1/3)*(-x^3 + 1)
^(2/3) + 2) - 10*sqrt(3)*log(2^(2/3)*(-x^3 + 1)^(1/3) - 2) - 30*a
rctan(1/3*sqrt(3)*2^(2/3)*(-x^3 + 1)^(1/3) + 1/3*sqrt(3)))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{\sqrt[3]{-\left(x-1\right)\left(x^2+x+1\right)}\left(x+1\right)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(x**8/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.570 $\int \frac{x^5}{\sqrt[3]{1-x^3}(1+x^3)} \, dx$

Optimal. Leaf size=98

$$-\frac{1}{2}\left(1-x^3\right)^{2/3}+\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

```
[Out] -(1 - x^3)^(2/3)/2 - ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]
]/(2^(1/3)*Sqrt[3]) + Log[1 + x^3]/(6*2^(1/3)) - Log[2^(1/3) - (1
 - x^3)^(1/3)]/(2*2^(1/3))
```

Rubi [A] time = 0.163835, antiderivative size = 98, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{1}{2}\left(1-x^3\right)^{2/3}+\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(2/3)/2 - ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]
]/(2^(1/3)*Sqrt[3]) + Log[1 + x^3]/(6*2^(1/3)) - Log[2^(1/3) - (1
 - x^3)^(1/3)]/(2*2^(1/3))
```

Rubi in Sympy [A] time = 9.84204, size = 82, normalized size = 0.84

$$-\frac{\left(-x^3+1\right)^{\frac{2}{3}}}{2}+\frac{2^{\frac{2}{3}}\log\left(x^3+1\right)}{12}-\frac{2^{\frac{2}{3}}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}-\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -(-x**3 + 1)**(2/3)/2 + 2**(2/3)*log(x**3 + 1)/12 - 2**(2/3)*log(
-(-x**3 + 1)**(1/3) + 2**(1/3))/4 - 2**(2/3)*sqrt(3)*atan(sqrt(3)
*(2**(2/3)*(-x**3 + 1)**(1/3)/3 + 1/3))/6
```

Mathematica [C] time = 0.0384303, size = 58, normalized size = 0.59

$$\frac{2\sqrt[3]{\frac{x^3-1}{x^3+1}}\,{}_2F_1\left(\frac{1}{3},\frac{1}{3};\frac{4}{3};\frac{2}{x^3+1}\right)+x^3-1}{2\sqrt[3]{1-x^3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-1 + x^3 + 2*((-1 + x^3)/(1 + x^3))^(1/3)*Hypergeometric2F1[1/3,
 1/3, 4/3, 2/(1 + x^3)])/(2*(1 - x^3)^(1/3))
```

Maple [F] time = 0.029, size = 0, normalized size = 0.

$$\int \frac{x^5}{x^3+1} \frac{1}{\sqrt[3]{-x^3+1}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(x^5/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [A] time = 1.5219, size = 131, normalized size = 1.34

$$-\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^3+1\right)^{\frac{1}{3}}\right)\right)+\frac{1}{12}\cdot 2^{\frac{2}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{2}{3}}\right) -\frac{1}{6}\cdot 2^{\frac{2}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}\right)-\frac{1}{2}\left(-x^3+1\right)^{\frac{2}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] -1/6*sqrt(3)*2^(2/3)*arctan(1/6*sqrt(3)*2^(2/3)*(2^(1/3) + 2*(-x^
3 + 1)^(1/3))) + 1/12*2^(2/3)*log(2^(2/3) + 2^(1/3)*(-x^3 + 1)^(1
/3) + (-x^3 + 1)^(2/3)) - 1/6*2^(2/3)*log(-2^(1/3) + (-x^3 + 1)^(
1/3)) - 1/2*(-x^3 + 1)^(2/3)
```

Fricas [A] time = 0.214897, size = 178, normalized size = 1.82

$$-\frac{1}{36}\sqrt{3}2^{\frac{2}{3}}\left(\sqrt{3}\left(-1\right)^{\frac{1}{3}}\log\left(2^{\frac{2}{3}}\left(-1\right)^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{2}{3}}-2\left(-1\right)^{\frac{1}{3}}\right)-2\sqrt{3}\left(-1\right)^{\frac{1}{3}}\log\left(2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}-2\left(-1\right)^{\frac{2}{3}}\right)+3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] -1/36*sqrt(3)*2^(2/3)*(sqrt(3)*(-1)^(1/3)*log(2^(2/3)*(-1)^(2/3)*
(-x^3 + 1)^(1/3) + 2^(1/3)*(-x^3 + 1)^(2/3) - 2*(-1)^(1/3)) - 2*s
qrt(3)*(-1)^(1/3)*log(2^(2/3)*(-x^3 + 1)^(1/3) - 2*(-1)^(2/3)) +
3*sqrt(3)*2^(1/3)*(-x^3 + 1)^(2/3) - 6*(-1)^(1/3)*arctan(-1/3*(-1
)^(1/3)*(sqrt(3)*2^(2/3)*(-x^3 + 1)^(1/3) + sqrt(3)*(-1)^(2/3))))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\sqrt[3]{-(x-1)(x^2+x+1)}(x+1)(x^2-x+1)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(x**5/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.571 $\int \frac{x^2}{\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=82

$$-\frac{\log(x^3+1)}{6\sqrt[3]{2}}+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

```
[Out] ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) -
 Log[1 + x^3]/(6*2^(1/3)) + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(
1/3))
```

Rubi [A] time = 0.136137, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{\log(x^3+1)}{6\sqrt[3]{2}}+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) -
 Log[1 + x^3]/(6*2^(1/3)) + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(
1/3))
```

Rubi in Sympy [A] time = 8.6589, size = 71, normalized size = 0.87

$$-\frac{2^{\frac{2}{3}}\log(x^3+1)}{12}+\frac{2^{\frac{2}{3}}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}+\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -2**(2/3)*log(x**3 + 1)/12 + 2**(2/3)*log(-(-x**3 + 1)**(1/3) + 2
**(1/3))/4 + 2**(2/3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**3 + 1)*
*(1/3)/3 + 1/3))/6
```

Mathematica [A] time = 0.0563128, size = 105, normalized size = 1.28

$$\frac{2\log\left(2-2^{2/3}\sqrt[3]{1-x^3}\right)-\log\left(\sqrt[3]{2}\left(1-x^3\right)^{2/3}+2^{2/3}\sqrt[3]{1-x^3}+2\right)+2\sqrt{3}\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{6\sqrt[3]{2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (2*Sqrt[3]*ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]] + 2*Log[
2 - 2^(2/3)*(1 - x^3)^(1/3)] - Log[2 + 2^(2/3)*(1 - x^3)^(1/3) +
2^(1/3)*(1 - x^3)^(2/3)])/(6*2^(1/3))
```

Maple [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(x^2/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [A] time = 1.52662, size = 116, normalized size = 1.41

$$\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^3+1\right)^{\frac{1}{3}}\right)\right)-\frac{1}{12}\cdot 2^{\frac{2}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{2}{3}}\right)+\frac{1}{6}\cdot 2^{\frac{2}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] 1/6*sqrt(3)*2^(2/3)*arctan(1/6*sqrt(3)*2^(2/3)*(2^(1/3) + 2*(-x^3
 + 1)^(1/3))) - 1/12*2^(2/3)*log(2^(2/3) + 2^(1/3)*(-x^3 + 1)^(1/
3) + (-x^3 + 1)^(2/3)) + 1/6*2^(2/3)*log(-2^(1/3) + (-x^3 + 1)^(1
/3))
```

Fricas [A] time = 0.214434, size = 120, normalized size = 1.46

$$-\frac{1}{36}\sqrt{3}2^{\frac{2}{3}}\left(\sqrt{3}\log\left(2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{2}{3}}+2\right)-2\sqrt{3}\log\left(2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}-2\right)-6\arctan\left(\frac{1}{3}\sqrt{3}2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\frac{1}{3}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] -1/36*sqrt(3)*2^(2/3)*(sqrt(3)*log(2^(2/3)*(-x^3 + 1)^(1/3) + 2^(
1/3)*(-x^3 + 1)^(2/3) + 2) - 2*sqrt(3)*log(2^(2/3)*(-x^3 + 1)^(1/
3) - 2) - 6*arctan(1/3*sqrt(3)*2^(2/3)*(-x^3 + 1)^(1/3) + 1/3*sqr
t(3)))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt[3]{-\left(x-1\right)\left(x^2+x+1\right)}\left(x+1\right)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(x**2/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.572 $\int \frac{1}{x\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=137

$$\frac{\log(x^3+1)}{6\sqrt[3]{2}}+\frac{1}{2}\log\left(1-\sqrt[3]{1-x^3}\right)-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{2\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt{3}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\log(x)}{2}$$

```
[Out] ArcTan[(1 + 2*(1 - x^3)^(1/3))/Sqrt[3]]/Sqrt[3] - ArcTan[(1 + 2^(
2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) - Log[x]/2 + Log
[1 + x^3]/(6*2^(1/3)) + Log[1 - (1 - x^3)^(1/3)]/2 - Log[2^(1/3)
- (1 - x^3)^(1/3)]/(2*2^(1/3))
```

Rubi [A] time = 0.223675, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.318

$$\frac{\log(x^3+1)}{6\sqrt[3]{2}}+\frac{1}{2}\log\left(1-\sqrt[3]{1-x^3}\right)-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{2\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt{3}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\log(x)}{2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] ArcTan[(1 + 2*(1 - x^3)^(1/3))/Sqrt[3]]/Sqrt[3] - ArcTan[(1 + 2^(
2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) - Log[x]/2 + Log
[1 + x^3]/(6*2^(1/3)) + Log[1 - (1 - x^3)^(1/3)]/2 - Log[2^(1/3)
- (1 - x^3)^(1/3)]/(2*2^(1/3))
```

Rubi in Sympy [A] time = 11.2751, size = 121, normalized size = 0.88

$$-\frac{\log(x^3)}{6}+\frac{2^{\frac{2}{3}}\log(x^3+1)}{12}+\frac{\log\left(-\sqrt[3]{-x^3+1}+1\right)}{2}-\frac{2^{\frac{2}{3}}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}-\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}+\frac{\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -log(x**3)/6 + 2**(2/3)*log(x**3 + 1)/12 + log(-(-x**3 + 1)**(1/3
) + 1)/2 - 2**(2/3)*log(-(-x**3 + 1)**(1/3) + 2**(1/3))/4 - 2**(2
/3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**3 + 1)**(1/3)/3 + 1/3))/6
 + sqrt(3)*atan(sqrt(3)*(2*(-x**3 + 1)**(1/3)/3 + 1/3))/3
```

Mathematica [C] time = 0.191695, size = 111, normalized size = 0.81

$$-\frac{7x^3F_1\left(\frac{4}{3};\frac{1}{3},1;\frac{7}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)}{4\sqrt[3]{1-x^3}\,(x^3+1)\left(7x^3F_1\left(\frac{4}{3};\frac{1}{3},1;\frac{7}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)-3F_1\left(\frac{7}{3};\frac{1}{3},2;\frac{10}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)+F_1\left(\frac{7}{3};\frac{4}{3},1;\frac{10}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-7*x^3*AppellF1[4/3, 1/3, 1, 7/3, x^(-3), -x^(-3)])/(4*(1 - x^3)
^(1/3)*(1 + x^3)*(7*x^3*AppellF1[4/3, 1/3, 1, 7/3, x^(-3), -x^(-3
)] - 3*AppellF1[7/3, 1/3, 2, 10/3, x^(-3), -x^(-3)] + AppellF1[7/
3, 4/3, 1, 10/3, x^(-3), -x^(-3)]))
```

Maple [F] time = 0.062, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(x^{3}+1\right)}\frac{1}{\sqrt[3]{-x^{3}+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(1/x/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^{3}+1)(-x^{3}+1)^{\frac{1}{3}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x),x, algorithm="fricas")
```

```
[Out] Exception raised: NotImplementedError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt[3]{-\left(x-1\right)\left(x^{2}+x+1\right)}\left(x+1\right)\left(x^{2}-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x*(-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x
+ 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x),x, algorithm="giac")

[Out] Exception raised: NotImplementedError
```

3.573 $\int \frac{1}{x^4 \sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=157

$$-\frac{\left(1-x^3\right)^{2/3}}{3x^3}-\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}-\frac{1}{3}\log\left(1-\sqrt[3]{1-x^3}\right)+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}-\frac{2\tan^{-1}\left(\frac{2\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{3\sqrt{3}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}+\frac{\log(x)}{3}$$

```
[Out] -(1 - x^3)^(2/3)/(3*x^3) - (2*ArcTan[(1 + 2*(1 - x^3)^(1/3))/Sqrt
[3]])/(3*Sqrt[3]) + ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]
/(2^(1/3)*Sqrt[3]) + Log[x]/3 - Log[1 + x^3]/(6*2^(1/3)) - Log[1
- (1 - x^3)^(1/3)]/3 + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(1/3))
```

Rubi [A] time = 0.285132, antiderivative size = 157, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$-\frac{\left(1-x^3\right)^{2/3}}{3x^3}-\frac{\log\left(x^3+1\right)}{6\sqrt[3]{2}}-\frac{1}{3}\log\left(1-\sqrt[3]{1-x^3}\right)+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\sqrt[3]{2}}-\frac{2\tan^{-1}\left(\frac{2\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{3\sqrt{3}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}+\frac{\log(x)}{3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(2/3)/(3*x^3) - (2*ArcTan[(1 + 2*(1 - x^3)^(1/3))/Sqrt
[3]])/(3*Sqrt[3]) + ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]
/(2^(1/3)*Sqrt[3]) + Log[x]/3 - Log[1 + x^3]/(6*2^(1/3)) - Log[1
- (1 - x^3)^(1/3)]/3 + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(1/3))
```

Rubi in Sympy [A] time = 15.7974, size = 136, normalized size = 0.87

$$\frac{\log\left(x^3\right)}{9}-\frac{2^{\frac{2}{3}}\log\left(x^3+1\right)}{12}-\frac{\log\left(-\sqrt[3]{-x^3+1}+1\right)}{3}+\frac{2^{\frac{2}{3}}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}+\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}-\frac{2\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{9}-\frac{\left(-x^3+1\right)^{\frac{2}{3}}}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] log(x**3)/9 - 2**(2/3)*log(x**3 + 1)/12 - log(-(-x**3 + 1)**(1/3)
 + 1)/3 + 2**(2/3)*log(-(-x**3 + 1)**(1/3) + 2**(1/3))/4 + 2**(2/
3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**3 + 1)**(1/3)/3 + 1/3))/6
- 2*sqrt(3)*atan(sqrt(3)*(2*(-x**3 + 1)**(1/3)/3 + 1/3))/9 - (-x*
*3 + 1)**(2/3)/(3*x**3)
```

Mathematica [C] time = 0.332608, size = 209, normalized size = 1.33

$$\frac{-\frac{4x^6 F_1\left(1;\frac{1}{3},1;2;x^3,-x^3\right)}{\left(x^3+1\right)\left(x^3\left(3F_1\left(2;\frac{1}{3},2;3;x^3,-x^3\right)-F_1\left(2;\frac{4}{3},1;3;x^3,-x^3\right)\right)-6F_1\left(1;\frac{1}{3},1;2;x^3,-x^3\right)\right)}+\frac{7x^6 F_1\left(\frac{4}{3};\frac{1}{3},1;\frac{7}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)}{\left(x^3+1\right)\left(7x^3 F_1\left(\frac{4}{3};\frac{1}{3},1;\frac{7}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)-3F_1\left(\frac{7}{3};\frac{1}{3},2;\frac{10}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)+F_1\left(\frac{7}{3};\frac{4}{3},1;\frac{10}{3};\frac{1}{x^3},\right.\right.}}{6x^3\sqrt[3]{1-x^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-2 + 2*x^3 - (4*x^6*AppellF1[1, 1/3, 1, 2, x^3, -x^3])/((1 + x^3
)*(-6*AppellF1[1, 1/3, 1, 2, x^3, -x^3] + x^3*(3*AppellF1[2, 1/3,
 2, 3, x^3, -x^3] - AppellF1[2, 4/3, 1, 3, x^3, -x^3]))) + (7*x^6
*AppellF1[4/3, 1/3, 1, 7/3, x^(-3), -x^(-3)])/((1 + x^3)*(7*x^3*A
ppellF1[4/3, 1/3, 1, 7/3, x^(-3), -x^(-3)] - 3*AppellF1[7/3, 1/3,
 2, 10/3, x^(-3), -x^(-3)] + AppellF1[7/3, 4/3, 1, 10/3, x^(-3),
-x^(-3)])))/(6*x^3*(1 - x^3)^(1/3))
```

Maple [F] time = 0.09, size = 0, normalized size = 0.

$$\int \frac{1}{x^{4}\left(x^{3}+1\right)}\frac{1}{\sqrt[3]{-x^{3}+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(1/x^4/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^{3}+1)(-x^{3}+1)^{\frac{1}{3}}x^{4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^4), x)
```

Fricas [A] time = 0.220024, size = 274, normalized size = 1.75

$$\sqrt{3}2^{\frac{2}{3}}\left(2\sqrt{3}2^{\frac{1}{3}}x^{3}\log\left(\left(-x^{3}+1\right)^{\frac{2}{3}}+\left(-x^{3}+1\right)^{\frac{1}{3}}+1\right)-4\sqrt{3}2^{\frac{1}{3}}x^{3}\log\left(\left(-x^{3}+1\right)^{\frac{1}{3}}-1\right)-3\sqrt{3}x^{3}\log\left(2^{\frac{2}{3}}\left(-x^{3}+1\right)^{\frac{1}{3}}+2^{\frac{1}{3}}(-\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^4),x, algorithm="fricas")
```

```
[Out] 1/108*sqrt(3)*2^(2/3)*(2*sqrt(3)*2^(1/3)*x^3*log((-x^3 + 1)^(2/3)
 + (-x^3 + 1)^(1/3) + 1) - 4*sqrt(3)*2^(1/3)*x^3*log((-x^3 + 1)^(
1/3) - 1) - 3*sqrt(3)*x^3*log(2^(2/3)*(-x^3 + 1)^(1/3) + 2^(1/3)*
(-x^3 + 1)^(2/3) + 2) + 6*sqrt(3)*x^3*log(2^(2/3)*(-x^3 + 1)^(1/3
) - 2) - 12*2^(1/3)*x^3*arctan(2/3*sqrt(3)*(-x^3 + 1)^(1/3) + 1/3
*sqrt(3)) + 18*x^3*arctan(1/3*sqrt(3)*2^(2/3)*(-x^3 + 1)^(1/3) +
1/3*sqrt(3)) - 6*sqrt(3)*2^(1/3)*(-x^3 + 1)^(2/3))/x^3
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{4}\sqrt[3]{-(x-1)\left(x^{2}+x+1\right)}\left(x+1\right)\left(x^{2}-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**4*(-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^4),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.574 $\int \frac{x^6}{\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=226

$$-\frac{1}{3}\left(1-x^3\right)^{2/3}x-\frac{2}{9}\log\left(\frac{x}{\sqrt[3]{1-x^3}}+1\right)+\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}+\frac{2\tan^{-1}\left(\frac{1-\frac{2x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{3\sqrt{3}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}+\frac{1}{9}\log\left(-\frac{x}{\sqrt[3]{1-x^3}}+\frac{x^2}{(1-x^3)^{2/3}}+1\right)-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

```
[Out] -(x*(1 - x^3)^(2/3))/3 + (2*ArcTan[(1 - (2*x)/(1 - x^3)^(1/3))/Sq
rt[3]])/(3*Sqrt[3]) - ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/
Sqrt[3]]/(2^(1/3)*Sqrt[3]) + Log[1 + x^2/(1 - x^3)^(2/3) - x/(1 -
 x^3)^(1/3)]/9 - (2*Log[1 + x/(1 - x^3)^(1/3)])/9 - Log[1 + (2^(2
/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3
)) + Log[1 + (2^(1/3)*x)/(1 - x^3)^(1/3)]/(3*2^(1/3))
```

Rubi [A] time = 0.384678, antiderivative size = 226, normalized size of antiderivative = 1., number of steps used = 15, number of rules used = 10, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.454

$$-\frac{1}{3}\left(1-x^3\right)^{2/3}x-\frac{2}{9}\log\left(\frac{x}{\sqrt[3]{1-x^3}}+1\right)+\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}+\frac{2\tan^{-1}\left(\frac{1-\frac{2x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{3\sqrt{3}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}+\frac{1}{9}\log\left(-\frac{x}{\sqrt[3]{1-x^3}}+\frac{x^2}{(1-x^3)^{2/3}}+1\right)-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(x*(1 - x^3)^(2/3))/3 + (2*ArcTan[(1 - (2*x)/(1 - x^3)^(1/3))/Sq
rt[3]])/(3*Sqrt[3]) - ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/
Sqrt[3]]/(2^(1/3)*Sqrt[3]) + Log[1 + x^2/(1 - x^3)^(2/3) - x/(1 -
 x^3)^(1/3)]/9 - (2*Log[1 + x/(1 - x^3)^(1/3)])/9 - Log[1 + (2^(2
/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3
)) + Log[1 + (2^(1/3)*x)/(1 - x^3)^(1/3)]/(3*2^(1/3))
```

Rubi in Sympy [A] time = 36.2785, size = 206, normalized size = 0.91

$$-\frac{x}{3\sqrt[3]{-x^3+1}\left(\frac{x^3}{-x^3+1}+1\right)}-\frac{2\log\left(\frac{x}{\sqrt[3]{-x^3+1}}+1\right)}{9}+\frac{2^{\frac{2}{3}}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}+\frac{\log\left(\frac{x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{x}{\sqrt[3]{-x^3+1}}+1\right)}{9}-\frac{2^{\frac{2}{3}}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}-\frac{2\sqrt{3}\operatorname{atan}\left(\sqrt{3}\left(\frac{2x}{3\sqrt[3]{-x^3+1}}-\frac{1}{3}\right)\right)}{9}-\frac{2^{\frac{2}{3}}\sqrt{3}\operatorname{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -x/(3*(-x**3 + 1)**(1/3)*(x**3/(-x**3 + 1) + 1)) - 2*log(x/(-x**3
 + 1)**(1/3) + 1)/9 + 2**(2/3)*log(2**(1/3)*x/(-x**3 + 1)**(1/3)
+ 1)/6 + log(x**2/(-x**3 + 1)**(2/3) - x/(-x**3 + 1)**(1/3) + 1)/
9 - 2**(2/3)*log(2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2**(1/3)*x/(-
x**3 + 1)**(1/3) + 1)/12 - 2*sqrt(3)*atan(sqrt(3)*(2*x/(3*(-x**3
+ 1)**(1/3)) - 1/3))/9 - 2**(2/3)*sqrt(3)*atan(sqrt(3)*(-2*2**(1/
3)*x/(3*(-x**3 + 1)**(1/3)) + 1/3))/6
```

Mathematica [C] time = 0.453987, size = 233, normalized size = 1.03

$$\frac{1}{36}\left(\frac{42x^4F_1\left(\frac{4}{3};\frac{1}{3},1;\frac{7}{3};x^3,-x^3\right)}{\sqrt[3]{1-x^3}\left(x^3+1\right)\left(x^3\left(3F_1\left(\frac{7}{3};\frac{1}{3},2;\frac{10}{3};x^3,-x^3\right)-F_1\left(\frac{7}{3};\frac{4}{3},1;\frac{10}{3};x^3,-x^3\right)\right)-7F_1\left(\frac{4}{3};\frac{1}{3},1;\frac{7}{3};x^3,-x^3\right)\right)}-12\left(1-x^3\right)^{2/3}x+2^{2/3}\left(2\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+1\right)+2\sqrt{3}\tan^{-1}\left(\frac{\frac{2\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}-1}{\sqrt{3}}\right)-\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+\frac{2^{2/3}x^2}{\left(x^3-1\right)^{2/3}}+1\right)\right)\right)$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^6/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-12*x*(1 - x^3)^(2/3) + (42*x^4*AppellF1[4/3, 1/3, 1, 7/3, x^3,
-x^3])/((1 - x^3)^(1/3)*(1 + x^3)*(-7*AppellF1[4/3, 1/3, 1, 7/3,
x^3, -x^3] + x^3*(3*AppellF1[7/3, 1/3, 2, 10/3, x^3, -x^3] - Appe
llF1[7/3, 4/3, 1, 10/3, x^3, -x^3]))) + 2^(2/3)*(2*Sqrt[3]*ArcTan
[(-1 + (2*2^(1/3)*x)/(-1 + x^3)^(1/3))/Sqrt[3]] - Log[1 + (2^(2/3
)*x^2)/(-1 + x^3)^(2/3) - (2^(1/3)*x)/(-1 + x^3)^(1/3)] + 2*Log[1
 + (2^(1/3)*x)/(-1 + x^3)^(1/3)]))/36
```

Maple [F] time = 0.08, size = 0, normalized size = 0.

$$\int \frac{x^6}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(x^6/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

Fricas [A] time = 0.219793, size = 301, normalized size = 1.33

$$-\frac{1}{108}\sqrt{3}2^{\frac{2}{3}}\left(6\sqrt{3}2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{2}{3}}x+4\sqrt{3}2^{\frac{1}{3}}\log\left(\frac{x+\left(-x^3+1\right)^{\frac{1}{3}}}{x}\right)-2\sqrt{3}2^{\frac{1}{3}}\log\left(\frac{x^2-\left(-x^3+1\right)^{\frac{1}{3}}x+\left(-x^3+1\right)^{\frac{2}{3}}}{x^2}\right)-6\sqrt{3}\,\mathrm{lo}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] -1/108*sqrt(3)*2^(2/3)*(6*sqrt(3)*2^(1/3)*(-x^3 + 1)^(2/3)*x + 4*
sqrt(3)*2^(1/3)*log((x + (-x^3 + 1)^(1/3))/x) - 2*sqrt(3)*2^(1/3)
*log((x^2 - (-x^3 + 1)^(1/3)*x + (-x^3 + 1)^(2/3))/x^2) - 6*sqrt(
3)*log((2^(2/3)*(-x^3 + 1)^(1/3) + 2*x)/x) + 3*sqrt(3)*log(-(2^(2
/3)*(-x^3 + 1)^(1/3)*x - 2*x^2 - 2^(1/3)*(-x^3 + 1)^(2/3))/x^2) -
 12*2^(1/3)*arctan(-1/3*(sqrt(3)*x - 2*sqrt(3)*(-x^3 + 1)^(1/3))/
x) + 18*arctan(1/3*(sqrt(3)*2^(2/3)*(-x^3 + 1)^(1/3) - sqrt(3)*x)
/x))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\sqrt[3]{-(x-1)\left(x^2+x+1\right)}\,(x+1)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(x**6/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

3.575 $\int \frac{x^3}{\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=207

$$\frac{1}{3}\log\left(\frac{x}{\sqrt[3]{1-x^3}}+1\right)-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{1-\frac{2x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt{3}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{1}{6}\log\left(-\frac{x}{\sqrt[3]{1-x^3}}+\frac{x^2}{(1-x^3)^{2/3}}+1\right)+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

```
[Out] -(ArcTan[(1 - (2*x)/(1 - x^3)^(1/3))/Sqrt[3]]/Sqrt[3]) + ArcTan[(
1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) - L
og[1 + x^2/(1 - x^3)^(2/3) - x/(1 - x^3)^(1/3)]/6 + Log[1 + x/(1
- x^3)^(1/3)]/3 + Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3
)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3)) - Log[1 + (2^(1/3)*x)/(1 - x^3)
^(1/3)]/(3*2^(1/3))
```

Rubi [A] time = 0.277401, antiderivative size = 207, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$\frac{1}{3}\log\left(\frac{x}{\sqrt[3]{1-x^3}}+1\right)-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{1-\frac{2x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt{3}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{1}{6}\log\left(-\frac{x}{\sqrt[3]{1-x^3}}+\frac{x^2}{(1-x^3)^{2/3}}+1\right)+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(ArcTan[(1 - (2*x)/(1 - x^3)^(1/3))/Sqrt[3]]/Sqrt[3]) + ArcTan[(
1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) - L
og[1 + x^2/(1 - x^3)^(2/3) - x/(1 - x^3)^(1/3)]/6 + Log[1 + x/(1
- x^3)^(1/3)]/3 + Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3
)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3)) - Log[1 + (2^(1/3)*x)/(1 - x^3)
^(1/3)]/(3*2^(1/3))
```

Rubi in Sympy [A] time = 30.5225, size = 180, normalized size = 0.87

$$\frac{\log\left(\frac{x}{\sqrt[3]{-x^3+1}}+1\right)}{3}-\frac{2^{\frac{2}{3}}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}-\frac{\log\left(\frac{x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{x}{\sqrt[3]{-x^3+1}}+1\right)}{6}+\frac{2^{\frac{2}{3}}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}+\frac{\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2x}{3\sqrt[3]{-x^3+1}}-\frac{1}{3}\right)\right)}{3}+\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] log(x/(-x**3 + 1)**(1/3) + 1)/3 - 2**(2/3)*log(2**(1/3)*x/(-x**3
+ 1)**(1/3) + 1)/6 - log(x**2/(-x**3 + 1)**(2/3) - x/(-x**3 + 1)*
*(1/3) + 1)/6 + 2**(2/3)*log(2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2
**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/12 + sqrt(3)*atan(sqrt(3)*(2*x/
(3*(-x**3 + 1)**(1/3)) - 1/3))/3 + 2**(2/3)*sqrt(3)*atan(sqrt(3)*
(-2*2**(1/3)*x/(3*(-x**3 + 1)**(1/3)) + 1/3))/6
```

Mathematica [C] time = 0.112097, size = 115, normalized size = 0.56

$$-\frac{7x^4F_1\left(\frac{4}{3};\frac{1}{3},1;\frac{7}{3};x^3,-x^3\right)}{4\sqrt[3]{1-x^3}\left(x^3+1\right)\left(x^3\left(3F_1\left(\frac{7}{3};\frac{1}{3},2;\frac{10}{3};x^3,-x^3\right)-F_1\left(\frac{7}{3};\frac{4}{3},1;\frac{10}{3};x^3,-x^3\right)\right)-7F_1\left(\frac{4}{3};\frac{1}{3},1;\frac{7}{3};x^3,-x^3\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-7*x^4*AppellF1[4/3, 1/3, 1, 7/3, x^3, -x^3])/(4*(1 - x^3)^(1/3)
*(1 + x^3)*(-7*AppellF1[4/3, 1/3, 1, 7/3, x^3, -x^3] + x^3*(3*App
ellF1[7/3, 1/3, 2, 10/3, x^3, -x^3] - AppellF1[7/3, 4/3, 1, 10/3,
 x^3, -x^3])))
```

Maple [F] time = 0.06, size = 0, normalized size = 0.

$$\int \frac{x^3}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(x^3/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] Exception raised: NotImplementedError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt[3]{-(x-1)(x^2+x+1)}(x+1)(x^2-x+1)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(x**3/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

3.576 $\int \frac{1}{\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=122

$$\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

```
[Out] -(ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sq
rt[3])) - Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3)*x)/(1
- x^3)^(1/3)]/(6*2^(1/3)) + Log[1 + (2^(1/3)*x)/(1 - x^3)^(1/3)]/
(3*2^(1/3))
```

Rubi [A] time = 0.133205, antiderivative size = 122, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.368

$$\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]/(2^(1/3)*Sq
rt[3])) - Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3)*x)/(1
- x^3)^(1/3)]/(6*2^(1/3)) + Log[1 + (2^(1/3)*x)/(1 - x^3)^(1/3)]/
(3*2^(1/3))
```

Rubi in Sympy [A] time = 16.6994, size = 107, normalized size = 0.88

$$\frac{2^{\frac{2}{3}}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}-\frac{2^{\frac{2}{3}}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}-\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] 2**(2/3)*log(2**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/6 - 2**(2/3)*log(
2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2**(1/3)*x/(-x**3 + 1)**(1/3)
+ 1)/12 - 2**(2/3)*sqrt(3)*atan(sqrt(3)*(-2*2**(1/3)*x/(3*(-x**3
+ 1)**(1/3)) + 1/3))/6
```

Mathematica [A] time = 0.120617, size = 104, normalized size = 0.85

$$\frac{2\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+1\right)+2\sqrt{3}\tan^{-1}\left(\frac{\frac{2\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}-1}{\sqrt{3}}\right)-\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+\frac{2^{2/3}x^2}{(x^3-1)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (2*Sqrt[3]*ArcTan[(-1 + (2*2^(1/3)*x)/(-1 + x^3)^(1/3))/Sqrt[3]]
- Log[1 + (2^(2/3)*x^2)/(-1 + x^3)^(2/3) - (2^(1/3)*x)/(-1 + x^3)
^(1/3)] + 2*Log[1 + (2^(1/3)*x)/(-1 + x^3)^(1/3)])/(6*2^(1/3))
```

Maple [F] time = 0.054, size = 0, normalized size = 0.

$$\int \frac{1}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(1/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

Fricas [A] time = 1.86098, size = 302, normalized size = 2.48

$$\frac{1}{108}\sqrt{3}2^{\frac{2}{3}}\left(2\sqrt{3}\log\left(\frac{3\cdot 2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{2}{3}}x+6\left(-x^3+1\right)^{\frac{1}{3}}x^2+2^{\frac{1}{3}}\left(x^3+1\right)}{x^3+1}\right)-\sqrt{3}\log\left(\frac{2^{\frac{2}{3}}\left(19\,x^6-16\,x^3+1\right)-12\cdot 2^{\frac{1}{3}}\left(2\,x^5-\right.}{x^6+2}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] 1/108*sqrt(3)*2^(2/3)*(2*sqrt(3)*log((3*2^(2/3)*(-x^3 + 1)^(2/3)*
x + 6*(-x^3 + 1)^(1/3)*x^2 + 2^(1/3)*(x^3 + 1))/(x^3 + 1)) - sqrt
(3)*log((2^(2/3)*(19*x^6 - 16*x^3 + 1) - 12*2^(1/3)*(2*x^5 - x^2)
*(-x^3 + 1)^(1/3) + 6*(5*x^4 - x)*(-x^3 + 1)^(2/3))/(x^6 + 2*x^3
+ 1)) - 6*arctan(1/3*(6*sqrt(3)*2^(2/3)*(-x^3 + 1)^(2/3)*x - 6*sq
rt(3)*(-x^3 + 1)^(1/3)*x^2 - sqrt(3)*2^(1/3)*(x^3 + 1))/(6*(-x^3
+ 1)^(1/3)*x^2 - 2^(1/3)*(x^3 + 1))))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt[3]{-(x-1)\left(x^2+x+1\right)}\left(x+1\right)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(1/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x +
1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

3.577 $\int \frac{1}{x^3\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=139

$$-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\left(1-x^3\right)^{2/3}}{2x^2}+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

```
[Out] -(1 - x^3)^(2/3)/(2*x^2) + ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1
/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) + Log[1 + (2^(2/3)*x^2)/(1 - x^3)
^(2/3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3)) - Log[1 + (2^(1
/3)*x)/(1 - x^3)^(1/3)]/(3*2^(1/3))
```

Rubi [A] time = 0.185035, antiderivative size = 139, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\left(1-x^3\right)^{2/3}}{2x^2}+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(2/3)/(2*x^2) + ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1
/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) + Log[1 + (2^(2/3)*x^2)/(1 - x^3)
^(2/3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3)) - Log[1 + (2^(1
/3)*x)/(1 - x^3)^(1/3)]/(3*2^(1/3))
```

Rubi in Sympy [A] time = 21.9584, size = 121, normalized size = 0.87

$$-\frac{2^{\frac{2}{3}}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}+\frac{2^{\frac{2}{3}}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}+\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}-\frac{\left(-x^3+1\right)^{\frac{2}{3}}}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -2**(2/3)*log(2**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/6 + 2**(2/3)*log
(2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2**(1/3)*x/(-x**3 + 1)**(1/3)
 + 1)/12 + 2**(2/3)*sqrt(3)*atan(sqrt(3)*(-2*2**(1/3)*x/(3*(-x**3
 + 1)**(1/3)) + 1/3))/6 - (-x**3 + 1)**(2/3)/(2*x**2)
```

Mathematica [A] time = 0.154516, size = 120, normalized size = 0.86

$$\frac{1}{12}\left(2^{2/3}\left(-2\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+1\right)-2\sqrt{3}\tan^{-1}\left(\frac{\frac{2\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}-1}{\sqrt{3}}\right)+\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+\frac{2^{2/3}x^2}{(x^3-1)^{2/3}}+1\right)\right)-\frac{6\left(1-x^3\right)^{2/3}}{x^2}\right)$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] ((-6*(1 - x^3)^(2/3))/x^2 + 2^(2/3)*(-2*Sqrt[3]*ArcTan[(-1 + (2*2
^(1/3)*x)/(-1 + x^3)^(1/3))/Sqrt[3]] + Log[1 + (2^(2/3)*x^2)/(-1
+ x^3)^(2/3) - (2^(1/3)*x)/(-1 + x^3)^(1/3)] - 2*Log[1 + (2^(1/3)
*x)/(-1 + x^3)^(1/3)]))/12
```

Maple [F] time = 0.071, size = 0, normalized size = 0.

$$\int \frac{1}{x^{3}\left(x^{3}+1\right)} \frac{1}{\sqrt[3]{-x^{3}+1}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(1/x^3/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^{3}+1)(-x^{3}+1)^{\frac{1}{3}} x^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^3), x)
```

Fricas [A] time = 1.84154, size = 386, normalized size = 2.78

$$\frac{\sqrt{3}2^{\frac{2}{3}}\left(2\sqrt{3}(-1)^{\frac{1}{3}}x^{2}\log\left(\frac{6(-1)^{\frac{2}{3}}\left(-x^{3}+1\right)^{\frac{1}{3}}x^{2}+3\cdot 2^{\frac{2}{3}}\left(-x^{3}+1\right)^{\frac{2}{3}}x-2^{\frac{1}{3}}(-1)^{\frac{1}{3}}\left(x^{3}+1\right)}{x^{3}+1}\right)-\sqrt{3}(-1)^{\frac{1}{3}}x^{2}\log\left(\frac{2^{\frac{2}{3}}(-1)^{\frac{2}{3}}\left(19x^{6}-16x^{3}+1\right)-6(-1)^{\frac{1}{3}}\left(5x^{4}-x\right.}{x^{6}+2\right.}\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^3),x, algorithm="fricas")
```

```
[Out] 1/108*sqrt(3)*2^(2/3)*(2*sqrt(3)*(-1)^(1/3)*x^2*log((6*(-1)^(2/3)
*(-x^3 + 1)^(1/3)*x^2 + 3*2^(2/3)*(-x^3 + 1)^(2/3)*x - 2^(1/3)*(-
1)^(1/3)*(x^3 + 1))/(x^3 + 1)) - sqrt(3)*(-1)^(1/3)*x^2*log((2^(2
/3)*(-1)^(2/3)*(19*x^6 - 16*x^3 + 1) - 6*(-1)^(1/3)*(5*x^4 - x)*(
-x^3 + 1)^(2/3) - 12*2^(1/3)*(2*x^5 - x^2)*(-x^3 + 1)^(1/3))/(x^6
 + 2*x^3 + 1)) - 6*(-1)^(1/3)*x^2*arctan(-1/3*(6*sqrt(3)*(-1)^(2/
3)*(-x^3 + 1)^(1/3)*x^2 - 6*sqrt(3)*2^(2/3)*(-x^3 + 1)^(2/3)*x -
sqrt(3)*2^(1/3)*(-1)^(1/3)*(x^3 + 1))/(6*(-1)^(2/3)*(-x^3 + 1)^(1
/3)*x^2 + 2^(1/3)*(-1)^(1/3)*(x^3 + 1))) - 9*sqrt(3)*2^(1/3)*(-x^
3 + 1)^(2/3))/x^2
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{3}\sqrt[3]{-\left(x-1\right)\left(x^{2}+x+1\right)}\left(x+1\right)\left(x^{2}-x+1\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**3*(-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^3), x)
```

3.578 $\int \frac{1}{x^6 \sqrt[3]{1-x^3}(1+x^3)} \, dx$

Optimal. Leaf size=140

$$\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\left(1-x^3\right)^{5/3}}{5x^5}-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

```
[Out] -(1 - x^3)^(5/3)/(5*x^5) - ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1
/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) - Log[1 + (2^(2/3)*x^2)/(1 - x^3)
^(2/3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3)) + Log[1 + (2^(1
/3)*x)/(1 - x^3)^(1/3)]/(3*2^(1/3))
```

Rubi [A] time = 0.216235, antiderivative size = 140, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\left(1-x^3\right)^{5/3}}{5x^5}-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^6*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(5/3)/(5*x^5) - ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1
/3))/Sqrt[3]]/(2^(1/3)*Sqrt[3]) - Log[1 + (2^(2/3)*x^2)/(1 - x^3)
^(2/3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3)) + Log[1 + (2^(1
/3)*x)/(1 - x^3)^(1/3)]/(3*2^(1/3))
```

Rubi in Sympy [A] time = 23.7636, size = 121, normalized size = 0.86

$$\frac{2^{\frac{2}{3}}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}-\frac{2^{\frac{2}{3}}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}-\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}-\frac{\left(-x^3+1\right)^{\frac{5}{3}}}{5x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**6/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] 2**(2/3)*log(2**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/6 - 2**(2/3)*log(
2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2**(1/3)*x/(-x**3 + 1)**(1/3)
+ 1)/12 - 2**(2/3)*sqrt(3)*atan(sqrt(3)*(-2*2**(1/3)*x/(3*(-x**3
+ 1)**(1/3)) + 1/3))/6 - (-x**3 + 1)**(5/3)/(5*x**5)
```

Mathematica [A] time = 0.233455, size = 123, normalized size = 0.88

$$\frac{2\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+1\right)+2\sqrt{3}\tan^{-1}\left(\frac{\frac{2\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}-1}{\sqrt{3}}\right)-\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+\frac{2^{2/3}x^2}{(x^3-1)^{2/3}}+1\right)}{6\sqrt[3]{2}}-\frac{\left(1-x^3\right)^{5/3}}{5x^5}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^6*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(5/3)/(5*x^5) + (2*Sqrt[3]*ArcTan[(-1 + (2*2^(1/3)*x)/
(-1 + x^3)^(1/3))/Sqrt[3]] - Log[1 + (2^(2/3)*x^2)/(-1 + x^3)^(2/
3) - (2^(1/3)*x)/(-1 + x^3)^(1/3)] + 2*Log[1 + (2^(1/3)*x)/(-1 +
x^3)^(1/3)])/(6*2^(1/3))
```

Maple [F] time = 0.039, size = 0, normalized size = 0.

$$\int \frac{1}{x^{6} \left(x^{3}+1\right)} \frac{1}{\sqrt[3]{-x^{3}+1}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^6/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(1/x^6/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{{\left(x^{3} + 1\right)} {\left(-x^{3} + 1\right)}^{\frac{1}{3}} x^{6}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^6),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^6), x)
```

Fricas [A] time = 1.86752, size = 348, normalized size = 2.49

$$\frac{\sqrt{3} 2^{\frac{2}{3}} \left(10 \sqrt{3} x^{5} \log\left(\frac{3 \cdot 2^{\frac{2}{3}} \left(-x^{3}+1\right)^{\frac{2}{3}} x+6 \left(-x^{3}+1\right)^{\frac{1}{3}} x^{2}+2^{\frac{1}{3}} \left(x^{3}+1\right)}{x^{3}+1}\right) - 5 \sqrt{3} x^{5} \log\left(\frac{2^{\frac{2}{3}} \left(19 x^{6}-16 x^{3}+1\right)-12 \cdot 2^{\frac{1}{3}} \left(2 x^{5}-x^{2}\right) \left(-x^{3}+1\right)^{\frac{1}{3}}+6 \left(5 x^{4}-x\right) \left(-x^{3}+1\right.}{x^{6}+2 x^{3}+1}\right.}{540 x^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^6),x, algorithm="fricas")
```

```
[Out] 1/540*sqrt(3)*2^(2/3)*(10*sqrt(3)*x^5*log((3*2^(2/3)*(-x^3 + 1)^(
2/3)*x + 6*(-x^3 + 1)^(1/3)*x^2 + 2^(1/3)*(x^3 + 1))/(x^3 + 1)) -
 5*sqrt(3)*x^5*log((2^(2/3)*(19*x^6 - 16*x^3 + 1) - 12*2^(1/3)*(2
*x^5 - x^2)*(-x^3 + 1)^(1/3) + 6*(5*x^4 - x)*(-x^3 + 1)^(2/3))/(x
^6 + 2*x^3 + 1)) - 30*x^5*arctan(1/3*(6*sqrt(3)*2^(2/3)*(-x^3 + 1
)^(2/3)*x - 6*sqrt(3)*(-x^3 + 1)^(1/3)*x^2 - sqrt(3)*2^(1/3)*(x^3
 + 1))/(6*(-x^3 + 1)^(1/3)*x^2 - 2^(1/3)*(x^3 + 1))) + 18*sqrt(3)
*2^(1/3)*(x^3 - 1)*(-x^3 + 1)^(2/3))/x^5
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{6} \sqrt[3]{- \left(x - 1\right) \left(x^{2} + x + 1\right)} \left(x + 1\right) \left(x^{2} - x + 1\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**6/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**6*(-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^6),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^6), x)
```

3.579 $\int \frac{1}{x^9\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=175

$$-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\left(1-x^3\right)^{8/3}}{8x^8}-\frac{\left(1-x^3\right)^{5/3}}{5x^5}-\frac{\left(1-x^3\right)^{2/3}}{2x^2}+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

```
[Out] -(1 - x^3)^(2/3)/(2*x^2) - (1 - x^3)^(5/3)/(5*x^5) - (1 - x^3)^(8
/3)/(8*x^8) + ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]
/(2^(1/3)*Sqrt[3]) + Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(
1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3)) - Log[1 + (2^(1/3)*x)/(1 - x
^3)^(1/3)]/(3*2^(1/3))
```

Rubi [A] time = 0.23688, antiderivative size = 175, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$

$$-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\sqrt[3]{2}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt[3]{2}\sqrt{3}}-\frac{\left(1-x^3\right)^{8/3}}{8x^8}-\frac{\left(1-x^3\right)^{5/3}}{5x^5}-\frac{\left(1-x^3\right)^{2/3}}{2x^2}+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\sqrt[3]{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^9*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(2/3)/(2*x^2) - (1 - x^3)^(5/3)/(5*x^5) - (1 - x^3)^(8
/3)/(8*x^8) + ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]
/(2^(1/3)*Sqrt[3]) + Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(
1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(1/3)) - Log[1 + (2^(1/3)*x)/(1 - x
^3)^(1/3)]/(3*2^(1/3))
```

Rubi in Sympy [A] time = 24.3662, size = 148, normalized size = 0.85

$$-\frac{2^{\frac{2}{3}}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}+\frac{2^{\frac{2}{3}}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}+\frac{2^{\frac{2}{3}}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}-\frac{\left(-x^3+1\right)^{\frac{2}{3}}}{2x^2}-\frac{\left(-x^3+1\right)^{\frac{5}{3}}}{5x^5}-\frac{\left(-x^3+1\right)^{\frac{8}{3}}}{8x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**9/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -2**(2/3)*log(2**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/6 + 2**(2/3)*log
(2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2**(1/3)*x/(-x**3 + 1)**(1/3)
 + 1)/12 + 2**(2/3)*sqrt(3)*atan(sqrt(3)*(-2*2**(1/3)*x/(3*(-x**3
 + 1)**(1/3)) + 1/3))/6 - (-x**3 + 1)**(2/3)/(2*x**2) - (-x**3 +
```

```
1)**(5/3)/(5*x**5) - (-x**3 + 1)**(8/3)/(8*x**8)
```

Mathematica [A] time = 0.174408, size = 133, normalized size = 0.76

$$\frac{-2\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+1\right)-2\sqrt{3}\tan^{-1}\left(\frac{\frac{2\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}-1}{\sqrt{3}}\right)+\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{x^3-1}}+\frac{2^{2/3}x^2}{(x^3-1)^{2/3}}+1\right)}{6\sqrt[3]{2}} - \frac{\left(1-x^3\right)^{2/3}\left(17x^6-2x^3+5\right)}{40x^8}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^9*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -((1 - x^3)^(2/3)*(5 - 2*x^3 + 17*x^6))/(40*x^8) + (-2*Sqrt[3]*Ar
cTan[(-1 + (2*2^(1/3)*x)/(-1 + x^3)^(1/3))/Sqrt[3]] + Log[1 + (2^
(2/3)*x^2)/(-1 + x^3)^(2/3) - (2^(1/3)*x)/(-1 + x^3)^(1/3)] - 2*L
og[1 + (2^(1/3)*x)/(-1 + x^3)^(1/3)])/(6*2^(1/3))
```

Maple [F] time = 0.043, size = 0, normalized size = 0.

$$\int \frac{1}{x^9\left(x^3+1\right)}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^9/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(1/x^9/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}x^9}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^9),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^9), x)
```

Fricas [A] time = 1.84806, size = 402, normalized size = 2.3

$$\sqrt{3}2^{\frac{2}{3}}\left(40\sqrt{3}(-1)^{\frac{1}{3}}x^8\log\left(\frac{6(-1)^{\frac{2}{3}}(-x^3+1)^{\frac{1}{3}}x^2+3\cdot 2^{\frac{2}{3}}(-x^3+1)^{\frac{2}{3}}x-2^{\frac{1}{3}}(-1)^{\frac{1}{3}}(x^3+1)}{x^3+1}\right)-20\sqrt{3}(-1)^{\frac{1}{3}}x^8\log\left(\frac{2^{\frac{2}{3}}(-1)^{\frac{2}{3}}(19x^6-16x^3+1)-6(-1)^{\frac{1}{3}}(5\ldots}{x\ldots}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^9),x, algorithm="fricas")
```

```
[Out] 1/2160*sqrt(3)*2^(2/3)*(40*sqrt(3)*(-1)^(1/3)*x^8*log((6*(-1)^(2/
3)*(-x^3 + 1)^(1/3)*x^2 + 3*2^(2/3)*(-x^3 + 1)^(2/3)*x - 2^(1/3)*
(-1)^(1/3)*(x^3 + 1))/(x^3 + 1)) - 20*sqrt(3)*(-1)^(1/3)*x^8*log(
(2^(2/3)*(-1)^(2/3)*(19*x^6 - 16*x^3 + 1) - 6*(-1)^(1/3)*(5*x^4 -
 x)*(-x^3 + 1)^(2/3) - 12*2^(1/3)*(2*x^5 - x^2)*(-x^3 + 1)^(1/3))
/(x^6 + 2*x^3 + 1)) - 120*(-1)^(1/3)*x^8*arctan(-1/3*(6*sqrt(3)*(
-1)^(2/3)*(-x^3 + 1)^(1/3)*x^2 - 6*sqrt(3)*2^(2/3)*(-x^3 + 1)^(2/
3)*x - sqrt(3)*2^(1/3)*(-1)^(1/3)*(x^3 + 1))/(6*(-1)^(2/3)*(-x^3
+ 1)^(1/3)*x^2 + 2^(1/3)*(-1)^(1/3)*(x^3 + 1))) - 9*sqrt(3)*2^(1/
3)*(17*x^6 - 2*x^3 + 5)*(-x^3 + 1)^(2/3))/x^8
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^9 \sqrt[3]{-(x-1)(x^2+x+1)}\,(x+1)(x^2-x+1)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**9/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**9*(-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}x^9}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^9),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^9), x)
```

3.580 $\int \frac{x^4}{\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=26

$$\frac{1}{5}x^5F_1\left(\frac{5}{3};\frac{1}{3},1;\frac{8}{3};x^3,-x^3\right)$$

```
[Out] (x^5*AppellF1[5/3, 1/3, 1, 8/3, x^3, -x^3])/5
```

Rubi [A] time = 0.0591777, antiderivative size = 26, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$\frac{1}{5}x^5F_1\left(\frac{5}{3};\frac{1}{3},1;\frac{8}{3};x^3,-x^3\right)$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (x^5*AppellF1[5/3, 1/3, 1, 8/3, x^3, -x^3])/5
```

Rubi in Sympy [A] time = 6.17415, size = 17, normalized size = 0.65

$$\frac{x^5\operatorname{appellf}_1\left(\frac{5}{3},\frac{1}{3},1,\frac{8}{3},x^3,-x^3\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] x**5*appellf1(5/3, 1/3, 1, 8/3, x**3, -x**3)/5
```

Mathematica [B] time = 0.16789, size = 115, normalized size = 4.42

$$-\frac{8x^5F_1\left(\frac{5}{3};\frac{1}{3},1;\frac{8}{3};x^3,-x^3\right)}{5\sqrt[3]{1-x^3}\,(x^3+1)\left(x^3\left(3F_1\left(\frac{8}{3};\frac{1}{3},2;\frac{11}{3};x^3,-x^3\right)-F_1\left(\frac{8}{3};\frac{4}{3},1;\frac{11}{3};x^3,-x^3\right)\right)-8F_1\left(\frac{5}{3};\frac{1}{3},1;\frac{8}{3};x^3,-x^3\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-8*x^5*AppellF1[5/3, 1/3, 1, 8/3, x^3, -x^3])/(5*(1 - x^3)^(1/3)
*(1 + x^3)*(-8*AppellF1[5/3, 1/3, 1, 8/3, x^3, -x^3] + x^3*(3*App
ellF1[8/3, 1/3, 2, 11/3, x^3, -x^3] - AppellF1[8/3, 4/3, 1, 11/3,
 x^3, -x^3])))
```

Maple [F] time = 0.059, size = 0, normalized size = 0.

$$\int \frac{x^4}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(x^4/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")
```

```
[Out] integral(x^4/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt[3]{-(x-1)(x^2+x+1)}\,(x+1)(x^2-x+1)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(x**4/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

3.581 $\int \frac{x}{\sqrt[3]{1-x^3}(1+x^3)} \, dx$

Optimal. Leaf size=26

$$\frac{1}{2}x^2F_1\left(\frac{2}{3};\frac{1}{3},1;\frac{5}{3};x^3,-x^3\right)$$

```
[Out] (x^2*AppellF1[2/3, 1/3, 1, 5/3, x^3, -x^3])/2
```

Rubi [A] time = 0.0462526, antiderivative size = 26, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$\frac{1}{2}x^2F_1\left(\frac{2}{3};\frac{1}{3},1;\frac{5}{3};x^3,-x^3\right)$$

Antiderivative was successfully verified.

```
[In]  Int[x/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (x^2*AppellF1[2/3, 1/3, 1, 5/3, x^3, -x^3])/2
```

Rubi in Sympy [A] time = 5.14259, size = 17, normalized size = 0.65

$$\frac{x^2 \operatorname{appellf}_1\left(\frac{2}{3},\frac{1}{3},1,\frac{5}{3},x^3,-x^3\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] x**2*appellf1(2/3, 1/3, 1, 5/3, x**3, -x**3)/2
```

Mathematica [B] time = 0.160272, size = 115, normalized size = 4.42

$$-\frac{5x^2F_1\left(\frac{2}{3};\frac{1}{3},1;\frac{5}{3};x^3,-x^3\right)}{2\sqrt[3]{1-x^3}\left(x^3+1\right)\left(x^3\left(3F_1\left(\frac{5}{3};\frac{1}{3},2;\frac{8}{3};x^3,-x^3\right)-F_1\left(\frac{5}{3};\frac{4}{3},1;\frac{8}{3};x^3,-x^3\right)\right)-5F_1\left(\frac{2}{3};\frac{1}{3},1;\frac{5}{3};x^3,-x^3\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-5*x^2*AppellF1[2/3, 1/3, 1, 5/3, x^3, -x^3])/(2*(1 - x^3)^(1/3)
*(1 + x^3)*(-5*AppellF1[2/3, 1/3, 1, 5/3, x^3, -x^3] + x^3*(3*App
ellF1[5/3, 1/3, 2, 8/3, x^3, -x^3] - AppellF1[5/3, 4/3, 1, 8/3, x
^3, -x^3])))
```

Maple [F] time = 0.056, size = 0, normalized size = 0.

$$\int \frac{x}{x^3+1}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-x^3+1)^(1/3)/(x^3+1),x)

[Out] int(x/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="maxima")

[Out] integrate(x/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

Fricas [A] time = 1.79286, size = 433, normalized size = 16.65

$$\frac{1}{216}\sqrt{3}2^{\frac{2}{3}}\left(2\sqrt{3}(-1)^{\frac{1}{3}}\log\left(-\frac{6\cdot 2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{2}{3}}x^2-6(-1)^{\frac{2}{3}}\left(x^4-x\right)\left(-x^3+1\right)^{\frac{1}{3}}-2^{\frac{1}{3}}(-1)^{\frac{1}{3}}\left(x^6+2x^3+1\right)}{x^6+2x^3+1}\right)-\sqrt{3}(-1)^{\frac{1}{3}}\log$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="fricas")

[Out] 1/216*sqrt(3)*2^(2/3)*(2*sqrt(3)*(-1)^(1/3)*log(-(6*2^(2/3)*(-x^3
 + 1)^(2/3)*x^2 - 6*(-1)^(2/3)*(x^4 - x)*(-x^3 + 1)^(1/3) - 2^(1/
3)*(-1)^(1/3)*(x^6 + 2*x^3 + 1))/(x^6 + 2*x^3 + 1)) - sqrt(3)*(-1
)^(1/3)*log((2^(2/3)*(-1)^(2/3)*(x^12 - 32*x^9 + 78*x^6 - 32*x^3
+ 1) - 24*(-1)^(1/3)*(x^8 - 4*x^5 + x^2)*(-x^3 + 1)^(2/3) + 6*2^(
1/3)*(x^10 - 11*x^7 + 11*x^4 - x)*(-x^3 + 1)^(1/3))/(x^12 + 4*x^9
 + 6*x^6 + 4*x^3 + 1)) + 6*(-1)^(1/3)*arctan(1/3*(12*sqrt(3)*2^(2
/3)*(-x^3 + 1)^(2/3)*x^2 + 6*sqrt(3)*(-1)^(2/3)*(x^4 - x)*(-x^3 +
 1)^(1/3) + sqrt(3)*2^(1/3)*(-1)^(1/3)*(x^6 + 2*x^3 + 1))/(6*(-1)
^(2/3)*(x^4 - x)*(-x^3 + 1)^(1/3) - 2^(1/3)*(-1)^(1/3)*(x^6 + 2*x
^3 + 1))))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt[3]{-(x-1)\left(x^2+x+1\right)}(x+1)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-x**3+1)**(1/3)/(x**3+1),x)

[Out] Integral(x/((-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 - x +
1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(x^3+1)(-x^3+1)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((x^3 + 1)*(-x^3 + 1)^(1/3)),x, algorithm="giac")

[Out] integrate(x/((x^3 + 1)*(-x^3 + 1)^(1/3)), x)
```

3.582 $\int \frac{1}{x^2 \sqrt[3]{1-x^3}(1+x^3)} \, dx$

Optimal. Leaf size=24

$$-\frac{F_1\left(-\frac{1}{3};\frac{1}{3},1;\frac{2}{3};x^3,-x^3\right)}{x}$$

```
[Out] -(AppellF1[-1/3, 1/3, 1, 2/3, x^3, -x^3]/x)
```

Rubi [A] time = 0.0622655, antiderivative size = 24, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$

$$-\frac{F_1\left(-\frac{1}{3};\frac{1}{3},1;\frac{2}{3};x^3,-x^3\right)}{x}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(AppellF1[-1/3, 1/3, 1, 2/3, x^3, -x^3]/x)
```

Rubi in Sympy [A] time = 6.22787, size = 17, normalized size = 0.71

$$-\frac{\text{appellf}_1\left(-\frac{1}{3},\frac{1}{3},1,\frac{2}{3},x^3,-x^3\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**2/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -appellf1(-1/3, 1/3, 1, 2/3, x**3, -x**3)/x
```

Mathematica [B] time = 0.320955, size = 229, normalized size = 9.54

$$\frac{\frac{25x^3F_1\left(\frac{2}{3};\frac{1}{3},1;\frac{5}{3};x^3,-x^3\right)}{(x^3+1)\left(x^3\left(3F_1\left(\frac{5}{3};\frac{1}{3},2;\frac{8}{3};x^3,-x^3\right)-F_1\left(\frac{5}{3};\frac{4}{3},1;\frac{8}{3};x^3,-x^3\right)\right)-5F_1\left(\frac{2}{3};\frac{1}{3},1;\frac{5}{3};x^3,-x^3\right)\right)}+\frac{8x^6F_1\left(\frac{5}{3};\frac{1}{3},1;\frac{8}{3};x^3,-x^3\right)}{(x^3+1)\left(x^3\left(3F_1\left(\frac{8}{3};\frac{1}{3},2;\frac{11}{3};x^3,-x^3\right)-F_1\left(\frac{8}{3};\frac{4}{3},1;\frac{11}{3};x^3,-x^3\right)\right)-8F_1\left(\frac{5}{3};\frac{1}{3},1;\frac{8}{3};x^3,-\right.}}{5x\sqrt[3]{1-x^3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/(x^2*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] (-5 + 5*x^3 + (25*x^3*AppellF1[2/3, 1/3, 1, 5/3, x^3, -x^3])/((1
+ x^3)*(-5*AppellF1[2/3, 1/3, 1, 5/3, x^3, -x^3] + x^3*(3*AppellF
1[5/3, 1/3, 2, 8/3, x^3, -x^3] - AppellF1[5/3, 4/3, 1, 8/3, x^3,
-x^3]))) + (8*x^6*AppellF1[5/3, 1/3, 1, 8/3, x^3, -x^3])/((1 + x^
3)*(-8*AppellF1[5/3, 1/3, 1, 8/3, x^3, -x^3] + x^3*(3*AppellF1[8/
3, 1/3, 2, 11/3, x^3, -x^3] - AppellF1[8/3, 4/3, 1, 11/3, x^3, -x
^3]))))/(5*x*(1 - x^3)^(1/3))
```

Maple [F] time = 0.082, size = 0, normalized size = 0.

$$\int \frac{1}{x^2(x^3+1)} \frac{1}{\sqrt[3]{-x^3+1}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(1/x^2/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{(x^5+x^2)(-x^3+1)^{\frac{1}{3}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/((x^5 + x^2)*(-x^3 + 1)^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt[3]{-(x-1)(x^2+x+1)}\,(x+1)(x^2-x+1)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**2*(-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^2), x)
```

3.583 $\int \frac{1}{x^5\sqrt[3]{1-x^3}(1+x^3)}\,dx$

Optimal. Leaf size=26

$$-\frac{F_1\left(-\frac{4}{3};\frac{1}{3},1;-\frac{1}{3};x^3,-x^3\right)}{4x^4}$$

```
[Out] -AppellF1[-4/3, 1/3, 1, -1/3, x^3, -x^3]/(4*x^4)
```

Rubi [A] time = 0.0623116, antiderivative size = 26, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$-\frac{F_1\left(-\frac{4}{3};\frac{1}{3},1;-\frac{1}{3};x^3,-x^3\right)}{4x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -AppellF1[-4/3, 1/3, 1, -1/3, x^3, -x^3]/(4*x^4)
```

Rubi in Sympy [A] time = 6.27381, size = 22, normalized size = 0.85

$$-\frac{\text{appellf}_1\left(-\frac{4}{3},\frac{1}{3},1,-\frac{1}{3},x^3,-x^3\right)}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] -appellf1(-4/3, 1/3, 1, -1/3, x**3, -x**3)/(4*x**4)
```

Mathematica [B] time = 0.297354, size = 234, normalized size = 9.

$$-\frac{\frac{16x^9F_1\left(\frac{5}{3};\frac{1}{3},1;\frac{8}{3};x^3,-x^3\right)}{(x^3+1)\left(x^3\left(3F_1\left(\frac{8}{3};\frac{1}{3},2;\frac{11}{3};x^3,-x^3\right)-F_1\left(\frac{8}{3};\frac{4}{3},1;\frac{11}{3};x^3,-x^3\right)\right)-8F_1\left(\frac{5}{3};\frac{1}{3},1;\frac{8}{3};x^3,-x^3\right)\right)}+\frac{75x^6F_1\left(\frac{2}{3};\frac{1}{3},1;\frac{5}{3};x^3,-x^3\right)}{(x^3+1)\left(x^3\left(3F_1\left(\frac{5}{3};\frac{1}{3},2;\frac{8}{3};x^3,-x^3\right)-F_1\left(\frac{5}{3};\frac{4}{3},1;\frac{8}{3};x^3,-x^3\right)\right)-5F_1\left(\frac{2}{3};\frac{1}{3},1;\frac{5}{3};x\right.}}{20x^4\sqrt[3]{1-x^3}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(1 - x^3)^(1/3)*(1 + x^3)),x]
```

```
[Out] -(5 - 15*x^3 + 10*x^6 + (75*x^6*AppellF1[2/3, 1/3, 1, 5/3, x^3, -
x^3])/((1 + x^3)*(-5*AppellF1[2/3, 1/3, 1, 5/3, x^3, -x^3] + x^3*
(3*AppellF1[5/3, 1/3, 2, 8/3, x^3, -x^3] - AppellF1[5/3, 4/3, 1,
8/3, x^3, -x^3]))) + (16*x^9*AppellF1[5/3, 1/3, 1, 8/3, x^3, -x^3
])/((1 + x^3)*(-8*AppellF1[5/3, 1/3, 1, 8/3, x^3, -x^3] + x^3*(3*
AppellF1[8/3, 1/3, 2, 11/3, x^3, -x^3] - AppellF1[8/3, 4/3, 1, 11
/3, x^3, -x^3]))))/(20*x^4*(1 - x^3)^(1/3))
```

Maple [F] time = 0.086, size = 0, normalized size = 0.

$$\int \frac{1}{x^5\,(x^3+1)}\frac{1}{\sqrt[3]{-x^3+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(-x^3+1)^(1/3)/(x^3+1),x)
```

```
[Out] int(1/x^5/(-x^3+1)^(1/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^5),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^5), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(x^8+x^5)(-x^3+1)^{\frac{1}{3}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^5),x, algorithm="fricas")
```

```
[Out] integral(1/((x^8 + x^5)*(-x^3 + 1)^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^5\sqrt[3]{-(x-1)(x^2+x+1)}(x+1)(x^2-x+1)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(-x**3+1)**(1/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**5*(-(x - 1)*(x**2 + x + 1))**(1/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{1}{3}}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^5),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(1/3)*x^5), x)
```

3.584 $\int \frac{x^{11}}{(1-x^3)^{2/3}(1+x^3)}\, dx$

Optimal. Leaf size=125

$$-\frac{1}{7}\left(1-x^3\right)^{7/3}+\frac{1}{4}\left(1-x^3\right)^{4/3}-\sqrt[3]{1-x^3}+\frac{\log\left(x^3+1\right)}{6\ 2^{2/3}}-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}$$

```
[Out] -(1 - x^3)^(1/3) + (1 - x^3)^(4/3)/4 - (1 - x^3)^(7/3)/7 + ArcTan
[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3]) + Log[1
 + x^3]/(6*2^(2/3)) - Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(2/3))
```

Rubi [A] time = 0.229906, antiderivative size = 125, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$-\frac{1}{7}\left(1-x^3\right)^{7/3}+\frac{1}{4}\left(1-x^3\right)^{4/3}-\sqrt[3]{1-x^3}+\frac{\log\left(x^3+1\right)}{6\ 2^{2/3}}-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(1/3) + (1 - x^3)^(4/3)/4 - (1 - x^3)^(7/3)/7 + ArcTan
[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3]) + Log[1
 + x^3]/(6*2^(2/3)) - Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(2/3))
```

Rubi in Sympy [A] time = 11.6213, size = 100, normalized size = 0.8

$$-\frac{\left(-x^3+1\right)^{\frac{7}{3}}}{7}+\frac{\left(-x^3+1\right)^{\frac{4}{3}}}{4}-\sqrt[3]{-x^3+1}+\frac{\sqrt[3]{2}\log\left(x^3+1\right)}{12}-\frac{\sqrt[3]{2}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}+\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] -(-x**3 + 1)**(7/3)/7 + (-x**3 + 1)**(4/3)/4 - (-x**3 + 1)**(1/3)
 + 2**(1/3)*log(x**3 + 1)/12 - 2**(1/3)*log(-(-x**3 + 1)**(1/3) +
 2**(1/3))/4 + 2**(1/3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**3 + 1
)**(1/3)/3 + 1/3))/6
```

Mathematica [C] time = 0.0573451, size = 70, normalized size = 0.56

$$\frac{14\left(\frac{x^3-1}{x^3+1}\right)^{2/3}\,{}_2F_1\left(\frac{2}{3},\frac{2}{3};\frac{5}{3};\frac{2}{x^3+1}\right)+4x^9-5x^6+26x^3-25}{28\left(1-x^3\right)^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (-25 + 26*x^3 - 5*x^6 + 4*x^9 + 14*((-1 + x^3)/(1 + x^3))^(2/3)*H
ypergeometric2F1[2/3, 2/3, 5/3, 2/(1 + x^3)])/(28*(1 - x^3)^(2/3)
```

)

Maple [F] time = 0.1, size = 0, normalized size = 0.

$$\int \frac{x^{11} \left(-x^3+1\right)^{-\frac{2}{3}}}{x^3+1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(x^11/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [A] time = 1.52887, size = 161, normalized size = 1.29

$$-\frac{1}{7}\left(-x^3+1\right)^{\frac{7}{3}}+\frac{1}{6}\sqrt{3}2^{\frac{1}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^3+1\right)^{\frac{1}{3}}\right)\right)+\frac{1}{4}\left(-x^3+1\right)^{\frac{4}{3}}+\frac{1}{12}\cdot 2^{\frac{1}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{2}{3}}\right)-\frac{1}{6}\cdot 2^{\frac{1}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}\right)-\left(-x^3+1\right)^{\frac{1}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")
```

```
[Out] -1/7*(-x^3 + 1)^(7/3) + 1/6*sqrt(3)*2^(1/3)*arctan(1/6*sqrt(3)*2^
(2/3)*(2^(1/3) + 2*(-x^3 + 1)^(1/3))) + 1/4*(-x^3 + 1)^(4/3) + 1/
12*2^(1/3)*log(2^(2/3) + 2^(1/3)*(-x^3 + 1)^(1/3) + (-x^3 + 1)^(2
/3)) - 1/6*2^(1/3)*log(-2^(1/3) + (-x^3 + 1)^(1/3)) - (-x^3 + 1)^
(1/3)
```

Fricas [A] time = 0.218497, size = 198, normalized size = 1.58

$$-\frac{1}{1008}\cdot 4^{\frac{2}{3}}\sqrt{3}\left(3\cdot 4^{\frac{1}{3}}\sqrt{3}\left(4x^6-x^3+25\right)\left(-x^3+1\right)^{\frac{1}{3}}+14\sqrt{3}(-1)^{\frac{1}{3}}\log\left(4^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{2}{3}}-2\cdot 4^{\frac{1}{3}}(-1)^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+4(-1)^{\frac{2}{3}}\right)-28\sqrt{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")
```

```
[Out] -1/1008*4^(2/3)*sqrt(3)*(3*4^(1/3)*sqrt(3)*(4*x^6 - x^3 + 25)*(-x
^3 + 1)^(1/3) + 14*sqrt(3)*(-1)^(1/3)*log(4^(2/3)*(-x^3 + 1)^(2/3
) - 2*4^(1/3)*(-1)^(1/3)*(-x^3 + 1)^(1/3) + 4*(-1)^(2/3)) - 28*sq
rt(3)*(-1)^(1/3)*log(4^(1/3)*(-x^3 + 1)^(1/3) + 2*(-1)^(1/3)) - 8
4*(-1)^(1/3)*arctan(-1/3*(-1)^(2/3)*(4^(1/3)*sqrt(3)*(-x^3 + 1)^(
1/3) - sqrt(3)*(-1)^(1/3))))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{11}}{\left(-(x-1)\left(x^2+x+1\right)\right)^{\frac{2}{3}}(x+1)\left(x^2-x+1\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(x**11/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 -
x + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.585 $\int \frac{x^8}{(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=98

$$\frac{1}{4}\left(1-x^3\right)^{4/3}-\frac{\log\left(x^3+1\right)}{6\ 2^{2/3}}+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}$$

```
[Out] (1 - x^3)^(4/3)/4 - ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]
/(2^(2/3)*Sqrt[3]) - Log[1 + x^3]/(6*2^(2/3)) + Log[2^(1/3) - (1
- x^3)^(1/3)]/(2*2^(2/3))
```

Rubi [A] time = 0.196147, antiderivative size = 98, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$\frac{1}{4}\left(1-x^3\right)^{4/3}-\frac{\log\left(x^3+1\right)}{6\ 2^{2/3}}+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (1 - x^3)^(4/3)/4 - ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]
/(2^(2/3)*Sqrt[3]) - Log[1 + x^3]/(6*2^(2/3)) + Log[2^(1/3) - (1
- x^3)^(1/3)]/(2*2^(2/3))
```

Rubi in Sympy [A] time = 10.8946, size = 82, normalized size = 0.84

$$\frac{\left(-x^3+1\right)^{\frac{4}{3}}}{4}-\frac{\sqrt[3]{2}\log\left(x^3+1\right)}{12}+\frac{\sqrt[3]{2}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}-\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] (-x**3 + 1)**(4/3)/4 - 2**(1/3)*log(x**3 + 1)/12 + 2**(1/3)*log(-
(-x**3 + 1)**(1/3) + 2**(1/3))/4 - 2**(1/3)*sqrt(3)*atan(sqrt(3)*
(2**(2/3)*(-x**3 + 1)**(1/3)/3 + 1/3))/6
```

Mathematica [C] time = 0.0518276, size = 61, normalized size = 0.62

$$\frac{\left(x^3-1\right)^2-2\left(\frac{x^3-1}{x^3+1}\right)^{2/3}{}_2F_1\left(\frac{2}{3},\frac{2}{3};\frac{5}{3};\frac{2}{x^3+1}\right)}{4\left(1-x^3\right)^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] ((-1 + x^3)^2 - 2*((-1 + x^3)/(1 + x^3))^(2/3)*Hypergeometric2F1[
2/3, 2/3, 5/3, 2/(1 + x^3)])/(4*(1 - x^3)^(2/3))
```

Maple [F] time = 0.075, size = 0, normalized size = 0.

$$\int \frac{x^{8}}{x^{3}+1}\left(-x^{3}+1\right)^{-\frac{2}{3}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(x^8/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [A] time = 1.51999, size = 131, normalized size = 1.34

$$-\frac{1}{6}\sqrt{3}2^{\frac{1}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^{3}+1\right)^{\frac{1}{3}}\right)\right)+\frac{1}{4}\left(-x^{3}+1\right)^{\frac{4}{3}}-\frac{1}{12}\cdot 2^{\frac{1}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^{3}+1\right)^{\frac{1}{3}}+\left(-x^{3}+1\right)^{\frac{2}{3}}\right)+\frac{1}{6}\cdot 2^{\frac{1}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^{3}+1\right)^{\frac{1}{3}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")
```

```
[Out] -1/6*sqrt(3)*2^(1/3)*arctan(1/6*sqrt(3)*2^(2/3)*(2^(1/3) + 2*(-x^
3 + 1)^(1/3))) + 1/4*(-x^3 + 1)^(4/3) - 1/12*2^(1/3)*log(2^(2/3)
+ 2^(1/3)*(-x^3 + 1)^(1/3) + (-x^3 + 1)^(2/3)) + 1/6*2^(1/3)*log(
-2^(1/3) + (-x^3 + 1)^(1/3))
```

Fricas [A] time = 0.221375, size = 153, normalized size = 1.56

$$-\frac{1}{144}\cdot 4^{\frac{2}{3}}\sqrt{3}\left(3\cdot 4^{\frac{1}{3}}\sqrt{3}\left(x^{3}-1\right)\left(-x^{3}+1\right)^{\frac{1}{3}}+2\sqrt{3}\log\left(4^{\frac{2}{3}}\left(-x^{3}+1\right)^{\frac{2}{3}}+2\cdot 4^{\frac{1}{3}}\left(-x^{3}+1\right)^{\frac{1}{3}}+4\right)-4\sqrt{3}\log\left(4^{\frac{1}{3}}\left(-x^{3}+1\right)^{\frac{1}{3}}-2\right)+12\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")
```

```
[Out] -1/144*4^(2/3)*sqrt(3)*(3*4^(1/3)*sqrt(3)*(x^3 - 1)*(-x^3 + 1)^(1
/3) + 2*sqrt(3)*log(4^(2/3)*(-x^3 + 1)^(2/3) + 2*4^(1/3)*(-x^3 +
1)^(1/3) + 4) - 4*sqrt(3)*log(4^(1/3)*(-x^3 + 1)^(1/3) - 2) + 12*
arctan(1/3*4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3) + 1/3*sqrt(3)))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{8}}{\left(-\left(x-1\right)\left(x^{2}+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^{2}-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(x**8/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")

[Out] Exception raised: NotImplementedError
```

3.586 $\int \frac{x^5}{(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=95

$$-\sqrt[3]{1-x^3}+\frac{\log(x^3+1)}{6\ 2^{2/3}}-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}$$

```
[Out] -(1 - x^3)^(1/3) + ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/
(2^(2/3)*Sqrt[3]) + Log[1 + x^3]/(6*2^(2/3)) - Log[2^(1/3) - (1 -
 x^3)^(1/3)]/(2*2^(2/3))
```

Rubi [A] time = 0.16553, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\sqrt[3]{1-x^3}+\frac{\log(x^3+1)}{6\ 2^{2/3}}-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(1/3) + ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/
(2^(2/3)*Sqrt[3]) + Log[1 + x^3]/(6*2^(2/3)) - Log[2^(1/3) - (1 -
 x^3)^(1/3)]/(2*2^(2/3))
```

Rubi in Sympy [A] time = 9.68162, size = 80, normalized size = 0.84

$$-\sqrt[3]{-x^3+1}+\frac{\sqrt[3]{2}\log(x^3+1)}{12}-\frac{\sqrt[3]{2}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}+\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] -(-x**3 + 1)**(1/3) + 2**(1/3)*log(x**3 + 1)/12 - 2**(1/3)*log(-(
-x**3 + 1)**(1/3) + 2**(1/3))/4 + 2**(1/3)*sqrt(3)*atan(sqrt(3)*(
2**(2/3)*(-x**3 + 1)**(1/3)/3 + 1/3))/6
```

Mathematica [C] time = 0.0372521, size = 59, normalized size = 0.62

$$\frac{\left(\frac{x^3-1}{x^3+1}\right)^{2/3}{}_2F_1\left(\frac{2}{3},\frac{2}{3};\frac{5}{3};\frac{2}{x^3+1}\right)+2x^3-2}{2(1-x^3)^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (-2 + 2*x^3 + ((-1 + x^3)/(1 + x^3))^(2/3)*Hypergeometric2F1[2/3,
 2/3, 5/3, 2/(1 + x^3)])/(2*(1 - x^3)^(2/3))
```

Maple [F] time = 0.027, size = 0, normalized size = 0.

$$\int \frac{x^5}{x^3+1} \left(-x^3+1\right)^{-\frac{2}{3}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(x^5/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [A] time = 1.60413, size = 131, normalized size = 1.38

$$\frac{1}{6}\sqrt{3}2^{\frac{1}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^3+1\right)^{\frac{1}{3}}\right)\right)+\frac{1}{12}\cdot 2^{\frac{1}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{2}{3}}\right) - \frac{1}{6}\cdot 2^{\frac{1}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}\right)-\left(-x^3+1\right)^{\frac{1}{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")
```

```
[Out] 1/6*sqrt(3)*2^(1/3)*arctan(1/6*sqrt(3)*2^(2/3)*(2^(1/3) + 2*(-x^3
 + 1)^(1/3))) + 1/12*2^(1/3)*log(2^(2/3) + 2^(1/3)*(-x^3 + 1)^(1/
3) + (-x^3 + 1)^(2/3)) - 1/6*2^(1/3)*log(-2^(1/3) + (-x^3 + 1)^(1
/3)) - (-x^3 + 1)^(1/3)
```

Fricas [A] time = 0.221243, size = 181, normalized size = 1.91

$$-\frac{1}{72} \cdot 4^{\frac{2}{3}}\sqrt{3}\left(\sqrt{3}\left(-1\right)^{\frac{1}{3}}\log\left(4^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{2}{3}}-2\cdot 4^{\frac{1}{3}}\left(-1\right)^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+4\left(-1\right)^{\frac{2}{3}}\right)-2\sqrt{3}\left(-1\right)^{\frac{1}{3}}\log\left(4^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+2\left(-1\right)^{\frac{1}{3}}\right)-6\,(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")
```

```
[Out] -1/72*4^(2/3)*sqrt(3)*(sqrt(3)*(-1)^(1/3)*log(4^(2/3)*(-x^3 + 1)^
(2/3) - 2*4^(1/3)*(-1)^(1/3)*(-x^3 + 1)^(1/3) + 4*(-1)^(2/3)) - 2
*sqrt(3)*(-1)^(1/3)*log(4^(1/3)*(-x^3 + 1)^(1/3) + 2*(-1)^(1/3))
- 6*(-1)^(1/3)*arctan(-1/3*(-1)^(2/3)*(4^(1/3)*sqrt(3)*(-x^3 + 1)
^(1/3) - sqrt(3)*(-1)^(1/3))) + 6*4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3
))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\left(-\left(x-1\right)\left(x^2+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^2-x+1\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(x**5/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.587 $\int \frac{x^2}{(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=83

$$-\frac{\log \left(x^3+1\right)}{6\ 2^{2/3}}+\frac{\log \left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}-\frac{\tan ^{-1}\left(\frac{2^{2/3} \sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3} \sqrt{3}}$$

```
[Out] -(ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3])
) - Log[1 + x^3]/(6*2^(2/3)) + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*
2^(2/3))
```

Rubi [A] time = 0.14188, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$-\frac{\log \left(x^3+1\right)}{6\ 2^{2/3}}+\frac{\log \left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}-\frac{\tan ^{-1}\left(\frac{2^{2/3} \sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3} \sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3])
) - Log[1 + x^3]/(6*2^(2/3)) + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*
2^(2/3))
```

Rubi in Sympy [A] time = 8.60666, size = 71, normalized size = 0.86

$$-\frac{\sqrt[3]{2} \log \left(x^3+1\right)}{12}+\frac{\sqrt[3]{2} \log \left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}-\frac{\sqrt[3]{2} \sqrt{3}\,\operatorname{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}} \sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] -2**(1/3)*log(x**3 + 1)/12 + 2**(1/3)*log(-(-x**3 + 1)**(1/3) + 2
**(1/3))/4 - 2**(1/3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**3 + 1)*
*(1/3)/3 + 1/3))/6
```

Mathematica [A] time = 0.0605552, size = 103, normalized size = 1.24

$$-\frac{-2 \log \left(2-2^{2/3} \sqrt[3]{1-x^3}\right)+\log \left(\sqrt[3]{2} \left(1-x^3\right)^{2/3}+2^{2/3} \sqrt[3]{1-x^3}+2\right)+2 \sqrt{3} \tan ^{-1}\left(\frac{2^{2/3} \sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{6\ 2^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(2*Sqrt[3]*ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]] - 2*Log
[2 - 2^(2/3)*(1 - x^3)^(1/3)] + Log[2 + 2^(2/3)*(1 - x^3)^(1/3) +
 2^(1/3)*(1 - x^3)^(2/3)])/(6*2^(2/3))
```

Maple [F] time = 0.058, size = 0, normalized size = 0.

$$\int \frac{x^2}{x^3+1}\left(-x^3+1\right)^{-\frac{2}{3}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(x^2/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [A] time = 1.52364, size = 116, normalized size = 1.4

$$-\frac{1}{6}\sqrt{3}2^{\frac{1}{3}}\arctan\left(\frac{1}{6}\sqrt{3}2^{\frac{2}{3}}\left(2^{\frac{1}{3}}+2\left(-x^3+1\right)^{\frac{1}{3}}\right)\right)-\frac{1}{12}\cdot 2^{\frac{1}{3}}\log\left(2^{\frac{2}{3}}+2^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{2}{3}}\right)+\frac{1}{6}\cdot 2^{\frac{1}{3}}\log\left(-2^{\frac{1}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")
```

```
[Out] -1/6*sqrt(3)*2^(1/3)*arctan(1/6*sqrt(3)*2^(2/3)*(2^(1/3) + 2*(-x^
3 + 1)^(1/3))) - 1/12*2^(1/3)*log(2^(2/3) + 2^(1/3)*(-x^3 + 1)^(1
/3) + (-x^3 + 1)^(2/3)) + 1/6*2^(1/3)*log(-2^(1/3) + (-x^3 + 1)^(
1/3))
```

Fricas [A] time = 0.213346, size = 122, normalized size = 1.47

$$-\frac{1}{72}\cdot 4^{\frac{2}{3}}\sqrt{3}\left(\sqrt{3}\log\left(4^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{2}{3}}+2\cdot 4^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}+4\right)-2\sqrt{3}\log\left(4^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}-2\right)+6\arctan\left(\frac{1}{3}\cdot 4^{\frac{1}{3}}\sqrt{3}\left(-x^3+1\right)^{\frac{1}{3}}+\frac{1}{3}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")
```

```
[Out] -1/72*4^(2/3)*sqrt(3)*(sqrt(3)*log(4^(2/3)*(-x^3 + 1)^(2/3) + 2*4
^(1/3)*(-x^3 + 1)^(1/3) + 4) - 2*sqrt(3)*log(4^(1/3)*(-x^3 + 1)^(
1/3) - 2) + 6*arctan(1/3*4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3) + 1/3*s
qrt(3)))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\left(-(x-1)\left(x^2+x+1\right)\right)^{\frac{2}{3}}(x+1)\left(x^2-x+1\right)} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(x**2/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.588 $\int \frac{1}{x(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=137

$$\frac{\log(x^3+1)}{6\,2^{2/3}}+\frac{1}{2}\log\left(1-\sqrt[3]{1-x^3}\right)-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\,2^{2/3}}-\frac{\tan^{-1}\left(\frac{2\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt{3}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}-\frac{\log(x)}{2}$$

```
[Out] -(ArcTan[(1 + 2*(1 - x^3)^(1/3))/Sqrt[3]]/Sqrt[3]) + ArcTan[(1 +
2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3]) - Log[x]/2 +
Log[1 + x^3]/(6*2^(2/3)) + Log[1 - (1 - x^3)^(1/3)]/2 - Log[2^(1/
3) - (1 - x^3)^(1/3)]/(2*2^(2/3))
```

Rubi [A] time = 0.228312, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.318

$$\frac{\log(x^3+1)}{6\,2^{2/3}}+\frac{1}{2}\log\left(1-\sqrt[3]{1-x^3}\right)-\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\,2^{2/3}}-\frac{\tan^{-1}\left(\frac{2\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{\sqrt{3}}+\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}-\frac{\log(x)}{2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(ArcTan[(1 + 2*(1 - x^3)^(1/3))/Sqrt[3]]/Sqrt[3]) + ArcTan[(1 +
2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3]) - Log[x]/2 +
Log[1 + x^3]/(6*2^(2/3)) + Log[1 - (1 - x^3)^(1/3)]/2 - Log[2^(1/
3) - (1 - x^3)^(1/3)]/(2*2^(2/3))
```

Rubi in Sympy [A] time = 11.2759, size = 121, normalized size = 0.88

$$-\frac{\log(x^3)}{6}+\frac{\sqrt[3]{2}\log(x^3+1)}{12}+\frac{\log\left(-\sqrt[3]{-x^3+1}+1\right)}{2}-\frac{\sqrt[3]{2}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}+\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}-\frac{\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] -log(x**3)/6 + 2**(1/3)*log(x**3 + 1)/12 + log(-(-x**3 + 1)**(1/3
) + 1)/2 - 2**(1/3)*log(-(-x**3 + 1)**(1/3) + 2**(1/3))/4 + 2**(1
/3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**3 + 1)**(1/3)/3 + 1/3))/6
 - sqrt(3)*atan(sqrt(3)*(2*(-x**3 + 1)**(1/3)/3 + 1/3))/3
```

Mathematica [C] time = 0.23698, size = 113, normalized size = 0.82

$$-\frac{8x^3F_1\left(\frac{5}{3};\frac{2}{3},1;\frac{8}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)}{5\left(1-x^3\right)^{2/3}\left(x^3+1\right)\left(8x^3F_1\left(\frac{5}{3};\frac{2}{3},1;\frac{8}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)-3F_1\left(\frac{8}{3};\frac{2}{3},2;\frac{11}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)+2F_1\left(\frac{8}{3};\frac{5}{3},1;\frac{11}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (-8*x^3*AppellF1[5/3, 2/3, 1, 8/3, x^(-3), -x^(-3)])/(5*(1 - x^3)
^(2/3)*(1 + x^3)*(8*x^3*AppellF1[5/3, 2/3, 1, 8/3, x^(-3), -x^(-3
)] - 3*AppellF1[8/3, 2/3, 2, 11/3, x^(-3), -x^(-3)] + 2*AppellF1[
8/3, 5/3, 1, 11/3, x^(-3), -x^(-3)]))
```

Maple [F] time = 0.065, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(x^{3}+1\right)}\left(-x^{3}+1\right)^{-\frac{2}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(1/x/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^{3}+1)(-x^{3}+1)^{\frac{2}{3}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x), x)
```

Fricas [A] time = 0.220461, size = 258, normalized size = 1.88

$$-\frac{1}{72}$$

$$\cdot 4^{\frac{2}{3}}\sqrt{3}\left(\sqrt{3}\,(-1)^{\frac{1}{3}}\log\left(4^{\frac{2}{3}}\left(-x^{3}+1\right)^{\frac{2}{3}}-2\cdot 4^{\frac{1}{3}}\,(-1)^{\frac{1}{3}}\left(-x^{3}+1\right)^{\frac{1}{3}}+4\,(-1)^{\frac{2}{3}}\right)-2\sqrt{3}\,(-1)^{\frac{1}{3}}\log\left(4^{\frac{1}{3}}\left(-x^{3}+1\right)^{\frac{1}{3}}+2\,(-1)^{\frac{1}{3}}\right)+4^{\frac{1}{3}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x),x, algorithm="fricas")
```

```
[Out] -1/72*4^(2/3)*sqrt(3)*(sqrt(3)*(-1)^(1/3)*log(4^(2/3)*(-x^3 + 1)^
(2/3) - 2*4^(1/3)*(-1)^(1/3)*(-x^3 + 1)^(1/3) + 4*(-1)^(2/3)) - 2
*sqrt(3)*(-1)^(1/3)*log(4^(1/3)*(-x^3 + 1)^(1/3) + 2*(-1)^(1/3))
+ 4^(1/3)*sqrt(3)*log((-x^3 + 1)^(2/3) + (-x^3 + 1)^(1/3) + 1) -
2*4^(1/3)*sqrt(3)*log((-x^3 + 1)^(1/3) - 1) - 6*(-1)^(1/3)*arctan
(-1/3*(-1)^(2/3)*(4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3) - sqrt(3)*(-1)
^(1/3))) + 6*4^(1/3)*arctan(2/3*sqrt(3)*(-x^3 + 1)^(1/3) + 1/3*sq
rt(3)))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(-\left(x-1\right)\left(x^{2}+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^{2}-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x*(-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x
+ 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.589 $\int \frac{1}{x^4(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=158

$$-\frac{\sqrt[3]{1-x^3}}{3x^3}-\frac{\log\left(x^3+1\right)}{6\ 2^{2/3}}-\frac{1}{6}\log\left(1-\sqrt[3]{1-x^3}\right)+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}+\frac{\tan^{-1}\left(\frac{2\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{3\sqrt{3}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}+\frac{\log(x)}{6}$$

```
[Out] -(1 - x^3)^(1/3)/(3*x^3) + ArcTan[(1 + 2*(1 - x^3)^(1/3))/Sqrt[3]
]/(3*Sqrt[3]) - ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^
(2/3)*Sqrt[3]) + Log[x]/6 - Log[1 + x^3]/(6*2^(2/3)) - Log[1 - (1
 - x^3)^(1/3)]/6 + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(2/3))
```

Rubi [A] time = 0.285735, antiderivative size = 158, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$-\frac{\sqrt[3]{1-x^3}}{3x^3}-\frac{\log\left(x^3+1\right)}{6\ 2^{2/3}}-\frac{1}{6}\log\left(1-\sqrt[3]{1-x^3}\right)+\frac{\log\left(\sqrt[3]{2}-\sqrt[3]{1-x^3}\right)}{2\ 2^{2/3}}+\frac{\tan^{-1}\left(\frac{2\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{3\sqrt{3}}-\frac{\tan^{-1}\left(\frac{2^{2/3}\sqrt[3]{1-x^3}+1}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}+\frac{\log(x)}{6}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(1/3)/(3*x^3) + ArcTan[(1 + 2*(1 - x^3)^(1/3))/Sqrt[3]
]/(3*Sqrt[3]) - ArcTan[(1 + 2^(2/3)*(1 - x^3)^(1/3))/Sqrt[3]]/(2^
(2/3)*Sqrt[3]) + Log[x]/6 - Log[1 + x^3]/(6*2^(2/3)) - Log[1 - (1
 - x^3)^(1/3)]/6 + Log[2^(1/3) - (1 - x^3)^(1/3)]/(2*2^(2/3))
```

Rubi in Sympy [A] time = 15.7629, size = 134, normalized size = 0.85

$$\frac{\log\left(x^3\right)}{18}-\frac{\sqrt[3]{2}\log\left(x^3+1\right)}{12}-\frac{\log\left(-\sqrt[3]{-x^3+1}+1\right)}{6}+\frac{\sqrt[3]{2}\log\left(-\sqrt[3]{-x^3+1}+\sqrt[3]{2}\right)}{4}-\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2^{\frac{2}{3}}\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{6}+\frac{\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2\sqrt[3]{-x^3+1}}{3}+\frac{1}{3}\right)\right)}{9}-\frac{\sqrt[3]{-x^3+1}}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] log(x**3)/18 - 2**(1/3)*log(x**3 + 1)/12 - log(-(-x**3 + 1)**(1/3
) + 1)/6 + 2**(1/3)*log(-(-x**3 + 1)**(1/3) + 2**(1/3))/4 - 2**(1
/3)*sqrt(3)*atan(sqrt(3)*(2**(2/3)*(-x**3 + 1)**(1/3)/3 + 1/3))/6
 + sqrt(3)*atan(sqrt(3)*(2*(-x**3 + 1)**(1/3)/3 + 1/3))/9 - (-x**
3 + 1)**(1/3)/(3*x**3)
```

Mathematica [C] time = 0.272252, size = 110, normalized size = 0.7

$$-\frac{11F_1\left(\frac{8}{3};\frac{2}{3},1;\frac{11}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)}{8\left(1-x^3\right)^{2/3}\left(x^3+1\right)\left(11x^3F_1\left(\frac{8}{3};\frac{2}{3},1;\frac{11}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)-3F_1\left(\frac{11}{3};\frac{2}{3},2;\frac{14}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)+2F_1\left(\frac{11}{3};\frac{5}{3},1;\frac{14}{3};\frac{1}{x^3},-\frac{1}{x^3}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[1/(x^4*(1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (-11*AppellF1[8/3, 2/3, 1, 11/3, x^(-3), -x^(-3)])/(8*(1 - x^3)^(
2/3)*(1 + x^3)*(11*x^3*AppellF1[8/3, 2/3, 1, 11/3, x^(-3), -x^(-3
)] - 3*AppellF1[11/3, 2/3, 2, 14/3, x^(-3), -x^(-3)] + 2*AppellF1
[11/3, 5/3, 1, 14/3, x^(-3), -x^(-3)]))
```

Maple [F] time = 0.099, size = 0, normalized size = 0.

$$\int \frac{1}{x^4\left(x^3+1\right)}\left(-x^3+1\right)^{-\frac{2}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^4/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(1/x^4/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^4), x)
```

Fricas [A] time = 0.221838, size = 274, normalized size = 1.73

$$4^{\frac{2}{3}}\sqrt{3}\left(4^{\frac{1}{3}}\sqrt{3}x^3\log\left(\left(-x^3+1\right)^{\frac{2}{3}}+\left(-x^3+1\right)^{\frac{1}{3}}+1\right)-2\cdot 4^{\frac{1}{3}}\sqrt{3}x^3\log\left(\left(-x^3+1\right)^{\frac{1}{3}}-1\right)-3\sqrt{3}x^3\log\left(4^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{2}{3}}+2\cdot 4^{\frac{1}{3}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^4),x, algorithm="fricas")
```

```
[Out] 1/216*4^(2/3)*sqrt(3)*(4^(1/3)*sqrt(3)*x^3*log((-x^3 + 1)^(2/3) +
 (-x^3 + 1)^(1/3) + 1) - 2*4^(1/3)*sqrt(3)*x^3*log((-x^3 + 1)^(1/
3) - 1) - 3*sqrt(3)*x^3*log(4^(2/3)*(-x^3 + 1)^(2/3) + 2*4^(1/3)*
(-x^3 + 1)^(1/3) + 4) + 6*sqrt(3)*x^3*log(4^(1/3)*(-x^3 + 1)^(1/3
) - 2) + 6*4^(1/3)*x^3*arctan(2/3*sqrt(3)*(-x^3 + 1)^(1/3) + 1/3*
sqrt(3)) - 18*x^3*arctan(1/3*4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3) + 1
/3*sqrt(3)) - 6*4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3))/x^3
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^4\left(-\left(x-1\right)\left(x^2+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**4*(-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^4),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.590 $\int \frac{x^4}{(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=207

$$-\frac{1}{3}\log\left(\frac{x}{\sqrt[3]{1-x^3}}+1\right)+\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\ 2^{2/3}}-\frac{\tan^{-1}\left(\frac{1-\frac{2x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt{3}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}+\frac{1}{6}\log\left(-\frac{x}{\sqrt[3]{1-x^3}}+\frac{x^2}{(1-x^3)^{2/3}}+1\right)-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\ 2^{2/3}}$$

```
[Out] -(ArcTan[(1 - (2*x)/(1 - x^3)^(1/3))/Sqrt[3]]/Sqrt[3]) + ArcTan[(
1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3]) + L
og[1 + x^2/(1 - x^3)^(2/3) - x/(1 - x^3)^(1/3)]/6 - Log[1 + x/(1
- x^3)^(1/3)]/3 - Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3
)*x)/(1 - x^3)^(1/3)]/(6*2^(2/3)) + Log[1 + (2^(1/3)*x)/(1 - x^3)
^(1/3)]/(3*2^(2/3))
```

Rubi [A] time = 0.308982, antiderivative size = 207, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$-\frac{1}{3}\log\left(\frac{x}{\sqrt[3]{1-x^3}}+1\right)+\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\ 2^{2/3}}-\frac{\tan^{-1}\left(\frac{1-\frac{2x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{\sqrt{3}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}+\frac{1}{6}\log\left(-\frac{x}{\sqrt[3]{1-x^3}}+\frac{x^2}{(1-x^3)^{2/3}}+1\right)-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\ 2^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(ArcTan[(1 - (2*x)/(1 - x^3)^(1/3))/Sqrt[3]]/Sqrt[3]) + ArcTan[(
1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3]) + L
og[1 + x^2/(1 - x^3)^(2/3) - x/(1 - x^3)^(1/3)]/6 - Log[1 + x/(1
- x^3)^(1/3)]/3 - Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3
)*x)/(1 - x^3)^(1/3)]/(6*2^(2/3)) + Log[1 + (2^(1/3)*x)/(1 - x^3)
^(1/3)]/(3*2^(2/3))
```

Rubi in Sympy [A] time = 27.0951, size = 180, normalized size = 0.87

$$-\frac{\log\left(\frac{x}{\sqrt[3]{-x^3+1}}+1\right)}{3}+\frac{\sqrt[3]{2}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}+\frac{\log\left(\frac{x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{x}{\sqrt[3]{-x^3+1}}+1\right)}{6}-\frac{\sqrt[3]{2}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}+\frac{\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2x}{3\sqrt[3]{-x^3+1}}-\frac{1}{3}\right)\right)}{3}+\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] -log(x/(-x**3 + 1)**(1/3) + 1)/3 + 2**(1/3)*log(2**(1/3)*x/(-x**3
 + 1)**(1/3) + 1)/6 + log(x**2/(-x**3 + 1)**(2/3) - x/(-x**3 + 1)
**(1/3) + 1)/6 - 2**(1/3)*log(2**(2/3)*x**2/(-x**3 + 1)**(2/3) -
2**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/12 + sqrt(3)*atan(sqrt(3)*(2*x
/(3*(-x**3 + 1)**(1/3)) - 1/3))/3 + 2**(1/3)*sqrt(3)*atan(sqrt(3)
*(-2*2**(1/3)*x/(3*(-x**3 + 1)**(1/3)) + 1/3))/6
```

Mathematica [C] time = 0.19284, size = 115, normalized size = 0.56

$$-\frac{8x^5F_1\left(\frac{5}{3};\frac{2}{3},1;\frac{8}{3};x^3,-x^3\right)}{5\left(1-x^3\right)^{2/3}\left(x^3+1\right)\left(x^3\left(3F_1\left(\frac{8}{3};\frac{2}{3},2;\frac{11}{3};x^3,-x^3\right)-2F_1\left(\frac{8}{3};\frac{5}{3},1;\frac{11}{3};x^3,-x^3\right)\right)-8F_1\left(\frac{5}{3};\frac{2}{3},1;\frac{8}{3};x^3,-x^3\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (-8*x^5*AppellF1[5/3, 2/3, 1, 8/3, x^3, -x^3])/(5*(1 - x^3)^(2/3)
*(1 + x^3)*(-8*AppellF1[5/3, 2/3, 1, 8/3, x^3, -x^3] + x^3*(3*App
ellF1[8/3, 2/3, 2, 11/3, x^3, -x^3] - 2*AppellF1[8/3, 5/3, 1, 11/
3, x^3, -x^3])))
```

Maple [F] time = 0.059, size = 0, normalized size = 0.

$$\int \frac{x^4}{x^3+1}\left(-x^3+1\right)^{-\frac{2}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(x^4/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

Fricas [A] time = 0.2203, size = 274, normalized size = 1.32

$$-\frac{1}{72}\cdot 4^{\frac{2}{3}}\sqrt{3}\left(2\cdot 4^{\frac{1}{3}}\sqrt{3}\log\left(\frac{x+\left(-x^3+1\right)^{\frac{1}{3}}}{x}\right)-4^{\frac{1}{3}}\sqrt{3}\log\left(\frac{x^2-\left(-x^3+1\right)^{\frac{1}{3}}x+\left(-x^3+1\right)^{\frac{2}{3}}}{x^2}\right)-2\sqrt{3}\log\left(\frac{2x+4^{\frac{1}{3}}\left(-x^3+1\right)^{\frac{1}{3}}}{x}\right)+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")
```

```
[Out] -1/72*4^(2/3)*sqrt(3)*(2*4^(1/3)*sqrt(3)*log((x + (-x^3 + 1)^(1/3
))/x) - 4^(1/3)*sqrt(3)*log((x^2 - (-x^3 + 1)^(1/3)*x + (-x^3 + 1
)^(2/3))/x^2) - 2*sqrt(3)*log((2*x + 4^(1/3)*(-x^3 + 1)^(1/3))/x)
 + sqrt(3)*log((4*x^2 - 2*4^(1/3)*(-x^3 + 1)^(1/3)*x + 4^(2/3)*(-
x^3 + 1)^(2/3))/x^2) + 6*4^(1/3)*arctan(-1/3*(sqrt(3)*x - 2*sqrt(
3)*(-x^3 + 1)^(1/3))/x) - 6*arctan(-1/3*(sqrt(3)*x - 4^(1/3)*sqrt
(3)*(-x^3 + 1)^(1/3))/x))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\left(-\left(x-1\right)\left(x^2+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(x**4/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

3.591 $\int \frac{x}{(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=122

$$-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\ 2^{2/3}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\ 2^{2/3}}$$

```
[Out] -(ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sq
rt[3])) + Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3)*x)/(1
- x^3)^(1/3)]/(6*2^(2/3)) - Log[1 + (2^(1/3)*x)/(1 - x^3)^(1/3)]/
(3*2^(2/3))
```

Rubi [A] time = 0.155538, antiderivative size = 122, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.35

$$-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\ 2^{2/3}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\ 2^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))/Sqrt[3]]/(2^(2/3)*Sq
rt[3])) + Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/3) - (2^(1/3)*x)/(1
- x^3)^(1/3)]/(6*2^(2/3)) - Log[1 + (2^(1/3)*x)/(1 - x^3)^(1/3)]/
(3*2^(2/3))
```

Rubi in Sympy [A] time = 16.7135, size = 107, normalized size = 0.88

$$-\frac{\sqrt[3]{2}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}+\frac{\sqrt[3]{2}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}-\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] -2**(1/3)*log(2**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/6 + 2**(1/3)*log
(2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2**(1/3)*x/(-x**3 + 1)**(1/3)
 + 1)/12 - 2**(1/3)*sqrt(3)*atan(sqrt(3)*(-2*2**(1/3)*x/(3*(-x**3
 + 1)**(1/3)) + 1/3))/6
```

Mathematica [C] time = 0.105468, size = 59, normalized size = 0.48

$$\frac{x^2\left(\frac{1-x^3}{x^3+1}\right)^{2/3}\,{}_2F_1\left(\frac{2}{3},\frac{2}{3};\frac{5}{3};\frac{2x^3}{x^3+1}\right)}{2\left(1-x^3\right)^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (x^2*((1 - x^3)/(1 + x^3))^(2/3)*Hypergeometric2F1[2/3, 2/3, 5/3,
 (2*x^3)/(1 + x^3)])/(2*(1 - x^3)^(2/3))
```

Maple [F] time = 0.058, size = 0, normalized size = 0.

$$\int \frac{x}{x^3+1}\left(-x^3+1\right)^{-\frac{2}{3}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(x/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")
```

```
[Out] integrate(x/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

Fricas [A] time = 1.44773, size = 348, normalized size = 2.85

$$-\frac{1}{216}\cdot 4^{\frac{2}{3}}\sqrt{3}\left(\sqrt{3}(-1)^{\frac{1}{3}}\log\left(\frac{3\cdot 4^{\frac{2}{3}}(-1)^{\frac{2}{3}}\left(5x^4-x\right)\left(-x^3+1\right)^{\frac{2}{3}}-12\cdot 4^{\frac{1}{3}}\left(2x^5-x^2\right)\left(-x^3+1\right)^{\frac{1}{3}}-2(-1)^{\frac{1}{3}}\left(19x^6-16x^3+1\right)}{x^6+2x^3+1}\right)-2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")
```

```
[Out] -1/216*4^(2/3)*sqrt(3)*(sqrt(3)*(-1)^(1/3)*log((3*4^(2/3)*(-1)^(2
/3)*(5*x^4 - x)*(-x^3 + 1)^(2/3) - 12*4^(1/3)*(2*x^5 - x^2)*(-x^3
 + 1)^(1/3) - 2*(-1)^(1/3)*(19*x^6 - 16*x^3 + 1))/(x^6 + 2*x^3 +
1)) - 2*sqrt(3)*(-1)^(1/3)*log(-(6*4^(1/3)*(-1)^(1/3)*(-x^3 + 1)^
(1/3)*x^2 - 3*4^(2/3)*(-x^3 + 1)^(2/3)*x - 2*(-1)^(2/3)*(x^3 + 1)
)/(x^3 + 1)) + 6*(-1)^(1/3)*arctan(1/3*(3*4^(1/3)*sqrt(3)*(-1)^(1
/3)*(-x^3 + 1)^(1/3)*x^2 + 3*4^(2/3)*sqrt(3)*(-x^3 + 1)^(2/3)*x -
 sqrt(3)*(-1)^(2/3)*(x^3 + 1))/(3*4^(1/3)*(-1)^(1/3)*(-x^3 + 1)^(
1/3)*x^2 + (-1)^(2/3)*(x^3 + 1))))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(-\left(x-1\right)\left(x^2+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(x/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x +
1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")
```

```
[Out] integrate(x/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

3.592 $\int \frac{1}{x^2(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=137

$$-\frac{\sqrt[3]{1-x^3}}{x}+\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\ 2^{2/3}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\ 2^{2/3}}$$

```
[Out] -((1 - x^3)^(1/3)/x) + ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))
/Sqrt[3]]/(2^(2/3)*Sqrt[3]) - Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/
3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(2/3)) + Log[1 + (2^(1/3)*
x)/(1 - x^3)^(1/3)]/(3*2^(2/3))
```

Rubi [A] time = 0.193234, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$-\frac{\sqrt[3]{1-x^3}}{x}+\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\ 2^{2/3}}+\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}-\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\ 2^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -((1 - x^3)^(1/3)/x) + ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1/3))
/Sqrt[3]]/(2^(2/3)*Sqrt[3]) - Log[1 + (2^(2/3)*x^2)/(1 - x^3)^(2/
3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(2/3)) + Log[1 + (2^(1/3)*
x)/(1 - x^3)^(1/3)]/(3*2^(2/3))
```

Rubi in Sympy [A] time = 20.775, size = 117, normalized size = 0.85

$$\frac{\sqrt[3]{2}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}-\frac{\sqrt[3]{2}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}+\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}-\frac{\sqrt[3]{-x^3+1}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] 2**(1/3)*log(2**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/6 - 2**(1/3)*log(
2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2**(1/3)*x/(-x**3 + 1)**(1/3)
+ 1)/12 + 2**(1/3)*sqrt(3)*atan(sqrt(3)*(-2*2**(1/3)*x/(3*(-x**3
+ 1)**(1/3)) + 1/3))/6 - (-x**3 + 1)**(1/3)/x
```

Mathematica [C] time = 0.834052, size = 154, normalized size = 1.12

$$\frac{5\left(-3x^6+x^3+2\right)\ {}_2F_1\left(\frac{2}{3},1;\frac{5}{3};\frac{2x^3}{x^3-1}\right)-12x^3\left(x^3+1\right)\ {}_2F_1\left(\frac{5}{3},2;\frac{8}{3};\frac{2x^3}{x^3-1}\right)}{2x\left(1-x^3\right)^{2/3}\left(15\left(x^6-1\right)\ {}_2F_1\left(\frac{2}{3},1;\frac{5}{3};\frac{2x^3}{x^3-1}\right)+18\left(x^6+x^3\right)\ {}_2F_1\left(\frac{5}{3},2;\frac{8}{3};\frac{2x^3}{x^3-1}\right)+5\left(3x^6-5x^3+2\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (5*(2 + x^3 - 3*x^6)*Hypergeometric2F1[2/3, 1, 5/3, (2*x^3)/(-1 +
 x^3)] - 12*x^3*(1 + x^3)*Hypergeometric2F1[5/3, 2, 8/3, (2*x^3)/
(-1 + x^3)])/(2*x*(1 - x^3)^(2/3)*(5*(2 - 5*x^3 + 3*x^6) + 15*(-1
 + x^6)*Hypergeometric2F1[2/3, 1, 5/3, (2*x^3)/(-1 + x^3)] + 18*(
x^3 + x^6)*Hypergeometric2F1[5/3, 2, 8/3, (2*x^3)/(-1 + x^3)]))
```

Maple [F] time = 0.087, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2}\left(x^{3}+1\right)}\left(-x^{3}+1\right)^{-\frac{2}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(1/x^2/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^2), x)
```

Fricas [A] time = 1.45293, size = 324, normalized size = 2.36

$$-\frac{4^{\frac{2}{3}}\sqrt{3}\left(\sqrt{3}x\log\left(\frac{38\,x^{6}-32\,x^{3}+3\cdot 4^{\frac{2}{3}}\left(5\,x^{4}-x\right)\left(-x^{3}+1\right)^{\frac{2}{3}}-12\cdot 4^{\frac{1}{3}}\left(2\,x^{5}-x^{2}\right)\left(-x^{3}+1\right)^{\frac{1}{3}}+2}{x^{6}+2\,x^{3}+1}\right)-2\sqrt{3}x\log\left(\frac{2\,x^{3}+6\cdot 4^{\frac{1}{3}}\left(-x^{3}+1\right)^{\frac{1}{3}}x^{2}+3\cdot 4^{\frac{2}{3}}\left(-x^{3}+1\right)^{\frac{2}{3}}x+2}{x^{3}+1}\right)}{216\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^2),x, algorithm="fricas")
```

```
[Out] -1/216*4^(2/3)*sqrt(3)*(sqrt(3)*x*log((38*x^6 - 32*x^3 + 3*4^(2/3
)*(5*x^4 - x)*(-x^3 + 1)^(2/3) - 12*4^(1/3)*(2*x^5 - x^2)*(-x^3 +
 1)^(1/3) + 2)/(x^6 + 2*x^3 + 1)) - 2*sqrt(3)*x*log((2*x^3 + 6*4^
(1/3)*(-x^3 + 1)^(1/3)*x^2 + 3*4^(2/3)*(-x^3 + 1)^(2/3)*x + 2)/(x
^3 + 1)) - 6*x*arctan(1/3*(3*4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3)*x^2
 - 3*4^(2/3)*sqrt(3)*(-x^3 + 1)^(2/3)*x + sqrt(3)*(x^3 + 1))/(x^3
 - 3*4^(1/3)*(-x^3 + 1)^(1/3)*x^2 + 1)) + 18*4^(1/3)*sqrt(3)*(-x^
3 + 1)^(1/3))/x
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{2}\left(-\left(x-1\right)\left(x^{2}+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^{2}-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**2*(-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^2), x)
```

3.593 $\int \frac{1}{x^5(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=140

$$-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\ 2^{2/3}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}-\frac{\left(1-x^3\right)^{4/3}}{4x^4}+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\ 2^{2/3}}$$

```
[Out] -(1 - x^3)^(4/3)/(4*x^4) - ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1
/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3]) + Log[1 + (2^(2/3)*x^2)/(1 - x^3)
^(2/3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(2/3)) - Log[1 + (2^(1
/3)*x)/(1 - x^3)^(1/3)]/(3*2^(2/3))
```

Rubi [A] time = 0.218828, antiderivative size = 140, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$-\frac{\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+1\right)}{3\ 2^{2/3}}-\frac{\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}}{\sqrt{3}}\right)}{2^{2/3}\sqrt{3}}-\frac{\left(1-x^3\right)^{4/3}}{4x^4}+\frac{\log\left(-\frac{\sqrt[3]{2}x}{\sqrt[3]{1-x^3}}+\frac{2^{2/3}x^2}{(1-x^3)^{2/3}}+1\right)}{6\ 2^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] -(1 - x^3)^(4/3)/(4*x^4) - ArcTan[(1 - (2*2^(1/3)*x)/(1 - x^3)^(1
/3))/Sqrt[3]]/(2^(2/3)*Sqrt[3]) + Log[1 + (2^(2/3)*x^2)/(1 - x^3)
^(2/3) - (2^(1/3)*x)/(1 - x^3)^(1/3)]/(6*2^(2/3)) - Log[1 + (2^(1
/3)*x)/(1 - x^3)^(1/3)]/(3*2^(2/3))
```

Rubi in Sympy [A] time = 22.5287, size = 121, normalized size = 0.86

$$-\frac{\sqrt[3]{2}\log\left(\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{6}+\frac{\sqrt[3]{2}\log\left(\frac{2^{\frac{2}{3}}x^2}{(-x^3+1)^{\frac{2}{3}}}-\frac{\sqrt[3]{2}x}{\sqrt[3]{-x^3+1}}+1\right)}{12}-\frac{\sqrt[3]{2}\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(-\frac{2\sqrt[3]{2}x}{3\sqrt[3]{-x^3+1}}+\frac{1}{3}\right)\right)}{6}-\frac{\left(-x^3+1\right)^{\frac{4}{3}}}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] -2**(1/3)*log(2**(1/3)*x/(-x**3 + 1)**(1/3) + 1)/6 + 2**(1/3)*log
(2**(2/3)*x**2/(-x**3 + 1)**(2/3) - 2**(1/3)*x/(-x**3 + 1)**(1/3)
 + 1)/12 - 2**(1/3)*sqrt(3)*atan(sqrt(3)*(-2*2**(1/3)*x/(3*(-x**3
 + 1)**(1/3)) + 1/3))/6 - (-x**3 + 1)**(4/3)/(4*x**4)
```

Mathematica [C] time = 44.1434, size = 1024, normalized size = 7.31

$$\frac{\qquad}{60x^9\left(1-x^3\right)^{4/3}\left(x^3-1\right)\left(x^3+1\right)\left(-\frac{81(x^3+1)^2\,{}_4F_3\left(\frac{2}{3},2,2,2;1,1,\frac{8}{3};\frac{2x^3}{x^3-1}\right)x^3+5\left(9x^9+x^6-9x^3+(9x^9-20x^6-13x^3+4)\,{}_2F_1\left(\frac{2}{3},1;\frac{5}{3};\frac{2x^3}{x^3-1}\right)-1\right)+216(x^9+x^6)\,{}_3F_2}{15x^5(1-x^3)^{2/3}(x^3-1)}\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (5*(-1 - 9*x^3 + x^6 + 9*x^9 + (4 - 13*x^3 - 20*x^6 + 9*x^9)*Hype
rgeometric2F1[2/3, 1, 5/3, (2*x^3)/(-1 + x^3)]) + 216*(x^6 + x^9)
*HypergeometricPFQ[{2/3, 2, 2}, {1, 8/3}, (2*x^3)/(-1 + x^3)] + 8
1*x^3*(1 + x^3)^2*HypergeometricPFQ[{2/3, 2, 2, 2}, {1, 1, 8/3},
(2*x^3)/(-1 + x^3)])/(60*x^9*(1 - x^3)^(4/3)*(-1 + x^3)*(1 + x^3)
*(-(5*(-1 - 9*x^3 + x^6 + 9*x^9 + (4 - 13*x^3 - 20*x^6 + 9*x^9)*H
ypergeometric2F1[2/3, 1, 5/3, (2*x^3)/(-1 + x^3)]) + 216*(x^6 + x
^9)*HypergeometricPFQ[{2/3, 2, 2}, {1, 8/3}, (2*x^3)/(-1 + x^3)]
+ 81*x^3*(1 + x^3)^2*HypergeometricPFQ[{2/3, 2, 2, 2}, {1, 1, 8/3
}, (2*x^3)/(-1 + x^3)])/(20*x^2*(1 - x^3)^(2/3)*(-1 + x^3)^2) + (
5*(-1 - 9*x^3 + x^6 + 9*x^9 + (4 - 13*x^3 - 20*x^6 + 9*x^9)*Hyper
geometric2F1[2/3, 1, 5/3, (2*x^3)/(-1 + x^3)]) + 216*(x^6 + x^9)*
HypergeometricPFQ[{2/3, 2, 2}, {1, 8/3}, (2*x^3)/(-1 + x^3)] + 81
*x^3*(1 + x^3)^2*HypergeometricPFQ[{2/3, 2, 2, 2}, {1, 1, 8/3}, (
2*x^3)/(-1 + x^3)])/(30*x^2*(1 - x^3)^(5/3)*(-1 + x^3)) - (5*(-1
- 9*x^3 + x^6 + 9*x^9 + (4 - 13*x^3 - 20*x^6 + 9*x^9)*Hypergeomet
ric2F1[2/3, 1, 5/3, (2*x^3)/(-1 + x^3)]) + 216*(x^6 + x^9)*Hyperg
eometricPFQ[{2/3, 2, 2}, {1, 8/3}, (2*x^3)/(-1 + x^3)] + 81*x^3*(
1 + x^3)^2*HypergeometricPFQ[{2/3, 2, 2, 2}, {1, 1, 8/3}, (2*x^3)
/(-1 + x^3)])/(15*x^5*(1 - x^3)^(2/3)*(-1 + x^3)) + (5*(-27*x^2 +
 6*x^5 + 81*x^8 + ((-1 + x^3)*(4 - 13*x^3 - 20*x^6 + 9*x^9)*((-6*
x^5)/(-1 + x^3)^2 + (6*x^2)/(-1 + x^3))*((1 - (2*x^3)/(-1 + x^3))
^(-1) - Hypergeometric2F1[2/3, 1, 5/3, (2*x^3)/(-1 + x^3)]))/(3*x
^3) + (-39*x^2 - 120*x^5 + 81*x^8)*Hypergeometric2F1[2/3, 1, 5/3,
 (2*x^3)/(-1 + x^3)]) + 216*(6*x^5 + 9*x^8)*HypergeometricPFQ[{2/
3, 2, 2}, {1, 8/3}, (2*x^3)/(-1 + x^3)] + 216*(x^6 + x^9)*((-6*x^
5)/(-1 + x^3)^2 + (6*x^2)/(-1 + x^3))*HypergeometricPFQ[{5/3, 3,
3}, {2, 11/3}, (2*x^3)/(-1 + x^3)] + 486*x^5*(1 + x^3)*Hypergeome
tricPFQ[{2/3, 2, 2, 2}, {1, 1, 8/3}, (2*x^3)/(-1 + x^3)] + 243*x^
2*(1 + x^3)^2*HypergeometricPFQ[{2/3, 2, 2, 2}, {1, 1, 8/3}, (2*x
^3)/(-1 + x^3)] + 162*x^3*(1 + x^3)^2*((-6*x^5)/(-1 + x^3)^2 + (6
*x^2)/(-1 + x^3))*HypergeometricPFQ[{5/3, 3, 3, 3}, {2, 2, 11/3},
 (2*x^3)/(-1 + x^3)])/(60*x^4*(1 - x^3)^(2/3)*(-1 + x^3))))
```

Maple [F] time = 0.082, size = 0, normalized size = 0.

$$\int \frac{1}{x^5\left(x^3+1\right)}\left(-x^3+1\right)^{-\frac{2}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(1/x^5/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(x^3+1\right)\left(-x^3+1\right)^{\frac{2}{3}}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^5),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^5), x)
```

Fricas [A] time = 1.44013, size = 396, normalized size = 2.83

$$-\frac{4^{\frac{2}{3}}\sqrt{3}\left(2\sqrt{3}(-1)^{\frac{1}{3}}x^4\log\left(\frac{3\cdot 4^{\frac{2}{3}}(-1)^{\frac{2}{3}}(5x^4-x)(-x^3+1)^{\frac{2}{3}}-12\cdot 4^{\frac{1}{3}}(2x^5-x^2)(-x^3+1)^{\frac{1}{3}}-2(-1)^{\frac{1}{3}}(19x^6-16x^3+1)}{x^6+2x^3+1}\right)-4\sqrt{3}(-1)^{\frac{1}{3}}x^4\log\left(-\frac{6\cdot 4^{\frac{1}{3}}(-\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^5),x, algorithm="fricas")
```

```
[Out] -1/432*4^(2/3)*sqrt(3)*(2*sqrt(3)*(-1)^(1/3)*x^4*log((3*4^(2/3)*(
-1)^(2/3)*(5*x^4 - x)*(-x^3 + 1)^(2/3) - 12*4^(1/3)*(2*x^5 - x^2)
*(-x^3 + 1)^(1/3) - 2*(-1)^(1/3)*(19*x^6 - 16*x^3 + 1))/(x^6 + 2*
x^3 + 1)) - 4*sqrt(3)*(-1)^(1/3)*x^4*log(-(6*4^(1/3)*(-1)^(1/3)*(
-x^3 + 1)^(1/3)*x^2 - 3*4^(2/3)*(-x^3 + 1)^(2/3)*x - 2*(-1)^(2/3)
*(x^3 + 1))/(x^3 + 1)) + 12*(-1)^(1/3)*x^4*arctan(1/3*(3*4^(1/3)*
sqrt(3)*(-1)^(1/3)*(-x^3 + 1)^(1/3)*x^2 + 3*4^(2/3)*sqrt(3)*(-x^3
 + 1)^(2/3)*x - sqrt(3)*(-1)^(2/3)*(x^3 + 1))/(3*4^(1/3)*(-1)^(1/
3)*(-x^3 + 1)^(1/3)*x^2 + (-1)^(2/3)*(x^3 + 1))) - 9*4^(1/3)*sqrt
(3)*(x^3 - 1)*(-x^3 + 1)^(1/3))/x^4
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^5\left(-(x-1)(x^2+x+1)\right)^{\frac{2}{3}}(x+1)(x^2-x+1)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**5*(-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^5),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^5), x)
```

3.594 $\int \frac{x^6}{(1-x^3)^{2/3}(1+x^3)} dx$

Optimal. Leaf size=26

$$\frac{1}{7}x^7F_1\left(\frac{7}{3};\frac{2}{3},1;\frac{10}{3};x^3,-x^3\right)$$

```
[Out] (x^7*AppellF1[7/3, 2/3, 1, 10/3, x^3, -x^3])/7
```

Rubi [A] time = 0.0609548, antiderivative size = 26, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$\frac{1}{7}x^7F_1\left(\frac{7}{3};\frac{2}{3},1;\frac{10}{3};x^3,-x^3\right)$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/((1 - x^3)^(2/3)*(1 + x^3)),x]

[Out] (x^7*AppellF1[7/3, 2/3, 1, 10/3, x^3, -x^3])/7
```

Rubi in Sympy [A] time = 6.15043, size = 17, normalized size = 0.65

$$\frac{x^7 \operatorname{appellf}_1\left(\frac{7}{3},\frac{2}{3},1,\frac{10}{3},x^3,-x^3\right)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(-x**3+1)**(2/3)/(x**3+1),x)

[Out] x**7*appellf1(7/3, 2/3, 1, 10/3, x**3, -x**3)/7
```

Mathematica [B] time = 0.195612, size = 115, normalized size = 4.42

$$\frac{1}{2}x\sqrt[3]{1-x^3}\left(-\frac{4F_1\left(\frac{1}{3};-\frac{1}{3},1;\frac{4}{3};x^3,-x^3\right)}{(x^3+1)\left(x^3\left(3F_1\left(\frac{4}{3};-\frac{1}{3},2;\frac{7}{3};x^3,-x^3\right)+F_1\left(\frac{4}{3};\frac{2}{3},1;\frac{7}{3};x^3,-x^3\right)\right)-4F_1\left(\frac{1}{3};-\frac{1}{3},1;\frac{4}{3};x^3,-x^3\right)\right)}-1\right)$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^6/((1 - x^3)^(2/3)*(1 + x^3)),x]

[Out] (x*(1 - x^3)^(1/3)*(-1 - (4*AppellF1[1/3, -1/3, 1, 4/3, x^3, -x^3
])/((1 + x^3)*(-4*AppellF1[1/3, -1/3, 1, 4/3, x^3, -x^3] + x^3*(3
*AppellF1[4/3, -1/3, 2, 7/3, x^3, -x^3] + AppellF1[4/3, 2/3, 1, 7
/3, x^3, -x^3])))))/2
```

Maple [F] time = 0.09, size = 0, normalized size = 0.

$$\int \frac{x^6}{x^3+1}\left(-x^3+1\right)^{-\frac{2}{3}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(x^6/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")
```

```
[Out] integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

Fricas [A] time = 1.87377, size = 402, normalized size = 15.46

$$-\frac{1}{432}\cdot 4^{\frac{2}{3}}\sqrt{3}\left(18\cdot 4^{\frac{1}{3}}\sqrt{3}\left(-x^3+1\right)^{\frac{1}{3}}x+\sqrt{3}\log\left(\frac{x^{12}-32\,x^9+78\,x^6-32\,x^3+6\cdot 4^{\frac{2}{3}}\left(x^8-4\,x^5+x^2\right)\left(-x^3+1\right)^{\frac{2}{3}}+3\cdot 4^{\frac{1}{3}}\left(x^{10}-11\,x^7\right.}{x^{12}+4\,x^9+6\,x^6+4\,x^3+1}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")
```

```
[Out] -1/432*4^(2/3)*sqrt(3)*(18*4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3)*x + s
qrt(3)*log((x^12 - 32*x^9 + 78*x^6 - 32*x^3 + 6*4^(2/3)*(x^8 - 4*
x^5 + x^2)*(-x^3 + 1)^(2/3) + 3*4^(1/3)*(x^10 - 11*x^7 + 11*x^4 -
 x)*(-x^3 + 1)^(1/3) + 1)/(x^12 + 4*x^9 + 6*x^6 + 4*x^3 + 1)) - 2
*sqrt(3)*log(-(x^6 + 3*4^(2/3)*(-x^3 + 1)^(2/3)*x^2 + 2*x^3 - 3*4
^(1/3)*(x^4 - x)*(-x^3 + 1)^(1/3) + 1)/(x^6 + 2*x^3 + 1)) + 6*arc
tan(1/3*(6*4^(2/3)*sqrt(3)*(-x^3 + 1)^(2/3)*x^2 + 3*4^(1/3)*sqrt(
3)*(x^4 - x)*(-x^3 + 1)^(1/3) - sqrt(3)*(x^6 + 2*x^3 + 1))/(x^6 +
 2*x^3 + 3*4^(1/3)*(x^4 - x)*(-x^3 + 1)^(1/3) + 1)))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\left(-(x-1)\left(x^2+x+1\right)\right)^{\frac{2}{3}}(x+1)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(x**6/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")

[Out] integrate(x^6/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

3.595 $\int \frac{x^3}{(1-x^3)^{2/3}(1+x^3)} dx$

Optimal. Leaf size=26

$$\frac{1}{4}x^4F_1\left(\frac{4}{3};\frac{2}{3},1;\frac{7}{3};x^3,-x^3\right)$$

```
[Out] (x^4*AppellF1[4/3, 2/3, 1, 7/3, x^3, -x^3])/4
```

Rubi [A] time = 0.0623624, antiderivative size = 26, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$\frac{1}{4}x^4F_1\left(\frac{4}{3};\frac{2}{3},1;\frac{7}{3};x^3,-x^3\right)$$

Antiderivative was successfully verified.

```
[In] Int[x^3/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (x^4*AppellF1[4/3, 2/3, 1, 7/3, x^3, -x^3])/4
```

Rubi in Sympy [A] time = 6.85313, size = 17, normalized size = 0.65

$$\frac{x^4 \operatorname{appellf}_1\left(\frac{4}{3},\frac{2}{3},1,\frac{7}{3},x^3,-x^3\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**3/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] x**4*appellf1(4/3, 2/3, 1, 7/3, x**3, -x**3)/4
```

Mathematica [B] time = 0.174404, size = 115, normalized size = 4.42

$$-\frac{7x^4F_1\left(\frac{4}{3};\frac{2}{3},1;\frac{7}{3};x^3,-x^3\right)}{4\left(1-x^3\right)^{2/3}\left(x^3+1\right)\left(x^3\left(3F_1\left(\frac{7}{3};\frac{2}{3},2;\frac{10}{3};x^3,-x^3\right)-2F_1\left(\frac{7}{3};\frac{5}{3},1;\frac{10}{3};x^3,-x^3\right)\right)-7F_1\left(\frac{4}{3};\frac{2}{3},1;\frac{7}{3};x^3,-x^3\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (-7*x^4*AppellF1[4/3, 2/3, 1, 7/3, x^3, -x^3])/(4*(1 - x^3)^(2/3)
*(1 + x^3)*(-7*AppellF1[4/3, 2/3, 1, 7/3, x^3, -x^3] + x^3*(3*App
ellF1[7/3, 2/3, 2, 10/3, x^3, -x^3] - 2*AppellF1[7/3, 5/3, 1, 10/
3, x^3, -x^3])))
```

Maple [F] time = 0.059, size = 0, normalized size = 0.

$$\int \frac{x^3}{x^3+1}\left(-x^3+1\right)^{-\frac{2}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(-x^3+1)^(2/3)/(x^3+1),x)

[Out] int(x^3/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")

[Out] integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")

[Out] integral(x^3/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\left(-\left(x-1\right)\left(x^2+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(-x**3+1)**(2/3)/(x**3+1),x)

[Out] Integral(x**3/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x
 + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")

[Out] integrate(x^3/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

3.596 $\int \frac{1}{(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=21

$$xF_1\left(\frac{1}{3};\frac{2}{3},1;\frac{4}{3};x^3,-x^3\right)$$

```
[Out] x*AppellF1[1/3, 2/3, 1, 4/3, x^3, -x^3]
```

Rubi [A] time = 0.0328469, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053

$$xF_1\left(\frac{1}{3};\frac{2}{3},1;\frac{4}{3};x^3,-x^3\right)$$

Antiderivative was successfully verified.

```
[In]  Int[1/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] x*AppellF1[1/3, 2/3, 1, 4/3, x^3, -x^3]
```

Rubi in Sympy [A] time = 4.62193, size = 14, normalized size = 0.67

$$x\,\mathrm{appellf}_1\left(\frac{1}{3},\frac{2}{3},1,\frac{4}{3},x^3,-x^3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] x*appellf1(1/3, 2/3, 1, 4/3, x**3, -x**3)
```

Mathematica [B] time = 0.185074, size = 111, normalized size = 5.29

$$-\frac{4xF_1\left(\frac{1}{3};\frac{2}{3},1;\frac{4}{3};x^3,-x^3\right)}{(1-x^3)^{2/3}(x^3+1)\left(x^3\left(3F_1\left(\frac{4}{3};\frac{2}{3},2;\frac{7}{3};x^3,-x^3\right)-2F_1\left(\frac{4}{3};\frac{5}{3},1;\frac{7}{3};x^3,-x^3\right)\right)-4F_1\left(\frac{1}{3};\frac{2}{3},1;\frac{4}{3};x^3,-x^3\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((1 - x^3)^(2/3)*(1 + x^3)),x]
```

```
[Out] (-4*x*AppellF1[1/3, 2/3, 1, 4/3, x^3, -x^3])/((1 - x^3)^(2/3)*(1
+ x^3)*(-4*AppellF1[1/3, 2/3, 1, 4/3, x^3, -x^3] + x^3*(3*AppellF
1[4/3, 2/3, 2, 7/3, x^3, -x^3] - 2*AppellF1[4/3, 5/3, 1, 7/3, x^3
, -x^3])))
```

Maple [F] time = 0.054, size = 0, normalized size = 0.

$$\int \frac{1}{x^3+1}\left(-x^3+1\right)^{-\frac{2}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(1/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="fricas")
```

```
[Out] integral(1/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(-\left(x-1\right)\left(x^2+x+1\right)\right)^{\frac{2}{3}}\left(x+1\right)\left(x^2-x+1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(1/((-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 - x +
1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)), x)
```

3.597 $\int \frac{1}{x^3(1-x^3)^{2/3}(1+x^3)}\,dx$

Optimal. Leaf size=26

$$-\frac{F_1\left(-\frac{2}{3};\frac{2}{3},1;\frac{1}{3};x^3,-x^3\right)}{2x^2}$$

```
[Out] -AppellF1[-2/3, 2/3, 1, 1/3, x^3, -x^3]/(2*x^2)
```

Rubi [A] time = 0.0630453, antiderivative size = 26, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045

$$-\frac{F_1\left(-\frac{2}{3};\frac{2}{3},1;\frac{1}{3};x^3,-x^3\right)}{2x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(1 - x^3)^(2/3)*(1 + x^3)),x]

[Out] -AppellF1[-2/3, 2/3, 1, 1/3, x^3, -x^3]/(2*x^2)
```

Rubi in Sympy [A] time = 6.27822, size = 20, normalized size = 0.77

$$-\frac{\operatorname{appellf}_1\left(-\frac{2}{3},\frac{2}{3},1,\frac{1}{3},x^3,-x^3\right)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(-x**3+1)**(2/3)/(x**3+1),x)

[Out] -appellf1(-2/3, 2/3, 1, 1/3, x**3, -x**3)/(2*x**2)
```

Mathematica [B] time = 0.181723, size = 120, normalized size = 4.62

$$\frac{\sqrt[3]{1-x^3}\left(\frac{4x^3F_1\left(\frac{1}{3};-\frac{1}{3},1;\frac{4}{3};x^3,-x^3\right)}{(x^3+1)\left(x^3\left(3F_1\left(\frac{4}{3};-\frac{1}{3},2;\frac{7}{3};x^3,-x^3\right)+F_1\left(\frac{4}{3};\frac{2}{3},1;\frac{7}{3};x^3,-x^3\right)\right)-4F_1\left(\frac{1}{3};-\frac{1}{3},1;\frac{4}{3};x^3,-x^3\right)\right)}-1\right)}{2x^2}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(1 - x^3)^(2/3)*(1 + x^3)),x]

[Out] ((1 - x^3)^(1/3)*(-1 + (4*x^3*AppellF1[1/3, -1/3, 1, 4/3, x^3, -x
^3])/((1 + x^3)*(-4*AppellF1[1/3, -1/3, 1, 4/3, x^3, -x^3] + x^3*
(3*AppellF1[4/3, -1/3, 2, 7/3, x^3, -x^3] + AppellF1[4/3, 2/3, 1,
 7/3, x^3, -x^3])))))/(2*x^2)
```

Maple [F] time = 0.08, size = 0, normalized size = 0.

$$\int \frac{1}{x^3(x^3+1)}\left(-x^3+1\right)^{-\frac{2}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(-x^3+1)^(2/3)/(x^3+1),x)
```

```
[Out] int(1/x^3/(-x^3+1)^(2/3)/(x^3+1),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^3), x)
```

Fricas [A] time = 1.81875, size = 474, normalized size = 18.23

$$4^{\frac{2}{3}}\sqrt{3}\left(2\sqrt{3}(-1)^{\frac{1}{3}}x^2\log\left(-\frac{3\cdot4^{\frac{2}{3}}(-x^3+1)^{\frac{2}{3}}x^2+3\cdot4^{\frac{1}{3}}(-1)^{\frac{1}{3}}(x^4-x)(-x^3+1)^{\frac{1}{3}}+(-1)^{\frac{2}{3}}(x^6+2x^3+1)}{x^6+2x^3+1}\right)-\sqrt{3}(-1)^{\frac{1}{3}}x^2\log\left(\frac{6\cdot4^{\frac{2}{3}}(-1)^{\frac{2}{3}}(x^8-4x^5+x^2)(-\cdots\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^3),x, algorithm="fricas")
```

```
[Out] 1/432*4^(2/3)*sqrt(3)*(2*sqrt(3)*(-1)^(1/3)*x^2*log(-(3*4^(2/3)*(
-x^3 + 1)^(2/3)*x^2 + 3*4^(1/3)*(-1)^(1/3)*(x^4 - x)*(-x^3 + 1)^(
1/3) + (-1)^(2/3)*(x^6 + 2*x^3 + 1))/(x^6 + 2*x^3 + 1)) - sqrt(3)
*(-1)^(1/3)*x^2*log((6*4^(2/3)*(-1)^(2/3)*(x^8 - 4*x^5 + x^2)*(-x
^3 + 1)^(2/3) + 3*4^(1/3)*(x^10 - 11*x^7 + 11*x^4 - x)*(-x^3 + 1)
^(1/3) - (-1)^(1/3)*(x^12 - 32*x^9 + 78*x^6 - 32*x^3 + 1))/(x^12
+ 4*x^9 + 6*x^6 + 4*x^3 + 1)) + 6*(-1)^(1/3)*x^2*arctan(1/3*(6*4^
(2/3)*sqrt(3)*(-x^3 + 1)^(2/3)*x^2 - 3*4^(1/3)*sqrt(3)*(-1)^(1/3)
*(x^4 - x)*(-x^3 + 1)^(1/3) - sqrt(3)*(-1)^(2/3)*(x^6 + 2*x^3 + 1
))/(3*4^(1/3)*(-1)^(1/3)*(x^4 - x)*(-x^3 + 1)^(1/3) - (-1)^(2/3)*
(x^6 + 2*x^3 + 1))) - 18*4^(1/3)*sqrt(3)*(-x^3 + 1)^(1/3))/x^2
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\left(-(x-1)(x^2+x+1)\right)^{\frac{2}{3}}(x+1)(x^2-x+1)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(-x**3+1)**(2/3)/(x**3+1),x)
```

```
[Out] Integral(1/(x**3*(-(x - 1)*(x**2 + x + 1))**(2/3)*(x + 1)*(x**2 -
 x + 1)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(x^3+1)(-x^3+1)^{\frac{2}{3}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3 + 1)*(-x^3 + 1)^(2/3)*x^3), x)
```

3.598 $\int \frac{x^{15}}{(a+bx^4)(c+dx^4)} dx$

Optimal. Leaf size=90

$$-\frac{a^3 \log \left(a+bx^4\right)}{4b^3(bc-ad)}-\frac{x^4(ad+bc)}{4b^2d^2}+\frac{c^3 \log \left(c+dx^4\right)}{4d^3(bc-ad)}+\frac{x^8}{8bd}$$

```
[Out] -((b*c + a*d)*x^4)/(4*b^2*d^2) + x^8/(8*b*d) - (a^3*Log[a + b*x^4
])/(4*b^3*(b*c - a*d)) + (c^3*Log[c + d*x^4])/(4*d^3*(b*c - a*d))
```

Rubi [A] time = 0.248019, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$-\frac{a^3 \log \left(a+bx^4\right)}{4b^3(bc-ad)}-\frac{x^4(ad+bc)}{4b^2d^2}+\frac{c^3 \log \left(c+dx^4\right)}{4d^3(bc-ad)}+\frac{x^8}{8bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^15/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -((b*c + a*d)*x^4)/(4*b^2*d^2) + x^8/(8*b*d) - (a^3*Log[a + b*x^4
])/(4*b^3*(b*c - a*d)) + (c^3*Log[c + d*x^4])/(4*d^3*(b*c - a*d))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{a^3 \log \left(a+bx^4\right)}{4b^3 \left(ad-bc\right)}-\frac{c^3 \log \left(c+dx^4\right)}{4d^3 \left(ad-bc\right)}-\frac{\left(ad+bc\right) \int^{x^4} \frac{1}{b^2} dx}{4d^2}+\frac{\int^{x^4} x\, dx}{4bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**15/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] a**3*log(a + b*x**4)/(4*b**3*(a*d - b*c)) - c**3*log(c + d*x**4)/
(4*d**3*(a*d - b*c)) - (a*d + b*c)*Integral(b**(-2), (x, x**4))/(
4*d**2) + Integral(x, (x, x**4))/(4*b*d)
```

Mathematica [A] time = 0.0780631, size = 92, normalized size = 1.02

$$-\frac{a^3 \log \left(a+bx^4\right)}{4b^3(bc-ad)}+\frac{x^4(-ad-bc)}{4b^2d^2}+\frac{c^3 \log \left(c+dx^4\right)}{4d^3(bc-ad)}+\frac{x^8}{8bd}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^15/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] ((-(b*c) - a*d)*x^4)/(4*b^2*d^2) + x^8/(8*b*d) - (a^3*Log[a + b*x
^4])/(4*b^3*(b*c - a*d)) + (c^3*Log[c + d*x^4])/(4*d^3*(b*c - a*d
))
```

Maple [A] time = 0.011, size = 89, normalized size = 1.

$$\frac{x^8}{8\,bd}-\frac{ax^4}{4\,b^2d}-\frac{cx^4}{4\,d^2b}-\frac{c^3 \ln \left(dx^4+c\right)}{4\,d^3 \left(ad-bc\right)}+\frac{a^3 \ln \left(bx^4+a\right)}{4\,b^3 \left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^15/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/8*x^8/b/d-1/4/d/b^2*x^4*a-1/4/d^2/b*x^4*c-1/4*c^3/d^3/(a*d-b*c)
*ln(d*x^4+c)+1/4*a^3/b^3/(a*d-b*c)*ln(b*x^4+a)
```

Maxima [A] time = 1.37438, size = 113, normalized size = 1.26

$$-\frac{a^3 \log\left(bx^4 + a\right)}{4\left(b^4c - ab^3d\right)} + \frac{c^3 \log\left(dx^4 + c\right)}{4\left(bcd^3 - ad^4\right)} + \frac{bdx^8 - 2\left(bc + ad\right)x^4}{8\, b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] -1/4*a^3*log(b*x^4 + a)/(b^4*c - a*b^3*d) + 1/4*c^3*log(d*x^4 + c
)/(b*c*d^3 - a*d^4) + 1/8*(b*d*x^8 - 2*(b*c + a*d)*x^4)/(b^2*d^2)
```

Fricas [A] time = 3.8838, size = 135, normalized size = 1.5

$$\frac{\left(b^3cd^2 - ab^2d^3\right)x^8 - 2\, a^3d^3 \log\left(bx^4 + a\right) + 2\, b^3c^3 \log\left(dx^4 + c\right) - 2\left(b^3c^2d - a^2bd^3\right)x^4}{8\left(b^4cd^3 - ab^3d^4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] 1/8*((b^3*c*d^2 - a*b^2*d^3)*x^8 - 2*a^3*d^3*log(b*x^4 + a) + 2*b
^3*c^3*log(d*x^4 + c) - 2*(b^3*c^2*d - a^2*b*d^3)*x^4)/(b^4*c*d^3
 - a*b^3*d^4)
```

Sympy [A] time = 17.1684, size = 230, normalized size = 2.56

$$\frac{a^3 \log\left(x^4 + \frac{\frac{a^5d^4}{b(ad-bc)} - \frac{2a^4cd^3}{ad-bc} + \frac{a^3bc^2d^2}{ad-bc} + a^3cd^2 + ab^2c^3}{a^3d^3+b^3c^3}\right)}{4b^3\left(ad - bc\right)} - \frac{c^3 \log\left(x^4 + \frac{a^3cd^2 - \frac{a^2b^2c^3d}{ad-bc} + \frac{2ab^3c^4}{ad-bc} + ab^2c^3 - \frac{b^4c^5}{d(ad-bc)}}{a^3d^3+b^3c^3}\right)}{4d^3\left(ad - bc\right)} + \frac{x^8}{8bd} - \frac{x^4\left(ad + bc\right)}{4b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**15/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] a**3*log(x**4 + (a**5*d**4/(b*(a*d - b*c)) - 2*a**4*c*d**3/(a*d -
 b*c) + a**3*b*c**2*d**2/(a*d - b*c) + a**3*c*d**2 + a*b**2*c**3)
/(a**3*d**3 + b**3*c**3))/(4*b**3*(a*d - b*c)) - c**3*log(x**4 +
(a**3*c*d**2 - a**2*b**2*c**3*d/(a*d - b*c) + 2*a*b**3*c**4/(a*d
- b*c) + a*b**2*c**3 - b**4*c**5/(d*(a*d - b*c)))/(a**3*d**3 + b*
*3*c**3))/(4*d**3*(a*d - b*c)) + x**8/(8*b*d) - x**4*(a*d + b*c)/
(4*b**2*d**2)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.599 $\int \frac{x^{11}}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=70

$$\frac{a^2\log\left(a+bx^4\right)}{4b^2(bc-ad)}-\frac{c^2\log\left(c+dx^4\right)}{4d^2(bc-ad)}+\frac{x^4}{4bd}$$

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

Rubi [A] time = 0.177386, antiderivative size = 70, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{a^2\log\left(a+bx^4\right)}{4b^2(bc-ad)}-\frac{c^2\log\left(c+dx^4\right)}{4d^2(bc-ad)}+\frac{x^4}{4bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((a + b*x^4)*(c + d*x^4)),x]
```

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

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^2\log\left(a+bx^4\right)}{4b^2\left(ad-bc\right)}+\frac{c^2\log\left(c+dx^4\right)}{4d^2\left(ad-bc\right)}+\frac{\int^{x^4}\frac{1}{b}\,dx}{4d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -a**2*log(a + b*x**4)/(4*b**2*(a*d - b*c)) + c**2*log(c + d*x**4)
/(4*d**2*(a*d - b*c)) + Integral(1/b, (x, x**4))/(4*d)
```

Mathematica [A] time = 0.0523422, size = 66, normalized size = 0.94

$$\frac{a^2d^2\log\left(a+bx^4\right)-b\left(dx^4(ad-bc)+bc^2\log\left(c+dx^4\right)\right)}{4b^2d^2(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((a + b*x^4)*(c + d*x^4)),x]
```

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

Maple [A] time = 0.012, size = 65, normalized size = 0.9

$$\frac{x^4}{4\,bd}+\frac{c^2\ln\left(dx^4+c\right)}{\left(4\,ad-4\,bc\right)d^2}-\frac{a^2\ln\left(bx^4+a\right)}{\left(4\,ad-4\,bc\right)b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/4*x^4/b/d+1/4*c^2/(a*d-b*c)/d^2*ln(d*x^4+c)-1/4*a^2/(a*d-b*c)/b
^2*ln(b*x^4+a)
```

Maxima [A] time = 1.48745, size = 92, normalized size = 1.31

$$\frac{x^4}{4\,bd} + \frac{a^2\log\left(bx^4+a\right)}{4\,(b^3c-ab^2d)} - \frac{c^2\log\left(dx^4+c\right)}{4\,(bcd^2-ad^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] 1/4*x^4/(b*d) + 1/4*a^2*log(b*x^4 + a)/(b^3*c - a*b^2*d) - 1/4*c^
2*log(d*x^4 + c)/(b*c*d^2 - a*d^3)
```

Fricas [A] time = 1.38102, size = 97, normalized size = 1.39

$$\frac{\left(b^2cd-abd^2\right)x^4 + a^2d^2\log\left(bx^4+a\right) - b^2c^2\log\left(dx^4+c\right)}{4\,(b^3cd^2-ab^2d^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] 1/4*((b^2*c*d - a*b*d^2)*x^4 + a^2*d^2*log(b*x^4 + a) - b^2*c^2*l
og(d*x^4 + c))/(b^3*c*d^2 - a*b^2*d^3)
```

Sympy [A] time = 13.3106, size = 201, normalized size = 2.87

$$-\frac{a^2\log\left(x^4+\frac{\frac{a^4d^3}{b(ad-bc)}-\frac{2a^3cd^2}{ad-bc}+\frac{a^2bc^2d}{ad-bc}+a^2cd+abc^2}{a^2d^2+b^2c^2}\right)}{4b^2\,(ad-bc)} + \frac{c^2\log\left(x^4+\frac{-\frac{a^2bc^2d}{ad-bc}+a^2cd+\frac{2ab^2c^3}{ad-bc}+abc^2-\frac{b^3c^4}{d(ad-bc)}}{a^2d^2+b^2c^2}\right)}{4d^2\,(ad-bc)} + \frac{x^4}{4bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -a**2*log(x**4 + (a**4*d**3/(b*(a*d - b*c)) - 2*a**3*c*d**2/(a*d
- b*c) + a**2*b*c**2*d/(a*d - b*c) + a**2*c*d + a*b*c**2)/(a**2*d
**2 + b**2*c**2))/(4*b**2*(a*d - b*c)) + c**2*log(x**4 + (-a**2*b
*c**2*d/(a*d - b*c) + a**2*c*d + 2*a*b**2*c**3/(a*d - b*c) + a*b*
c**2 - b**3*c**4/(d*(a*d - b*c)))/(a**2*d**2 + b**2*c**2))/(4*d**
2*(a*d - b*c)) + x**4/(4*b*d)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.600 $\int \frac{x^7}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=53

$$\frac{c\log(c+dx^4)}{4d(bc-ad)}-\frac{a\log(a+bx^4)}{4b(bc-ad)}$$

```
[Out] -(a*Log[a + b*x^4])/(4*b*(b*c - a*d)) + (c*Log[c + d*x^4])/(4*d*(
b*c - a*d))
```

Rubi [A] time = 0.138214, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{c\log(c+dx^4)}{4d(bc-ad)}-\frac{a\log(a+bx^4)}{4b(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -(a*Log[a + b*x^4])/(4*b*(b*c - a*d)) + (c*Log[c + d*x^4])/(4*d*(
b*c - a*d))
```

Rubi in Sympy [A] time = 18.344, size = 39, normalized size = 0.74

$$\frac{a\log(a+bx^4)}{4b(ad-bc)}-\frac{c\log(c+dx^4)}{4d(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] a*log(a + b*x**4)/(4*b*(a*d - b*c)) - c*log(c + d*x**4)/(4*d*(a*d
 - b*c))
```

Mathematica [A] time = 0.0362688, size = 43, normalized size = 0.81

$$-\frac{ad\log(a+bx^4)-bc\log(c+dx^4)}{4b^2cd-4abd^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7/((a + b*x^4)*(c + d*x^4)),x]
```

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

Maple [A] time = 0.009, size = 50, normalized size = 0.9

$$-\frac{c\ln(dx^4+c)}{(4ad-4bc)d}+\frac{a\ln(bx^4+a)}{(4ad-4bc)b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] -1/4*c/(a*d-b*c)/d*ln(d*x^4+c)+1/4*a/(a*d-b*c)/b*ln(b*x^4+a)
```

Maxima [A] time = 1.39137, size = 66, normalized size = 1.25

$$-\frac{a\log\left(bx^4+a\right)}{4\left(b^2c-abd\right)}+\frac{c\log\left(dx^4+c\right)}{4\left(bcd-ad^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] -1/4*a*log(b*x^4 + a)/(b^2*c - a*b*d) + 1/4*c*log(d*x^4 + c)/(b*c
*d - a*d^2)
```

Fricas [A] time = 0.504553, size = 57, normalized size = 1.08

$$-\frac{ad\log\left(bx^4+a\right)-bc\log\left(dx^4+c\right)}{4\left(b^2cd-abd^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] -1/4*(a*d*log(b*x^4 + a) - b*c*log(d*x^4 + c))/(b^2*c*d - a*b*d^2
)
```

Sympy [A] time = 8.04644, size = 144, normalized size = 2.72

$$\frac{a\log\left(x^4+\frac{\frac{a^3d^2}{b(ad-bc)}-\frac{2a^2cd}{ad-bc}+\frac{abc^2}{ad-bc}+2ac}{ad+bc}\right)}{4b\left(ad-bc\right)}-\frac{c\log\left(x^4+\frac{-\frac{a^2cd}{ad-bc}+\frac{2abc^2}{ad-bc}+2ac-\frac{b^2c^3}{d(ad-bc)}}{ad+bc}\right)}{4d\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] a*log(x**4 + (a**3*d**2/(b*(a*d - b*c)) - 2*a**2*c*d/(a*d - b*c)
+ a*b*c**2/(a*d - b*c) + 2*a*c)/(a*d + b*c))/(4*b*(a*d - b*c)) -
c*log(x**4 + (-a**2*c*d/(a*d - b*c) + 2*a*b*c**2/(a*d - b*c) + 2*
a*c - b**2*c**3/(d*(a*d - b*c)))/(a*d + b*c))/(4*d*(a*d - b*c))
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.601 $\int \frac{x^3}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=45

$$\frac{\log(a+bx^4)}{4(bc-ad)}-\frac{\log(c+dx^4)}{4(bc-ad)}$$

```
[Out] Log[a + b*x^4]/(4*(b*c - a*d)) - Log[c + d*x^4]/(4*(b*c - a*d))
```

Rubi [A] time = 0.093747, antiderivative size = 45, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{\log(a+bx^4)}{4(bc-ad)}-\frac{\log(c+dx^4)}{4(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] Log[a + b*x^4]/(4*(b*c - a*d)) - Log[c + d*x^4]/(4*(b*c - a*d))
```

Rubi in Sympy [A] time = 12.7466, size = 36, normalized size = 0.8

$$-\frac{\log(a+bx^4)}{4(ad-bc)}+\frac{\log(c+dx^4)}{4(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -log(a + b*x**4)/(4*(a*d - b*c)) + log(c + d*x**4)/(4*(a*d - b*c)
)
```

Mathematica [A] time = 0.0316985, size = 31, normalized size = 0.69

$$\frac{\log(a+bx^4)-\log(c+dx^4)}{4bc-4ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (Log[a + b*x^4] - Log[c + d*x^4])/(4*b*c - 4*a*d)
```

Maple [A] time = 0.01, size = 42, normalized size = 0.9

$$\frac{\ln(dx^4+c)}{4ad-4bc}-\frac{\ln(bx^4+a)}{4ad-4bc}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/4/(a*d-b*c)*ln(d*x^4+c)-1/4/(a*d-b*c)*ln(b*x^4+a)
```

Maxima [A] time = 1.36802, size = 55, normalized size = 1.22

$$\frac{\log\left(bx^4+a\right)}{4\,(bc-ad)}-\frac{\log\left(dx^4+c\right)}{4\,(bc-ad)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] 1/4*log(b*x^4 + a)/(b*c - a*d) - 1/4*log(d*x^4 + c)/(b*c - a*d)
```

Fricas [A] time = 0.213667, size = 42, normalized size = 0.93

$$\frac{\log\left(bx^4+a\right)-\log\left(dx^4+c\right)}{4\,(bc-ad)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] 1/4*(log(b*x^4 + a) - log(d*x^4 + c))/(b*c - a*d)
```

Sympy [A] time = 3.01317, size = 138, normalized size = 3.07

$$\frac{\log\left(x^4+\frac{-\frac{a^2d^2}{ad-bc}+\frac{2abcd}{ad-bc}+ad-\frac{b^2c^2}{ad-bc}+bc}{2bd}\right)}{4\,(ad-bc)}-\frac{\log\left(x^4+\frac{\frac{a^2d^2}{ad-bc}-\frac{2abcd}{ad-bc}+ad+\frac{b^2c^2}{ad-bc}+bc}{2bd}\right)}{4\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] log(x**4 + (-a**2*d**2/(a*d - b*c) + 2*a*b*c*d/(a*d - b*c) + a*d
- b**2*c**2/(a*d - b*c) + b*c)/(2*b*d))/(4*(a*d - b*c)) - log(x**
4 + (a**2*d**2/(a*d - b*c) - 2*a*b*c*d/(a*d - b*c) + a*d + b**2*c
**2/(a*d - b*c) + b*c)/(2*b*d))/(4*(a*d - b*c))
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.602 $\int \frac{1}{x(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=62

$$-\frac{b\log\left(a+bx^4\right)}{4a(bc-ad)}+\frac{d\log\left(c+dx^4\right)}{4c(bc-ad)}+\frac{\log(x)}{ac}$$

```
[Out] Log[x]/(a*c) - (b*Log[a + b*x^4])/(4*a*(b*c - a*d)) + (d*Log[c +
d*x^4])/(4*c*(b*c - a*d))
```

Rubi [A] time = 0.165029, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{b\log\left(a+bx^4\right)}{4a(bc-ad)}+\frac{d\log\left(c+dx^4\right)}{4c(bc-ad)}+\frac{\log(x)}{ac}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] Log[x]/(a*c) - (b*Log[a + b*x^4])/(4*a*(b*c - a*d)) + (d*Log[c +
d*x^4])/(4*c*(b*c - a*d))
```

Rubi in Sympy [A] time = 23.4307, size = 49, normalized size = 0.79

$$-\frac{d\log\left(c+dx^4\right)}{4c\left(ad-bc\right)}+\frac{b\log\left(a+bx^4\right)}{4a\left(ad-bc\right)}+\frac{\log\left(x^4\right)}{4ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -d*log(c + d*x**4)/(4*c*(a*d - b*c)) + b*log(a + b*x**4)/(4*a*(a*
d - b*c)) + log(x**4)/(4*a*c)
```

Mathematica [A] time = 0.0497906, size = 54, normalized size = 0.87

$$\frac{-bc\log\left(a+bx^4\right)+ad\log\left(c+dx^4\right)-4ad\log(x)+4bc\log(x)}{4abc^2-4a^2cd}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a + b*x^4)*(c + d*x^4)),x]
```

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

Maple [A] time = 0.013, size = 59, normalized size = 1.

$$-\frac{d\ln\left(dx^4+c\right)}{4\,c\left(ad-bc\right)}+\frac{\ln(x)}{ac}+\frac{b\ln\left(bx^4+a\right)}{4\,a\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] -1/4*d/c/(a*d-b*c)*ln(d*x^4+c)+ln(x)/a/c+1/4*b/a/(a*d-b*c)*ln(b*x
^4+a)
```

Maxima [A] time = 1.37105, size = 82, normalized size = 1.32

$$-\frac{b\log\left(bx^4+a\right)}{4\left(abc-a^2d\right)}+\frac{d\log\left(dx^4+c\right)}{4\left(bc^2-acd\right)}+\frac{\log\left(x^4\right)}{4\,ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x),x, algorithm="maxima")
```

```
[Out] -1/4*b*log(b*x^4 + a)/(a*b*c - a^2*d) + 1/4*d*log(d*x^4 + c)/(b*c
^2 - a*c*d) + 1/4*log(x^4)/(a*c)
```

Fricas [A] time = 1.6431, size = 73, normalized size = 1.18

$$-\frac{bc\log\left(bx^4+a\right)-ad\log\left(dx^4+c\right)-4\left(bc-ad\right)\log\left(x\right)}{4\left(abc^2-a^2cd\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x),x, algorithm="fricas")
```

```
[Out] -1/4*(b*c*log(b*x^4 + a) - a*d*log(d*x^4 + c) - 4*(b*c - a*d)*log
(x))/(a*b*c^2 - a^2*c*d)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.603 $\int \frac{1}{x^5(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=87

$$\frac{b^2\log\left(a+bx^4\right)}{4a^2(bc-ad)}-\frac{\log(x)(ad+bc)}{a^2c^2}-\frac{d^2\log\left(c+dx^4\right)}{4c^2(bc-ad)}-\frac{1}{4acx^4}$$

```
[Out] -1/(4*a*c*x^4) - ((b*c + a*d)*Log[x])/(a^2*c^2) + (b^2*Log[a + b*
x^4])/(4*a^2*(b*c - a*d)) - (d^2*Log[c + d*x^4])/(4*c^2*(b*c - a*
d))
```

Rubi [A] time = 0.228493, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{b^2\log\left(a+bx^4\right)}{4a^2(bc-ad)}-\frac{\log(x)(ad+bc)}{a^2c^2}-\frac{d^2\log\left(c+dx^4\right)}{4c^2(bc-ad)}-\frac{1}{4acx^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -1/(4*a*c*x^4) - ((b*c + a*d)*Log[x])/(a^2*c^2) + (b^2*Log[a + b*
x^4])/(4*a^2*(b*c - a*d)) - (d^2*Log[c + d*x^4])/(4*c^2*(b*c - a*
d))
```

Rubi in Sympy [A] time = 30.3838, size = 76, normalized size = 0.87

$$\frac{d^2\log\left(c+dx^4\right)}{4c^2\left(ad-bc\right)}-\frac{1}{4acx^4}-\frac{b^2\log\left(a+bx^4\right)}{4a^2\left(ad-bc\right)}-\frac{(ad+bc)\log\left(x^4\right)}{4a^2c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] d**2*log(c + d*x**4)/(4*c**2*(a*d - b*c)) - 1/(4*a*c*x**4) - b**2
*log(a + b*x**4)/(4*a**2*(a*d - b*c)) - (a*d + b*c)*log(x**4)/(4*
a**2*c**2)
```

Mathematica [A] time = 0.0705019, size = 88, normalized size = 1.01

$$-\frac{b^2\log\left(a+bx^4\right)}{4a^2(ad-bc)}+\frac{\log(x)(-ad-bc)}{a^2c^2}-\frac{d^2\log\left(c+dx^4\right)}{4c^2(bc-ad)}-\frac{1}{4acx^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^5*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -1/(4*a*c*x^4) + ((-(b*c) - a*d)*Log[x])/(a^2*c^2) - (b^2*Log[a +
 b*x^4])/(4*a^2*(-(b*c) + a*d)) - (d^2*Log[c + d*x^4])/(4*c^2*(b*
c - a*d))
```

Maple [A] time = 0.016, size = 87, normalized size = 1.

$$\frac{d^2\ln\left(dx^4+c\right)}{4\,c^2\left(ad-bc\right)}-\frac{1}{4\,acx^4}-\frac{\ln(x)\,d}{ac^2}-\frac{\ln(x)\,b}{a^2c}-\frac{b^2\ln\left(bx^4+a\right)}{4\,a^2\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/4*d^2/c^2/(a*d-b*c)*ln(d*x^4+c)-1/4/a/c/x^4-1/a/c^2*ln(x)*d-1/a
^2/c*ln(x)*b-1/4*b^2/a^2/(a*d-b*c)*ln(b*x^4+a)
```

Maxima [A] time = 1.39795, size = 117, normalized size = 1.34

$$\frac{b^2 \log\left(bx^4 + a\right)}{4\left(a^2bc - a^3d\right)} - \frac{d^2 \log\left(dx^4 + c\right)}{4\left(bc^3 - ac^2d\right)} - \frac{(bc + ad)\log\left(x^4\right)}{4\,a^2c^2} - \frac{1}{4\,acx^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^5),x, algorithm="maxima")
```

```
[Out] 1/4*b^2*log(b*x^4 + a)/(a^2*b*c - a^3*d) - 1/4*d^2*log(d*x^4 + c)
/(b*c^3 - a*c^2*d) - 1/4*(b*c + a*d)*log(x^4)/(a^2*c^2) - 1/4/(a*
c*x^4)
```

Fricas [A] time = 7.1214, size = 134, normalized size = 1.54

$$\frac{b^2c^2x^4 \log\left(bx^4 + a\right) - a^2d^2x^4 \log\left(dx^4 + c\right) - 4\left(b^2c^2 - a^2d^2\right)x^4 \log\left(x\right) - abc^2 + a^2cd}{4\left(a^2bc^3 - a^3c^2d\right)x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^5),x, algorithm="fricas")
```

```
[Out] 1/4*(b^2*c^2*x^4*log(b*x^4 + a) - a^2*d^2*x^4*log(d*x^4 + c) - 4*
(b^2*c^2 - a^2*d^2)*x^4*log(x) - a*b*c^2 + a^2*c*d)/((a^2*b*c^3 -
 a^3*c^2*d)*x^4)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^5),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.604 $\int \frac{x^{13}}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=112

$$-\frac{a^{5/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2b^{5/2}(bc-ad)}-\frac{x^2(ad+bc)}{2b^2d^2}+\frac{c^{5/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2d^{5/2}(bc-ad)}+\frac{x^6}{6bd}$$

```
[Out] -((b*c + a*d)*x^2)/(2*b^2*d^2) + x^6/(6*b*d) - (a^(5/2)*ArcTan[(S
qrt[b]*x^2)/Sqrt[a]])/(2*b^(5/2)*(b*c - a*d)) + (c^(5/2)*ArcTan[(
Sqrt[d]*x^2)/Sqrt[c]])/(2*d^(5/2)*(b*c - a*d))
```

Rubi [A] time = 0.639138, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$-\frac{a^{5/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2b^{5/2}(bc-ad)}-\frac{x^2(ad+bc)}{2b^2d^2}+\frac{c^{5/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2d^{5/2}(bc-ad)}+\frac{x^6}{6bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^13/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -((b*c + a*d)*x^2)/(2*b^2*d^2) + x^6/(6*b*d) - (a^(5/2)*ArcTan[(S
qrt[b]*x^2)/Sqrt[a]])/(2*b^(5/2)*(b*c - a*d)) + (c^(5/2)*ArcTan[(
Sqrt[d]*x^2)/Sqrt[c]])/(2*d^(5/2)*(b*c - a*d))
```

Rubi in Sympy [A] time = 73.9624, size = 94, normalized size = 0.84

$$\frac{a^{\frac{5}{2}}\operatorname{atan}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2b^{\frac{5}{2}}(ad-bc)}-\frac{c^{\frac{5}{2}}\operatorname{atan}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2d^{\frac{5}{2}}(ad-bc)}+\frac{x^6}{6bd}-\frac{x^2(ad+bc)}{2b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**13/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] a**(5/2)*atan(sqrt(b)*x**2/sqrt(a))/(2*b**(5/2)*(a*d - b*c)) - c*
*(5/2)*atan(sqrt(d)*x**2/sqrt(c))/(2*d**(5/2)*(a*d - b*c)) + x**6
/(6*b*d) - x**2*(a*d + b*c)/(2*b**2*d**2)
```

Mathematica [A] time = 0.385159, size = 104, normalized size = 0.93

$$\frac{1}{6}\left(\frac{3a^{5/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{b^{5/2}(ad-bc)}+\frac{x^2\left(-3ad-3bc+bdx^4\right)}{b^2d^2}+\frac{3c^{5/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{d^{5/2}(bc-ad)}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^13/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] ((x^2*(-3*b*c - 3*a*d + b*d*x^4))/(b^2*d^2) + (3*a^(5/2)*ArcTan[(
Sqrt[b]*x^2)/Sqrt[a]])/(b^(5/2)*(-(b*c) + a*d)) + (3*c^(5/2)*ArcT
an[(Sqrt[d]*x^2)/Sqrt[c]])/(d^(5/2)*(b*c - a*d)))/6
```

Maple [A] time = 0.013, size = 105, normalized size = 0.9

$$\frac{x^6}{6\,bd}-\frac{ax^2}{2\,b^2d}-\frac{cx^2}{2\,d^2b}-\frac{c^3}{2\,d^2\,(ad-bc)}\arctan\left(dx^2\frac{1}{\sqrt{cd}}\right)\frac{1}{\sqrt{cd}}+\frac{a^3}{2\,b^2\,(ad-bc)}\arctan\left(bx^2\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^13/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/6*x^6/b/d-1/2/d/b^2*a*x^2-1/2/d^2/b*x^2*c-1/2*c^3/d^2/(a*d-b*c)
/(c*d)^(1/2)*arctan(x^2*d/(c*d)^(1/2))+1/2*a^3/b^2/(a*d-b*c)/(a*b
)^(1/2)*arctan(x^2*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 2.35535, size = 1, normalized size = 0.01

$$\left[\frac{2\left(b^2cd-abd^2\right)x^6-3\,a^2d^2\sqrt{-\frac{a}{b}}\log\left(\frac{bx^4+2\,bx^2\sqrt{-\frac{a}{b}}-a}{bx^4+a}\right)-3\,b^2c^2\sqrt{-\frac{c}{d}}\log\left(\frac{dx^4-2\,dx^2\sqrt{-\frac{c}{d}}-c}{dx^4+c}\right)-6\left(b^2c^2-a^2d^2\right)x^2}{12\left(b^3cd^2-ab^2d^3\right)},\ \frac{2\left(b^2cd-\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/12*(2*(b^2*c*d - a*b*d^2)*x^6 - 3*a^2*d^2*sqrt(-a/b)*log((b*x^
4 + 2*b*x^2*sqrt(-a/b) - a)/(b*x^4 + a)) - 3*b^2*c^2*sqrt(-c/d)*l
og((d*x^4 - 2*d*x^2*sqrt(-c/d) - c)/(d*x^4 + c)) - 6*(b^2*c^2 - a
^2*d^2)*x^2)/(b^3*c*d^2 - a*b^2*d^3), 1/12*(2*(b^2*c*d - a*b*d^2)
*x^6 - 6*a^2*d^2*sqrt(a/b)*arctan(x^2/sqrt(a/b)) - 3*b^2*c^2*sqrt
(-c/d)*log((d*x^4 - 2*d*x^2*sqrt(-c/d) - c)/(d*x^4 + c)) - 6*(b^2
*c^2 - a^2*d^2)*x^2)/(b^3*c*d^2 - a*b^2*d^3), 1/12*(2*(b^2*c*d -
a*b*d^2)*x^6 + 6*b^2*c^2*sqrt(c/d)*arctan(x^2/sqrt(c/d)) - 3*a^2*
d^2*sqrt(-a/b)*log((b*x^4 + 2*b*x^2*sqrt(-a/b) - a)/(b*x^4 + a))
- 6*(b^2*c^2 - a^2*d^2)*x^2)/(b^3*c*d^2 - a*b^2*d^3), 1/6*((b^2*c
*d - a*b*d^2)*x^6 - 3*a^2*d^2*sqrt(a/b)*arctan(x^2/sqrt(a/b)) + 3
*b^2*c^2*sqrt(c/d)*arctan(x^2/sqrt(c/d)) - 3*(b^2*c^2 - a^2*d^2)*
x^2)/(b^3*c*d^2 - a*b^2*d^3)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**13/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.257493, size = 722, normalized size = 6.45

$$-\frac{\left(\sqrt{cd}b^{7}c^{2}d^{3}x^{4}|d| + \sqrt{cd}ab^{6}cd^{4}x^{4}|d| + \sqrt{cd}a^{2}b^{5}d^{5}x^{4}|d| + \sqrt{cd}ab^{6}c^{2}d^{3}|d| + \sqrt{cd}a^{2}b^{5}cd^{4}|d|\right)\arctan\left(\frac{8\sqrt{\frac{1}{2}}\cdots}{\sqrt{\frac{16\,b^{4}cd^{3}+16\,ab^{3}d^{4}+\sqrt{-1024\,\cdots}}{b^{4}\cdots}}}\cdots\right)}{b^{4}cd^{3}|b^{4}cd^{3}-ab^{3}d^{4}| + ab^{3}d^{4}|b^{4}cd^{3}-ab^{3}d^{4}| + \left(b^{4}cd^{3}-ab^{3}d^{4}\right)^{2}}$$
$$+\frac{\left(\sqrt{ab}b^{5}c^{2}d^{5}x^{4}|b| + \sqrt{ab}ab^{4}cd^{6}x^{4}|b| + \sqrt{ab}a^{2}b^{3}d^{7}x^{4}|b| + \sqrt{ab}ab^{4}c^{2}d^{5}|b| + \sqrt{ab}a^{2}b^{3}cd^{6}|b|\right)\arctan\left(\frac{8\sqrt{\frac{1}{2}}\cdots}{\sqrt{\frac{16\,b^{4}cd^{3}+16\,ab^{3}d^{4}-\sqrt{-1024\,\cdots}}{b^{4}\cdots}}}\cdots\right)}{b^{4}cd^{3}|b^{4}cd^{3}-ab^{3}d^{4}| + ab^{3}d^{4}|b^{4}cd^{3}-ab^{3}d^{4}| - \left(b^{4}cd^{3}-ab^{3}d^{4}\right)^{2}}$$
$$+\frac{b^{2}d^{2}x^{6}-3\,b^{2}cdx^{2}-3\,abd^{2}x^{2}}{6\,b^{3}d^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -(sqrt(c*d)*b^7*c^2*d^3*x^4*abs(d) + sqrt(c*d)*a*b^6*c*d^4*x^4*ab
s(d) + sqrt(c*d)*a^2*b^5*d^5*x^4*abs(d) + sqrt(c*d)*a*b^6*c^2*d^3
*abs(d) + sqrt(c*d)*a^2*b^5*c*d^4*abs(d))*arctan(8*sqrt(1/2)*x^2/
sqrt((16*b^4*c*d^3 + 16*a*b^3*d^4 + sqrt(-1024*a*b^7*c*d^7 + 256*
(b^4*c*d^3 + a*b^3*d^4)^2))/(b^4*d^4)))/(b^4*c*d^3*abs(b^4*c*d^3
- a*b^3*d^4) + a*b^3*d^4*abs(b^4*c*d^3 - a*b^3*d^4) + (b^4*c*d^3
- a*b^3*d^4)^2) + (sqrt(a*b)*b^5*c^2*d^5*x^4*abs(b) + sqrt(a*b)*a
*b^4*c*d^6*x^4*abs(b) + sqrt(a*b)*a^2*b^3*d^7*x^4*abs(b) + sqrt(a
*b)*a*b^4*c^2*d^5*abs(b) + sqrt(a*b)*a^2*b^3*c*d^6*abs(b))*arctan
(8*sqrt(1/2)*x^2/sqrt((16*b^4*c*d^3 + 16*a*b^3*d^4 - sqrt(-1024*a
*b^7*c*d^7 + 256*(b^4*c*d^3 + a*b^3*d^4)^2))/(b^4*d^4)))/(b^4*c*d
^3*abs(b^4*c*d^3 - a*b^3*d^4) + a*b^3*d^4*abs(b^4*c*d^3 - a*b^3*d
^4) - (b^4*c*d^3 - a*b^3*d^4)^2) + 1/6*(b^2*d^2*x^6 - 3*b^2*c*d*x
^2 - 3*a*b*d^2*x^2)/(b^3*d^3)
```

3.605 $\int \frac{x^9}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=92

$$\frac{a^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2b^{3/2}(bc-ad)}-\frac{c^{3/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2d^{3/2}(bc-ad)}+\frac{x^2}{2bd}$$

```
[Out] x^2/(2*b*d) + (a^(3/2)*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/(2*b^(3/2)*
(b*c - a*d)) - (c^(3/2)*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/(2*d^(3/2)
*(b*c - a*d))
```

Rubi [A] time = 0.306129, antiderivative size = 92, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{a^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2b^{3/2}(bc-ad)}-\frac{c^{3/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2d^{3/2}(bc-ad)}+\frac{x^2}{2bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^9/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] x^2/(2*b*d) + (a^(3/2)*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/(2*b^(3/2)*
(b*c - a*d)) - (c^(3/2)*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/(2*d^(3/2)
*(b*c - a*d))
```

Rubi in Sympy [A] time = 44.9054, size = 75, normalized size = 0.82

$$-\frac{a^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2b^{\frac{3}{2}}\left(ad-bc\right)}+\frac{c^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2d^{\frac{3}{2}}\left(ad-bc\right)}+\frac{x^2}{2bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**9/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -a**(3/2)*atan(sqrt(b)*x**2/sqrt(a))/(2*b**(3/2)*(a*d - b*c)) + c
**(3/2)*atan(sqrt(d)*x**2/sqrt(c))/(2*d**(3/2)*(a*d - b*c)) + x**
2/(2*b*d)
```

Mathematica [A] time = 0.258417, size = 82, normalized size = 0.89

$$\frac{\frac{a^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{b^{3/2}}+x^2\left(\frac{c}{d}-\frac{a}{b}\right)-\frac{c^{3/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{d^{3/2}}}{2bc-2ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^9/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] ((-(a/b) + c/d)*x^2 + (a^(3/2)*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/b^(
3/2) - (c^(3/2)*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/d^(3/2))/(2*b*c -
2*a*d)
```

Maple [A] time = 0.01, size = 81, normalized size = 0.9

$$\frac{x^2}{2bd}+\frac{c^2}{(2ad-2bc)d}\arctan\left(dx^2\frac{1}{\sqrt{cd}}\right)\frac{1}{\sqrt{cd}}-\frac{a^2}{(2ad-2bc)b}\arctan\left(bx^2\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^9/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/2*x^2/b/d+1/2*c^2/(a*d-b*c)/d/(c*d)^(1/2)*arctan(x^2*d/(c*d)^(1
/2))-1/2*a^2/(a*d-b*c)/b/(a*b)^(1/2)*arctan(x^2*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.556566, size = 1, normalized size = 0.01

$$\left[-\frac{ad\sqrt{-\frac{a}{b}}\log\left(\frac{bx^4-2bx^2\sqrt{-\frac{a}{b}}-a}{bx^4+a}\right)+bc\sqrt{-\frac{c}{d}}\log\left(\frac{dx^4+2dx^2\sqrt{-\frac{c}{d}}-c}{dx^4+c}\right)-2(bc-ad)x^2}{4(b^2cd-abd^2)}, \frac{2ad\sqrt{\frac{a}{b}}\arctan\left(\frac{x^2}{\sqrt{\frac{a}{b}}}\right)-bc\sqrt{-\frac{c}{d}}\log\left(\frac{dx^4 \cdots}{\cdots}\right)\cdots}{4(b^2cd-abd\cdots)}\right.$$

$$-\frac{2bc\sqrt{\frac{c}{d}}\arctan\left(\frac{x^2}{\sqrt{\frac{c}{d}}}\right)+ad\sqrt{-\frac{a}{b}}\log\left(\frac{bx^4-2bx^2\sqrt{-\frac{a}{b}}-a}{bx^4+a}\right)-2(bc-ad)x^2}{4(b^2cd-abd^2)}, \frac{ad\sqrt{\frac{a}{b}}\arctan\left(\frac{x^2}{\sqrt{\frac{a}{b}}}\right)-bc\sqrt{\frac{c}{d}}\arctan\left(\frac{x^2}{\sqrt{\frac{c}{d}}}\right)+(bc-\cdots}{2(b^2cd-abd^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [-1/4*(a*d*sqrt(-a/b)*log((b*x^4 - 2*b*x^2*sqrt(-a/b) - a)/(b*x^4
 + a)) + b*c*sqrt(-c/d)*log((d*x^4 + 2*d*x^2*sqrt(-c/d) - c)/(d*x
^4 + c)) - 2*(b*c - a*d)*x^2)/(b^2*c*d - a*b*d^2), 1/4*(2*a*d*sqr
t(a/b)*arctan(x^2/sqrt(a/b)) - b*c*sqrt(-c/d)*log((d*x^4 + 2*d*x^
2*sqrt(-c/d) - c)/(d*x^4 + c)) + 2*(b*c - a*d)*x^2)/(b^2*c*d - a*
b*d^2), -1/4*(2*b*c*sqrt(c/d)*arctan(x^2/sqrt(c/d)) + a*d*sqrt(-a
/b)*log((b*x^4 - 2*b*x^2*sqrt(-a/b) - a)/(b*x^4 + a)) - 2*(b*c -
a*d)*x^2)/(b^2*c*d - a*b*d^2), 1/2*(a*d*sqrt(a/b)*arctan(x^2/sqrt
(a/b)) - b*c*sqrt(c/d)*arctan(x^2/sqrt(c/d)) + (b*c - a*d)*x^2)/(
b^2*c*d - a*b*d^2)]
```

Sympy [A] time = 17.7964, size = 932, normalized size = 10.13

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -sqrt(-a**3/b**3)*log(x**2 + (-a**4*d**4*sqrt(-a**3/b**3)/(a*d -
b*c) - a**3*b**3*d**6*(-a**3/b**3)**(3/2)/(a*d - b*c)**3 + a**2*b
**4*c*d**5*(-a**3/b**3)**(3/2)/(a*d - b*c)**3 + a*b**5*c**2*d**4*
(-a**3/b**3)**(3/2)/(a*d - b*c)**3 - b**6*c**3*d**3*(-a**3/b**3)*
*(3/2)/(a*d - b*c)**3 - b**4*c**4*sqrt(-a**3/b**3)/(a*d - b*c))/(
a**3*c*d**2 + a**2*b*c**2*d + a*b**2*c**3))/(4*(a*d - b*c)) + sqr
t(-a**3/b**3)*log(x**2 + (a**4*d**4*sqrt(-a**3/b**3)/(a*d - b*c)
+ a**3*b**3*d**6*(-a**3/b**3)**(3/2)/(a*d - b*c)**3 - a**2*b**4*c
*d**5*(-a**3/b**3)**(3/2)/(a*d - b*c)**3 - a*b**5*c**2*d**4*(-a**
3/b**3)**(3/2)/(a*d - b*c)**3 + b**6*c**3*d**3*(-a**3/b**3)**(3/2
)/(a*d - b*c)**3 + b**4*c**4*sqrt(-a**3/b**3)/(a*d - b*c))/(a**3*
c*d**2 + a**2*b*c**2*d + a*b**2*c**3))/(4*(a*d - b*c)) - sqrt(-c*
*3/d**3)*log(x**2 + (-a**4*d**4*sqrt(-c**3/d**3)/(a*d - b*c) - a*
*3*b**3*d**6*(-c**3/d**3)**(3/2)/(a*d - b*c)**3 + a**2*b**4*c*d**
5*(-c**3/d**3)**(3/2)/(a*d - b*c)**3 + a*b**5*c**2*d**4*(-c**3/d*
*3)**(3/2)/(a*d - b*c)**3 - b**6*c**3*d**3*(-c**3/d**3)**(3/2)/(a
*d - b*c)**3 - b**4*c**4*sqrt(-c**3/d**3)/(a*d - b*c))/(a**3*c*d*
*2 + a**2*b*c**2*d + a*b**2*c**3))/(4*(a*d - b*c)) + sqrt(-c**3/d
**3)*log(x**2 + (a**4*d**4*sqrt(-c**3/d**3)/(a*d - b*c) + a**3*b*
*3*d**6*(-c**3/d**3)**(3/2)/(a*d - b*c)**3 - a**2*b**4*c*d**5*(-c
**3/d**3)**(3/2)/(a*d - b*c)**3 - a*b**5*c**2*d**4*(-c**3/d**3)**
(3/2)/(a*d - b*c)**3 + b**6*c**3*d**3*(-c**3/d**3)**(3/2)/(a*d -
b*c)**3 + b**4*c**4*sqrt(-c**3/d**3)/(a*d - b*c))/(a**3*c*d**2 +
a**2*b*c**2*d + a*b**2*c**3))/(4*(a*d - b*c)) + x**2/(2*b*d)
```

GIAC/XCAS [A] time = 0.250056, size = 482, normalized size = 5.24

$$\frac{\left(\sqrt{cd}b^3cx^4|d| + \sqrt{cd}ab^2dx^4|d| + \sqrt{cd}ab^2c|d|\right)\arctan\left(\frac{4\sqrt{\frac{1}{2}}x^2}{\sqrt{\frac{4\,b^2cd+4\,abd^2+\sqrt{-64\,ab^3cd^3+16\left(b^2cd+abd^2\right)^2}}{b^2d^2}}}\right)}{b^2cd|b^2cd-abd^2| + abd^2|b^2cd-abd^2| + \left(b^2cd-abd^2\right)^2} - \frac{\left(\sqrt{ab}bcd^2x^4|b| + \sqrt{ab}ad^3x^4|b| + \sqrt{ab}acd^2|b|\right)\arctan\left(\frac{4\sqrt{\frac{1}{2}}x^2}{\sqrt{\frac{4\,b^2cd+4\,abd^2-\sqrt{-64\,ab^3cd^3+16\left(b^2cd+abd^2\right)^2}}{b^2d^2}}}\right)}{b^2cd|b^2cd-abd^2| + abd^2|b^2cd-abd^2| - \left(b^2cd-abd^2\right)^2} + \frac{x^2}{2\,bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] (sqrt(c*d)*b^3*c*x^4*abs(d) + sqrt(c*d)*a*b^2*d*x^4*abs(d) + sqrt
(c*d)*a*b^2*c*abs(d))*arctan(4*sqrt(1/2)*x^2/sqrt((4*b^2*c*d + 4*
a*b*d^2 + sqrt(-64*a*b^3*c*d^3 + 16*(b^2*c*d + a*b*d^2)^2))/(b^2*
d^2)))/(b^2*c*d*abs(b^2*c*d - a*b*d^2) + a*b*d^2*abs(b^2*c*d - a*
b*d^2) + (b^2*c*d - a*b*d^2)^2) - (sqrt(a*b)*b*c*d^2*x^4*abs(b) +
 sqrt(a*b)*a*d^3*x^4*abs(b) + sqrt(a*b)*a*c*d^2*abs(b))*arctan(4*
sqrt(1/2)*x^2/sqrt((4*b^2*c*d + 4*a*b*d^2 - sqrt(-64*a*b^3*c*d^3
+ 16*(b^2*c*d + a*b*d^2)^2))/(b^2*d^2)))/(b^2*c*d*abs(b^2*c*d - a
*b*d^2) + a*b*d^2*abs(b^2*c*d - a*b*d^2) - (b^2*c*d - a*b*d^2)^2)
 + 1/2*x^2/(b*d)
```

3.606 $\int \frac{x^5}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=79

$$\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2\sqrt{d}(bc-ad)}-\frac{\sqrt{a}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2\sqrt{b}(bc-ad)}$$

```
[Out] -(Sqrt[a]*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/(2*Sqrt[b]*(b*c - a*d))
+ (Sqrt[c]*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/(2*Sqrt[d]*(b*c - a*d))
```

Rubi [A] time = 0.17717, antiderivative size = 79, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2\sqrt{d}(bc-ad)}-\frac{\sqrt{a}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2\sqrt{b}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -(Sqrt[a]*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/(2*Sqrt[b]*(b*c - a*d))
+ (Sqrt[c]*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/(2*Sqrt[d]*(b*c - a*d))
```

Rubi in Sympy [A] time = 28.1415, size = 66, normalized size = 0.84

$$\frac{\sqrt{a}\,\mathrm{atan}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2\sqrt{b}\,(ad-bc)}-\frac{\sqrt{c}\,\mathrm{atan}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2\sqrt{d}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] sqrt(a)*atan(sqrt(b)*x**2/sqrt(a))/(2*sqrt(b)*(a*d - b*c)) - sqrt
(c)*atan(sqrt(d)*x**2/sqrt(c))/(2*sqrt(d)*(a*d - b*c))
```

Mathematica [A] time = 0.0639652, size = 66, normalized size = 0.84

$$\frac{\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{\sqrt{b}}}{2bc-2ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (-((Sqrt[a]*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/Sqrt[b]) + (Sqrt[c]*Ar
cTan[(Sqrt[d]*x^2)/Sqrt[c]])/Sqrt[d])/(2*b*c - 2*a*d)
```

Maple [A] time = 0.008, size = 60, normalized size = 0.8

$$-\frac{c}{2\,ad-2\,bc}\arctan\left(dx^2\frac{1}{\sqrt{cd}}\right)\frac{1}{\sqrt{cd}}+\frac{a}{2\,ad-2\,bc}\arctan\left(bx^2\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] -1/2*c/(a*d-b*c)/(c*d)^(1/2)*arctan(x^2*d/(c*d)^(1/2))+1/2*a/(a*d
-b*c)/(a*b)^(1/2)*arctan(x^2*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.271902, size = 1, normalized size = 0.01

$$\left[-\frac{\sqrt{-\frac{a}{b}}\log\left(\frac{bx^4+2\,bx^2\sqrt{-\frac{a}{b}}-a}{bx^4+a}\right)+\sqrt{-\frac{c}{d}}\log\left(\frac{dx^4-2\,dx^2\sqrt{-\frac{c}{d}}-c}{dx^4+c}\right)}{4\,(bc-ad)},\ -\frac{2\sqrt{\frac{a}{b}}\arctan\left(\frac{x^2}{\sqrt{\frac{a}{b}}}\right)+\sqrt{-\frac{c}{d}}\log\left(\frac{dx^4-2\,dx^2\sqrt{-\frac{c}{d}}-c}{dx^4+c}\right)}{4\,(bc-ad)},\ \frac{2\sqrt{\frac{c}{d}}\arctan\left(\frac{x^2}{\sqrt{\frac{c}{d}}}\right)-\sqrt{-\frac{a}{b}}\log\left(\frac{bx^4+2\,bx^2\sqrt{-\frac{a}{b}}-a}{bx^4+a}\right)}{4\,(bc-ad)},\ -\frac{\sqrt{\frac{a}{b}}\arctan\left(\frac{x^2}{\sqrt{\frac{a}{b}}}\right)-\sqrt{\frac{c}{d}}\arctan\left(\frac{x^2}{\sqrt{\frac{c}{d}}}\right)}{2\,(bc-ad)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [-1/4*(sqrt(-a/b)*log((b*x^4 + 2*b*x^2*sqrt(-a/b) - a)/(b*x^4 + a
)) + sqrt(-c/d)*log((d*x^4 - 2*d*x^2*sqrt(-c/d) - c)/(d*x^4 + c))
)/(b*c - a*d), -1/4*(2*sqrt(a/b)*arctan(x^2/sqrt(a/b)) + sqrt(-c/
d)*log((d*x^4 - 2*d*x^2*sqrt(-c/d) - c)/(d*x^4 + c)))/(b*c - a*d)
, 1/4*(2*sqrt(c/d)*arctan(x^2/sqrt(c/d)) - sqrt(-a/b)*log((b*x^4
+ 2*b*x^2*sqrt(-a/b) - a)/(b*x^4 + a)))/(b*c - a*d), -1/2*(sqrt(a
/b)*arctan(x^2/sqrt(a/b)) - sqrt(c/d)*arctan(x^2/sqrt(c/d)))/(b*c
 - a*d)]
```

Sympy [A] time = 52.6507, size = 576, normalized size = 7.29

$$\frac{\sqrt{-\frac{a}{b}}\log\left(-\frac{2a^2bd^3\left(-\frac{a}{b}\right)^{\frac{3}{2}}}{(ad-bc)^3}+\frac{4ab^2cd^2\left(-\frac{a}{b}\right)^{\frac{3}{2}}}{(ad-bc)^3}-\frac{ad\sqrt{-\frac{a}{b}}}{ad-bc}-\frac{2b^3c^2d\left(-\frac{a}{b}\right)^{\frac{3}{2}}}{(ad-bc)^3}-\frac{bc\sqrt{-\frac{a}{b}}}{ad-bc}+x^2\right)}{4(ad-bc)}$$
$$-\frac{\sqrt{-\frac{a}{b}}\log\left(\frac{2a^2bd^3\left(-\frac{a}{b}\right)^{\frac{3}{2}}}{(ad-bc)^3}-\frac{4ab^2cd^2\left(-\frac{a}{b}\right)^{\frac{3}{2}}}{(ad-bc)^3}+\frac{ad\sqrt{-\frac{a}{b}}}{ad-bc}+\frac{2b^3c^2d\left(-\frac{a}{b}\right)^{\frac{3}{2}}}{(ad-bc)^3}+\frac{bc\sqrt{-\frac{a}{b}}}{ad-bc}+x^2\right)}{4(ad-bc)}$$
$$+\frac{\sqrt{-\frac{c}{d}}\log\left(-\frac{2a^2bd^3\left(-\frac{c}{d}\right)^{\frac{3}{2}}}{(ad-bc)^3}+\frac{4ab^2cd^2\left(-\frac{c}{d}\right)^{\frac{3}{2}}}{(ad-bc)^3}-\frac{ad\sqrt{-\frac{c}{d}}}{ad-bc}-\frac{2b^3c^2d\left(-\frac{c}{d}\right)^{\frac{3}{2}}}{(ad-bc)^3}-\frac{bc\sqrt{-\frac{c}{d}}}{ad-bc}+x^2\right)}{4(ad-bc)}$$
$$-\frac{\sqrt{-\frac{c}{d}}\log\left(\frac{2a^2bd^3\left(-\frac{c}{d}\right)^{\frac{3}{2}}}{(ad-bc)^3}-\frac{4ab^2cd^2\left(-\frac{c}{d}\right)^{\frac{3}{2}}}{(ad-bc)^3}+\frac{ad\sqrt{-\frac{c}{d}}}{ad-bc}+\frac{2b^3c^2d\left(-\frac{c}{d}\right)^{\frac{3}{2}}}{(ad-bc)^3}+\frac{bc\sqrt{-\frac{c}{d}}}{ad-bc}+x^2\right)}{4(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] sqrt(-a/b)*log(-2*a**2*b*d**3*(-a/b)**(3/2)/(a*d - b*c)**3 + 4*a*
b**2*c*d**2*(-a/b)**(3/2)/(a*d - b*c)**3 - a*d*sqrt(-a/b)/(a*d -
b*c) - 2*b**3*c**2*d*(-a/b)**(3/2)/(a*d - b*c)**3 - b*c*sqrt(-a/b
)/(a*d - b*c) + x**2)/(4*(a*d - b*c)) - sqrt(-a/b)*log(2*a**2*b*d
**3*(-a/b)**(3/2)/(a*d - b*c)**3 - 4*a*b**2*c*d**2*(-a/b)**(3/2)/
(a*d - b*c)**3 + a*d*sqrt(-a/b)/(a*d - b*c) + 2*b**3*c**2*d*(-a/b
)**(3/2)/(a*d - b*c)**3 + b*c*sqrt(-a/b)/(a*d - b*c) + x**2)/(4*(
a*d - b*c)) + sqrt(-c/d)*log(-2*a**2*b*d**3*(-c/d)**(3/2)/(a*d -
b*c)**3 + 4*a*b**2*c*d**2*(-c/d)**(3/2)/(a*d - b*c)**3 - a*d*sqrt
(-c/d)/(a*d - b*c) - 2*b**3*c**2*d*(-c/d)**(3/2)/(a*d - b*c)**3 -
 b*c*sqrt(-c/d)/(a*d - b*c) + x**2)/(4*(a*d - b*c)) - sqrt(-c/d)*
log(2*a**2*b*d**3*(-c/d)**(3/2)/(a*d - b*c)**3 - 4*a*b**2*c*d**2*
(-c/d)**(3/2)/(a*d - b*c)**3 + a*d*sqrt(-c/d)/(a*d - b*c) + 2*b**
3*c**2*d*(-c/d)**(3/2)/(a*d - b*c)**3 + b*c*sqrt(-c/d)/(a*d - b*c
) + x**2)/(4*(a*d - b*c))
```

GIAC/XCAS [A] time = 0.234224, size = 271, normalized size = 3.43

$$-\frac{\sqrt{cd}bx^4|d|\arctan\left(\frac{2x^2}{\sqrt{\frac{2bc+2ad+\sqrt{-16abcd+4(bc+ad)^2}}{bd}}}\right)}{bcd|bc-ad|+ad^2|bc-ad|+(bc-ad)^2d}+\frac{\sqrt{ab}dx^4|b|\arctan\left(\frac{2x^2}{\sqrt{\frac{2bc+2ad-\sqrt{-16abcd+4(bc+ad)^2}}{bd}}}\right)}{b^2c|bc-ad|+abd|bc-ad|-(bc-ad)^2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -sqrt(c*d)*b*x^4*abs(d)*arctan(2*x^2/sqrt((2*b*c + 2*a*d + sqrt(-
16*a*b*c*d + 4*(b*c + a*d)^2))/(b*d)))/(b*c*d*abs(b*c - a*d) + a*
d^2*abs(b*c - a*d) + (b*c - a*d)^2*d) + sqrt(a*b)*d*x^4*abs(b)*ar
ctan(2*x^2/sqrt((2*b*c + 2*a*d - sqrt(-16*a*b*c*d + 4*(b*c + a*d)
^2))/(b*d)))/(b^2*c*abs(b*c - a*d) + a*b*d*abs(b*c - a*d) - (b*c
- a*d)^2*b)
```

3.607 $\int \frac{x}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=79

$$\frac{\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2\sqrt{a}(bc-ad)}-\frac{\sqrt{d}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2\sqrt{c}(bc-ad)}$$

```
[Out] (Sqrt[b]*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/(2*Sqrt[a]*(b*c - a*d)) -
 (Sqrt[d]*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/(2*Sqrt[c]*(b*c - a*d))
```

Rubi [A] time = 0.128169, antiderivative size = 79, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$\frac{\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2\sqrt{a}(bc-ad)}-\frac{\sqrt{d}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2\sqrt{c}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (Sqrt[b]*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/(2*Sqrt[a]*(b*c - a*d)) -
 (Sqrt[d]*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/(2*Sqrt[c]*(b*c - a*d))
```

Rubi in Sympy [A] time = 23.0259, size = 66, normalized size = 0.84

$$\frac{\sqrt{d}\,\text{atan}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2\sqrt{c}\,(ad-bc)}-\frac{\sqrt{b}\,\text{atan}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2\sqrt{a}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] sqrt(d)*atan(sqrt(d)*x**2/sqrt(c))/(2*sqrt(c)*(a*d - b*c)) - sqrt
(b)*atan(sqrt(b)*x**2/sqrt(a))/(2*sqrt(a)*(a*d - b*c))
```

Mathematica [A] time = 0.0783699, size = 66, normalized size = 0.84

$$\frac{\frac{\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{\sqrt{a}}-\frac{\sqrt{d}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{\sqrt{c}}}{2bc-2ad}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] ((Sqrt[b]*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/Sqrt[a] - (Sqrt[d]*ArcTa
n[(Sqrt[d]*x^2)/Sqrt[c]])/Sqrt[c])/(2*b*c - 2*a*d)
```

Maple [A] time = 0.008, size = 60, normalized size = 0.8

$$\frac{d}{2\,ad-2\,bc}\arctan\left(dx^2\frac{1}{\sqrt{cd}}\right)\frac{1}{\sqrt{cd}}-\frac{b}{2\,ad-2\,bc}\arctan\left(bx^2\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/2*d/(a*d-b*c)/(c*d)^(1/2)*arctan(x^2*d/(c*d)^(1/2))-1/2*b/(a*d-
b*c)/(a*b)^(1/2)*arctan(x^2*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.275073, size = 1, normalized size = 0.01

$$\left[-\frac{\sqrt{-\frac{b}{a}}\log\left(\frac{bx^4-2\,ax^2\sqrt{-\frac{b}{a}}-a}{bx^4+a}\right)+\sqrt{-\frac{d}{c}}\log\left(\frac{dx^4+2\,cx^2\sqrt{-\frac{d}{c}}-c}{dx^4+c}\right)}{4\,(bc-ad)}, \frac{2\sqrt{\frac{d}{c}}\arctan\left(\frac{c\sqrt{\frac{d}{c}}}{dx^2}\right)-\sqrt{-\frac{b}{a}}\log\left(\frac{bx^4-2\,ax^2\sqrt{-\frac{b}{a}}-a}{bx^4+a}\right)}{4\,(bc-ad)}, -\frac{2\sqrt{\frac{b}{a}}\arctan\left(\frac{a\sqrt{\frac{b}{a}}}{bx^2}\right)+\sqrt{-\frac{d}{c}}\log\left(\frac{dx^4+2\,cx^2\sqrt{-\frac{d}{c}}-c}{dx^4+c}\right)}{4\,(bc-ad)}, -\frac{\sqrt{\frac{b}{a}}\arctan\left(\frac{a\sqrt{\frac{b}{a}}}{bx^2}\right)-\sqrt{\frac{d}{c}}\arctan\left(\frac{c\sqrt{\frac{d}{c}}}{dx^2}\right)}{2\,(bc-ad)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [-1/4*(sqrt(-b/a)*log((b*x^4 - 2*a*x^2*sqrt(-b/a) - a)/(b*x^4 + a
)) + sqrt(-d/c)*log((d*x^4 + 2*c*x^2*sqrt(-d/c) - c)/(d*x^4 + c))
)/(b*c - a*d), 1/4*(2*sqrt(d/c)*arctan(c*sqrt(d/c)/(d*x^2)) - sqr
t(-b/a)*log((b*x^4 - 2*a*x^2*sqrt(-b/a) - a)/(b*x^4 + a)))/(b*c -
 a*d), -1/4*(2*sqrt(b/a)*arctan(a*sqrt(b/a)/(b*x^2)) + sqrt(-d/c)
*log((d*x^4 + 2*c*x^2*sqrt(-d/c) - c)/(d*x^4 + c)))/(b*c - a*d),
-1/2*(sqrt(b/a)*arctan(a*sqrt(b/a)/(b*x^2)) - sqrt(d/c)*arctan(c*
sqrt(d/c)/(d*x^2)))/(b*c - a*d)]
```

Sympy [A] time = 31.2626, size = 719, normalized size = 9.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] sqrt(-b/a)*log(x**2 + (-a**4*c*d**3*(-b/a)**(3/2)/(a*d - b*c)**3
+ a**3*b*c**2*d**2*(-b/a)**(3/2)/(a*d - b*c)**3 + a**2*b**2*c**3*
d*(-b/a)**(3/2)/(a*d - b*c)**3 - a**2*d**2*sqrt(-b/a)/(a*d - b*c)
 - a*b**3*c**4*(-b/a)**(3/2)/(a*d - b*c)**3 - b**2*c**2*sqrt(-b/a
)/(a*d - b*c))/(b*d))/(4*(a*d - b*c)) - sqrt(-b/a)*log(x**2 + (a*
*4*c*d**3*(-b/a)**(3/2)/(a*d - b*c)**3 - a**3*b*c**2*d**2*(-b/a)*
*(3/2)/(a*d - b*c)**3 - a**2*b**2*c**3*d*(-b/a)**(3/2)/(a*d - b*c
```

```
)**3 + a**2*d**2*sqrt(-b/a)/(a*d - b*c) + a*b**3*c**4*(-b/a)**(3/
2)/(a*d - b*c)**3 + b**2*c**2*sqrt(-b/a)/(a*d - b*c))/(b*d))/(4*(
a*d - b*c)) + sqrt(-d/c)*log(x**2 + (-a**4*c*d**3*(-d/c)**(3/2)/(
a*d - b*c)**3 + a**3*b*c**2*d**2*(-d/c)**(3/2)/(a*d - b*c)**3 + a
**2*b**2*c**3*d*(-d/c)**(3/2)/(a*d - b*c)**3 - a**2*d**2*sqrt(-d/
c)/(a*d - b*c) - a*b**3*c**4*(-d/c)**(3/2)/(a*d - b*c)**3 - b**2*
c**2*sqrt(-d/c)/(a*d - b*c))/(b*d))/(4*(a*d - b*c)) - sqrt(-d/c)*
log(x**2 + (a**4*c*d**3*(-d/c)**(3/2)/(a*d - b*c)**3 - a**3*b*c**
2*d**2*(-d/c)**(3/2)/(a*d - b*c)**3 - a**2*b**2*c**3*d*(-d/c)**(3
/2)/(a*d - b*c)**3 + a**2*d**2*sqrt(-d/c)/(a*d - b*c) + a*b**3*c*
*4*(-d/c)**(3/2)/(a*d - b*c)**3 + b**2*c**2*sqrt(-d/c)/(a*d - b*c
))/(b*d))/(4*(a*d - b*c))
```

GIAC/XCAS [A] time = 0.244262, size = 261, normalized size = 3.3

$$-\frac{\sqrt{cd}b|d|\arctan\left(\frac{2\sqrt{\frac{1}{2}}x^2}{\sqrt{\frac{bc+ad+\sqrt{-4\,abcd+(bc+ad)^2}}{bd}}}\right)}{bcd|bc-ad|+ad^2|bc-ad|+(bc-ad)^2d}+\frac{\sqrt{ab}d|b|\arctan\left(\frac{2\sqrt{\frac{1}{2}}x^2}{\sqrt{\frac{bc+ad-\sqrt{-4\,abcd+(bc+ad)^2}}{bd}}}\right)}{b^2c|bc-ad|+abd|bc-ad|-(bc-ad)^2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -sqrt(c*d)*b*abs(d)*arctan(2*sqrt(1/2)*x^2/sqrt((b*c + a*d + sqrt
(-4*a*b*c*d + (b*c + a*d)^2))/(b*d)))/(b*c*d*abs(b*c - a*d) + a*d
^2*abs(b*c - a*d) + (b*c - a*d)^2*d) + sqrt(a*b)*d*abs(b)*arctan(
2*sqrt(1/2)*x^2/sqrt((b*c + a*d - sqrt(-4*a*b*c*d + (b*c + a*d)^2
))/(b*d)))/(b^2*c*abs(b*c - a*d) + a*b*d*abs(b*c - a*d) - (b*c -
a*d)^2*b)
```

3.608 $\int \frac{1}{x^3(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=92

$$-\frac{b^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2a^{3/2}(bc-ad)}+\frac{d^{3/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2c^{3/2}(bc-ad)}-\frac{1}{2acx^2}$$

```
[Out] -1/(2*a*c*x^2) - (b^(3/2)*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/(2*a^(3/
2)*(b*c - a*d)) + (d^(3/2)*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/(2*c^(3
/2)*(b*c - a*d))
```

Rubi [A] time = 0.311112, antiderivative size = 92, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{b^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2a^{3/2}(bc-ad)}+\frac{d^{3/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2c^{3/2}(bc-ad)}-\frac{1}{2acx^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -1/(2*a*c*x^2) - (b^(3/2)*ArcTan[(Sqrt[b]*x^2)/Sqrt[a]])/(2*a^(3/
2)*(b*c - a*d)) + (d^(3/2)*ArcTan[(Sqrt[d]*x^2)/Sqrt[c]])/(2*c^(3
/2)*(b*c - a*d))
```

Rubi in Sympy [A] time = 51.5054, size = 76, normalized size = 0.83

$$-\frac{d^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2c^{\frac{3}{2}}(ad-bc)}-\frac{1}{2acx^2}+\frac{b^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -d**(3/2)*atan(sqrt(d)*x**2/sqrt(c))/(2*c**(3/2)*(a*d - b*c)) - 1
/(2*a*c*x**2) + b**(3/2)*atan(sqrt(b)*x**2/sqrt(a))/(2*a**(3/2)*(
a*d - b*c))
```

Mathematica [A] time = 0.382706, size = 169, normalized size = 1.84

$$\frac{-\frac{b^{3/2}x^2\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{a^{3/2}}-\frac{b^{3/2}x^2\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{a^{3/2}}+\frac{b}{a}+\frac{d^{3/2}x^2\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{c^{3/2}}+\frac{d^{3/2}x^2\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{c^{3/2}}-\frac{d}{c}}{2x^2(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (b/a - d/c - (b^(3/2)*x^2*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)]
)/a^(3/2) - (b^(3/2)*x^2*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4)])
/a^(3/2) + (d^(3/2)*x^2*ArcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/
c^(3/2) + (d^(3/2)*x^2*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/c
^(3/2))/(2*(-(b*c) + a*d)*x^2)
```

Maple [A] time = 0.012, size = 81, normalized size = 0.9

$$-\frac{d^{2}}{2\,c\,(ad-bc)}\arctan\left(dx^{2}\frac{1}{\sqrt{cd}}\right)\frac{1}{\sqrt{cd}}+\frac{b^{2}}{2\,a\,(ad-bc)}\arctan\left(bx^{2}\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}-\frac{1}{2\,acx^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] -1/2*d^2/c/(a*d-b*c)/(c*d)^(1/2)*arctan(x^2*d/(c*d)^(1/2))+1/2*b^
2/a/(a*d-b*c)/(a*b)^(1/2)*arctan(x^2*b/(a*b)^(1/2))-1/2/a/c/x^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.611711, size = 1, normalized size = 0.01

$$\left[-\frac{bcx^{2}\sqrt{-\frac{b}{a}}\log\left(\frac{bx^{4}+2\,ax^{2}\sqrt{-\frac{b}{a}}-a}{bx^{4}+a}\right)+adx^{2}\sqrt{-\frac{d}{c}}\log\left(\frac{dx^{4}-2\,cx^{2}\sqrt{-\frac{d}{c}}-c}{dx^{4}+c}\right)+2\,bc-2\,ad}{4\,(abc^{2}-a^{2}cd)x^{2}},\right.$$
$$-\frac{2\,adx^{2}\sqrt{\frac{d}{c}}\arctan\left(\frac{c\sqrt{\frac{d}{c}}}{dx^{2}}\right)+bcx^{2}\sqrt{-\frac{b}{a}}\log\left(\frac{bx^{4}+2\,ax^{2}\sqrt{-\frac{b}{a}}-a}{bx^{4}+a}\right)+2\,bc-2\,ad}{4\,(abc^{2}-a^{2}cd)x^{2}},\frac{2\,bcx^{2}\sqrt{\frac{b}{a}}\arctan\left(\frac{a\sqrt{\frac{b}{a}}}{bx^{2}}\right)-adx^{2}\sqrt{-\frac{d}{c}}\log\left(\frac{dx^{4}\cdots}{\cdots}\right.}{4\,(abc^{2}-a^{2}cd)x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^3),x, algorithm="fricas")
```

```
[Out] [-1/4*(b*c*x^2*sqrt(-b/a)*log((b*x^4 + 2*a*x^2*sqrt(-b/a) - a)/(b
*x^4 + a)) + a*d*x^2*sqrt(-d/c)*log((d*x^4 - 2*c*x^2*sqrt(-d/c) -
 c)/(d*x^4 + c)) + 2*b*c - 2*a*d)/((a*b*c^2 - a^2*c*d)*x^2), -1/4
*(2*a*d*x^2*sqrt(d/c)*arctan(c*sqrt(d/c)/(d*x^2)) + b*c*x^2*sqrt(
-b/a)*log((b*x^4 + 2*a*x^2*sqrt(-b/a) - a)/(b*x^4 + a)) + 2*b*c -
 2*a*d)/((a*b*c^2 - a^2*c*d)*x^2), 1/4*(2*b*c*x^2*sqrt(b/a)*arcta
n(a*sqrt(b/a)/(b*x^2)) - a*d*x^2*sqrt(-d/c)*log((d*x^4 - 2*c*x^2*
sqrt(-d/c) - c)/(d*x^4 + c)) - 2*b*c + 2*a*d)/((a*b*c^2 - a^2*c*d
)*x^2), 1/2*(b*c*x^2*sqrt(b/a)*arctan(a*sqrt(b/a)/(b*x^2)) - a*d*
x^2*sqrt(d/c)*arctan(c*sqrt(d/c)/(d*x^2)) - b*c + a*d)/((a*b*c^2
- a^2*c*d)*x^2)]
```

Sympy [A] time = 20.0406, size = 1103, normalized size = 11.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -sqrt(-b**3/a**3)*log(x**2 + (-a**7*c**3*d**4*(-b**3/a**3)**(3/2)
/(a*d - b*c)**3 + 2*a**6*b*c**4*d**3*(-b**3/a**3)**(3/2)/(a*d - b
*c)**3 - 2*a**5*b**2*c**5*d**2*(-b**3/a**3)**(3/2)/(a*d - b*c)**3
 - a**5*d**5*sqrt(-b**3/a**3)/(a*d - b*c) + 2*a**4*b**3*c**6*d*(-
b**3/a**3)**(3/2)/(a*d - b*c)**3 - a**3*b**4*c**7*(-b**3/a**3)**(
3/2)/(a*d - b*c)**3 - b**5*c**5*sqrt(-b**3/a**3)/(a*d - b*c))/(a*
*2*b**2*d**4 + a*b**3*c*d**3 + b**4*c**2*d**2))/(4*(a*d - b*c)) +
 sqrt(-b**3/a**3)*log(x**2 + (a**7*c**3*d**4*(-b**3/a**3)**(3/2)/
(a*d - b*c)**3 - 2*a**6*b*c**4*d**3*(-b**3/a**3)**(3/2)/(a*d - b*
c)**3 + 2*a**5*b**2*c**5*d**2*(-b**3/a**3)**(3/2)/(a*d - b*c)**3
+ a**5*d**5*sqrt(-b**3/a**3)/(a*d - b*c) - 2*a**4*b**3*c**6*d*(-b
**3/a**3)**(3/2)/(a*d - b*c)**3 + a**3*b**4*c**7*(-b**3/a**3)**(3
/2)/(a*d - b*c)**3 + b**5*c**5*sqrt(-b**3/a**3)/(a*d - b*c))/(a**
2*b**2*d**4 + a*b**3*c*d**3 + b**4*c**2*d**2))/(4*(a*d - b*c)) -
sqrt(-d**3/c**3)*log(x**2 + (-a**7*c**3*d**4*(-d**3/c**3)**(3/2)/
(a*d - b*c)**3 + 2*a**6*b*c**4*d**3*(-d**3/c**3)**(3/2)/(a*d - b*
c)**3 - 2*a**5*b**2*c**5*d**2*(-d**3/c**3)**(3/2)/(a*d - b*c)**3
- a**5*d**5*sqrt(-d**3/c**3)/(a*d - b*c) + 2*a**4*b**3*c**6*d*(-d
**3/c**3)**(3/2)/(a*d - b*c)**3 - a**3*b**4*c**7*(-d**3/c**3)**(3
/2)/(a*d - b*c)**3 - b**5*c**5*sqrt(-d**3/c**3)/(a*d - b*c))/(a**
2*b**2*d**4 + a*b**3*c*d**3 + b**4*c**2*d**2))/(4*(a*d - b*c)) +
sqrt(-d**3/c**3)*log(x**2 + (a**7*c**3*d**4*(-d**3/c**3)**(3/2)/(
a*d - b*c)**3 - 2*a**6*b*c**4*d**3*(-d**3/c**3)**(3/2)/(a*d - b*c
)**3 + 2*a**5*b**2*c**5*d**2*(-d**3/c**3)**(3/2)/(a*d - b*c)**3 +
 a**5*d**5*sqrt(-d**3/c**3)/(a*d - b*c) - 2*a**4*b**3*c**6*d*(-d*
*3/c**3)**(3/2)/(a*d - b*c)**3 + a**3*b**4*c**7*(-d**3/c**3)**(3/
2)/(a*d - b*c)**3 + b**5*c**5*sqrt(-d**3/c**3)/(a*d - b*c))/(a**2
*b**2*d**4 + a*b**3*c*d**3 + b**4*c**2*d**2))/(4*(a*d - b*c)) - 1
/(2*a*c*x**2)
```

GIAC/XCAS [A] time = 0.247899, size = 508, normalized size = 5.52

$$\frac{\left(\sqrt{cd}ab^2cdx^4|d| + \sqrt{cd}ab^2c^2|d| + \sqrt{cd}a^2bcd|d|\right)\arctan\left(\frac{2\,x^2}{\sqrt{\frac{2\,abc^2+2\,a^2cd+\sqrt{-16\,a^3bc^3d+4\left(abc^2+a^2cd\right)^2}}{abcd}}}\right)}{abc^2d|abc^2-a^2cd| + a^2cd^2|abc^2-a^2cd| + \left(abc^2-a^2cd\right)^2d} - \frac{\left(\sqrt{ab}abcd^2x^4|b| + \sqrt{ab}abc^2d|b| + \sqrt{ab}a^2cd^2|b|\right)\arctan\left(\frac{2\,x^2}{\sqrt{\frac{2\,abc^2+2\,a^2cd-\sqrt{-16\,a^3bc^3d+4\left(abc^2+a^2cd\right)^2}}{abcd}}}\right)}{ab^2c^2|abc^2-a^2cd| + a^2bcd|abc^2-a^2cd| - \left(abc^2-a^2cd\right)^2b} - \frac{1}{2\,acx^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^3),x, algorithm="giac")
```

```
[Out] (sqrt(c*d)*a*b^2*c*d*x^4*abs(d) + sqrt(c*d)*a*b^2*c^2*abs(d) + sq
rt(c*d)*a^2*b*c*d*abs(d))*arctan(2*x^2/sqrt((2*a*b*c^2 + 2*a^2*c*
d + sqrt(-16*a^3*b*c^3*d + 4*(a*b*c^2 + a^2*c*d)^2))/(a*b*c*d)))/
(a*b*c^2*d*abs(a*b*c^2 - a^2*c*d) + a^2*c*d^2*abs(a*b*c^2 - a^2*c
*d) + (a*b*c^2 - a^2*c*d)^2*d) - (sqrt(a*b)*a*b*c*d^2*x^4*abs(b)
+ sqrt(a*b)*a*b*c^2*d*abs(b) + sqrt(a*b)*a^2*c*d^2*abs(b))*arctan
(2*x^2/sqrt((2*a*b*c^2 + 2*a^2*c*d - sqrt(-16*a^3*b*c^3*d + 4*(a*
b*c^2 + a^2*c*d)^2))/(a*b*c*d)))/(a*b^2*c^2*abs(a*b*c^2 - a^2*c*d
) + a^2*b*c*d*abs(a*b*c^2 - a^2*c*d) - (a*b*c^2 - a^2*c*d)^2*b) -
 1/2/(a*c*x^2)
```

3.609 $\int \frac{1}{x^7(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=112

$$\frac{b^{5/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2a^{5/2}(bc-ad)}+\frac{ad+bc}{2a^2c^2x^2}-\frac{d^{5/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2c^{5/2}(bc-ad)}-\frac{1}{6acx^6}$$

```
[Out] -1/(6*a*c*x^6) + (b*c + a*d)/(2*a^2*c^2*x^2) + (b^(5/2)*ArcTan[(S
qrt[b]*x^2)/Sqrt[a]])/(2*a^(5/2)*(b*c - a*d)) - (d^(5/2)*ArcTan[(
Sqrt[d]*x^2)/Sqrt[c]])/(2*c^(5/2)*(b*c - a*d))
```

Rubi [A] time = 0.557457, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{b^{5/2}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2a^{5/2}(bc-ad)}+\frac{ad+bc}{2a^2c^2x^2}-\frac{d^{5/2}\tan^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2c^{5/2}(bc-ad)}-\frac{1}{6acx^6}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -1/(6*a*c*x^6) + (b*c + a*d)/(2*a^2*c^2*x^2) + (b^(5/2)*ArcTan[(S
qrt[b]*x^2)/Sqrt[a]])/(2*a^(5/2)*(b*c - a*d)) - (d^(5/2)*ArcTan[(
Sqrt[d]*x^2)/Sqrt[c]])/(2*c^(5/2)*(b*c - a*d))
```

Rubi in Sympy [A] time = 94.3498, size = 95, normalized size = 0.85

$$\frac{d^{\frac{5}{2}}\operatorname{atan}\left(\frac{\sqrt{d}x^2}{\sqrt{c}}\right)}{2c^{\frac{5}{2}}(ad-bc)}-\frac{1}{6acx^6}+\frac{ad+bc}{2a^2c^2x^2}-\frac{b^{\frac{5}{2}}\operatorname{atan}\left(\frac{\sqrt{b}x^2}{\sqrt{a}}\right)}{2a^{\frac{5}{2}}(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] d**(5/2)*atan(sqrt(d)*x**2/sqrt(c))/(2*c**(5/2)*(a*d - b*c)) - 1/
(6*a*c*x**6) + (a*d + b*c)/(2*a**2*c**2*x**2) - b**(5/2)*atan(sqr
t(b)*x**2/sqrt(a))/(2*a**(5/2)*(a*d - b*c))
```

Mathematica [A] time = 0.512473, size = 193, normalized size = 1.72

$$\frac{\frac{3b^{5/2}x^6\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{a^{5/2}}+\frac{3b^{5/2}x^6\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{a^{5/2}}-\frac{3b^2x^4}{a^2}+\frac{b}{a}-\frac{3d^{5/2}x^6\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{c^{5/2}}-\frac{3d^{5/2}x^6\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{c^{5/2}}+\frac{3d^2x^4}{c^2}-\frac{d}{c}}{6x^6(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^7*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (b/a - d/c - (3*b^2*x^4)/a^2 + (3*d^2*x^4)/c^2 + (3*b^(5/2)*x^6*A
rcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/a^(5/2) + (3*b^(5/2)*x^6*
ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/a^(5/2) - (3*d^(5/2)*x^6
*ArcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/c^(5/2) - (3*d^(5/2)*x^
6*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/c^(5/2))/(6*(-(b*c) +
a*d)*x^6)
```

Maple [A] time = 0.016, size = 105, normalized size = 0.9

$$\frac{d^3}{2\,c^2\,(ad-bc)}\arctan\left(dx^2\frac{1}{\sqrt{cd}}\right)\frac{1}{\sqrt{cd}}-\frac{1}{6\,acx^6}+\frac{d}{2\,ac^2x^2}+\frac{b}{2\,a^2cx^2}-\frac{b^3}{2\,a^2\,(ad-bc)}\arctan\left(bx^2\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/2*d^3/c^2/(a*d-b*c)/(c*d)^(1/2)*arctan(x^2*d/(c*d)^(1/2))-1/6/a
/c/x^6+1/2/a/c^2/x^2*d+1/2/a^2/c/x^2*b-1/2*b^3/a^2/(a*d-b*c)/(a*b
)^(1/2)*arctan(x^2*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^7),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 3.18912, size = 1, normalized size = 0.01

$$\left[-\frac{3\,b^2c^2x^6\sqrt{-\frac{b}{a}}\log\left(\frac{bx^4-2\,ax^2\sqrt{-\frac{b}{a}}-a}{bx^4+a}\right)+3\,a^2d^2x^6\sqrt{-\frac{d}{c}}\log\left(\frac{dx^4+2\,cx^2\sqrt{-\frac{d}{c}}-c}{dx^4+c}\right)-6\left(b^2c^2-a^2d^2\right)x^4+2\,abc^2-2\,a^2cd}{12\,(a^2bc^3-a^3c^2d)x^6},\ \frac{6\,a^2d^2\cdots}{\cdots}\right.$$

$$-\frac{6\,b^2c^2x^6\sqrt{\frac{b}{a}}\arctan\left(\frac{a\sqrt{\frac{b}{a}}}{bx^2}\right)+3\,a^2d^2x^6\sqrt{-\frac{d}{c}}\log\left(\frac{dx^4+2\,cx^2\sqrt{-\frac{d}{c}}-c}{dx^4+c}\right)-6\left(b^2c^2-a^2d^2\right)x^4+2\,abc^2-2\,a^2cd}{12\,(a^2bc^3-a^3c^2d)x^6},$$

$$\left.-\frac{3\,b^2c^2x^6\sqrt{\frac{b}{a}}\arctan\left(\frac{a\sqrt{\frac{b}{a}}}{bx^2}\right)-3\,a^2d^2x^6\sqrt{\frac{d}{c}}\arctan\left(\frac{c\sqrt{\frac{d}{c}}}{dx^2}\right)-3\left(b^2c^2-a^2d^2\right)x^4+abc^2-a^2cd}{6\,(a^2bc^3-a^3c^2d)x^6}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^7),x, algorithm="fricas")
```

```
[Out] [-1/12*(3*b^2*c^2*x^6*sqrt(-b/a)*log((b*x^4 - 2*a*x^2*sqrt(-b/a)
- a)/(b*x^4 + a)) + 3*a^2*d^2*x^6*sqrt(-d/c)*log((d*x^4 + 2*c*x^2
*sqrt(-d/c) - c)/(d*x^4 + c)) - 6*(b^2*c^2 - a^2*d^2)*x^4 + 2*a*b
*c^2 - 2*a^2*c*d)/((a^2*b*c^3 - a^3*c^2*d)*x^6), 1/12*(6*a^2*d^2*
x^6*sqrt(d/c)*arctan(c*sqrt(d/c)/(d*x^2)) - 3*b^2*c^2*x^6*sqrt(-b
/a)*log((b*x^4 - 2*a*x^2*sqrt(-b/a) - a)/(b*x^4 + a)) + 6*(b^2*c^
2 - a^2*d^2)*x^4 - 2*a*b*c^2 + 2*a^2*c*d)/((a^2*b*c^3 - a^3*c^2*d
)*x^6), -1/12*(6*b^2*c^2*x^6*sqrt(b/a)*arctan(a*sqrt(b/a)/(b*x^2)
) + 3*a^2*d^2*x^6*sqrt(-d/c)*log((d*x^4 + 2*c*x^2*sqrt(-d/c) - c)
/(d*x^4 + c)) - 6*(b^2*c^2 - a^2*d^2)*x^4 + 2*a*b*c^2 - 2*a^2*c*d
)/((a^2*b*c^3 - a^3*c^2*d)*x^6), -1/6*(3*b^2*c^2*x^6*sqrt(b/a)*ar
ctan(a*sqrt(b/a)/(b*x^2)) - 3*a^2*d^2*x^6*sqrt(d/c)*arctan(c*sqrt
(d/c)/(d*x^2)) - 3*(b^2*c^2 - a^2*d^2)*x^4 + a*b*c^2 - a^2*c*d)/(
(a^2*b*c^3 - a^3*c^2*d)*x^6)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.248433, size = 736, normalized size = 6.57

$$-\frac{\left(\sqrt{cd}a^2b^3c^3dx^4|d| + \sqrt{cd}a^3b^2c^2d^2x^4|d| + \sqrt{cd}a^2b^3c^4|d| + \sqrt{cd}a^3b^2c^3d|d| + \sqrt{cd}a^4bc^2d^2|d|\right)\arctan\left(\frac{2\,x^2}{\sqrt{\frac{2\,a^2bc^3+2\,a^3c^2d+\sqrt{-16\,a^5b}}{a^2bc^2}}}\right.}{a^2bc^3d|a^2bc^3 - a^3c^2d| + a^3c^2d^2|a^2bc^3 - a^3c^2d| + (a^2bc^3 - a^3c^2d)^2d}$$
$$+\frac{\left(\sqrt{ab}a^2b^2c^3d^2x^4|b| + \sqrt{ab}a^3bc^2d^3x^4|b| + \sqrt{ab}a^2b^2c^4d|b| + \sqrt{ab}a^3bc^3d^2|b| + \sqrt{ab}a^4c^2d^3|b|\right)\arctan\left(\frac{2\,x^2}{\sqrt{\frac{2\,a^2bc^3+2\,a^3c^2d-\sqrt{-16\,a^5b}}{a^2bc^2}}}\right.}{a^2b^2c^3|a^2bc^3 - a^3c^2d| + a^3bc^2d|a^2bc^3 - a^3c^2d| - (a^2bc^3 - a^3c^2d)^2b}$$
$$+\frac{3\,bcx^4 + 3\,adx^4 - ac}{6\,a^2c^2x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^7),x, algorithm="giac")
```

```
[Out] -(sqrt(c*d)*a^2*b^3*c^3*d*x^4*abs(d) + sqrt(c*d)*a^3*b^2*c^2*d^2*
x^4*abs(d) + sqrt(c*d)*a^2*b^3*c^4*abs(d) + sqrt(c*d)*a^3*b^2*c^3
*d*abs(d) + sqrt(c*d)*a^4*b*c^2*d^2*abs(d))*arctan(2*x^2/sqrt((2*
a^2*b*c^3 + 2*a^3*c^2*d + sqrt(-16*a^5*b*c^5*d + 4*(a^2*b*c^3 + a
^3*c^2*d)^2))/(a^2*b*c^2*d)))/(a^2*b*c^3*d*abs(a^2*b*c^3 - a^3*c^
2*d) + a^3*c^2*d^2*abs(a^2*b*c^3 - a^3*c^2*d) + (a^2*b*c^3 - a^3*
c^2*d)^2*d) + (sqrt(a*b)*a^2*b^2*c^3*d^2*x^4*abs(b) + sqrt(a*b)*a
^3*b*c^2*d^3*x^4*abs(b) + sqrt(a*b)*a^2*b^2*c^4*d*abs(b) + sqrt(a
*b)*a^3*b*c^3*d^2*abs(b) + sqrt(a*b)*a^4*c^2*d^3*abs(b))*arctan(2
*x^2/sqrt((2*a^2*b*c^3 + 2*a^3*c^2*d - sqrt(-16*a^5*b*c^5*d + 4*(
a^2*b*c^3 + a^3*c^2*d)^2))/(a^2*b*c^2*d)))/(a^2*b^2*c^3*abs(a^2*b
*c^3 - a^3*c^2*d) + a^3*b*c^2*d*abs(a^2*b*c^3 - a^3*c^2*d) - (a^2
*b*c^3 - a^3*c^2*d)^2*b) + 1/6*(3*b*c*x^4 + 3*a*d*x^4 - a*c)/(a^2
*c^2*x^6)
```

3.610 $\int \frac{x^8}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=457

$$-\frac{a^{5/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}b^{5/4}(bc-ad)}+\frac{a^{5/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}b^{5/4}(bc-ad)}-\frac{a^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}b^{5/4}(bc-ad)}+\frac{a^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}b^{5/4}(bc-ad)}+\frac{c^{5/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}d^{5/4}(bc-ad)}-\frac{c^{5/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}d^{5/4}(bc-ad)}+\frac{c^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}d^{5/4}(bc-ad)}-\frac{c^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}d^{5/4}(bc-ad)}+\frac{x}{bd}$$

```
[Out] x/(b*d) - (a^(5/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sq
rt[2]*b^(5/4)*(b*c - a*d)) + (a^(5/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)
*x)/a^(1/4)])/(2*Sqrt[2]*b^(5/4)*(b*c - a*d)) + (c^(5/4)*ArcTan[1
 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(5/4)*(b*c - a*d))
- (c^(5/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^
(5/4)*(b*c - a*d)) - (a^(5/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/
4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*b^(5/4)*(b*c - a*d)) + (a^(5/4)*L
og[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]
*b^(5/4)*(b*c - a*d)) + (c^(5/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^
(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*d^(5/4)*(b*c - a*d)) - (c^(5/4
)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt
[2]*d^(5/4)*(b*c - a*d))
```

Rubi [A] time = 1.02152, antiderivative size = 457, normalized size of antiderivative = 1., number of steps used = 20, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$

$$-\frac{a^{5/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}b^{5/4}(bc-ad)}+\frac{a^{5/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}b^{5/4}(bc-ad)}-\frac{a^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}b^{5/4}(bc-ad)}+\frac{a^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}b^{5/4}(bc-ad)}+\frac{c^{5/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}d^{5/4}(bc-ad)}-\frac{c^{5/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}d^{5/4}(bc-ad)}+\frac{c^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}d^{5/4}(bc-ad)}-\frac{c^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}d^{5/4}(bc-ad)}+\frac{x}{bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] x/(b*d) - (a^(5/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sq
rt[2]*b^(5/4)*(b*c - a*d)) + (a^(5/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)
*x)/a^(1/4)])/(2*Sqrt[2]*b^(5/4)*(b*c - a*d)) + (c^(5/4)*ArcTan[1
 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(5/4)*(b*c - a*d))
- (c^(5/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^
(5/4)*(b*c - a*d)) - (a^(5/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/
4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*b^(5/4)*(b*c - a*d)) + (a^(5/4)*L
og[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]
*b^(5/4)*(b*c - a*d)) + (c^(5/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^
(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*d^(5/4)*(b*c - a*d)) - (c^(5/4
)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt
[2]*d^(5/4)*(b*c - a*d))
```

Rubi in Sympy [A] time = 151.257, size = 405, normalized size = 0.89

$$\frac{\sqrt{2}a^{\frac{5}{4}}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{8b^{\frac{5}{4}}(ad-bc)}-\frac{\sqrt{2}a^{\frac{5}{4}}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{8b^{\frac{5}{4}}(ad-bc)}+\frac{\sqrt{2}a^{\frac{5}{4}}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4b^{\frac{5}{4}}(ad-bc)}-\frac{\sqrt{2}a^{\frac{5}{4}}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4b^{\frac{5}{4}}(ad-bc)}-\frac{\sqrt{2}c^{\frac{5}{4}}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{8d^{\frac{5}{4}}(ad-bc)}+\frac{\sqrt{2}c^{\frac{5}{4}}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{8d^{\frac{5}{4}}(ad-bc)}-\frac{\sqrt{2}c^{\frac{5}{4}}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4d^{\frac{5}{4}}(ad-bc)}+\frac{\sqrt{2}c^{\frac{5}{4}}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4d^{\frac{5}{4}}(ad-bc)}+\frac{x}{bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] sqrt(2)*a**(5/4)*log(-sqrt(2)*a**(1/4)*b**(1/4)*x + sqrt(a) + sqr
t(b)*x**2)/(8*b**(5/4)*(a*d - b*c)) - sqrt(2)*a**(5/4)*log(sqrt(2
)*a**(1/4)*b**(1/4)*x + sqrt(a) + sqrt(b)*x**2)/(8*b**(5/4)*(a*d
- b*c)) + sqrt(2)*a**(5/4)*atan(1 - sqrt(2)*b**(1/4)*x/a**(1/4))/
(4*b**(5/4)*(a*d - b*c)) - sqrt(2)*a**(5/4)*atan(1 + sqrt(2)*b**(
1/4)*x/a**(1/4))/(4*b**(5/4)*(a*d - b*c)) - sqrt(2)*c**(5/4)*log(
-sqrt(2)*c**(1/4)*d**(1/4)*x + sqrt(c) + sqrt(d)*x**2)/(8*d**(5/4
)*(a*d - b*c)) + sqrt(2)*c**(5/4)*log(sqrt(2)*c**(1/4)*d**(1/4)*x
 + sqrt(c) + sqrt(d)*x**2)/(8*d**(5/4)*(a*d - b*c)) - sqrt(2)*c**
(5/4)*atan(1 - sqrt(2)*d**(1/4)*x/c**(1/4))/(4*d**(5/4)*(a*d - b*
c)) + sqrt(2)*c**(5/4)*atan(1 + sqrt(2)*d**(1/4)*x/c**(1/4))/(4*d
**(5/4)*(a*d - b*c)) + x/(b*d)
```

Mathematica [A] time = 0.423531, size = 377, normalized size = 0.82

$$\frac{-\frac{\sqrt{2}a^{5/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{b^{5/4}}+\frac{\sqrt{2}a^{5/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{b^{5/4}}-\frac{2\sqrt{2}a^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{b^{5/4}}+\frac{2\sqrt{2}a^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{b^{5/4}}-\frac{8ax}{b}+ \cdots}{8bc-8a \cdots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] ((-8*a*x)/b + (8*c*x)/d - (2*Sqrt[2]*a^(5/4)*ArcTan[1 - (Sqrt[2]*
b^(1/4)*x)/a^(1/4)])/b^(5/4) + (2*Sqrt[2]*a^(5/4)*ArcTan[1 + (Sqr
t[2]*b^(1/4)*x)/a^(1/4)])/b^(5/4) + (2*Sqrt[2]*c^(5/4)*ArcTan[1 -
 (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/d^(5/4) - (2*Sqrt[2]*c^(5/4)*ArcTa
n[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/d^(5/4) - (Sqrt[2]*a^(5/4)*Lo
g[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/b^(5/4) + (
Sqrt[2]*a^(5/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]
*x^2])/b^(5/4) + (Sqrt[2]*c^(5/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d
^(1/4)*x + Sqrt[d]*x^2])/d^(5/4) - (Sqrt[2]*c^(5/4)*Log[Sqrt[c] +
 Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/d^(5/4))/(8*b*c - 8*a*
d)
```

Maple [A] time = 0.003, size = 328, normalized size = 0.7

$$\frac{x}{bd}+\frac{c\sqrt{2}}{8\,(ad-bc)\,d}\sqrt[4]{\frac{c}{d}}\ln\left(1\left(x^2+\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)\left(x^2-\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)^{-1}\right)+\frac{c\sqrt{2}}{4\,(ad-bc)\,d}\sqrt[4]{\frac{c}{d}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}+1\right)+\frac{c\sqrt{2}}{4\,(ad-bc)\,d}\sqrt[4]{\frac{c}{d}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}-1\right)-\frac{a\sqrt{2}}{8\,(ad-bc)\,b}\sqrt[4]{\frac{a}{b}}\ln\left(1\left(x^2+\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)\left(x^2-\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)^{-1}\right)-\frac{a\sqrt{2}}{4\,(ad-bc)\,b}\sqrt[4]{\frac{a}{b}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}+1\right)-\frac{a\sqrt{2}}{4\,(ad-bc)\,b}\sqrt[4]{\frac{a}{b}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] x/b/d+1/8/d*c/(a*d-b*c)*(c/d)^(1/4)*2^(1/2)*ln((x^2+(c/d)^(1/4)*x
*2^(1/2)+(c/d)^(1/2))/(x^2-(c/d)^(1/4)*x*2^(1/2)+(c/d)^(1/2)))+1/
4/d*c/(a*d-b*c)*(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x+
1)+1/4/d*c/(a*d-b*c)*(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/
4)*x-1)-1/8/b*a/(a*d-b*c)*(a/b)^(1/4)*2^(1/2)*ln((x^2+(a/b)^(1/4)
*x*2^(1/2)+(a/b)^(1/2))/(x^2-(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2)))-
1/4/b*a/(a*d-b*c)*(a/b)^(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*
x+1)-1/4/b*a/(a*d-b*c)*(a/b)^(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(
1/4)*x-1)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.442969, size = 1501, normalized size = 3.28

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] 1/4*(4*(-a^5/(b^9*c^4 - 4*a*b^8*c^3*d + 6*a^2*b^7*c^2*d^2 - 4*a^3
*b^6*c*d^3 + a^4*b^5*d^4))^(1/4)*b*d*arctan(-(-a^5/(b^9*c^4 - 4*a
*b^8*c^3*d + 6*a^2*b^7*c^2*d^2 - 4*a^3*b^6*c*d^3 + a^4*b^5*d^4))^
(1/4)*(b^2*c - a*b*d)/(a*x + a*sqrt((a^2*x^2 + (b^4*c^2 - 2*a*b^3
*c*d + a^2*b^2*d^2)*sqrt(-a^5/(b^9*c^4 - 4*a*b^8*c^3*d + 6*a^2*b^
7*c^2*d^2 - 4*a^3*b^6*c*d^3 + a^4*b^5*d^4)))/a^2))) - 4*(-c^5/(b^
4*c^4*d^5 - 4*a*b^3*c^3*d^6 + 6*a^2*b^2*c^2*d^7 - 4*a^3*b*c*d^8 +
 a^4*d^9))^(1/4)*b*d*arctan(-(-c^5/(b^4*c^4*d^5 - 4*a*b^3*c^3*d^6
 + 6*a^2*b^2*c^2*d^7 - 4*a^3*b*c*d^8 + a^4*d^9))^(1/4)*(b*c*d - a
*d^2)/(c*x + c*sqrt((c^2*x^2 + (b^2*c^2*d^2 - 2*a*b*c*d^3 + a^2*d
^4)*sqrt(-c^5/(b^4*c^4*d^5 - 4*a*b^3*c^3*d^6 + 6*a^2*b^2*c^2*d^7
- 4*a^3*b*c*d^8 + a^4*d^9)))/c^2))) + (-a^5/(b^9*c^4 - 4*a*b^8*c^
```

```
3*d + 6*a^2*b^7*c^2*d^2 - 4*a^3*b^6*c*d^3 + a^4*b^5*d^4))^(1/4)*b
*d*log(a*x + (-a^5/(b^9*c^4 - 4*a*b^8*c^3*d + 6*a^2*b^7*c^2*d^2 -
 4*a^3*b^6*c*d^3 + a^4*b^5*d^4))^(1/4)*(b^2*c - a*b*d)) - (-a^5/(
b^9*c^4 - 4*a*b^8*c^3*d + 6*a^2*b^7*c^2*d^2 - 4*a^3*b^6*c*d^3 + a
^4*b^5*d^4))^(1/4)*b*d*log(a*x - (-a^5/(b^9*c^4 - 4*a*b^8*c^3*d +
 6*a^2*b^7*c^2*d^2 - 4*a^3*b^6*c*d^3 + a^4*b^5*d^4))^(1/4)*(b^2*c
 - a*b*d)) - (-c^5/(b^4*c^4*d^5 - 4*a*b^3*c^3*d^6 + 6*a^2*b^2*c^2
*d^7 - 4*a^3*b*c*d^8 + a^4*d^9))^(1/4)*b*d*log(c*x + (-c^5/(b^4*c
^4*d^5 - 4*a*b^3*c^3*d^6 + 6*a^2*b^2*c^2*d^7 - 4*a^3*b*c*d^8 + a^
4*d^9))^(1/4)*(b*c*d - a*d^2)) + (-c^5/(b^4*c^4*d^5 - 4*a*b^3*c^3
*d^6 + 6*a^2*b^2*c^2*d^7 - 4*a^3*b*c*d^8 + a^4*d^9))^(1/4)*b*d*lo
g(c*x - (-c^5/(b^4*c^4*d^5 - 4*a*b^3*c^3*d^6 + 6*a^2*b^2*c^2*d^7
- 4*a^3*b*c*d^8 + a^4*d^9))^(1/4)*(b*c*d - a*d^2)) + 4*x)/(b*d)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{(bx^4 + a)(dx^4 + c)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^8/((b*x^4 + a)*(d*x^4 + c)), x)
```

3.611 $\int \frac{x^6}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=449

$$-\frac{a^{3/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}b^{3/4}(bc-ad)}+\frac{a^{3/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}b^{3/4}(bc-ad)}+\frac{a^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}b^{3/4}(bc-ad)}-\frac{a^{3/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}b^{3/4}(bc-ad)}+\frac{c^{3/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}d^{3/4}(bc-ad)}-\frac{c^{3/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}d^{3/4}(bc-ad)}-\frac{c^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}d^{3/4}(bc-ad)}+\frac{c^{3/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}d^{3/4}(bc-ad)}$$

```
[Out] (a^(3/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*b^(3
/4)*(b*c - a*d)) - (a^(3/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4
)])/(2*Sqrt[2]*b^(3/4)*(b*c - a*d)) - (c^(3/4)*ArcTan[1 - (Sqrt[2
]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(3/4)*(b*c - a*d)) + (c^(3/4)
*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(3/4)*(b*c
 - a*d)) - (a^(3/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqr
t[b]*x^2])/(4*Sqrt[2]*b^(3/4)*(b*c - a*d)) + (a^(3/4)*Log[Sqrt[a]
 + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*b^(3/4)*(
b*c - a*d)) + (c^(3/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x +
Sqrt[d]*x^2])/(4*Sqrt[2]*d^(3/4)*(b*c - a*d)) - (c^(3/4)*Log[Sqrt
[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*d^(3/4
)*(b*c - a*d))
```

Rubi [A] time = 0.651635, antiderivative size = 449, normalized size of antiderivative = 1., number of steps used = 19, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.318

$$-\frac{a^{3/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}b^{3/4}(bc-ad)}+\frac{a^{3/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}b^{3/4}(bc-ad)}+\frac{a^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}b^{3/4}(bc-ad)}-\frac{a^{3/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}b^{3/4}(bc-ad)}+\frac{c^{3/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}d^{3/4}(bc-ad)}-\frac{c^{3/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}d^{3/4}(bc-ad)}-\frac{c^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}d^{3/4}(bc-ad)}+\frac{c^{3/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}d^{3/4}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (a^(3/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*b^(3
/4)*(b*c - a*d)) - (a^(3/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4
)])/(2*Sqrt[2]*b^(3/4)*(b*c - a*d)) - (c^(3/4)*ArcTan[1 - (Sqrt[2
]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(3/4)*(b*c - a*d)) + (c^(3/4)
*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(3/4)*(b*c
 - a*d)) - (a^(3/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqr
t[b]*x^2])/(4*Sqrt[2]*b^(3/4)*(b*c - a*d)) + (a^(3/4)*Log[Sqrt[a]
 + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*b^(3/4)*(
b*c - a*d)) + (c^(3/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x +
Sqrt[d]*x^2])/(4*Sqrt[2]*d^(3/4)*(b*c - a*d)) - (c^(3/4)*Log[Sqrt
[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*d^(3/4
)*(b*c - a*d))
```

Rubi in Sympy [A] time = 119.055, size = 400, normalized size = 0.89

$$\frac{\sqrt{2}a^{\frac{3}{4}}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)}{8b^{\frac{3}{4}}\left(ad-bc\right)}-\frac{\sqrt{2}a^{\frac{3}{4}}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)}{8b^{\frac{3}{4}}\left(ad-bc\right)}-\frac{\sqrt{2}a^{\frac{3}{4}}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4b^{\frac{3}{4}}\left(ad-bc\right)}+\frac{\sqrt{2}a^{\frac{3}{4}}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4b^{\frac{3}{4}}\left(ad-bc\right)}-\frac{\sqrt{2}c^{\frac{3}{4}}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^{2}\right)}{8d^{\frac{3}{4}}\left(ad-bc\right)}+\frac{\sqrt{2}c^{\frac{3}{4}}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^{2}\right)}{8d^{\frac{3}{4}}\left(ad-bc\right)}+\frac{\sqrt{2}c^{\frac{3}{4}}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4d^{\frac{3}{4}}\left(ad-bc\right)}-\frac{\sqrt{2}c^{\frac{3}{4}}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4d^{\frac{3}{4}}\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] sqrt(2)*a**(3/4)*log(-sqrt(2)*a**(1/4)*b**(1/4)*x + sqrt(a) + sqr
t(b)*x**2)/(8*b**(3/4)*(a*d - b*c)) - sqrt(2)*a**(3/4)*log(sqrt(2
)*a**(1/4)*b**(1/4)*x + sqrt(a) + sqrt(b)*x**2)/(8*b**(3/4)*(a*d
- b*c)) - sqrt(2)*a**(3/4)*atan(1 - sqrt(2)*b**(1/4)*x/a**(1/4))/
(4*b**(3/4)*(a*d - b*c)) + sqrt(2)*a**(3/4)*atan(1 + sqrt(2)*b**(
1/4)*x/a**(1/4))/(4*b**(3/4)*(a*d - b*c)) - sqrt(2)*c**(3/4)*log(
-sqrt(2)*c**(1/4)*d**(1/4)*x + sqrt(c) + sqrt(d)*x**2)/(8*d**(3/4
)*(a*d - b*c)) + sqrt(2)*c**(3/4)*log(sqrt(2)*c**(1/4)*d**(1/4)*x
 + sqrt(c) + sqrt(d)*x**2)/(8*d**(3/4)*(a*d - b*c)) + sqrt(2)*c**
(3/4)*atan(1 - sqrt(2)*d**(1/4)*x/c**(1/4))/(4*d**(3/4)*(a*d - b*
c)) - sqrt(2)*c**(3/4)*atan(1 + sqrt(2)*d**(1/4)*x/c**(1/4))/(4*d
**(3/4)*(a*d - b*c))
```

Mathematica [A] time = 0.217366, size = 340, normalized size = 0.76

$$-a^{3/4}d^{3/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)+a^{3/4}d^{3/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)+2a^{3/4}d^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)-2a^{3/4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^6/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (2*a^(3/4)*d^(3/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)] - 2*a^
(3/4)*d^(3/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4)] - 2*b^(3/4)
*c^(3/4)*ArcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)] + 2*b^(3/4)*c^(3
/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)] - a^(3/4)*d^(3/4)*Log
[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2] + a^(3/4)*d^(
3/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2] + b^(
3/4)*c^(3/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^
2] - b^(3/4)*c^(3/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sq
rt[d]*x^2])/(4*Sqrt[2]*b^(3/4)*d^(3/4)*(b*c - a*d))
```

Maple [A] time = 0.001, size = 320, normalized size = 0.7

$$-\frac{c\sqrt{2}}{(8ad-8bc)d}\ln\left(1\left(x^2-\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)\left(x^2+\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)^{-1}\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}-\frac{c\sqrt{2}}{(4ad-4bc)d}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}+1\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}-\frac{c\sqrt{2}}{(4ad-4bc)d}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}-1\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}+\frac{a\sqrt{2}}{(8ad-8bc)b}\ln\left(1\left(x^2-\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)\left(x^2+\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)^{-1}\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}+\frac{a\sqrt{2}}{(4ad-4bc)b}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}+1\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}+\frac{a\sqrt{2}}{(4ad-4bc)b}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}-1\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] -1/8*c/(a*d-b*c)/d/(c/d)^(1/4)*2^(1/2)*ln((x^2-(c/d)^(1/4)*x*2^(1
/2)+(c/d)^(1/2))/(x^2+(c/d)^(1/4)*x*2^(1/2)+(c/d)^(1/2)))-1/4*c/(
a*d-b*c)/d/(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x+1)-1/
4*c/(a*d-b*c)/d/(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x-
1)+1/8*a/(a*d-b*c)/b/(a/b)^(1/4)*2^(1/2)*ln((x^2-(a/b)^(1/4)*x*2^
(1/2)+(a/b)^(1/2))/(x^2+(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2)))+1/4*a
/(a*d-b*c)/b/(a/b)^(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x+1)+
1/4*a/(a*d-b*c)/b/(a/b)^(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*
x-1)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.303875, size = 1728, normalized size = 3.85

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] (-a^3/(b^7*c^4 - 4*a*b^6*c^3*d + 6*a^2*b^5*c^2*d^2 - 4*a^3*b^4*c*
d^3 + a^4*b^3*d^4))^(1/4)*arctan(-(b^5*c^3 - 3*a*b^4*c^2*d + 3*a^
2*b^3*c*d^2 - a^3*b^2*d^3)*(-a^3/(b^7*c^4 - 4*a*b^6*c^3*d + 6*a^2
*b^5*c^2*d^2 - 4*a^3*b^4*c*d^3 + a^4*b^3*d^4))^(3/4)/(a^2*x + a^2
*sqrt((a*x^2 - (b^3*c^2 - 2*a*b^2*c*d + a^2*b*d^2)*sqrt(-a^3/(b^7
*c^4 - 4*a*b^6*c^3*d + 6*a^2*b^5*c^2*d^2 - 4*a^3*b^4*c*d^3 + a^4*
b^3*d^4)))/a))) - (-c^3/(b^4*c^4*d^3 - 4*a*b^3*c^3*d^4 + 6*a^2*b^
2*c^2*d^5 - 4*a^3*b*c*d^6 + a^4*d^7))^(1/4)*arctan(-(b^3*c^3*d^2
- 3*a*b^2*c^2*d^3 + 3*a^2*b*c*d^4 - a^3*d^5)*(-c^3/(b^4*c^4*d^3 -
 4*a*b^3*c^3*d^4 + 6*a^2*b^2*c^2*d^5 - 4*a^3*b*c*d^6 + a^4*d^7))^
```

```
(3/4)/(c^2*x + c^2*sqrt((c*x^2 - (b^2*c^2*d - 2*a*b*c*d^2 + a^2*d
^3)*sqrt(-c^3/(b^4*c^4*d^3 - 4*a*b^3*c^3*d^4 + 6*a^2*b^2*c^2*d^5
- 4*a^3*b*c*d^6 + a^4*d^7)))/c))) - 1/4*(-a^3/(b^7*c^4 - 4*a*b^6*
c^3*d + 6*a^2*b^5*c^2*d^2 - 4*a^3*b^4*c*d^3 + a^4*b^3*d^4))^(1/4)
*log(a^2*x + (b^5*c^3 - 3*a*b^4*c^2*d + 3*a^2*b^3*c*d^2 - a^3*b^2
*d^3)*(-a^3/(b^7*c^4 - 4*a*b^6*c^3*d + 6*a^2*b^5*c^2*d^2 - 4*a^3*
b^4*c*d^3 + a^4*b^3*d^4))^(3/4)) + 1/4*(-a^3/(b^7*c^4 - 4*a*b^6*c
^3*d + 6*a^2*b^5*c^2*d^2 - 4*a^3*b^4*c*d^3 + a^4*b^3*d^4))^(1/4)*
log(a^2*x - (b^5*c^3 - 3*a*b^4*c^2*d + 3*a^2*b^3*c*d^2 - a^3*b^2*
d^3)*(-a^3/(b^7*c^4 - 4*a*b^6*c^3*d + 6*a^2*b^5*c^2*d^2 - 4*a^3*b
^4*c*d^3 + a^4*b^3*d^4))^(3/4)) + 1/4*(-c^3/(b^4*c^4*d^3 - 4*a*b^
3*c^3*d^4 + 6*a^2*b^2*c^2*d^5 - 4*a^3*b*c*d^6 + a^4*d^7))^(1/4)*l
og(c^2*x + (b^3*c^3*d^2 - 3*a*b^2*c^2*d^3 + 3*a^2*b*c*d^4 - a^3*d
^5)*(-c^3/(b^4*c^4*d^3 - 4*a*b^3*c^3*d^4 + 6*a^2*b^2*c^2*d^5 - 4*
a^3*b*c*d^6 + a^4*d^7))^(3/4)) - 1/4*(-c^3/(b^4*c^4*d^3 - 4*a*b^3
*c^3*d^4 + 6*a^2*b^2*c^2*d^5 - 4*a^3*b*c*d^6 + a^4*d^7))^(1/4)*lo
g(c^2*x - (b^3*c^3*d^2 - 3*a*b^2*c^2*d^3 + 3*a^2*b*c*d^4 - a^3*d^
5)*(-c^3/(b^4*c^4*d^3 - 4*a*b^3*c^3*d^4 + 6*a^2*b^2*c^2*d^5 - 4*a
^3*b*c*d^6 + a^4*d^7))^(3/4))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(bx^4 + a)(dx^4 + c)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^6/((b*x^4 + a)*(d*x^4 + c)), x)
```

3.612 $\int \frac{x^4}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=449

$$\frac{\sqrt[4]{a}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}\sqrt[4]{b}(bc-ad)}-\frac{\sqrt[4]{a}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}\sqrt[4]{b}(bc-ad)}-\frac{\sqrt[4]{c}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}\sqrt[4]{d}(bc-ad)}+\frac{\sqrt[4]{c}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}\sqrt[4]{d}(bc-ad)}+\frac{\sqrt[4]{a}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}\sqrt[4]{b}(bc-ad)}-\frac{\sqrt[4]{a}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}\sqrt[4]{b}(bc-ad)}-\frac{\sqrt[4]{c}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}\sqrt[4]{d}(bc-ad)}+\frac{\sqrt[4]{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}\sqrt[4]{d}(bc-ad)}$$

```
[Out] (a^(1/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*b^(1
/4)*(b*c - a*d)) - (a^(1/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4
)])/(2*Sqrt[2]*b^(1/4)*(b*c - a*d)) - (c^(1/4)*ArcTan[1 - (Sqrt[2
]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(1/4)*(b*c - a*d)) + (c^(1/4)
*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(1/4)*(b*c
 - a*d)) + (a^(1/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqr
t[b]*x^2])/(4*Sqrt[2]*b^(1/4)*(b*c - a*d)) - (a^(1/4)*Log[Sqrt[a]
 + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*b^(1/4)*(
b*c - a*d)) - (c^(1/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x +
Sqrt[d]*x^2])/(4*Sqrt[2]*d^(1/4)*(b*c - a*d)) + (c^(1/4)*Log[Sqrt
[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*d^(1/4
)*(b*c - a*d))
```

Rubi [A] time = 0.616876, antiderivative size = 449, normalized size of antiderivative = 1., number of steps used = 19, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.318

$$\frac{\sqrt[4]{a}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}\sqrt[4]{b}(bc-ad)}-\frac{\sqrt[4]{a}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}\sqrt[4]{b}(bc-ad)}-\frac{\sqrt[4]{c}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}\sqrt[4]{d}(bc-ad)}+\frac{\sqrt[4]{c}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}\sqrt[4]{d}(bc-ad)}+\frac{\sqrt[4]{a}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}\sqrt[4]{b}(bc-ad)}-\frac{\sqrt[4]{a}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}\sqrt[4]{b}(bc-ad)}-\frac{\sqrt[4]{c}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}\sqrt[4]{d}(bc-ad)}+\frac{\sqrt[4]{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}\sqrt[4]{d}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((a + b*x^4)*(c + d*x^4)),x]
```


```
[Out] (a^(1/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*b^(1
/4)*(b*c - a*d)) - (a^(1/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4
)])/(2*Sqrt[2]*b^(1/4)*(b*c - a*d)) - (c^(1/4)*ArcTan[1 - (Sqrt[2
]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(1/4)*(b*c - a*d)) + (c^(1/4)
*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*d^(1/4)*(b*c
 - a*d)) + (a^(1/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqr
t[b]*x^2])/(4*Sqrt[2]*b^(1/4)*(b*c - a*d)) - (a^(1/4)*Log[Sqrt[a]
 + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*b^(1/4)*(
b*c - a*d)) - (c^(1/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x +
Sqrt[d]*x^2])/(4*Sqrt[2]*d^(1/4)*(b*c - a*d)) + (c^(1/4)*Log[Sqrt
[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*d^(1/4
)*(b*c - a*d))
```

Rubi in Sympy [A] time = 117.598, size = 400, normalized size = 0.89

$$-\frac{\sqrt{2}\sqrt[4]{a}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{8\sqrt[4]{b}\,(ad-bc)}+\frac{\sqrt{2}\sqrt[4]{a}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{8\sqrt[4]{b}\,(ad-bc)}-\frac{\sqrt{2}\sqrt[4]{a}\,\mathrm{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4\sqrt[4]{b}\,(ad-bc)}+\frac{\sqrt{2}\sqrt[4]{a}\,\mathrm{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4\sqrt[4]{b}\,(ad-bc)}+\frac{\sqrt{2}\sqrt[4]{c}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{8\sqrt[4]{d}\,(ad-bc)}-\frac{\sqrt{2}\sqrt[4]{c}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{8\sqrt[4]{d}\,(ad-bc)}+\frac{\sqrt{2}\sqrt[4]{c}\,\mathrm{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4\sqrt[4]{d}\,(ad-bc)}-\frac{\sqrt{2}\sqrt[4]{c}\,\mathrm{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4\sqrt[4]{d}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -sqrt(2)*a**(1/4)*log(-sqrt(2)*a**(1/4)*b**(1/4)*x + sqrt(a) + sq
rt(b)*x**2)/(8*b**(1/4)*(a*d - b*c)) + sqrt(2)*a**(1/4)*log(sqrt(
2)*a**(1/4)*b**(1/4)*x + sqrt(a) + sqrt(b)*x**2)/(8*b**(1/4)*(a*d
 - b*c)) - sqrt(2)*a**(1/4)*atan(1 - sqrt(2)*b**(1/4)*x/a**(1/4))
/(4*b**(1/4)*(a*d - b*c)) + sqrt(2)*a**(1/4)*atan(1 + sqrt(2)*b**
(1/4)*x/a**(1/4))/(4*b**(1/4)*(a*d - b*c)) + sqrt(2)*c**(1/4)*log
(-sqrt(2)*c**(1/4)*d**(1/4)*x + sqrt(c) + sqrt(d)*x**2)/(8*d**(1/
4)*(a*d - b*c)) - sqrt(2)*c**(1/4)*log(sqrt(2)*c**(1/4)*d**(1/4)*
x + sqrt(c) + sqrt(d)*x**2)/(8*d**(1/4)*(a*d - b*c)) + sqrt(2)*c*
*(1/4)*atan(1 - sqrt(2)*d**(1/4)*x/c**(1/4))/(4*d**(1/4)*(a*d - b
*c)) - sqrt(2)*c**(1/4)*atan(1 + sqrt(2)*d**(1/4)*x/c**(1/4))/(4*
d**(1/4)*(a*d - b*c))
```

Mathematica [A] time = 0.194242, size = 340, normalized size = 0.76

$$\sqrt[4]{a}\sqrt[4]{d}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)-\sqrt[4]{a}\sqrt[4]{d}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)+2\sqrt[4]{a}\sqrt[4]{d}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)-2\sqrt[4]{a}\sqrt[4]{d}\tan^{-1}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (2*a^(1/4)*d^(1/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)] - 2*a^
(1/4)*d^(1/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4)] - 2*b^(1/4)
*c^(1/4)*ArcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)] + 2*b^(1/4)*c^(1
/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)] + a^(1/4)*d^(1/4)*Log
[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2] - a^(1/4)*d^(
1/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2] - b^(
1/4)*c^(1/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^
2] + b^(1/4)*c^(1/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sq
rt[d]*x^2])/(4*Sqrt[2]*b^(1/4)*d^(1/4)*(b*c - a*d))
```

Maple [A] time = 0.002, size = 296, normalized size = 0.7

$$-\frac{\sqrt{2}}{8ad-8bc}\sqrt[4]{\frac{c}{d}}\ln\left(1\left(x^2+\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)\left(x^2-\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)^{-1}\right)$$
$$-\frac{\sqrt{2}}{4ad-4bc}\sqrt[4]{\frac{c}{d}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}+1\right)-\frac{\sqrt{2}}{4ad-4bc}\sqrt[4]{\frac{c}{d}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}-1\right)$$
$$+\frac{\sqrt{2}}{8ad-8bc}\sqrt[4]{\frac{a}{b}}\ln\left(1\left(x^2+\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)\left(x^2-\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)^{-1}\right)$$
$$+\frac{\sqrt{2}}{4ad-4bc}\sqrt[4]{\frac{a}{b}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}+1\right)+\frac{\sqrt{2}}{4ad-4bc}\sqrt[4]{\frac{a}{b}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^4/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] -1/8/(a*d-b*c)*(c/d)^(1/4)*2^(1/2)*ln((x^2+(c/d)^(1/4)*x*2^(1/2)+
(c/d)^(1/2))/(x^2-(c/d)^(1/4)*x*2^(1/2)+(c/d)^(1/2)))-1/4/(a*d-b*
c)*(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x+1)-1/4/(a*d-b
*c)*(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x-1)+1/8/(a*d-
b*c)*(a/b)^(1/4)*2^(1/2)*ln((x^2+(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2
))/(x^2-(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2)))+1/4/(a*d-b*c)*(a/b)^(
1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x+1)+1/4/(a*d-b*c)*(a/b)^
(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x-1)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^4/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.244839, size = 1315, normalized size = 2.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^4/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] -(-a/(b^5*c^4 - 4*a*b^4*c^3*d + 6*a^2*b^3*c^2*d^2 - 4*a^3*b^2*c*d
^3 + a^4*b*d^4))^(1/4)*arctan(-(b*c - a*d)*(-a/(b^5*c^4 - 4*a*b^4
*c^3*d + 6*a^2*b^3*c^2*d^2 - 4*a^3*b^2*c*d^3 + a^4*b*d^4))^(1/4)/
(x + sqrt(x^2 + (b^2*c^2 - 2*a*b*c*d + a^2*d^2)*sqrt(-a/(b^5*c^4
- 4*a*b^4*c^3*d + 6*a^2*b^3*c^2*d^2 - 4*a^3*b^2*c*d^3 + a^4*b*d^4
))))) + (-c/(b^4*c^4*d - 4*a*b^3*c^3*d^2 + 6*a^2*b^2*c^2*d^3 - 4*
a^3*b*c*d^4 + a^4*d^5))^(1/4)*arctan(-(b*c - a*d)*(-c/(b^4*c^4*d
- 4*a*b^3*c^3*d^2 + 6*a^2*b^2*c^2*d^3 - 4*a^3*b*c*d^4 + a^4*d^5))
^(1/4)/(x + sqrt(x^2 + (b^2*c^2 - 2*a*b*c*d + a^2*d^2)*sqrt(-c/(b
^4*c^4*d - 4*a*b^3*c^3*d^2 + 6*a^2*b^2*c^2*d^3 - 4*a^3*b*c*d^4 +
a^4*d^5))))) - 1/4*(-a/(b^5*c^4 - 4*a*b^4*c^3*d + 6*a^2*b^3*c^2*d
^2 - 4*a^3*b^2*c*d^3 + a^4*b*d^4))^(1/4)*log((b*c - a*d)*(-a/(b^5
*c^4 - 4*a*b^4*c^3*d + 6*a^2*b^3*c^2*d^2 - 4*a^3*b^2*c*d^3 + a^4*
```

```
b*d^4))^(1/4) + x) + 1/4*(-a/(b^5*c^4 - 4*a*b^4*c^3*d + 6*a^2*b^3
*c^2*d^2 - 4*a^3*b^2*c*d^3 + a^4*b*d^4))^(1/4)*log(-(b*c - a*d)*(
-a/(b^5*c^4 - 4*a*b^4*c^3*d + 6*a^2*b^3*c^2*d^2 - 4*a^3*b^2*c*d^3
 + a^4*b*d^4))^(1/4) + x) + 1/4*(-c/(b^4*c^4*d - 4*a*b^3*c^3*d^2
+ 6*a^2*b^2*c^2*d^3 - 4*a^3*b*c*d^4 + a^4*d^5))^(1/4)*log((b*c -
a*d)*(-c/(b^4*c^4*d - 4*a*b^3*c^3*d^2 + 6*a^2*b^2*c^2*d^3 - 4*a^3
*b*c*d^4 + a^4*d^5))^(1/4) + x) - 1/4*(-c/(b^4*c^4*d - 4*a*b^3*c^
3*d^2 + 6*a^2*b^2*c^2*d^3 - 4*a^3*b*c*d^4 + a^4*d^5))^(1/4)*log(-
(b*c - a*d)*(-c/(b^4*c^4*d - 4*a*b^3*c^3*d^2 + 6*a^2*b^2*c^2*d^3
- 4*a^3*b*c*d^4 + a^4*d^5))^(1/4) + x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^4 + a)(dx^4 + c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((b*x^4 + a)*(d*x^4 + c)), x)
```

3.613 $\int \frac{x^2}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=449

$$\frac{\sqrt[4]{b}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}\sqrt[4]{a}(bc-ad)}-\frac{\sqrt[4]{b}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}\sqrt[4]{a}(bc-ad)}-\frac{\sqrt[4]{d}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}\sqrt[4]{c}(bc-ad)}+\frac{\sqrt[4]{d}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}\sqrt[4]{c}(bc-ad)}-\frac{\sqrt[4]{b}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}\sqrt[4]{a}(bc-ad)}+\frac{\sqrt[4]{b}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}\sqrt[4]{a}(bc-ad)}+\frac{\sqrt[4]{d}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}\sqrt[4]{c}(bc-ad)}-\frac{\sqrt[4]{d}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}\sqrt[4]{c}(bc-ad)}$$

```
[Out] -(b^(1/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(
1/4)*(b*c - a*d)) + (b^(1/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/
4)])/(2*Sqrt[2]*a^(1/4)*(b*c - a*d)) + (d^(1/4)*ArcTan[1 - (Sqrt[
2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(1/4)*(b*c - a*d)) - (d^(1/4
)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(1/4)*(b*
c - a*d)) + (b^(1/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sq
rt[b]*x^2])/(4*Sqrt[2]*a^(1/4)*(b*c - a*d)) - (b^(1/4)*Log[Sqrt[a
] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(1/4)*
(b*c - a*d)) - (d^(1/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x +
 Sqrt[d]*x^2])/(4*Sqrt[2]*c^(1/4)*(b*c - a*d)) + (d^(1/4)*Log[Sqr
t[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(1/
4)*(b*c - a*d))
```

Rubi [A] time = 0.635035, antiderivative size = 449, normalized size of antiderivative = 1., number of steps used = 19, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.318$

$$\frac{\sqrt[4]{b}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}\sqrt[4]{a}(bc-ad)}-\frac{\sqrt[4]{b}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}\sqrt[4]{a}(bc-ad)}-\frac{\sqrt[4]{d}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}\sqrt[4]{c}(bc-ad)}+\frac{\sqrt[4]{d}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}\sqrt[4]{c}(bc-ad)}-\frac{\sqrt[4]{b}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}\sqrt[4]{a}(bc-ad)}+\frac{\sqrt[4]{b}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}\sqrt[4]{a}(bc-ad)}+\frac{\sqrt[4]{d}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}\sqrt[4]{c}(bc-ad)}-\frac{\sqrt[4]{d}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}\sqrt[4]{c}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -(b^(1/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(
1/4)*(b*c - a*d)) + (b^(1/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/
4)])/(2*Sqrt[2]*a^(1/4)*(b*c - a*d)) + (d^(1/4)*ArcTan[1 - (Sqrt[
2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(1/4)*(b*c - a*d)) - (d^(1/4
)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(1/4)*(b*
c - a*d)) + (b^(1/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sq
rt[b]*x^2])/(4*Sqrt[2]*a^(1/4)*(b*c - a*d)) - (b^(1/4)*Log[Sqrt[a
] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(1/4)*
(b*c - a*d)) - (d^(1/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x +
 Sqrt[d]*x^2])/(4*Sqrt[2]*c^(1/4)*(b*c - a*d)) + (d^(1/4)*Log[Sqr
t[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(1/
4)*(b*c - a*d))
```

Rubi in Sympy [A] time = 117.405, size = 400, normalized size = 0.89

$$\frac{\sqrt{2}\sqrt[4]{d}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^{2}\right)}{8\sqrt[4]{c}\,(ad-bc)}-\frac{\sqrt{2}\sqrt[4]{d}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^{2}\right)}{8\sqrt[4]{c}\,(ad-bc)}-\frac{\sqrt{2}\sqrt[4]{d}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4\sqrt[4]{c}\,(ad-bc)}+\frac{\sqrt{2}\sqrt[4]{d}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4\sqrt[4]{c}\,(ad-bc)}-\frac{\sqrt{2}\sqrt[4]{b}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)}{8\sqrt[4]{a}\,(ad-bc)}+\frac{\sqrt{2}\sqrt[4]{b}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)}{8\sqrt[4]{a}\,(ad-bc)}+\frac{\sqrt{2}\sqrt[4]{b}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4\sqrt[4]{a}\,(ad-bc)}-\frac{\sqrt{2}\sqrt[4]{b}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4\sqrt[4]{a}\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] sqrt(2)*d**(1/4)*log(-sqrt(2)*c**(1/4)*d**(1/4)*x + sqrt(c) + sqr
t(d)*x**2)/(8*c**(1/4)*(a*d - b*c)) - sqrt(2)*d**(1/4)*log(sqrt(2
)*c**(1/4)*d**(1/4)*x + sqrt(c) + sqrt(d)*x**2)/(8*c**(1/4)*(a*d
- b*c)) - sqrt(2)*d**(1/4)*atan(1 - sqrt(2)*d**(1/4)*x/c**(1/4))/
(4*c**(1/4)*(a*d - b*c)) + sqrt(2)*d**(1/4)*atan(1 + sqrt(2)*d**(
1/4)*x/c**(1/4))/(4*c**(1/4)*(a*d - b*c)) - sqrt(2)*b**(1/4)*log(
-sqrt(2)*a**(1/4)*b**(1/4)*x + sqrt(a) + sqrt(b)*x**2)/(8*a**(1/4
)*(a*d - b*c)) + sqrt(2)*b**(1/4)*log(sqrt(2)*a**(1/4)*b**(1/4)*x
 + sqrt(a) + sqrt(b)*x**2)/(8*a**(1/4)*(a*d - b*c)) + sqrt(2)*b**
(1/4)*atan(1 - sqrt(2)*b**(1/4)*x/a**(1/4))/(4*a**(1/4)*(a*d - b*
c)) - sqrt(2)*b**(1/4)*atan(1 + sqrt(2)*b**(1/4)*x/a**(1/4))/(4*a
**(1/4)*(a*d - b*c))
```

Mathematica [A] time = 0.259295, size = 340, normalized size = 0.76

$$\frac{\sqrt[4]{b}\sqrt[4]{c}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)-\sqrt[4]{b}\sqrt[4]{c}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)-2\sqrt[4]{b}\sqrt[4]{c}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)+2\sqrt[4]{b}\sqrt[4]{c}\tan^{-1}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (-2*b^(1/4)*c^(1/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)] + 2*b
^(1/4)*c^(1/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4)] + 2*a^(1/4
)*d^(1/4)*ArcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)] - 2*a^(1/4)*d^(
1/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)] + b^(1/4)*c^(1/4)*Lo
g[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2] - b^(1/4)*c^
(1/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2] - a^
(1/4)*d^(1/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x
^2] + a^(1/4)*d^(1/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + S
qrt[d]*x^2])/(4*Sqrt[2]*a^(1/4)*c^(1/4)*(b*c - a*d))
```

Maple [A] time = 0.003, size = 296, normalized size = 0.7

$$\frac{\sqrt{2}}{8ad-8bc}\ln\left(1\left(x^2-\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)\left(x^2+\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)^{-1}\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}+\frac{\sqrt{2}}{4ad-4bc}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}+1\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}+\frac{\sqrt{2}}{4ad-4bc}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}-1\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}-\frac{\sqrt{2}}{8ad-8bc}\ln\left(1\left(x^2-\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)\left(x^2+\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)^{-1}\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}-\frac{\sqrt{2}}{4ad-4bc}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}+1\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}-\frac{\sqrt{2}}{4ad-4bc}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}-1\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/8/(a*d-b*c)/(c/d)^(1/4)*2^(1/2)*ln((x^2-(c/d)^(1/4)*x*2^(1/2)+(
c/d)^(1/2))/(x^2+(c/d)^(1/4)*x*2^(1/2)+(c/d)^(1/2)))+1/4/(a*d-b*c
)/(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x+1)+1/4/(a*d-b*
c)/(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x-1)-1/8/(a*d-b
*c)/(a/b)^(1/4)*2^(1/2)*ln((x^2-(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2)
)/(x^2+(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2)))-1/4/(a*d-b*c)/(a/b)^(1
/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x+1)-1/4/(a*d-b*c)/(a/b)^(
1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x-1)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^2/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.253101, size = 1615, normalized size = 3.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^2/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] -(-b/(a*b^4*c^4 - 4*a^2*b^3*c^3*d + 6*a^3*b^2*c^2*d^2 - 4*a^4*b*c
*d^3 + a^5*d^4))^(1/4)*arctan(-(a*b^3*c^3 - 3*a^2*b^2*c^2*d + 3*a
^3*b*c*d^2 - a^4*d^3)*(-b/(a*b^4*c^4 - 4*a^2*b^3*c^3*d + 6*a^3*b^
2*c^2*d^2 - 4*a^4*b*c*d^3 + a^5*d^4))^(3/4)/(b*x + b*sqrt((b*x^2
- (a*b^2*c^2 - 2*a^2*b*c*d + a^3*d^2)*sqrt(-b/(a*b^4*c^4 - 4*a^2*
b^3*c^3*d + 6*a^3*b^2*c^2*d^2 - 4*a^4*b*c*d^3 + a^5*d^4)))/b))) +
 (-d/(b^4*c^5 - 4*a*b^3*c^4*d + 6*a^2*b^2*c^3*d^2 - 4*a^3*b*c^2*d
^3 + a^4*c*d^4))^(1/4)*arctan(-(b^3*c^4 - 3*a*b^2*c^3*d + 3*a^2*b
*c^2*d^2 - a^3*c*d^3)*(-d/(b^4*c^5 - 4*a*b^3*c^4*d + 6*a^2*b^2*c^
3*d^2 - 4*a^3*b*c^2*d^3 + a^4*c*d^4))^(3/4)/(d*x + d*sqrt((d*x^2
- (b^2*c^3 - 2*a*b*c^2*d + a^2*c*d^2)*sqrt(-d/(b^4*c^5 - 4*a*b^3*
```

```
c^4*d + 6*a^2*b^2*c^3*d^2 - 4*a^3*b*c^2*d^3 + a^4*c*d^4)))/d))) +
 1/4*(-b/(a*b^4*c^4 - 4*a^2*b^3*c^3*d + 6*a^3*b^2*c^2*d^2 - 4*a^4
*b*c*d^3 + a^5*d^4))^(1/4)*log(b*x + (a*b^3*c^3 - 3*a^2*b^2*c^2*d
 + 3*a^3*b*c*d^2 - a^4*d^3)*(-b/(a*b^4*c^4 - 4*a^2*b^3*c^3*d + 6*
a^3*b^2*c^2*d^2 - 4*a^4*b*c*d^3 + a^5*d^4))^(3/4)) - 1/4*(-b/(a*b
^4*c^4 - 4*a^2*b^3*c^3*d + 6*a^3*b^2*c^2*d^2 - 4*a^4*b*c*d^3 + a^
5*d^4))^(1/4)*log(b*x - (a*b^3*c^3 - 3*a^2*b^2*c^2*d + 3*a^3*b*c*
d^2 - a^4*d^3)*(-b/(a*b^4*c^4 - 4*a^2*b^3*c^3*d + 6*a^3*b^2*c^2*d
^2 - 4*a^4*b*c*d^3 + a^5*d^4))^(3/4)) - 1/4*(-d/(b^4*c^5 - 4*a*b^
3*c^4*d + 6*a^2*b^2*c^3*d^2 - 4*a^3*b*c^2*d^3 + a^4*c*d^4))^(1/4)
*log(d*x + (b^3*c^4 - 3*a*b^2*c^3*d + 3*a^2*b*c^2*d^2 - a^3*c*d^3
)*(-d/(b^4*c^5 - 4*a*b^3*c^4*d + 6*a^2*b^2*c^3*d^2 - 4*a^3*b*c^2*
d^3 + a^4*c*d^4))^(3/4)) + 1/4*(-d/(b^4*c^5 - 4*a*b^3*c^4*d + 6*a
^2*b^2*c^3*d^2 - 4*a^3*b*c^2*d^3 + a^4*c*d^4))^(1/4)*log(d*x - (b
^3*c^4 - 3*a*b^2*c^3*d + 3*a^2*b*c^2*d^2 - a^3*c*d^3)*(-d/(b^4*c^
5 - 4*a*b^3*c^4*d + 6*a^2*b^2*c^3*d^2 - 4*a^3*b*c^2*d^3 + a^4*c*d
^4))^(3/4))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**4+a)/(d*x**4+c),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^4+a)(dx^4+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")

[Out] integrate(x^2/((b*x^4 + a)*(d*x^4 + c)), x)
```

3.614 $\int \frac{1}{(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=449

$$-\frac{b^{3/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{3/4}(bc-ad)}+\frac{b^{3/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{3/4}(bc-ad)}-\frac{b^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}a^{3/4}(bc-ad)}+\frac{b^{3/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}a^{3/4}(bc-ad)}+\frac{d^{3/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{3/4}(bc-ad)}-\frac{d^{3/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{3/4}(bc-ad)}+\frac{d^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}c^{3/4}(bc-ad)}-\frac{d^{3/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}c^{3/4}(bc-ad)}$$

```
[Out] -(b^(3/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(
3/4)*(b*c - a*d)) + (b^(3/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/
4)])/(2*Sqrt[2]*a^(3/4)*(b*c - a*d)) + (d^(3/4)*ArcTan[1 - (Sqrt[
2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(3/4)*(b*c - a*d)) - (d^(3/4
)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(3/4)*(b*
c - a*d)) - (b^(3/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sq
rt[b]*x^2])/(4*Sqrt[2]*a^(3/4)*(b*c - a*d)) + (b^(3/4)*Log[Sqrt[a
] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(3/4)*
(b*c - a*d)) + (d^(3/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x +
 Sqrt[d]*x^2])/(4*Sqrt[2]*c^(3/4)*(b*c - a*d)) - (d^(3/4)*Log[Sqr
t[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(3/
4)*(b*c - a*d))
```

Rubi [A] time = 0.605709, antiderivative size = 449, normalized size of antiderivative = 1., number of steps used = 19, number of rules used = 7, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.368

$$-\frac{b^{3/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{3/4}(bc-ad)}+\frac{b^{3/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{3/4}(bc-ad)}-\frac{b^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}a^{3/4}(bc-ad)}+\frac{b^{3/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}a^{3/4}(bc-ad)}+\frac{d^{3/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{3/4}(bc-ad)}-\frac{d^{3/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{3/4}(bc-ad)}+\frac{d^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}c^{3/4}(bc-ad)}-\frac{d^{3/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}c^{3/4}(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^4)*(c + d*x^4)),x]
```


```
[Out] -(b^(3/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(
3/4)*(b*c - a*d)) + (b^(3/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/
4)])/(2*Sqrt[2]*a^(3/4)*(b*c - a*d)) + (d^(3/4)*ArcTan[1 - (Sqrt[
2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(3/4)*(b*c - a*d)) - (d^(3/4
)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(3/4)*(b*
c - a*d)) - (b^(3/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sq
rt[b]*x^2])/(4*Sqrt[2]*a^(3/4)*(b*c - a*d)) + (b^(3/4)*Log[Sqrt[a
] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(3/4)*
(b*c - a*d)) + (d^(3/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x +
 Sqrt[d]*x^2])/(4*Sqrt[2]*c^(3/4)*(b*c - a*d)) - (d^(3/4)*Log[Sqr
t[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(3/
4)*(b*c - a*d))
```

Rubi in Sympy [A] time = 114.059, size = 400, normalized size = 0.89

$$-\frac{\sqrt{2}d^{\frac{3}{4}}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^{2}\right)}{8c^{\frac{3}{4}}(ad-bc)}+\frac{\sqrt{2}d^{\frac{3}{4}}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^{2}\right)}{8c^{\frac{3}{4}}(ad-bc)}-\frac{\sqrt{2}d^{\frac{3}{4}}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4c^{\frac{3}{4}}(ad-bc)}+\frac{\sqrt{2}d^{\frac{3}{4}}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4c^{\frac{3}{4}}(ad-bc)}+\frac{\sqrt{2}b^{\frac{3}{4}}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)}{8a^{\frac{3}{4}}(ad-bc)}-\frac{\sqrt{2}b^{\frac{3}{4}}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^{2}\right)}{8a^{\frac{3}{4}}(ad-bc)}+\frac{\sqrt{2}b^{\frac{3}{4}}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4a^{\frac{3}{4}}(ad-bc)}-\frac{\sqrt{2}b^{\frac{3}{4}}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4a^{\frac{3}{4}}(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] -sqrt(2)*d**(3/4)*log(-sqrt(2)*c**(1/4)*d**(1/4)*x + sqrt(c) + sq
rt(d)*x**2)/(8*c**(3/4)*(a*d - b*c)) + sqrt(2)*d**(3/4)*log(sqrt(
2)*c**(1/4)*d**(1/4)*x + sqrt(c) + sqrt(d)*x**2)/(8*c**(3/4)*(a*d
 - b*c)) - sqrt(2)*d**(3/4)*atan(1 - sqrt(2)*d**(1/4)*x/c**(1/4))
/(4*c**(3/4)*(a*d - b*c)) + sqrt(2)*d**(3/4)*atan(1 + sqrt(2)*d**
(1/4)*x/c**(1/4))/(4*c**(3/4)*(a*d - b*c)) + sqrt(2)*b**(3/4)*log
(-sqrt(2)*a**(1/4)*b**(1/4)*x + sqrt(a) + sqrt(b)*x**2)/(8*a**(3/
4)*(a*d - b*c)) - sqrt(2)*b**(3/4)*log(sqrt(2)*a**(1/4)*b**(1/4)*
x + sqrt(a) + sqrt(b)*x**2)/(8*a**(3/4)*(a*d - b*c)) + sqrt(2)*b*
*(3/4)*atan(1 - sqrt(2)*b**(1/4)*x/a**(1/4))/(4*a**(3/4)*(a*d - b
*c)) - sqrt(2)*b**(3/4)*atan(1 + sqrt(2)*b**(1/4)*x/a**(1/4))/(4*
a**(3/4)*(a*d - b*c))
```

Mathematica [A] time = 0.266318, size = 340, normalized size = 0.76

$$a^{3/4}d^{3/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^{2}\right)-a^{3/4}d^{3/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^{2}\right)+2a^{3/4}d^{3/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)-2a^{3/4}d$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/((a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] (-2*b^(3/4)*c^(3/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)] + 2*b
^(3/4)*c^(3/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4)] + 2*a^(3/4
)*d^(3/4)*ArcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)] - 2*a^(3/4)*d^(
3/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)] - b^(3/4)*c^(3/4)*Lo
g[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2] + b^(3/4)*c^
(3/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2] + a^
(3/4)*d^(3/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x
^2] - a^(3/4)*d^(3/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + S
qrt[d]*x^2])/(4*Sqrt[2]*a^(3/4)*c^(3/4)*(b*c - a*d))
```

Maple [A] time = 0.001, size = 320, normalized size = 0.7

$$\frac{d\sqrt{2}}{(8\,ad-8\,bc)\,c}\sqrt[4]{\frac{c}{d}}\ln\left(1\left(x^2+\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)\left(x^2-\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)^{-1}\right)+\frac{d\sqrt{2}}{(4\,ad-4\,bc)\,c}\sqrt[4]{\frac{c}{d}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}+1\right)+\frac{d\sqrt{2}}{(4\,ad-4\,bc)\,c}\sqrt[4]{\frac{c}{d}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}-1\right)-\frac{b\sqrt{2}}{(8\,ad-8\,bc)\,a}\sqrt[4]{\frac{a}{b}}\ln\left(1\left(x^2+\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)\left(x^2-\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)^{-1}\right)-\frac{b\sqrt{2}}{(4\,ad-4\,bc)\,a}\sqrt[4]{\frac{a}{b}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}+1\right)-\frac{b\sqrt{2}}{(4\,ad-4\,bc)\,a}\sqrt[4]{\frac{a}{b}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/8*d/(a*d-b*c)*(c/d)^(1/4)/c*2^(1/2)*ln((x^2+(c/d)^(1/4)*x*2^(1/
2)+(c/d)^(1/2))/(x^2-(c/d)^(1/4)*x*2^(1/2)+(c/d)^(1/2)))+1/4*d/(a
*d-b*c)*(c/d)^(1/4)/c*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x+1)+1/4
*d/(a*d-b*c)*(c/d)^(1/4)/c*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x-1
)-1/8*b/(a*d-b*c)*(a/b)^(1/4)/a*2^(1/2)*ln((x^2+(a/b)^(1/4)*x*2^(
1/2)+(a/b)^(1/2))/(x^2-(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2)))-1/4*b/
(a*d-b*c)*(a/b)^(1/4)/a*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x+1)-1
/4*b/(a*d-b*c)*(a/b)^(1/4)/a*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x
-1)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.376943, size = 1472, normalized size = 3.28

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] (-b^3/(a^3*b^4*c^4 - 4*a^4*b^3*c^3*d + 6*a^5*b^2*c^2*d^2 - 4*a^6*
b*c*d^3 + a^7*d^4))^(1/4)*arctan(-(a*b*c - a^2*d)*(-b^3/(a^3*b^4*
c^4 - 4*a^4*b^3*c^3*d + 6*a^5*b^2*c^2*d^2 - 4*a^6*b*c*d^3 + a^7*d
^4))^(1/4)/(b*x + b*sqrt((b^2*x^2 + (a^2*b^2*c^2 - 2*a^3*b*c*d +
a^4*d^2)*sqrt(-b^3/(a^3*b^4*c^4 - 4*a^4*b^3*c^3*d + 6*a^5*b^2*c^2
*d^2 - 4*a^6*b*c*d^3 + a^7*d^4)))/b^2))) - (-d^3/(b^4*c^7 - 4*a*b
^3*c^6*d + 6*a^2*b^2*c^5*d^2 - 4*a^3*b*c^4*d^3 + a^4*c^3*d^4))^(1
/4)*arctan(-(b*c^2 - a*c*d)*(-d^3/(b^4*c^7 - 4*a*b^3*c^6*d + 6*a^
2*b^2*c^5*d^2 - 4*a^3*b*c^4*d^3 + a^4*c^3*d^4))^(1/4)/(d*x + d*sq
rt((d^2*x^2 + (b^2*c^4 - 2*a*b*c^3*d + a^2*c^2*d^2)*sqrt(-d^3/(b^
4*c^7 - 4*a*b^3*c^6*d + 6*a^2*b^2*c^5*d^2 - 4*a^3*b*c^4*d^3 + a^4
*c^3*d^4)))/d^2))) + 1/4*(-b^3/(a^3*b^4*c^4 - 4*a^4*b^3*c^3*d + 6
```

```
*a^5*b^2*c^2*d^2 - 4*a^6*b*c*d^3 + a^7*d^4))^(1/4)*log(b*x + (a*b
*c - a^2*d)*(-b^3/(a^3*b^4*c^4 - 4*a^4*b^3*c^3*d + 6*a^5*b^2*c^2*
d^2 - 4*a^6*b*c*d^3 + a^7*d^4))^(1/4)) - 1/4*(-b^3/(a^3*b^4*c^4 -
 4*a^4*b^3*c^3*d + 6*a^5*b^2*c^2*d^2 - 4*a^6*b*c*d^3 + a^7*d^4))^
(1/4)*log(b*x - (a*b*c - a^2*d)*(-b^3/(a^3*b^4*c^4 - 4*a^4*b^3*c^
3*d + 6*a^5*b^2*c^2*d^2 - 4*a^6*b*c*d^3 + a^7*d^4))^(1/4)) - 1/4*
(-d^3/(b^4*c^7 - 4*a*b^3*c^6*d + 6*a^2*b^2*c^5*d^2 - 4*a^3*b*c^4*
d^3 + a^4*c^3*d^4))^(1/4)*log(d*x + (b*c^2 - a*c*d)*(-d^3/(b^4*c^
7 - 4*a*b^3*c^6*d + 6*a^2*b^2*c^5*d^2 - 4*a^3*b*c^4*d^3 + a^4*c^3
*d^4))^(1/4)) + 1/4*(-d^3/(b^4*c^7 - 4*a*b^3*c^6*d + 6*a^2*b^2*c^
5*d^2 - 4*a^3*b*c^4*d^3 + a^4*c^3*d^4))^(1/4)*log(d*x - (b*c^2 -
a*c*d)*(-d^3/(b^4*c^7 - 4*a*b^3*c^6*d + 6*a^2*b^2*c^5*d^2 - 4*a^3
*b*c^4*d^3 + a^4*c^3*d^4))^(1/4))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4 + a)(dx^4 + c)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^4 + a)*(d*x^4 + c)), x)
```

3.615 $\int \frac{1}{x^2(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=460

$$-\frac{b^{5/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{5/4}(bc-ad)}+\frac{b^{5/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{5/4}(bc-ad)}+\frac{b^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}a^{5/4}(bc-ad)}-\frac{b^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}a^{5/4}(bc-ad)}+\frac{d^{5/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{5/4}(bc-ad)}-\frac{d^{5/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{5/4}(bc-ad)}-\frac{d^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}c^{5/4}(bc-ad)}+\frac{d^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}c^{5/4}(bc-ad)}-\frac{1}{acx}$$

```
[Out] -(1/(a*c*x)) + (b^(5/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/
(2*Sqrt[2]*a^(5/4)*(b*c - a*d)) - (b^(5/4)*ArcTan[1 + (Sqrt[2]*b^
(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(5/4)*(b*c - a*d)) - (d^(5/4)*Arc
Tan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(5/4)*(b*c - a
*d)) + (d^(5/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[
2]*c^(5/4)*(b*c - a*d)) - (b^(5/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*
b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(5/4)*(b*c - a*d)) + (b^(5
/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sq
rt[2]*a^(5/4)*(b*c - a*d)) + (d^(5/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/
4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(5/4)*(b*c - a*d)) - (d
^(5/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4
*Sqrt[2]*c^(5/4)*(b*c - a*d))
```

Rubi [A] time = 1.03999, antiderivative size = 460, normalized size of antiderivative = 1., number of steps used = 21, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$

$$-\frac{b^{5/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{5/4}(bc-ad)}+\frac{b^{5/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{5/4}(bc-ad)}+\frac{b^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}a^{5/4}(bc-ad)}-\frac{b^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}a^{5/4}(bc-ad)}+\frac{d^{5/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{5/4}(bc-ad)}-\frac{d^{5/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{5/4}(bc-ad)}-\frac{d^{5/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}c^{5/4}(bc-ad)}+\frac{d^{5/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}c^{5/4}(bc-ad)}-\frac{1}{acx}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] -(1/(a*c*x)) + (b^(5/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/
(2*Sqrt[2]*a^(5/4)*(b*c - a*d)) - (b^(5/4)*ArcTan[1 + (Sqrt[2]*b^
(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(5/4)*(b*c - a*d)) - (d^(5/4)*Arc
Tan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(5/4)*(b*c - a
*d)) + (d^(5/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[
2]*c^(5/4)*(b*c - a*d)) - (b^(5/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*
b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(5/4)*(b*c - a*d)) + (b^(5
/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sq
rt[2]*a^(5/4)*(b*c - a*d)) + (d^(5/4)*Log[Sqrt[c] - Sqrt[2]*c^(1/
4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(5/4)*(b*c - a*d)) - (d
^(5/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4
*Sqrt[2]*c^(5/4)*(b*c - a*d))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.514008, size = 385, normalized size = 0.84

$$\frac{\frac{\sqrt{2}b^{5/4}x\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{a^{5/4}}-\frac{\sqrt{2}b^{5/4}x\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{a^{5/4}}-\frac{2\sqrt{2}b^{5/4}x\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{a^{5/4}}+\frac{2\sqrt{2}b^{5/4}x\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{a^{5/4}}+\frac{8b}{a}-}{8adx-}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] ((8*b)/a - (8*d)/c - (2*Sqrt[2]*b^(5/4)*x*ArcTan[1 - (Sqrt[2]*b^(
1/4)*x)/a^(1/4)])/a^(5/4) + (2*Sqrt[2]*b^(5/4)*x*ArcTan[1 + (Sqrt
[2]*b^(1/4)*x)/a^(1/4)])/a^(5/4) + (2*Sqrt[2]*d^(5/4)*x*ArcTan[1
- (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/c^(5/4) - (2*Sqrt[2]*d^(5/4)*x*Ar
cTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/c^(5/4) + (Sqrt[2]*b^(5/4)
*x*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/a^(5/4
) - (Sqrt[2]*b^(5/4)*x*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x +
Sqrt[b]*x^2])/a^(5/4) - (Sqrt[2]*d^(5/4)*x*Log[Sqrt[c] - Sqrt[2]*
c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/c^(5/4) + (Sqrt[2]*d^(5/4)*x*Lo
g[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/c^(5/4))/(-
8*b*c*x + 8*a*d*x)
```

Maple [A] time = 0.003, size = 331, normalized size = 0.7

$$-\frac{d\sqrt{2}}{8c(ad-bc)}\ln\left(1\left(x^2-\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)\left(x^2+\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)^{-1}\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}$$
$$-\frac{d\sqrt{2}}{4c(ad-bc)}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}+1\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}-\frac{d\sqrt{2}}{4c(ad-bc)}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}-1\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}$$
$$+\frac{b\sqrt{2}}{8a(ad-bc)}\ln\left(1\left(x^2-\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)\left(x^2+\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)^{-1}\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}$$
$$+\frac{b\sqrt{2}}{4a(ad-bc)}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}+1\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}+\frac{b\sqrt{2}}{4a(ad-bc)}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}-1\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}-\frac{1}{acx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] -1/8*d/c/(a*d-b*c)/(c/d)^(1/4)*2^(1/2)*ln((x^2-(c/d)^(1/4)*x*2^(1
/2)+(c/d)^(1/2))/(x^2+(c/d)^(1/4)*x*2^(1/2)+(c/d)^(1/2)))-1/4*d/c
/(a*d-b*c)/(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x+1)-1/
4*d/c/(a*d-b*c)/(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*x-
1)+1/8*b/a/(a*d-b*c)/(a/b)^(1/4)*2^(1/2)*ln((x^2-(a/b)^(1/4)*x*2^
(1/2)+(a/b)^(1/2))/(x^2+(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2)))+1/4*b
/a/(a*d-b*c)/(a/b)^(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x+1)+
1/4*b/a/(a*d-b*c)/(a/b)^(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*
x-1)-1/a/c/x
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.59273, size = 1778, normalized size = 3.87

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^2),x, algorithm="fricas")
```

```
[Out] 1/4*(4*(-b^5/(a^5*b^4*c^4 - 4*a^6*b^3*c^3*d + 6*a^7*b^2*c^2*d^2 -
 4*a^8*b*c*d^3 + a^9*d^4))^(1/4)*a*c*x*arctan(-(a^4*b^3*c^3 - 3*a
^5*b^2*c^2*d + 3*a^6*b*c*d^2 - a^7*d^3)*(-b^5/(a^5*b^4*c^4 - 4*a^
6*b^3*c^3*d + 6*a^7*b^2*c^2*d^2 - 4*a^8*b*c*d^3 + a^9*d^4))^(3/4)
/(b^4*x + b^4*sqrt((b^3*x^2 - (a^3*b^2*c^2 - 2*a^4*b*c*d + a^5*d^
2)*sqrt(-b^5/(a^5*b^4*c^4 - 4*a^6*b^3*c^3*d + 6*a^7*b^2*c^2*d^2 -
 4*a^8*b*c*d^3 + a^9*d^4)))/b^3))) - 4*(-d^5/(b^4*c^9 - 4*a*b^3*c
^8*d + 6*a^2*b^2*c^7*d^2 - 4*a^3*b*c^6*d^3 + a^4*c^5*d^4))^(1/4)*
a*c*x*arctan(-(b^3*c^7 - 3*a*b^2*c^6*d + 3*a^2*b*c^5*d^2 - a^3*c^
4*d^3)*(-d^5/(b^4*c^9 - 4*a*b^3*c^8*d + 6*a^2*b^2*c^7*d^2 - 4*a^3
*b*c^6*d^3 + a^4*c^5*d^4))^(3/4)/(d^4*x + d^4*sqrt((d^3*x^2 - (b^
2*c^5 - 2*a*b*c^4*d + a^2*c^3*d^2)*sqrt(-d^5/(b^4*c^9 - 4*a*b^3*c
^8*d + 6*a^2*b^2*c^7*d^2 - 4*a^3*b*c^6*d^3 + a^4*c^5*d^4)))/d^3))
) - (-b^5/(a^5*b^4*c^4 - 4*a^6*b^3*c^3*d + 6*a^7*b^2*c^2*d^2 - 4*
a^8*b*c*d^3 + a^9*d^4))^(1/4)*a*c*x*log(b^4*x + (a^4*b^3*c^3 - 3*
a^5*b^2*c^2*d + 3*a^6*b*c*d^2 - a^7*d^3)*(-b^5/(a^5*b^4*c^4 - 4*a
^6*b^3*c^3*d + 6*a^7*b^2*c^2*d^2 - 4*a^8*b*c*d^3 + a^9*d^4))^(3/4
)) + (-b^5/(a^5*b^4*c^4 - 4*a^6*b^3*c^3*d + 6*a^7*b^2*c^2*d^2 - 4
*a^8*b*c*d^3 + a^9*d^4))^(1/4)*a*c*x*log(b^4*x - (a^4*b^3*c^3 - 3
*a^5*b^2*c^2*d + 3*a^6*b*c*d^2 - a^7*d^3)*(-b^5/(a^5*b^4*c^4 - 4*
a^6*b^3*c^3*d + 6*a^7*b^2*c^2*d^2 - 4*a^8*b*c*d^3 + a^9*d^4))^(3/
4)) + (-d^5/(b^4*c^9 - 4*a*b^3*c^8*d + 6*a^2*b^2*c^7*d^2 - 4*a^3*
b*c^6*d^3 + a^4*c^5*d^4))^(1/4)*a*c*x*log(d^4*x + (b^3*c^7 - 3*a*
b^2*c^6*d + 3*a^2*b*c^5*d^2 - a^3*c^4*d^3)*(-d^5/(b^4*c^9 - 4*a*b
^3*c^8*d + 6*a^2*b^2*c^7*d^2 - 4*a^3*b*c^6*d^3 + a^4*c^5*d^4))^(3
/4)) - (-d^5/(b^4*c^9 - 4*a*b^3*c^8*d + 6*a^2*b^2*c^7*d^2 - 4*a^3
*b*c^6*d^3 + a^4*c^5*d^4))^(1/4)*a*c*x*log(d^4*x - (b^3*c^7 - 3*a
*b^2*c^6*d + 3*a^2*b*c^5*d^2 - a^3*c^4*d^3)*(-d^5/(b^4*c^9 - 4*a*
b^3*c^8*d + 6*a^2*b^2*c^7*d^2 - 4*a^3*b*c^6*d^3 + a^4*c^5*d^4))^(
3/4)) - 4)/(a*c*x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4 + a)(dx^4 + c)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^2), x)
```

3.616 $\int \frac{1}{x^4(a+bx^4)(c+dx^4)}\,dx$

Optimal. Leaf size=462

$$\frac{b^{7/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{7/4}(bc-ad)}-\frac{b^{7/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{7/4}(bc-ad)}+\frac{b^{7/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}a^{7/4}(bc-ad)}-\frac{b^{7/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}a^{7/4}(bc-ad)}-\frac{d^{7/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{7/4}(bc-ad)}+\frac{d^{7/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{7/4}(bc-ad)}-\frac{d^{7/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}c^{7/4}(bc-ad)}+\frac{d^{7/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}c^{7/4}(bc-ad)}-\frac{1}{3acx^3}$$

```
[Out] -1/(3*a*c*x^3) + (b^(7/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)]
)/(2*Sqrt[2]*a^(7/4)*(b*c - a*d)) - (b^(7/4)*ArcTan[1 + (Sqrt[2]*
b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(7/4)*(b*c - a*d)) - (d^(7/4)*A
rcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(7/4)*(b*c -
 a*d)) + (d^(7/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqr
t[2]*c^(7/4)*(b*c - a*d)) + (b^(7/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4
)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(7/4)*(b*c - a*d)) - (b^
(7/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*
Sqrt[2]*a^(7/4)*(b*c - a*d)) - (d^(7/4)*Log[Sqrt[c] - Sqrt[2]*c^(
1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(7/4)*(b*c - a*d)) +
(d^(7/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/
(4*Sqrt[2]*c^(7/4)*(b*c - a*d))
```

Rubi [A] time = 0.928743, antiderivative size = 462, normalized size of antiderivative = 1., number of steps used = 20, number of rules used = 8, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$\frac{b^{7/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{7/4}(bc-ad)}-\frac{b^{7/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{7/4}(bc-ad)}+\frac{b^{7/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}a^{7/4}(bc-ad)}-\frac{b^{7/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}a^{7/4}(bc-ad)}-\frac{d^{7/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{7/4}(bc-ad)}+\frac{d^{7/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{7/4}(bc-ad)}-\frac{d^{7/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}c^{7/4}(bc-ad)}+\frac{d^{7/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}c^{7/4}(bc-ad)}-\frac{1}{3acx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(a + b*x^4)*(c + d*x^4)),x]
```


```
[Out] -1/(3*a*c*x^3) + (b^(7/4)*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)]
)/(2*Sqrt[2]*a^(7/4)*(b*c - a*d)) - (b^(7/4)*ArcTan[1 + (Sqrt[2]*
b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(7/4)*(b*c - a*d)) - (d^(7/4)*A
rcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(7/4)*(b*c -
 a*d)) + (d^(7/4)*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/(2*Sqr
t[2]*c^(7/4)*(b*c - a*d)) + (b^(7/4)*Log[Sqrt[a] - Sqrt[2]*a^(1/4
)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(7/4)*(b*c - a*d)) - (b^
(7/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*
Sqrt[2]*a^(7/4)*(b*c - a*d)) - (d^(7/4)*Log[Sqrt[c] - Sqrt[2]*c^(
1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(7/4)*(b*c - a*d)) +
(d^(7/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/
(4*Sqrt[2]*c^(7/4)*(b*c - a*d))
```

Rubi in Sympy [A] time = 157.768, size = 410, normalized size = 0.89

$$\frac{\sqrt{2}d^{\frac{7}{4}}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{8c^{\frac{7}{4}}(ad-bc)}-\frac{\sqrt{2}d^{\frac{7}{4}}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{8c^{\frac{7}{4}}(ad-bc)}+\frac{\sqrt{2}d^{\frac{7}{4}}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4c^{\frac{7}{4}}(ad-bc)}-\frac{\sqrt{2}d^{\frac{7}{4}}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{4c^{\frac{7}{4}}(ad-bc)}-\frac{1}{3acx^3}-\frac{\sqrt{2}b^{\frac{7}{4}}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{8a^{\frac{7}{4}}(ad-bc)}+\frac{\sqrt{2}b^{\frac{7}{4}}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{8a^{\frac{7}{4}}(ad-bc)}-\frac{\sqrt{2}b^{\frac{7}{4}}\operatorname{atan}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4a^{\frac{7}{4}}(ad-bc)}+\frac{\sqrt{2}b^{\frac{7}{4}}\operatorname{atan}\left(1+\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{4a^{\frac{7}{4}}(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] sqrt(2)*d**(7/4)*log(-sqrt(2)*c**(1/4)*d**(1/4)*x + sqrt(c) + sqr
t(d)*x**2)/(8*c**(7/4)*(a*d - b*c)) - sqrt(2)*d**(7/4)*log(sqrt(2
)*c**(1/4)*d**(1/4)*x + sqrt(c) + sqrt(d)*x**2)/(8*c**(7/4)*(a*d
- b*c)) + sqrt(2)*d**(7/4)*atan(1 - sqrt(2)*d**(1/4)*x/c**(1/4))/
(4*c**(7/4)*(a*d - b*c)) - sqrt(2)*d**(7/4)*atan(1 + sqrt(2)*d**(
1/4)*x/c**(1/4))/(4*c**(7/4)*(a*d - b*c)) - 1/(3*a*c*x**3) - sqrt
(2)*b**(7/4)*log(-sqrt(2)*a**(1/4)*b**(1/4)*x + sqrt(a) + sqrt(b)
*x**2)/(8*a**(7/4)*(a*d - b*c)) + sqrt(2)*b**(7/4)*log(sqrt(2)*a*
*(1/4)*b**(1/4)*x + sqrt(a) + sqrt(b)*x**2)/(8*a**(7/4)*(a*d - b*
c)) - sqrt(2)*b**(7/4)*atan(1 - sqrt(2)*b**(1/4)*x/a**(1/4))/(4*a
**(7/4)*(a*d - b*c)) + sqrt(2)*b**(7/4)*atan(1 + sqrt(2)*b**(1/4)
*x/a**(1/4))/(4*a**(7/4)*(a*d - b*c))
```

Mathematica [A] time = 0.563759, size = 406, normalized size = 0.88

$$\frac{-\frac{6\sqrt{2}b^{7/4}x^3\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{a^{7/4}}+\frac{6\sqrt{2}b^{7/4}x^3\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{a^{7/4}}-\frac{3\sqrt{2}b^{7/4}x^3\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{a^{7/4}}+\frac{3\sqrt{2}b^{7/4}x^3\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{a^{7/4}}}{24}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^4*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] ((8*b)/a - (8*d)/c - (6*Sqrt[2]*b^(7/4)*x^3*ArcTan[1 - (Sqrt[2]*b
^(1/4)*x)/a^(1/4)])/a^(7/4) + (6*Sqrt[2]*b^(7/4)*x^3*ArcTan[1 + (
Sqrt[2]*b^(1/4)*x)/a^(1/4)])/a^(7/4) + (6*Sqrt[2]*d^(7/4)*x^3*Arc
Tan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/c^(7/4) - (6*Sqrt[2]*d^(7/4
)*x^3*ArcTan[1 + (Sqrt[2]*d^(1/4)*x)/c^(1/4)])/c^(7/4) - (3*Sqrt[
2]*b^(7/4)*x^3*Log[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*
x^2])/a^(7/4) + (3*Sqrt[2]*b^(7/4)*x^3*Log[Sqrt[a] + Sqrt[2]*a^(1
/4)*b^(1/4)*x + Sqrt[b]*x^2])/a^(7/4) + (3*Sqrt[2]*d^(7/4)*x^3*Lo
g[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/c^(7/4) - (
3*Sqrt[2]*d^(7/4)*x^3*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + S
qrt[d]*x^2])/c^(7/4))/(24*(-(b*c) + a*d)*x^3)
```

Maple [A] time = 0.002, size = 343, normalized size = 0.7

$$-\frac{d^2\sqrt{2}}{8\,c^2\,(ad-bc)}\sqrt[4]{\frac{c}{d}}\ln\left(1\left(x^2+\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)\left(x^2-\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)^{-1}\right) - \frac{d^2\sqrt{2}}{4\,c^2\,(ad-bc)}\sqrt[4]{\frac{c}{d}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}+1\right) - \frac{d^2\sqrt{2}}{4\,c^2\,(ad-bc)}\sqrt[4]{\frac{c}{d}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}-1\right) + \frac{b^2\sqrt{2}}{8\,a^2\,(ad-bc)}\sqrt[4]{\frac{a}{b}}\ln\left(1\left(x^2+\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)\left(x^2-\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)^{-1}\right) + \frac{b^2\sqrt{2}}{4\,a^2\,(ad-bc)}\sqrt[4]{\frac{a}{b}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}+1\right) + \frac{b^2\sqrt{2}}{4\,a^2\,(ad-bc)}\sqrt[4]{\frac{a}{b}}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}-1\right) - \frac{1}{3\,acx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] -1/8/c^2*d^2/(a*d-b*c)*(c/d)^(1/4)*2^(1/2)*ln((x^2+(c/d)^(1/4)*x*
2^(1/2)+(c/d)^(1/2))/(x^2-(c/d)^(1/4)*x*2^(1/2)+(c/d)^(1/2)))-1/4
/c^2*d^2/(a*d-b*c)*(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)
*x+1)-1/4/c^2*d^2/(a*d-b*c)*(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c
/d)^(1/4)*x-1)+1/8/a^2*b^2/(a*d-b*c)*(a/b)^(1/4)*2^(1/2)*ln((x^2+
(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2))/(x^2-(a/b)^(1/4)*x*2^(1/2)+(a/
b)^(1/2)))+1/4/a^2*b^2/(a*d-b*c)*(a/b)^(1/4)*2^(1/2)*arctan(2^(1/
2)/(a/b)^(1/4)*x+1)+1/4/a^2*b^2/(a*d-b*c)*(a/b)^(1/4)*2^(1/2)*arc
tan(2^(1/2)/(a/b)^(1/4)*x-1)-1/3/a/c/x^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^4),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 4.89386, size = 1567, normalized size = 3.39

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^4),x, algorithm="fricas")
```

```
[Out] -1/12*(12*(-b^7/(a^7*b^4*c^4 - 4*a^8*b^3*c^3*d + 6*a^9*b^2*c^2*d^
2 - 4*a^10*b*c*d^3 + a^11*d^4))^(1/4)*a*c*x^3*arctan(-(-b^7/(a^7*
b^4*c^4 - 4*a^8*b^3*c^3*d + 6*a^9*b^2*c^2*d^2 - 4*a^10*b*c*d^3 +
a^11*d^4))^(1/4)*(a^2*b*c - a^3*d)/(b^2*x + b^2*sqrt((b^4*x^2 + (
a^4*b^2*c^2 - 2*a^5*b*c*d + a^6*d^2)*sqrt(-b^7/(a^7*b^4*c^4 - 4*a
^8*b^3*c^3*d + 6*a^9*b^2*c^2*d^2 - 4*a^10*b*c*d^3 + a^11*d^4)))/b
^4))) - 12*(-d^7/(b^4*c^11 - 4*a*b^3*c^10*d + 6*a^2*b^2*c^9*d^2 -
 4*a^3*b*c^8*d^3 + a^4*c^7*d^4))^(1/4)*a*c*x^3*arctan(-(-d^7/(b^4
*c^11 - 4*a*b^3*c^10*d + 6*a^2*b^2*c^9*d^2 - 4*a^3*b*c^8*d^3 + a^
4*c^7*d^4))^(1/4)*(b*c^3 - a*c^2*d)/(d^2*x + d^2*sqrt((d^4*x^2 +
(b^2*c^6 - 2*a*b*c^5*d + a^2*c^4*d^2)*sqrt(-d^7/(b^4*c^11 - 4*a*b
^3*c^10*d + 6*a^2*b^2*c^9*d^2 - 4*a^3*b*c^8*d^3 + a^4*c^7*d^4)))/
```

```
d^4))) + 3*(-b^7/(a^7*b^4*c^4 - 4*a^8*b^3*c^3*d + 6*a^9*b^2*c^2*d
^2 - 4*a^10*b*c*d^3 + a^11*d^4))^(1/4)*a*c*x^3*log(b^2*x + (-b^7/
(a^7*b^4*c^4 - 4*a^8*b^3*c^3*d + 6*a^9*b^2*c^2*d^2 - 4*a^10*b*c*d
^3 + a^11*d^4))^(1/4)*(a^2*b*c - a^3*d)) - 3*(-b^7/(a^7*b^4*c^4 -
 4*a^8*b^3*c^3*d + 6*a^9*b^2*c^2*d^2 - 4*a^10*b*c*d^3 + a^11*d^4)
)^(1/4)*a*c*x^3*log(b^2*x - (-b^7/(a^7*b^4*c^4 - 4*a^8*b^3*c^3*d
+ 6*a^9*b^2*c^2*d^2 - 4*a^10*b*c*d^3 + a^11*d^4))^(1/4)*(a^2*b*c
- a^3*d)) - 3*(-d^7/(b^4*c^11 - 4*a*b^3*c^10*d + 6*a^2*b^2*c^9*d^
2 - 4*a^3*b*c^8*d^3 + a^4*c^7*d^4))^(1/4)*a*c*x^3*log(d^2*x + (-d
^7/(b^4*c^11 - 4*a*b^3*c^10*d + 6*a^2*b^2*c^9*d^2 - 4*a^3*b*c^8*d
^3 + a^4*c^7*d^4))^(1/4)*(b*c^3 - a*c^2*d)) + 3*(-d^7/(b^4*c^11 -
 4*a*b^3*c^10*d + 6*a^2*b^2*c^9*d^2 - 4*a^3*b*c^8*d^3 + a^4*c^7*d
^4))^(1/4)*a*c*x^3*log(d^2*x - (-d^7/(b^4*c^11 - 4*a*b^3*c^10*d +
 6*a^2*b^2*c^9*d^2 - 4*a^3*b*c^8*d^3 + a^4*c^7*d^4))^(1/4)*(b*c^3
 - a*c^2*d)) + 4)/(a*c*x^3)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**4+a)/(d*x**4+c),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4 + a)(dx^4 + c)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^4),x, algorithm="giac")

[Out] integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^4), x)
```

3.617 $\int \frac{1}{x^6(a+bx^4)(c+dx^4)} \, dx$

Optimal. Leaf size=479

$$\frac{b^{9/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{9/4}(bc-ad)}-\frac{b^{9/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{9/4}(bc-ad)}-\frac{b^{9/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}a^{9/4}(bc-ad)}+\frac{b^{9/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}a^{9/4}(bc-ad)}+\frac{ad+bc}{a^2c^2x}-\frac{d^{9/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{9/4}(bc-ad)}+\frac{d^{9/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{9/4}(bc-ad)}+\frac{d^{9/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}c^{9/4}(bc-ad)}-\frac{d^{9/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}c^{9/4}(bc-ad)}-\frac{1}{5acx^5}$$

```
[Out] -1/(5*a*c*x^5) + (b*c + a*d)/(a^2*c^2*x) - (b^(9/4)*ArcTan[1 - (S
qrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(9/4)*(b*c - a*d)) + (b^
(9/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(9/4)
*(b*c - a*d)) + (d^(9/4)*ArcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])
/(2*Sqrt[2]*c^(9/4)*(b*c - a*d)) - (d^(9/4)*ArcTan[1 + (Sqrt[2]*d
^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(9/4)*(b*c - a*d)) + (b^(9/4)*Lo
g[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*
a^(9/4)*(b*c - a*d)) - (b^(9/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(
1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(9/4)*(b*c - a*d)) - (d^(9/4)
*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[
2]*c^(9/4)*(b*c - a*d)) + (d^(9/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*
d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(9/4)*(b*c - a*d))
```

Rubi [A] time = 1.36835, antiderivative size = 479, normalized size of antiderivative = 1., number of steps used = 22, number of rules used = 9, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.409

$$\frac{b^{9/4}\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{9/4}(bc-ad)}-\frac{b^{9/4}\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{4\sqrt{2}a^{9/4}(bc-ad)}-\frac{b^{9/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{2\sqrt{2}a^{9/4}(bc-ad)}+\frac{b^{9/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{2\sqrt{2}a^{9/4}(bc-ad)}+\frac{ad+bc}{a^2c^2x}-\frac{d^{9/4}\log\left(-\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{9/4}(bc-ad)}+\frac{d^{9/4}\log\left(\sqrt{2}\sqrt[4]{c}\sqrt[4]{d}x+\sqrt{c}+\sqrt{d}x^2\right)}{4\sqrt{2}c^{9/4}(bc-ad)}+\frac{d^{9/4}\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}\right)}{2\sqrt{2}c^{9/4}(bc-ad)}-\frac{d^{9/4}\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{d}x}{\sqrt[4]{c}}+1\right)}{2\sqrt{2}c^{9/4}(bc-ad)}-\frac{1}{5acx^5}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^6*(a + b*x^4)*(c + d*x^4)),x]
```


```
[Out] -1/(5*a*c*x^5) + (b*c + a*d)/(a^2*c^2*x) - (b^(9/4)*ArcTan[1 - (S
qrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(9/4)*(b*c - a*d)) + (b^
(9/4)*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/(2*Sqrt[2]*a^(9/4)
*(b*c - a*d)) + (d^(9/4)*ArcTan[1 - (Sqrt[2]*d^(1/4)*x)/c^(1/4)])
/(2*Sqrt[2]*c^(9/4)*(b*c - a*d)) - (d^(9/4)*ArcTan[1 + (Sqrt[2]*d
^(1/4)*x)/c^(1/4)])/(2*Sqrt[2]*c^(9/4)*(b*c - a*d)) + (b^(9/4)*Lo
g[Sqrt[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*
a^(9/4)*(b*c - a*d)) - (b^(9/4)*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(
1/4)*x + Sqrt[b]*x^2])/(4*Sqrt[2]*a^(9/4)*(b*c - a*d)) - (d^(9/4)
*Log[Sqrt[c] - Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[
2]*c^(9/4)*(b*c - a*d)) + (d^(9/4)*Log[Sqrt[c] + Sqrt[2]*c^(1/4)*
d^(1/4)*x + Sqrt[d]*x^2])/(4*Sqrt[2]*c^(9/4)*(b*c - a*d))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**6/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.70033, size = 428, normalized size = 0.89

$$\frac{\frac{10\sqrt{2}b^{9/4}x^5\tan^{-1}\left(1-\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}\right)}{a^{9/4}}-\frac{10\sqrt{2}b^{9/4}x^5\tan^{-1}\left(\frac{\sqrt{2}\sqrt[4]{b}x}{\sqrt[4]{a}}+1\right)}{a^{9/4}}-\frac{5\sqrt{2}b^{9/4}x^5\log\left(-\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{a^{9/4}}+\frac{5\sqrt{2}b^{9/4}x^5\log\left(\sqrt{2}\sqrt[4]{a}\sqrt[4]{b}x+\sqrt{a}+\sqrt{b}x^2\right)}{a^{9/4}}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^6*(a + b*x^4)*(c + d*x^4)),x]
```

```
[Out] ((8*b)/a - (8*d)/c - (40*b^2*x^4)/a^2 + (40*d^2*x^4)/c^2 + (10*Sq
rt[2]*b^(9/4)*x^5*ArcTan[1 - (Sqrt[2]*b^(1/4)*x)/a^(1/4)])/a^(9/4
) - (10*Sqrt[2]*b^(9/4)*x^5*ArcTan[1 + (Sqrt[2]*b^(1/4)*x)/a^(1/4
)])/a^(9/4) - (10*Sqrt[2]*d^(9/4)*x^5*ArcTan[1 - (Sqrt[2]*d^(1/4)
*x)/c^(1/4)])/c^(9/4) + (10*Sqrt[2]*d^(9/4)*x^5*ArcTan[1 + (Sqrt[
2]*d^(1/4)*x)/c^(1/4)])/c^(9/4) - (5*Sqrt[2]*b^(9/4)*x^5*Log[Sqrt
[a] - Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]*x^2])/a^(9/4) + (5*Sqrt
[2]*b^(9/4)*x^5*Log[Sqrt[a] + Sqrt[2]*a^(1/4)*b^(1/4)*x + Sqrt[b]
*x^2])/a^(9/4) + (5*Sqrt[2]*d^(9/4)*x^5*Log[Sqrt[c] - Sqrt[2]*c^(
1/4)*d^(1/4)*x + Sqrt[d]*x^2])/c^(9/4) - (5*Sqrt[2]*d^(9/4)*x^5*L
og[Sqrt[c] + Sqrt[2]*c^(1/4)*d^(1/4)*x + Sqrt[d]*x^2])/c^(9/4))/(
40*(-(b*c) + a*d)*x^5)
```

Maple [A] time = 0.002, size = 365, normalized size = 0.8

$$\frac{d^2\sqrt{2}}{8\,c^2\,(ad-bc)}\ln\left(1\left(x^2-\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)\left(x^2+\sqrt[4]{\frac{c}{d}}x\sqrt{2}+\sqrt{\frac{c}{d}}\right)^{-1}\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}$$
$$+\frac{d^2\sqrt{2}}{4\,c^2\,(ad-bc)}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}+1\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}+\frac{d^2\sqrt{2}}{4\,c^2\,(ad-bc)}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{c}{d}}}-1\right)\frac{1}{\sqrt[4]{\frac{c}{d}}}-\frac{1}{5\,acx^5}$$
$$+\frac{d}{ac^2x}+\frac{b}{a^2cx}-\frac{b^2\sqrt{2}}{8\,a^2\,(ad-bc)}\ln\left(1\left(x^2-\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)\left(x^2+\sqrt[4]{\frac{a}{b}}x\sqrt{2}+\sqrt{\frac{a}{b}}\right)^{-1}\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}$$
$$-\frac{b^2\sqrt{2}}{4\,a^2\,(ad-bc)}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}+1\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}-\frac{b^2\sqrt{2}}{4\,a^2\,(ad-bc)}\arctan\left(x\sqrt{2}\frac{1}{\sqrt[4]{\frac{a}{b}}}-1\right)\frac{1}{\sqrt[4]{\frac{a}{b}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^6/(b*x^4+a)/(d*x^4+c),x)
```

```
[Out] 1/8*d^2/c^2/(a*d-b*c)/(c/d)^(1/4)*2^(1/2)*ln((x^2-(c/d)^(1/4)*x*2
^(1/2)+(c/d)^(1/2))/(x^2+(c/d)^(1/4)*x*2^(1/2)+(c/d)^(1/2)))+1/4*
```

```
d^2/c^2/(a*d-b*c)/(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/d)^(1/4)*
x+1)+1/4*d^2/c^2/(a*d-b*c)/(c/d)^(1/4)*2^(1/2)*arctan(2^(1/2)/(c/
d)^(1/4)*x-1)-1/5/a/c/x^5+1/a/c^2/x*d+1/a^2/c/x*b-1/8*b^2/a^2/(a*
d-b*c)/(a/b)^(1/4)*2^(1/2)*ln((x^2-(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1
/2))/(x^2+(a/b)^(1/4)*x*2^(1/2)+(a/b)^(1/2)))-1/4*b^2/a^2/(a*d-b*
c)/(a/b)^(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x+1)-1/4*b^2/a^
2/(a*d-b*c)/(a/b)^(1/4)*2^(1/2)*arctan(2^(1/2)/(a/b)^(1/4)*x-1)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^6),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 7.85057, size = 1850, normalized size = 3.86

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^6),x, algorithm="fricas")
```

```
[Out] -1/20*(20*(-b^9/(a^9*b^4*c^4 - 4*a^10*b^3*c^3*d + 6*a^11*b^2*c^2*
d^2 - 4*a^12*b*c*d^3 + a^13*d^4))^(1/4)*a^2*c^2*x^5*arctan(-(a^7*
b^3*c^3 - 3*a^8*b^2*c^2*d + 3*a^9*b*c*d^2 - a^10*d^3)*(-b^9/(a^9*
b^4*c^4 - 4*a^10*b^3*c^3*d + 6*a^11*b^2*c^2*d^2 - 4*a^12*b*c*d^3
+ a^13*d^4))^(3/4)/(b^7*x + b^7*sqrt((b^5*x^2 - (a^5*b^2*c^2 - 2*
a^6*b*c*d + a^7*d^2)*sqrt(-b^9/(a^9*b^4*c^4 - 4*a^10*b^3*c^3*d +
6*a^11*b^2*c^2*d^2 - 4*a^12*b*c*d^3 + a^13*d^4)))/b^5))) - 20*(-d
^9/(b^4*c^13 - 4*a*b^3*c^12*d + 6*a^2*b^2*c^11*d^2 - 4*a^3*b*c^10
*d^3 + a^4*c^9*d^4))^(1/4)*a^2*c^2*x^5*arctan(-(b^3*c^10 - 3*a*b^
2*c^9*d + 3*a^2*b*c^8*d^2 - a^3*c^7*d^3)*(-d^9/(b^4*c^13 - 4*a*b^
3*c^12*d + 6*a^2*b^2*c^11*d^2 - 4*a^3*b*c^10*d^3 + a^4*c^9*d^4))^
(3/4)/(d^7*x + d^7*sqrt((d^5*x^2 - (b^2*c^7 - 2*a*b*c^6*d + a^2*c
^5*d^2)*sqrt(-d^9/(b^4*c^13 - 4*a*b^3*c^12*d + 6*a^2*b^2*c^11*d^2
 - 4*a^3*b*c^10*d^3 + a^4*c^9*d^4)))/d^5))) - 5*(-b^9/(a^9*b^4*c^
4 - 4*a^10*b^3*c^3*d + 6*a^11*b^2*c^2*d^2 - 4*a^12*b*c*d^3 + a^13
*d^4))^(1/4)*a^2*c^2*x^5*log(b^7*x + (a^7*b^3*c^3 - 3*a^8*b^2*c^2
*d + 3*a^9*b*c*d^2 - a^10*d^3)*(-b^9/(a^9*b^4*c^4 - 4*a^10*b^3*c^
3*d + 6*a^11*b^2*c^2*d^2 - 4*a^12*b*c*d^3 + a^13*d^4))^(3/4)) + 5
*(-b^9/(a^9*b^4*c^4 - 4*a^10*b^3*c^3*d + 6*a^11*b^2*c^2*d^2 - 4*a
^12*b*c*d^3 + a^13*d^4))^(1/4)*a^2*c^2*x^5*log(b^7*x - (a^7*b^3*c
^3 - 3*a^8*b^2*c^2*d + 3*a^9*b*c*d^2 - a^10*d^3)*(-b^9/(a^9*b^4*c
^4 - 4*a^10*b^3*c^3*d + 6*a^11*b^2*c^2*d^2 - 4*a^12*b*c*d^3 + a^1
3*d^4))^(3/4)) + 5*(-d^9/(b^4*c^13 - 4*a*b^3*c^12*d + 6*a^2*b^2*c
^11*d^2 - 4*a^3*b*c^10*d^3 + a^4*c^9*d^4))^(1/4)*a^2*c^2*x^5*log(
d^7*x + (b^3*c^10 - 3*a*b^2*c^9*d + 3*a^2*b*c^8*d^2 - a^3*c^7*d^3
)*(-d^9/(b^4*c^13 - 4*a*b^3*c^12*d + 6*a^2*b^2*c^11*d^2 - 4*a^3*b
*c^10*d^3 + a^4*c^9*d^4))^(3/4)) - 5*(-d^9/(b^4*c^13 - 4*a*b^3*c^
12*d + 6*a^2*b^2*c^11*d^2 - 4*a^3*b*c^10*d^3 + a^4*c^9*d^4))^(1/4
)*a^2*c^2*x^5*log(d^7*x - (b^3*c^10 - 3*a*b^2*c^9*d + 3*a^2*b*c^8
*d^2 - a^3*c^7*d^3)*(-d^9/(b^4*c^13 - 4*a*b^3*c^12*d + 6*a^2*b^2*
c^11*d^2 - 4*a^3*b*c^10*d^3 + a^4*c^9*d^4))^(3/4)) - 20*(b*c + a*
d)*x^4 + 4*a*c)/(a^2*c^2*x^5)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**6/(b*x**4+a)/(d*x**4+c),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4 + a)(dx^4 + c)x^6}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^6),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^4 + a)*(d*x^4 + c)*x^6), x)
```

3.618 $\int \frac{x^7\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=93

$$\frac{a\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{5/2}}-\frac{a\sqrt{c+dx^4}}{2b^2}+\frac{\left(c+dx^4\right)^{3/2}}{6bd}$$

```
[Out] -(a*Sqrt[c + d*x^4])/(2*b^2) + (c + d*x^4)^(3/2)/(6*b*d) + (a*Sqr
t[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/
(2*b^(5/2))
```

Rubi [A] time = 0.260944, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{a\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{5/2}}-\frac{a\sqrt{c+dx^4}}{2b^2}+\frac{\left(c+dx^4\right)^{3/2}}{6bd}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^7*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] -(a*Sqrt[c + d*x^4])/(2*b^2) + (c + d*x^4)^(3/2)/(6*b*d) + (a*Sqr
t[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/
(2*b^(5/2))
```

Rubi in Sympy [A] time = 24.019, size = 76, normalized size = 0.82

$$-\frac{a\sqrt{c+dx^4}}{2b^2}+\frac{a\sqrt{ad-bc}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2b^{\frac{5}{2}}}+\frac{\left(c+dx^4\right)^{\frac{3}{2}}}{6bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] -a*sqrt(c + d*x**4)/(2*b**2) + a*sqrt(a*d - b*c)*atan(sqrt(b)*sqr
t(c + d*x**4)/sqrt(a*d - b*c))/(2*b**(5/2)) + (c + d*x**4)**(3/2)
/(6*b*d)
```

Mathematica [A] time = 0.347101, size = 88, normalized size = 0.95

$$\frac{a\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{5/2}}+\frac{\sqrt{c+dx^4}\left(b\left(c+dx^4\right)-3ad\right)}{6b^2d}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^7*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (Sqrt[c + d*x^4]*(-3*a*d + b*(c + d*x^4)))/(6*b^2*d) + (a*Sqrt[b*
c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(2*b
^(5/2))
```

Maple [B] time = 0.028, size = 1015, normalized size = 10.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] 1/6*(d*x^4+c)^(3/2)/b/d-1/4*a/b^2*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d
*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/4*a/b
^3*d^(1/2)*(-a*b)^(1/2)*ln((d*(-a*b)^(1/2)/b+(x^2-1/b*(-a*b)^(1/2
))*d)/d^(1/2)+((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2
-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))-1/4*a^2/b^3/(-(a*d-b*c)/b)
^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2
))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^
(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b
)^(1/2)))*d+1/4*a/b^2/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d
*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x
^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2)
)-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))*c-1/4*a/b^2*((x^2+1
/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a
*d-b*c)/b)^(1/2)+1/4*a/b^3*d^(1/2)*(-a*b)^(1/2)*ln((-d*(-a*b)^(1/
2)/b+(x^2+1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x^2+1/b*(-a*b)^(1/2))^2*
d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))-1
/4*a^2/b^3/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/
2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*
b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)
/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*d+1/4*a/b^2/(-(a*d-b*c)/b)^(1/
2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2
*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2
)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1
/2)))*c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^7/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.217318, size = 1, normalized size = 0.01

$$\left[\frac{3\,ad\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^4+2\,bc-ad+2\,\sqrt{dx^4+c}\,b\sqrt{\frac{bc-ad}{b}}}{bx^4+a}\right)+2\,\left(bdx^4+bc-3\,ad\right)\sqrt{dx^4+c}}{12\,b^2d},\ \frac{3\,ad\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)+\left(bdx\right.}{6\,b^2d}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^7/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] [1/12*(3*a*d*sqrt((b*c - a*d)/b)*log((b*d*x^4 + 2*b*c - a*d + 2*s
qrt(d*x^4 + c)*b*sqrt((b*c - a*d)/b))/(b*x^4 + a)) + 2*(b*d*x^4 +
 b*c - 3*a*d)*sqrt(d*x^4 + c))/(b^2*d), 1/6*(3*a*d*sqrt(-(b*c - a
*d)/b)*arctan(sqrt(d*x^4 + c)/sqrt(-(b*c - a*d)/b)) + (b*d*x^4 +
b*c - 3*a*d)*sqrt(d*x^4 + c))/(b^2*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7\sqrt{c+dx^4}}{a+bx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(x**7*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [A] time = 0.211739, size = 130, normalized size = 1.4

$$-\frac{\frac{3\left(abcd-a^{2}d^{2}\right)\arctan\left(\frac{\sqrt{dx^{4}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{\sqrt{-b^{2}c+abd}b^{2}}-\frac{\left(dx^{4}+c\right)^{\frac{3}{2}}b^{2}-3\sqrt{dx^{4}+c}abd}{b^{3}}}{6d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^7/(b*x^4 + a),x, algorithm="giac")
```

```
[Out] -1/6*(3*(a*b*c*d - a^2*d^2)*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c
+ a*b*d))/(sqrt(-b^2*c + a*b*d)*b^2) - ((d*x^4 + c)^(3/2)*b^2 - 3
*sqrt(d*x^4 + c)*a*b*d)/b^3)/d
```

3.619 $\int \frac{x^5\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=120

$$-\frac{\sqrt{a}\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b^2}+\frac{(bc-2ad)\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^2\sqrt{d}}+\frac{x^2\sqrt{c+dx^4}}{4b}$$

```
[Out] (x^2*Sqrt[c + d*x^4])/(4*b) - (Sqrt[a]*Sqrt[b*c - a*d]*ArcTan[(Sq
rt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(2*b^2) + ((b*c -
2*a*d)*ArcTanh[(Sqrt[d]*x^2)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[d])
```

Rubi [A] time = 0.42646, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$

$$-\frac{\sqrt{a}\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b^2}+\frac{(bc-2ad)\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^2\sqrt{d}}+\frac{x^2\sqrt{c+dx^4}}{4b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^5*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (x^2*Sqrt[c + d*x^4])/(4*b) - (Sqrt[a]*Sqrt[b*c - a*d]*ArcTan[(Sq
rt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(2*b^2) + ((b*c -
2*a*d)*ArcTanh[(Sqrt[d]*x^2)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[d])
```

Rubi in Sympy [A] time = 45.9007, size = 105, normalized size = 0.88

$$\frac{\sqrt{a}\sqrt{ad-bc}\,\text{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b^2}+\frac{x^2\sqrt{c+dx^4}}{4b}-\frac{(2ad-bc)\,\text{atanh}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^2\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] sqrt(a)*sqrt(a*d - b*c)*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt(
c + d*x**4)))/(2*b**2) + x**2*sqrt(c + d*x**4)/(4*b) - (2*a*d - b
*c)*atanh(sqrt(d)*x**2/sqrt(c + d*x**4))/(4*b**2*sqrt(d))
```

Mathematica [A] time = 0.234717, size = 114, normalized size = 0.95

$$\frac{\frac{(bc-2ad)\log\left(\sqrt{d}\sqrt{c+dx^4}+dx^2\right)}{\sqrt{d}}-2\sqrt{a}\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)+bx^2\sqrt{c+dx^4}}{4b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^5*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (b*x^2*Sqrt[c + d*x^4] - 2*Sqrt[a]*Sqrt[b*c - a*d]*ArcTan[(Sqrt[b
*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])] + ((b*c - 2*a*d)*Log[d*
x^2 + Sqrt[d]*Sqrt[c + d*x^4]])/Sqrt[d])/(4*b^2)
```

Maple [B] time = 0.026, size = 1066, normalized size = 8.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] 1/4*x^2*(d*x^4+c)^(1/2)/b+1/4/b*c/d^(1/2)*ln(x^2*d^(1/2)+(d*x^4+c
)^(1/2))-1/4*a/b/(-a*b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a
*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/4*a/b^2*d
^(1/2)*ln((d*(-a*b)^(1/2)/b+(x^2-1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x
^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2)
)-(a*d-b*c)/b)^(1/2))-1/4*a^2/b^2/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/
2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2
*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2
)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1
/2)))*d+1/4*a/b/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c
)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1
/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b
)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))*c+1/4*a/b/(-
a*b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/
b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/4*a/b^2*d^(1/2)*ln((-d*(-a*b
)^(1/2)/b+(x^2+1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x^2+1/b*(-a*b)^(1/2
))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/
2))+1/4*a^2/b^2/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c
)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1
/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b
)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*d-1/4*a/b/(-
a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/
2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*
b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)
/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^5/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.309671, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{dx^4+c}\,b\sqrt{d}x^2 - (bc-2ad)\log\left(2\sqrt{dx^4+c}\,dx^2 - \left(2\,dx^4+c\right)\sqrt{d}\right) + \sqrt{-abc+a^2d}\sqrt{d}\log\left(\frac{\left(b^2c^2-8\,abcd+8\,a^2d^2\right)x^8-2\left(3\,abc^2\cdots\right.}{\cdots}\right.}{8\,b^2\sqrt{d}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^5/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] [1/8*(2*sqrt(d*x^4 + c)*b*sqrt(d)*x^2 - (b*c - 2*a*d)*log(2*sqrt(
d*x^4 + c)*d*x^2 - (2*d*x^4 + c)*sqrt(d)) + sqrt(-a*b*c + a^2*d)*
sqrt(d)*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2
 - 4*a^2*c*d)*x^4 + a^2*c^2 - 4*((b*c - 2*a*d)*x^6 - a*c*x^2)*sqr
t(d*x^4 + c)*sqrt(-a*b*c + a^2*d))/(b^2*x^8 + 2*a*b*x^4 + a^2)))/
(b^2*sqrt(d)), 1/8*(2*sqrt(d*x^4 + c)*b*sqrt(-d)*x^2 + 2*(b*c - 2
*a*d)*arctan(sqrt(-d)*x^2/sqrt(d*x^4 + c)) + sqrt(-a*b*c + a^2*d)
```

```
*sqrt(-d)*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c
^2 - 4*a^2*c*d)*x^4 + a^2*c^2 - 4*((b*c - 2*a*d)*x^6 - a*c*x^2)*s
qrt(d*x^4 + c)*sqrt(-a*b*c + a^2*d))/(b^2*x^8 + 2*a*b*x^4 + a^2))
)/(b^2*sqrt(-d)), 1/8*(2*sqrt(d*x^4 + c)*b*sqrt(d)*x^2 + 2*sqrt(a
*b*c - a^2*d)*sqrt(d)*arctan(-1/2*((b*c - 2*a*d)*x^4 - a*c)/(sqrt
(d*x^4 + c)*sqrt(a*b*c - a^2*d)*x^2)) - (b*c - 2*a*d)*log(2*sqrt(
d*x^4 + c)*d*x^2 - (2*d*x^4 + c)*sqrt(d)))/(b^2*sqrt(d)), 1/4*(sq
rt(d*x^4 + c)*b*sqrt(-d)*x^2 + (b*c - 2*a*d)*arctan(sqrt(-d)*x^2/
sqrt(d*x^4 + c)) + sqrt(a*b*c - a^2*d)*sqrt(-d)*arctan(-1/2*((b*c
 - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*sqrt(a*b*c - a^2*d)*x^2)))/
(b^2*sqrt(-d))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5\sqrt{c+dx^4}}{a+bx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(x**5*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [A] time = 0.332472, size = 136, normalized size = 1.13

$$\frac{\sqrt{dx^4+c}b^2x^2}{384\,d^3}+\frac{\sqrt{abc-a^2d}\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{2\,b^2}-\frac{\left(b^2c-2\,abd\right)\arctan\left(\frac{\sqrt{d+\frac{c}{x^4}}}{\sqrt{-d}}\right)}{384\,\sqrt{-d}d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^5/(b*x^4 + a),x, algorithm="giac")
```

```
[Out] 1/384*sqrt(d*x^4 + c)*b^2*x^2/d^3 + 1/2*sqrt(a*b*c - a^2*d)*arcta
n(a*sqrt(d + c/x^4)/sqrt(a*b*c - a^2*d))/b^2 - 1/384*(b^2*c - 2*a
*b*d)*arctan(sqrt(d + c/x^4)/sqrt(-d))/(sqrt(-d)*d^3)
```

3.620 $\int \frac{x^3\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=70

$$\frac{\sqrt{c+dx^4}}{2b}-\frac{\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{3/2}}$$

```
[Out] Sqrt[c + d*x^4]/(2*b) - (Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c
+ d*x^4])/Sqrt[b*c - a*d]])/(2*b^(3/2))
```

Rubi [A] time = 0.182226, antiderivative size = 70, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$\frac{\sqrt{c+dx^4}}{2b}-\frac{\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] Sqrt[c + d*x^4]/(2*b) - (Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c
+ d*x^4])/Sqrt[b*c - a*d]])/(2*b^(3/2))
```

Rubi in Sympy [A] time = 18.9067, size = 56, normalized size = 0.8

$$\frac{\sqrt{c+dx^4}}{2b}-\frac{\sqrt{ad-bc}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] sqrt(c + d*x**4)/(2*b) - sqrt(a*d - b*c)*atan(sqrt(b)*sqrt(c + d*
x**4)/sqrt(a*d - b*c))/(2*b**(3/2))
```

Mathematica [A] time = 0.0640862, size = 70, normalized size = 1.

$$\frac{\sqrt{c+dx^4}}{2b}-\frac{\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^3*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] Sqrt[c + d*x^4]/(2*b) - (Sqrt[b*c - a*d]*ArcTanh[(Sqrt[b]*Sqrt[c
+ d*x^4])/Sqrt[b*c - a*d]])/(2*b^(3/2))
```

Maple [B] time = 0.01, size = 988, normalized size = 14.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] 1/4/b*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a
*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/4/b^2*d^(1/2)*(-a*b)^(1/2)*ln((d*
(-a*b)^(1/2)/b+(x^2-1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x^2-1/b*(-a*b)
^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b
)^(1/2))+1/4/b^2/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*
b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/
b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*
d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))*a*d-1/4/b/(-(a*d-b*c)/b)
^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2
))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^
(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b
)^(1/2)))*c+1/4/b*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*
(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/4/b^2*d^(1/2)*(-a*b)^
(1/2)*ln((-d*(-a*b)^(1/2)/b+(x^2+1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x
^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2)
)-(a*d-b*c)/b)^(1/2))+1/4/b^2/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*
c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(
1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*
b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*a*d-1/4/b/(
-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/
b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*
d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(
x^2+1/b*(-a*b)^(1/2)))*c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^3/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.217246, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^4+2\,bc-ad-2\,\sqrt{dx^4+c}b\sqrt{\frac{bc-ad}{b}}}{bx^4+a}\right)+2\,\sqrt{dx^4+c}}{4\,b}, -\frac{\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)-\sqrt{dx^4+c}}{2\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^3/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] [1/4*(sqrt((b*c - a*d)/b)*log((b*d*x^4 + 2*b*c - a*d - 2*sqrt(d*x
^4 + c)*b*sqrt((b*c - a*d)/b))/(b*x^4 + a)) + 2*sqrt(d*x^4 + c))/
b, -1/2*(sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^4 + c)/sqrt(-(b*c -
 a*d)/b)) - sqrt(d*x^4 + c))/b]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3\sqrt{c+dx^4}}{a+bx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(x**3*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [A] time = 0.211631, size = 89, normalized size = 1.27

$$\frac{(bc - ad)\arctan\left(\frac{\sqrt{dx^4+c}\,b}{\sqrt{-b^2c+abd}}\right)}{2\sqrt{-b^2c+abd}\,b} + \frac{\sqrt{dx^4+c}}{2\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^3/(b*x^4 + a),x, algorithm="giac")
```

```
[Out] 1/2*(b*c - a*d)*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c + a*b*d))/(s
qrt(-b^2*c + a*b*d)*b) + 1/2*sqrt(d*x^4 + c)/b
```

3.621 $\int \frac{x\sqrt{c+dx^4}}{a+bx^4} dx$

Optimal. Leaf size=91

$$\frac{\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2\sqrt{a}b}+\frac{\sqrt{d}\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b}$$

```
[Out] (Sqrt[b*c - a*d]*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d
*x^4])])/(2*Sqrt[a]*b) + (Sqrt[d]*ArcTanh[(Sqrt[d]*x^2)/Sqrt[c +
d*x^4]])/(2*b)
```

Rubi [A] time = 0.206905, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$\frac{\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2\sqrt{a}b}+\frac{\sqrt{d}\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (Sqrt[b*c - a*d]*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d
*x^4])])/(2*Sqrt[a]*b) + (Sqrt[d]*ArcTanh[(Sqrt[d]*x^2)/Sqrt[c +
d*x^4]])/(2*b)
```

Rubi in Sympy [A] time = 26.265, size = 76, normalized size = 0.84

$$\frac{\sqrt{d}\operatorname{atanh}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b}-\frac{\sqrt{ad-bc}\operatorname{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] sqrt(d)*atanh(sqrt(d)*x**2/sqrt(c + d*x**4))/(2*b) - sqrt(a*d - b
*c)*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**4)))/(2*sqr
t(a)*b)
```

Mathematica [A] time = 0.0558978, size = 89, normalized size = 0.98

$$\frac{\frac{\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{\sqrt{a}}+\sqrt{d}\log\left(\sqrt{d}\sqrt{c+dx^4}+dx^2\right)}{2b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] ((Sqrt[b*c - a*d]*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c +
d*x^4])])/Sqrt[a] + Sqrt[d]*Log[d*x^2 + Sqrt[d]*Sqrt[c + d*x^4]])
/(2*b)
```

Maple [B] time = 0.008, size = 1000, normalized size = 11.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] 1/4/(-a*b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(
x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/4*d^(1/2)/b*ln((d*(-a*
b)^(1/2)/b+(x^2-1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x^2-1/b*(-a*b)^(1/
2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1
/2))+1/4/(-a*b)^(1/2)/b/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2
*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*(
(x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/
2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))*a*d-1/4/(-a*b)^(1
/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x
^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2
))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/
2))/(x^2-1/b*(-a*b)^(1/2)))*c-1/4/(-a*b)^(1/2)*((x^2+1/b*(-a*b)^(
1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^
(1/2)+1/4*d^(1/2)/b*ln((-d*(-a*b)^(1/2)/b+(x^2+1/b*(-a*b)^(1/2))*
d)/d^(1/2)+((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/
b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))-1/4/(-a*b)^(1/2)/b/(-(a*d-b*c
)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^
(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a
*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(
-a*b)^(1/2)))*a*d+1/4/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a
*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)
/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b
*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.253652, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{d}\log\left(-2\,dx^4 - 2\sqrt{dx^4 + c}\sqrt{d}x^2 - c\right) + \sqrt{-\frac{bc-ad}{a}}\log\left(\frac{\left(b^2c^2-8\,abcd+8\,a^2d^2\right)x^8-2\left(3\,abc^2-4\,a^2cd\right)x^4+a^2c^2+4\left(\left(abc-2\,a^2d\right)x^6-a^2cx^2\right.}{b^2x^8+2\,abx^4+a^2}\right.}{8\,b}\right.$$

$$-\frac{\sqrt{\frac{bc-ad}{a}}\arctan\left(-\frac{(bc-2\,ad)x^4-ac}{2\sqrt{dx^4+c}ax^2\sqrt{\frac{bc-ad}{a}}}\right) - \sqrt{d}\log\left(-2\,dx^4 - 2\sqrt{dx^4 + c}\sqrt{d}x^2 - c\right)}{4\,b}, \frac{2\sqrt{-d}\arctan\left(\frac{dx^2}{\sqrt{dx^4+c}\sqrt{-d}}\right) - \sqrt{\frac{bc-ad}{a}}\,\mathrm{a}}{4\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] [1/8*(2*sqrt(d)*log(-2*d*x^4 - 2*sqrt(d*x^4 + c)*sqrt(d)*x^2 - c)
 + sqrt(-(b*c - a*d)/a)*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^
```

```
8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2 + 4*((a*b*c - 2*a^2*d
)*x^6 - a^2*c*x^2)*sqrt(d*x^4 + c)*sqrt(-(b*c - a*d)/a))/(b^2*x^8
 + 2*a*b*x^4 + a^2)))/b, 1/8*(4*sqrt(-d)*arctan(d*x^2/(sqrt(d*x^4
 + c)*sqrt(-d))) + sqrt(-(b*c - a*d)/a)*log(((b^2*c^2 - 8*a*b*c*d
 + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2 + 4*(
(a*b*c - 2*a^2*d)*x^6 - a^2*c*x^2)*sqrt(d*x^4 + c)*sqrt(-(b*c - a
*d)/a))/(b^2*x^8 + 2*a*b*x^4 + a^2)))/b, -1/4*(sqrt((b*c - a*d)/a
)*arctan(-1/2*((b*c - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*a*x^2*sq
rt((b*c - a*d)/a))) - sqrt(d)*log(-2*d*x^4 - 2*sqrt(d*x^4 + c)*sq
rt(d)*x^2 - c))/b, 1/4*(2*sqrt(-d)*arctan(d*x^2/(sqrt(d*x^4 + c)*
sqrt(-d))) - sqrt((b*c - a*d)/a)*arctan(-1/2*((b*c - 2*a*d)*x^4 -
 a*c)/(sqrt(d*x^4 + c)*a*x^2*sqrt((b*c - a*d)/a))))/b]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x\sqrt{c+dx^4}}{a+bx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(d*x**4+c)**(1/2)/(b*x**4+a),x)

[Out] Integral(x*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [A] time = 0.227485, size = 157, normalized size = 1.73

$$-\frac{\left(bc\sqrt{d}-ad^{\frac{3}{2}}\right)\arctan\left(\frac{\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^2b-bc+2\,ad}{2\,\sqrt{abcd-a^2d^2}}\right)}{2\,\sqrt{abcd-a^2d^2}b}-\frac{\sqrt{d}\ln\left(\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^2\right)}{4\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x/(b*x^4 + a),x, algorithm="giac")

[Out] -1/2*(b*c*sqrt(d) - a*d^(3/2))*arctan(1/2*((sqrt(d)*x^2 - sqrt(d*
x^4 + c))^2*b - b*c + 2*a*d)/sqrt(a*b*c*d - a^2*d^2))/(sqrt(a*b*c
*d - a^2*d^2)*b) - 1/4*sqrt(d)*ln((sqrt(d)*x^2 - sqrt(d*x^4 + c))
^2)/b
```

3.622 $\int \frac{\sqrt{c+dx^4}}{x(a+bx^4)}\,dx$

Optimal. Leaf size=85

$$\frac{\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2a\sqrt{b}}-\frac{\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a}$$

```
[Out] -(Sqrt[c]*ArcTanh[Sqrt[c + d*x^4]/Sqrt[c]])/(2*a) + (Sqrt[b*c - a
*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(2*a*Sqrt
[b])
```

Rubi [A] time = 0.223052, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2a\sqrt{b}}-\frac{\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^4]/(x*(a + b*x^4)),x]
```

```
[Out] -(Sqrt[c]*ArcTanh[Sqrt[c + d*x^4]/Sqrt[c]])/(2*a) + (Sqrt[b*c - a
*d]*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(2*a*Sqrt
[b])
```

Rubi in Sympy [A] time = 23.5395, size = 70, normalized size = 0.82

$$-\frac{\sqrt{c}\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a}+\frac{\sqrt{ad-bc}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2a\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/x/(b*x**4+a),x)
```

```
[Out] -sqrt(c)*atanh(sqrt(c + d*x**4)/sqrt(c))/(2*a) + sqrt(a*d - b*c)*
atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(2*a*sqrt(b))
```

Mathematica [C] time = 0.287604, size = 162, normalized size = 1.91

$$-\frac{3bdx^4\sqrt{c+dx^4}F_1\left(\frac{1}{2};-\frac{1}{2},1;\frac{3}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)}{2\left(a+bx^4\right)\left(3bdx^4F_1\left(\frac{1}{2};-\frac{1}{2},1;\frac{3}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)-2adF_1\left(\frac{3}{2};-\frac{1}{2},2;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+bcF_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^4]/(x*(a + b*x^4)),x]
```

```
[Out] (-3*b*d*x^4*Sqrt[c + d*x^4]*AppellF1[1/2, -1/2, 1, 3/2, -(c/(d*x^
4)), -(a/(b*x^4))])/(2*(a + b*x^4)*(3*b*d*x^4*AppellF1[1/2, -1/2,
 1, 3/2, -(c/(d*x^4)), -(a/(b*x^4))] - 2*a*d*AppellF1[3/2, -1/2,
2, 5/2, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*AppellF1[3/2, 1/2, 1, 5
/2, -(c/(d*x^4)), -(a/(b*x^4))]))
```

Maple [B] time = 0.022, size = 1037, normalized size = 12.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/x/(b*x^4+a),x)
```

```
[Out] 1/2/a*(d*x^4+c)^(1/2)-1/2/a*c^(1/2)*ln((2*c+2*c^(1/2)*(d*x^4+c)^(
1/2))/x^2)-1/4/a*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(
x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/4/b/a*d^(1/2)*(-a*b)^(
1/2)*ln((d*(-a*b)^(1/2)/b+(x^2-1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x^2
-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-
(a*d-b*c)/b)^(1/2))-1/4/b/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b
+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)
*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(
1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))*d+1/4/a/(-(a*d-
b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*
b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*
(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/
b*(-a*b)^(1/2)))*c-1/4/a*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(
1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/4/b/a*d^(1/2)*
(-a*b)^(1/2)*ln((-d*(-a*b)^(1/2)/b+(x^2+1/b*(-a*b)^(1/2))*d)/d^(1
/2)+((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b
)^(1/2))-(a*d-b*c)/b)^(1/2))-1/4/b/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a
*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)
/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b
*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*d+1/4/
a/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2
+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))
^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)
)/(x^2+1/b*(-a*b)^(1/2)))*c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}}{(bx^4+a)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x), x)
```

Fricas [A] time = 0.235215, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^4+2\,bc-ad+2\,\sqrt{dx^4+c}\,b\sqrt{\frac{bc-ad}{b}}}{bx^4+a}\right)+\sqrt{c}\log\left(\frac{dx^4-2\,\sqrt{dx^4+c}\sqrt{c}+2\,c}{x^4}\right)}{4\,a},\ \frac{2\,\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)+\sqrt{c}\log\left(\frac{dx^4-2\cdots}{\cdots}\right)}{4\,a}\right.$$

$$-\frac{2\,\sqrt{-c}\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-c}}\right)-\sqrt{\frac{bc-ad}{b}}\log\left(\frac{bdx^4+2\,bc-ad+2\,\sqrt{dx^4+c}\,b\sqrt{\frac{bc-ad}{b}}}{bx^4+a}\right)}{4\,a},$$

$$\left.-\frac{\sqrt{-c}\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-c}}\right)-\sqrt{-\frac{bc-ad}{b}}\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-\frac{bc-ad}{b}}}\right)}{2\,a}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x),x, algorithm="fricas")
```

```
[Out] [1/4*(sqrt((b*c - a*d)/b)*log((b*d*x^4 + 2*b*c - a*d + 2*sqrt(d*x
^4 + c)*b*sqrt((b*c - a*d)/b))/(b*x^4 + a)) + sqrt(c)*log((d*x^4
- 2*sqrt(d*x^4 + c)*sqrt(c) + 2*c)/x^4))/a, 1/4*(2*sqrt(-(b*c - a
*d)/b)*arctan(sqrt(d*x^4 + c)/sqrt(-(b*c - a*d)/b)) + sqrt(c)*log
((d*x^4 - 2*sqrt(d*x^4 + c)*sqrt(c) + 2*c)/x^4))/a, -1/4*(2*sqrt(
-c)*arctan(sqrt(d*x^4 + c)/sqrt(-c)) - sqrt((b*c - a*d)/b)*log((b
*d*x^4 + 2*b*c - a*d + 2*sqrt(d*x^4 + c)*b*sqrt((b*c - a*d)/b))/(
b*x^4 + a)))/a, -1/2*(sqrt(-c)*arctan(sqrt(d*x^4 + c)/sqrt(-c)) -
 sqrt(-(b*c - a*d)/b)*arctan(sqrt(d*x^4 + c)/sqrt(-(b*c - a*d)/b)
))/a]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c + dx^4}}{x\,(a + bx^4)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/x/(b*x**4+a),x)
```

```
[Out] Integral(sqrt(c + d*x**4)/(x*(a + b*x**4)), x)
```

GIAC/XCAS [A] time = 0.223032, size = 117, normalized size = 1.38

$$-\frac{1}{2}\,d\left(\frac{(bc - ad)\arctan\left(\frac{\sqrt{dx^4+c}\,b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c + abd}\,ad} - \frac{c\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-c}}\right)}{a\sqrt{-c}\,d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x),x, algorithm="giac")
```

```
[Out] -1/2*d*((b*c - a*d)*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c + a*b*d)
)/(sqrt(-b^2*c + a*b*d)*a*d) - c*arctan(sqrt(d*x^4 + c)/sqrt(-c))
/(a*sqrt(-c)*d))
```

3.623 $\int \frac{\sqrt{c+dx^4}}{x^3(a+bx^4)}\,dx$

Optimal. Leaf size=76

$$-\frac{\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{3/2}}-\frac{\sqrt{c+dx^4}}{2ax^2}$$

```
[Out] -Sqrt[c + d*x^4]/(2*a*x^2) - (Sqrt[b*c - a*d]*ArcTan[(Sqrt[b*c -
a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(2*a^(3/2))
```

Rubi [A] time = 0.253304, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{3/2}}-\frac{\sqrt{c+dx^4}}{2ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^4]/(x^3*(a + b*x^4)),x]
```

```
[Out] -Sqrt[c + d*x^4]/(2*a*x^2) - (Sqrt[b*c - a*d]*ArcTan[(Sqrt[b*c -
a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(2*a^(3/2))
```

Rubi in Sympy [A] time = 28.6608, size = 63, normalized size = 0.83

$$-\frac{\sqrt{c+dx^4}}{2ax^2}+\frac{\sqrt{ad-bc}\,\mathrm{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/x**3/(b*x**4+a),x)
```

```
[Out] -sqrt(c + d*x**4)/(2*a*x**2) + sqrt(a*d - b*c)*atanh(x**2*sqrt(a*
d - b*c)/(sqrt(a)*sqrt(c + d*x**4)))/(2*a**(3/2))
```

Mathematica [A] time = 1.21772, size = 136, normalized size = 1.79

$$\frac{\sqrt{c+dx^4}\left(-\frac{x^4(bc-ad)\sin^{-1}\left(\frac{\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^4}{a}+1}}\right)}{c\sqrt{\frac{bx^4}{a}+1}\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}\sqrt{\frac{a\left(c+dx^4\right)}{c\left(a+bx^4\right)}}}-a\right)}{2a^2x^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[c + d*x^4]/(x^3*(a + b*x^4)),x]
```

```
[Out] (Sqrt[c + d*x^4]*(-a - ((b*c - a*d)*x^4*ArcSin[Sqrt[(b/a - d/c)*x
^4]/Sqrt[1 + (b*x^4)/a]])/(c*Sqrt[(b/a - d/c)*x^4]*Sqrt[1 + (b*x^
4)/a]*Sqrt[(a*(c + d*x^4))/(c*(a + b*x^4))])))/(2*a^2*x^2)
```

Maple [B] time = 0.021, size = 1075, normalized size = 14.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/x^3/(b*x^4+a),x)
```

```
[Out] -1/2/a/c/x^2*(d*x^4+c)^(3/2)+1/2/a*d/c*x^2*(d*x^4+c)^(1/2)+1/2/a*
d^(1/2)*ln(x^2*d^(1/2)+(d*x^4+c)^(1/2))-1/4*b/a/(-a*b)^(1/2)*((x^
2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))
-(a*d-b*c)/b)^(1/2)-1/4/a*d^(1/2)*ln((d*(-a*b)^(1/2)/b+(x^2-1/b*(
-a*b)^(1/2))*d)/d^(1/2)+((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1
/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))-1/4/(-a*b)^(1/2)
/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-
1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^
2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))
/(x^2-1/b*(-a*b)^(1/2)))*d+1/4*b/a/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1
/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+
2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/
2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(
1/2)))*c+1/4*b/a/(-a*b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a
*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/4/a*d^(1/
2)*ln((-d*(-a*b)^(1/2)/b+(x^2+1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x^2+
1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(
a*d-b*c)/b)^(1/2))+1/4/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(
a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c
)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/
b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*d-1/4
*b/a/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a
*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1
/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a
*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}}{(bx^4 + a)x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^3), x)
```

Fricas [A] time = 0.233045, size = 1, normalized size = 0.01

$$\left[\frac{x^2\sqrt{-\frac{bc-ad}{a}}\log\left(\frac{\left(b^2c^2-8\,abcd+8\,a^2d^2\right)x^8-2\left(3\,abc^2-4\,a^2cd\right)x^4+a^2c^2-4\left(\left(abc-2\,a^2d\right)x^6-a^2cx^2\right)\sqrt{dx^4+c}\sqrt{-\frac{bc-ad}{a}}}{b^2x^8+2\,abx^4+a^2}\right)-4\sqrt{dx^4+c}}{8\,ax^2}, \frac{x^2\sqrt{\frac{bc-a}{a}}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^3),x, algorithm="fricas")
```

```
[Out] [1/8*(x^2*sqrt(-(b*c - a*d)/a)*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*
d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2 - 4*((a*b*c -
2*a^2*d)*x^6 - a^2*c*x^2)*sqrt(d*x^4 + c)*sqrt(-(b*c - a*d)/a))/(
b^2*x^8 + 2*a*b*x^4 + a^2)) - 4*sqrt(d*x^4 + c))/(a*x^2), 1/4*(x^
2*sqrt((b*c - a*d)/a)*arctan(-1/2*((b*c - 2*a*d)*x^4 - a*c)/(sqrt
```

```
(d*x^4 + c)*a*x^2*sqrt((b*c - a*d)/a))) - 2*sqrt(d*x^4 + c))/(a*x
^2)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c + dx^4}}{x^3 (a + bx^4)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/x**3/(b*x**4+a),x)
```

```
[Out] Integral(sqrt(c + d*x**4)/(x**3*(a + b*x**4)), x)
```

GIAC/XCAS [A] time = 0.218513, size = 89, normalized size = 1.17

$$\frac{(bc - ad)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{2\sqrt{abc - a^2d}a} - \frac{\sqrt{d + \frac{c}{x^4}}}{2a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^3),x, algorithm="giac")
```

```
[Out] 1/2*(b*c - a*d)*arctan(a*sqrt(d + c/x^4)/sqrt(a*b*c - a^2*d))/(sq
rt(a*b*c - a^2*d)*a) - 1/2*sqrt(d + c/x^4)/a
```

3.624 $\int \frac{\sqrt{c+dx^4}}{x^5(a+bx^4)}\,dx$

Optimal. Leaf size=115

$$\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{4a^2\sqrt{c}}-\frac{\sqrt{b}\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2a^2}-\frac{\sqrt{c+dx^4}}{4ax^4}$$

```
[Out] -Sqrt[c + d*x^4]/(4*a*x^4) + ((2*b*c - a*d)*ArcTanh[Sqrt[c + d*x^
4]/Sqrt[c]])/(4*a^2*Sqrt[c]) - (Sqrt[b]*Sqrt[b*c - a*d]*ArcTanh[(
Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(2*a^2)
```

Rubi [A] time = 0.384249, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{4a^2\sqrt{c}}-\frac{\sqrt{b}\sqrt{bc-ad}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2a^2}-\frac{\sqrt{c+dx^4}}{4ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^4]/(x^5*(a + b*x^4)),x]
```

```
[Out] -Sqrt[c + d*x^4]/(4*a*x^4) + ((2*b*c - a*d)*ArcTanh[Sqrt[c + d*x^
4]/Sqrt[c]])/(4*a^2*Sqrt[c]) - (Sqrt[b]*Sqrt[b*c - a*d]*ArcTanh[(
Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(2*a^2)
```

Rubi in Sympy [A] time = 43.369, size = 100, normalized size = 0.87

$$-\frac{\sqrt{c+dx^4}}{4ax^4}-\frac{\sqrt{b}\sqrt{ad-bc}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2a^2}-\frac{\left(\frac{ad}{2}-bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a^2\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/x**5/(b*x**4+a),x)
```

```
[Out] -sqrt(c + d*x**4)/(4*a*x**4) - sqrt(b)*sqrt(a*d - b*c)*atan(sqrt(
b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(2*a**2) - (a*d/2 - b*c)*ata
nh(sqrt(c + d*x**4)/sqrt(c))/(2*a**2*sqrt(c))
```

Mathematica [C] time = 0.956401, size = 407, normalized size = 3.54

$$\frac{\frac{6bcdx^8F_1\left(1;\frac{1}{2},1;2;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{x^4\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{5bdx^4\left(3ac+4adx^4+bcx^4+3bdx^8\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)-}{a\left(-5bdx^4F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+2a\right.}}{12x^4\left(a+bx^4\right)\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^4]/(x^5*(a + b*x^4)),x]
```

```
[Out] ((6*b*c*d*x^8*AppellF1[1, 1/2, 1, 2, -((d*x^4)/c), -((b*x^4)/a)])
/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^4)/c), -((b*x^4)/a)] + x^4
*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^4)/c), -((b*x^4)/a)] + a*d*
AppellF1[2, 3/2, 1, 3, -((d*x^4)/c), -((b*x^4)/a)])) + (5*b*d*x^4
*(3*a*c + b*c*x^4 + 4*a*d*x^4 + 3*b*d*x^8)*AppellF1[3/2, 1/2, 1,
5/2, -(c/(d*x^4)), -(a/(b*x^4))] - 3*(a + b*x^4)*(c + d*x^4)*(2*a
```

```
*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*A
ppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^4)), -(a/(b*x^4))]))/(a*(-5*b*
d*x^4*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^4)), -(a/(b*x^4))] + 2*
a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*
AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^4)), -(a/(b*x^4))])))/(12*x^4
*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [B] time = 0.023, size = 1107, normalized size = 9.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/x^5/(b*x^4+a),x)
```

```
[Out] -1/4/a/c/x^4*(d*x^4+c)^(3/2)-1/4/a*d/c^(1/2)*ln((2*c+2*c^(1/2)*(d
*x^4+c)^(1/2))/x^2)+1/4/a*d/c*(d*x^4+c)^(1/2)+1/4/a^2*b*((x^2-1/b
*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d
-b*c)/b)^(1/2)+1/4/a^2*d^(1/2)*(-a*b)^(1/2)*ln((d*(-a*b)^(1/2)/b+
(x^2-1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x^2-1/b*(-a*b)^(1/2))^2*d+2*d
*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))+1/4/a/
(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1
/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2
*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/
(x^2-1/b*(-a*b)^(1/2)))*d-1/4/a^2*b/(-(a*d-b*c)/b)^(1/2)*ln((-2*(
a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c
)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/
b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))*c+1/4
/a^2*b*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-
a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/4/a^2*d^(1/2)*(-a*b)^(1/2)*ln((-
d*(-a*b)^(1/2)/b+(x^2+1/b*(-a*b)^(1/2))*d)/d^(1/2)+((x^2+1/b*(-a*
b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)
/b)^(1/2))+1/4/a/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*
b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/
b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*
d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*d-1/4/a^2*b/(-(a*d-b*c)/
b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1
/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b
)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a
*b)^(1/2)))*c-1/2*b/a^2*(d*x^4+c)^(1/2)+1/2*b/a^2*c^(1/2)*ln((2*c
+2*c^(1/2)*(d*x^4+c)^(1/2))/x^2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}}{(bx^4 + a)x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^5),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^5), x)
```

Fricas [A] time = 0.243514, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{b^2c-abd}\sqrt{c}x^4\log\left(\frac{bdx^4+2\,bc-ad-2\sqrt{dx^4+c}\sqrt{b^2c-abd}}{bx^4+a}\right)-(2\,bc-ad)x^4\log\left(\frac{(dx^4+2\,c)\sqrt{c}-2\sqrt{dx^4+c}c}{x^4}\right)-2\sqrt{dx^4+c}a\sqrt{c}}{8\,a^2\sqrt{c}x^4}, \frac{4\sqrt{-\ldots}}{\ldots}\right.$$

$$-\frac{(2\,bc-ad)x^4\arctan\left(\frac{c}{\sqrt{dx^4+c}\sqrt{-c}}\right)-\sqrt{b^2c-abd}\sqrt{-c}x^4\log\left(\frac{bdx^4+2\,bc-ad-2\sqrt{dx^4+c}\sqrt{b^2c-abd}}{bx^4+a}\right)+\sqrt{dx^4+c}a\sqrt{-c}}{4\,a^2\sqrt{-c}x^4},$$

$$\left.-\frac{(2\,bc-ad)x^4\arctan\left(\frac{c}{\sqrt{dx^4+c}\sqrt{-c}}\right)-2\sqrt{-b^2c+abd}\sqrt{-c}x^4\arctan\left(\frac{\sqrt{-b^2c+abd}}{\sqrt{dx^4+c}b}\right)+\sqrt{dx^4+c}a\sqrt{-c}}{4\,a^2\sqrt{-c}x^4}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^5),x, algorithm="fricas")
```

```
[Out] [1/8*(2*sqrt(b^2*c - a*b*d)*sqrt(c)*x^4*log((b*d*x^4 + 2*b*c - a*
d - 2*sqrt(d*x^4 + c)*sqrt(b^2*c - a*b*d))/(b*x^4 + a)) - (2*b*c
- a*d)*x^4*log(((d*x^4 + 2*c)*sqrt(c) - 2*sqrt(d*x^4 + c)*c)/x^4)
 - 2*sqrt(d*x^4 + c)*a*sqrt(c))/(a^2*sqrt(c)*x^4), 1/8*(4*sqrt(-b
^2*c + a*b*d)*sqrt(c)*x^4*arctan(sqrt(-b^2*c + a*b*d)/(sqrt(d*x^4
 + c)*b)) - (2*b*c - a*d)*x^4*log(((d*x^4 + 2*c)*sqrt(c) - 2*sqrt
(d*x^4 + c)*c)/x^4) - 2*sqrt(d*x^4 + c)*a*sqrt(c))/(a^2*sqrt(c)*x
^4), -1/4*((2*b*c - a*d)*x^4*arctan(c/(sqrt(d*x^4 + c)*sqrt(-c)))
 - sqrt(b^2*c - a*b*d)*sqrt(-c)*x^4*log((b*d*x^4 + 2*b*c - a*d -
2*sqrt(d*x^4 + c)*sqrt(b^2*c - a*b*d))/(b*x^4 + a)) + sqrt(d*x^4
+ c)*a*sqrt(-c))/(a^2*sqrt(-c)*x^4), -1/4*((2*b*c - a*d)*x^4*arct
an(c/(sqrt(d*x^4 + c)*sqrt(-c))) - 2*sqrt(-b^2*c + a*b*d)*sqrt(-c
)*x^4*arctan(sqrt(-b^2*c + a*b*d)/(sqrt(d*x^4 + c)*b)) + sqrt(d*x
^4 + c)*a*sqrt(-c))/(a^2*sqrt(-c)*x^4)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^4}}{x^5\,(a+bx^4)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/x**5/(b*x**4+a),x)
```

```
[Out] Integral(sqrt(c + d*x**4)/(x**5*(a + b*x**4)), x)
```

GIAC/XCAS [A] time = 0.215831, size = 163, normalized size = 1.42

$$\frac{1}{4}\,d^2\left(\frac{2\left(b^2c-abd\right)\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}a^2d^2}-\frac{(2\,bc-ad)\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2}-\frac{\sqrt{dx^4+c}}{ad^2x^4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^5),x, algorithm="giac")
```

```
[Out] 1/4*d^2*(2*(b^2*c - a*b*d)*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c +
 a*b*d))/(sqrt(-b^2*c + a*b*d)*a^2*d^2) - (2*b*c - a*d)*arctan(sq
rt(d*x^4 + c)/sqrt(-c))/(a^2*sqrt(-c)*d^2) - sqrt(d*x^4 + c)/(a*d
^2*x^4))
```

3.625 $\int \frac{\sqrt{c+dx^4}}{x^7(a+bx^4)}\,dx$

Optimal. Leaf size=110

$$\frac{b\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{5/2}}+\frac{\sqrt{c+dx^4}(3bc-ad)}{6a^2cx^2}-\frac{\sqrt{c+dx^4}}{6ax^6}$$

```
[Out] -Sqrt[c + d*x^4]/(6*a*x^6) + ((3*b*c - a*d)*Sqrt[c + d*x^4])/(6*a
^2*c*x^2) + (b*Sqrt[b*c - a*d]*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt
[a]*Sqrt[c + d*x^4])])/(2*a^(5/2))
```

Rubi [A] time = 0.481663, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{b\sqrt{bc-ad}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{5/2}}+\frac{\sqrt{c+dx^4}(3bc-ad)}{6a^2cx^2}-\frac{\sqrt{c+dx^4}}{6ax^6}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^4]/(x^7*(a + b*x^4)),x]
```

```
[Out] -Sqrt[c + d*x^4]/(6*a*x^6) + ((3*b*c - a*d)*Sqrt[c + d*x^4])/(6*a
^2*c*x^2) + (b*Sqrt[b*c - a*d]*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt
[a]*Sqrt[c + d*x^4])])/(2*a^(5/2))
```

Rubi in Sympy [A] time = 59.7717, size = 95, normalized size = 0.86

$$-\frac{\sqrt{c+dx^4}}{6ax^6}-\frac{\sqrt{c+dx^4}\,(ad-3bc)}{6a^2cx^2}-\frac{b\sqrt{ad-bc}\,\operatorname{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/x**7/(b*x**4+a),x)
```

```
[Out] -sqrt(c + d*x**4)/(6*a*x**6) - sqrt(c + d*x**4)*(a*d - 3*b*c)/(6*
a**2*c*x**2) - b*sqrt(a*d - b*c)*atanh(x**2*sqrt(a*d - b*c)/(sqrt
(a)*sqrt(c + d*x**4)))/(2*a**(5/2))
```

Mathematica [A] time = 0.828968, size = 156, normalized size = 1.42

$$\frac{\sqrt{c+dx^4}\left(-a^2+\frac{ax^4(3bc-ad)}{c}+\frac{3bx^8(bc-ad)\sin^{-1}\left(\frac{\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^4}{a}+1}}\right)}{c\sqrt{\frac{bx^4}{a}+1}\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}\sqrt{\frac{a(c+dx^4)}{c(a+bx^4)}}}\right)}{6a^3x^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[c + d*x^4]/(x^7*(a + b*x^4)),x]
```

```
[Out] (Sqrt[c + d*x^4]*(-a^2 + (a*(3*b*c - a*d)*x^4)/c + (3*b*(b*c - a*
d)*x^8*ArcSin[Sqrt[(b/a - d/c)*x^4]/Sqrt[1 + (b*x^4)/a]])/(c*Sqrt
[(b/a - d/c)*x^4]*Sqrt[1 + (b*x^4)/a]*Sqrt[(a*(c + d*x^4))/(c*(a
```

```
+ b*x^4))]))))/(6*a^3*x^6)
```

Maple [B] time = 0.023, size = 1116, normalized size = 10.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/x^7/(b*x^4+a),x)
```

```
[Out] -1/6/a/c/x^6*(d*x^4+c)^(3/2)+1/4/a^2*b^2/(-a*b)^(1/2)*((x^2-1/b*(
-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b
*c)/b)^(1/2)+1/4/a^2*b*d^(1/2)*ln((d*(-a*b)^(1/2)/b+(x^2-1/b*(-a*
b)^(1/2))*d)/d^(1/2)+((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)
/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))+1/4/a*b/(-a*b)^(1/2
)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2
-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))
^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)
)/(x^2-1/b*(-a*b)^(1/2)))*d-1/4/a^2*b^2/(-a*b)^(1/2)/(-(a*d-b*c)/
b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1
/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b
)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a
*b)^(1/2)))*c-1/4/a^2*b^2/(-a*b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*
d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/
4/a^2*b*d^(1/2)*ln((-d*(-a*b)^(1/2)/b+(x^2+1/b*(-a*b)^(1/2))*d)/d
^(1/2)+((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-
a*b)^(1/2))-(a*d-b*c)/b)^(1/2))-1/4/a*b/(-a*b)^(1/2)/(-(a*d-b*c)/
b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1
/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b
)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a
*b)^(1/2)))*d+1/4/a^2*b^2/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-
2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-
b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2
+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))*c+
1/2*b/a^2/c/x^2*(d*x^4+c)^(3/2)-1/2*b/a^2*d/c*x^2*(d*x^4+c)^(1/2)
-1/2*b/a^2*d^(1/2)*ln(x^2*d^(1/2)+(d*x^4+c)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}}{(bx^4 + a)x^7}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^7),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^7), x)
```

Fricas [A] time = 0.279906, size = 1, normalized size = 0.01

$$\left[\frac{3\,bcx^6\sqrt{-\frac{bc-ad}{a}}\log\left(\frac{\left(b^2c^2-8\,abcd+8\,a^2d^2\right)x^8-2\left(3\,abc^2-4\,a^2cd\right)x^4+a^2c^2+4\left(\left(abc-2\,a^2d\right)x^6-a^2cx^2\right)\sqrt{dx^4+c}\sqrt{-\frac{bc-ad}{a}}}{b^2x^8+2\,abx^4+a^2}\right)+4\left((3\,bc-ad)x^4-\right.}{24\,a^2cx^6}\right.$$

$$\left.-\frac{3\,bcx^6\sqrt{\frac{bc-ad}{a}}\arctan\left(-\frac{(bc-2\,ad)x^4-ac}{2\sqrt{dx^4+c}\,ax^2\sqrt{\frac{bc-ad}{a}}}\right)-2\left((3\,bc-ad)x^4-ac\right)\sqrt{dx^4+c}}{12\,a^2cx^6}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^7),x, algorithm="fricas")
```

```
[Out] [1/24*(3*b*c*x^6*sqrt(-(b*c - a*d)/a)*log(((b^2*c^2 - 8*a*b*c*d +
 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2 + 4*((a
*b*c - 2*a^2*d)*x^6 - a^2*c*x^2)*sqrt(d*x^4 + c)*sqrt(-(b*c - a*d
)/a))/(b^2*x^8 + 2*a*b*x^4 + a^2)) + 4*((3*b*c - a*d)*x^4 - a*c)*
sqrt(d*x^4 + c))/(a^2*c*x^6), -1/12*(3*b*c*x^6*sqrt((b*c - a*d)/a
)*arctan(-1/2*((b*c - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*a*x^2*sq
rt((b*c - a*d)/a))) - 2*((3*b*c - a*d)*x^4 - a*c)*sqrt(d*x^4 + c)
)/(a^2*c*x^6)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^4}}{x^7\left(a+bx^4\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/x**7/(b*x**4+a),x)
```

```
[Out] Integral(sqrt(c + d*x**4)/(x**7*(a + b*x**4)), x)
```

GIAC/XCAS [A] time = 0.217342, size = 131, normalized size = 1.19

$$-\frac{\frac{3\left(b^2c^2-abcd\right)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}\,a^2}-\frac{3\,abc\sqrt{d+\frac{c}{x^4}}-a^2\left(d+\frac{c}{x^4}\right)^{\frac{3}{2}}}{a^3}}{6\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^7),x, algorithm="giac")
```

```
[Out] -1/6*(3*(b^2*c^2 - a*b*c*d)*arctan(a*sqrt(d + c/x^4)/sqrt(a*b*c -
 a^2*d))/(sqrt(a*b*c - a^2*d)*a^2) - (3*a*b*c*sqrt(d + c/x^4) - a
^2*(d + c/x^4)^(3/2))/a^3)/c
```

3.626 $\int \frac{x^6\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=857

$$\frac{\sqrt{dx^4+c}\,x^3}{5b}+\frac{(2bc-5ad)\sqrt{dx^4+c}\,x}{5b^2\sqrt{d}\left(\sqrt{d}x^2+\sqrt{c}\right)}-\frac{a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{4b^2}$$
$$-\frac{a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{4b^2}-\frac{\sqrt[4]{c}(2bc-5ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{5b^2d^{3/4}\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{c}\left(b^2c^2+abdc-5a^2d^2\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{5b^2d^{3/4}(bc+ad)\sqrt{dx^4+c}}$$
$$+\frac{a\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{5/2}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{a\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{5/2}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$

```
[Out] (x^3*Sqrt[c + d*x^4])/(5*b) + ((2*b*c - 5*a*d)*x*Sqrt[c + d*x^4])
/(5*b^2*Sqrt[d]*(Sqrt[c] + Sqrt[d]*x^2)) - (a*Sqrt[-((b*c - a*d)/
(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]
))]*x)/Sqrt[c + d*x^4]])/(4*b^2) - (a*Sqrt[(b*c - a*d)/(Sqrt[-a]*
Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c
+ d*x^4]])/(4*b^2) - (c^(1/4)*(2*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*
x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcT
an[(d^(1/4)*x)/c^(1/4)], 1/2])/(5*b^2*d^(3/4)*Sqrt[c + d*x^4]) +
(c^(1/4)*(b^2*c^2 + a*b*c*d - 5*a^2*d^2)*(Sqrt[c] + Sqrt[d]*x^2)*
Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d
^(1/4)*x)/c^(1/4)], 1/2])/(5*b^2*d^(3/4)*(b*c + a*d)*Sqrt[c + d*x
^4]) + (a*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt[
c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ell
ipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b
]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^(5/
2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c
+ d*x^4]) - (a*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(
Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2
]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/
(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2]
)/(8*b^(5/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/
4)*Sqrt[c + d*x^4])
```

Rubi [A] time = 3.84672, antiderivative size = 1095, normalized size of antiderivative = 1.28, number

of steps used = 11, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$

$$
\begin{aligned}
&\frac{\sqrt{dx^4+c}\,x^3}{5b}+\frac{(2bc-5ad)\sqrt{dx^4+c}\,x}{5b^2\sqrt{d}\left(\sqrt{d}x^2+\sqrt{c}\right)}-\frac{a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4b^2}\\
&-\frac{a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4b^2}-\frac{\sqrt[4]{c}(2bc-5ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{5b^2d^{3/4}\sqrt{dx^4+c}}\\
&+\frac{\sqrt[4]{c}(2bc-5ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{10b^2d^{3/4}\sqrt{dx^4+c}}\\
&+\frac{a\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b^{5/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}\\
&+\frac{a\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b^{5/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}\\
&+\frac{a\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{5/2}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}\\
&-\frac{a\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{5/2}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}}
\end{aligned}
$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(x^6*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (x^3*Sqrt[c + d*x^4])/(5*b) + ((2*b*c - 5*a*d)*x*Sqrt[c + d*x^4])
/(5*b^2*Sqrt[d]*(Sqrt[c] + Sqrt[d]*x^2)) - (a*Sqrt[-((b*c - a*d)/
(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]
))]*x)/Sqrt[c + d*x^4]])/(4*b^2) - (a*Sqrt[(b*c - a*d)/(Sqrt[-a]*
Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c
+ d*x^4]])/(4*b^2) - (c^(1/4)*(2*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*
x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcT
an[(d^(1/4)*x)/c^(1/4)], 1/2])/(5*b^2*d^(3/4)*Sqrt[c + d*x^4]) +
(c^(1/4)*(2*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)
/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4
)], 1/2])/(10*b^2*d^(3/4)*Sqrt[c + d*x^4]) + (a*d^(1/4)*(b*c - a*
d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^
2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b^(5/2)*c
^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^4]) + (a
*d^(1/4)*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sq
rt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)],
1/2])/(4*b^(5/2)*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*Sqr
t[c + d*x^4]) + (a*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*
d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^
2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-
a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])
/(8*b^(5/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4
)*Sqrt[c + d*x^4]) - (a*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c
 - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[
d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqr
t[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/
4)], 1/2])/(8*b^(5/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[
d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.981389, size = 428, normalized size = 0.5

$$\frac{x^3\left(\frac{49a^2c^2F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{14x^4(a+bx^4)(c+dx^4)\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^4}{c},-\frac{b}{}\right.\right.}{2x^4\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^4}{c},-\frac{dx^4}{c}\right.\right.}\right.}{35b\left(a+bx^4\right)\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^6*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (x^3*((49*a^2*c^2*AppellF1[3/4, 1/2, 1, 7/4, -((d*x^4)/c), -((b*x
^4)/a)])/(-7*a*c*AppellF1[3/4, 1/2, 1, 7/4, -((d*x^4)/c), -((b*x^
4)/a)] + 2*x^4*(2*b*c*AppellF1[7/4, 1/2, 2, 11/4, -((d*x^4)/c), -
((b*x^4)/a)] + a*d*AppellF1[7/4, 3/2, 1, 11/4, -((d*x^4)/c), -((b
*x^4)/a)])) + (-11*a*c*(7*a*c + 9*b*c*x^4 + 2*a*d*x^4 + 7*b*d*x^8
)*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + 14*x^
4*(a + b*x^4)*(c + d*x^4)*(2*b*c*AppellF1[11/4, 1/2, 2, 15/4, -((
d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[11/4, 3/2, 1, 15/4, -((d*
x^4)/c), -((b*x^4)/a)]))/(-11*a*c*AppellF1[7/4, 1/2, 1, 11/4, -((
d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[11/4, 1/2, 2, 15
/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[11/4, 3/2, 1, 15/4
, -((d*x^4)/c), -((b*x^4)/a)]))))/(35*b*(a + b*x^4)*Sqrt[c + d*x^
4])
```

Maple [C] time = 0.076, size = 421, normalized size = 0.5

$$\frac{1}{b}\left(\frac{x^3}{5}\sqrt{dx^4+c}+\frac{2\,i}{5}c^{\frac{3}{2}}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\left(EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)-EllipticE\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{}{\sqrt{d}}\right.$$

$$-\frac{a}{b}\left(\frac{i}{b}\sqrt{c}\sqrt{d}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\left(EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)-EllipticE\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}-\frac{}{8}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] 1/b*(1/5*x^3*(d*x^4+c)^(1/2)+2/5*I*c^(3/2)/(I/c^(1/2)*d^(1/2))^(1
/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/
2)/(d*x^4+c)^(1/2)/d^(1/2)*(EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2)
,I)-EllipticE(x*(I/c^(1/2)*d^(1/2))^(1/2),I)))-a/b*(I/b*d^(1/2)*c
^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*
(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*(EllipticF(x*(I/c
^(1/2)*d^(1/2))^(1/2),I)-EllipticE(x*(I/c^(1/2)*d^(1/2))^(1/2),I)
)-1/8/b^2*sum((a*d-b*c)/_alpha*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1
/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2
/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)
^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi
(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c
```

```
^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_
Z^4*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}x^6}{bx^4 + a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^6/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)*x^6/(b*x^4 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^6/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6\sqrt{c + dx^4}}{a + bx^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(x**6*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}x^6}{bx^4 + a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^6/(b*x^4 + a),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^4 + c)*x^6/(b*x^4 + a), x)
```

3.627 $\int \frac{x^4\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=700

$$-\frac{(bc-ad)\tan^{-1}\left(\frac{x\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4b^2\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{(bc-ad)\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4b^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)(bc-ad)\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^2\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}-\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^2\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}+\frac{c^{3/4}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}(bc-2ad)F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{3b\sqrt[4]{d}\sqrt{c+dx^4}(ad+bc)}+\frac{x\sqrt{c+dx^4}}{3b}$$

```
[Out] (x*Sqrt[c + d*x^4])/(3*b) - ((b*c - a*d)*ArcTan[(Sqrt[(Sqrt[-a]*(
(b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[-((b*c -
a*d)/(Sqrt[-a]*Sqrt[b]))]) - ((b*c - a*d)*ArcTan[(Sqrt[(b*c - a*d
)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[(b*c - a*d
)/(Sqrt[-a]*Sqrt[b])]) + (c^(3/4)*(b*c - 2*a*d)*(Sqrt[c] + Sqrt[d
]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*Ar
cTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(3*b*d^(1/4)*(b*c + a*d)*Sqrt[c
+ d*x^4]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sq
rt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*
EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sq
rt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b
^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c +
d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt
[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*El
lipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[
b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^2*
c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x
^4])
```

Rubi [A] time = 2.27633, antiderivative size = 949, normalized size of antiderivative = 1.36, number

of steps used = 8, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{\sqrt{dx^4+cx}}{3b}-\frac{(bc-ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4b^2\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{(bc-ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4b^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$+\frac{(2bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{6b^2\sqrt[4]{c}\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$+\frac{a\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b^2\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$-\frac{a\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b^2\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(x^4*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (x*Sqrt[c + d*x^4])/(3*b) - ((b*c - a*d)*ArcTan[(Sqrt[(Sqrt[-a]*(
(b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[-((b*c -
a*d)/(Sqrt[-a]*Sqrt[b]))]) - ((b*c - a*d)*ArcTan[(Sqrt[(b*c - a*d
)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[(b*c - a*d
)/(Sqrt[-a]*Sqrt[b])]) + ((2*b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)
*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(
d^(1/4)*x)/c^(1/4)], 1/2])/(6*b^2*c^(1/4)*d^(1/4)*Sqrt[c + d*x^4]
) + (a*d^(1/4)*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^
4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1
/4)], 1/2])/(4*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])
*Sqrt[c + d*x^4]) - (a*d^(1/4)*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2
)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[
(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt
[c] + a*Sqrt[d])*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*
Sqrt[d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sq
rt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*S
qrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)
*x)/c^(1/4)], 1/2])/(8*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sq
rt[d])*d^(1/4)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sq
rt[d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt
[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt
[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)
/c^(1/4)], 1/2])/(8*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[
d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.994491, size = 426, normalized size = 0.61

$$\frac{x\left(\frac{25a^2c^2F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{10x^4(a+bx^4)(c+dx^4)\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\cdots\right.}{2x^4\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\cdots\right.\right.}\cdots\right.}{15b\left(a+bx^4\right)\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^4*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (x*((25*a^2*c^2*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4
)/a)])/(-5*a*c*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4)
/a)] + 2*x^4*(2*b*c*AppellF1[5/4, 1/2, 2, 9/4, -((d*x^4)/c), -((b
*x^4)/a)] + a*d*AppellF1[5/4, 3/2, 1, 9/4, -((d*x^4)/c), -((b*x^4
)/a)])) + (-9*a*c*(5*a*c + 7*b*c*x^4 + 2*a*d*x^4 + 5*b*d*x^8)*App
ellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + 10*x^4*(a +
 b*x^4)*(c + d*x^4)*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^4)/
c), -((b*x^4)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/c),
 -((b*x^4)/a)]))/(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c),
 -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^
4)/c), -((b*x^4)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/
c), -((b*x^4)/a)]))))/(15*b*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [C] time = 0.03, size = 368, normalized size = 0.5

$$\frac{1}{b}\left(\frac{x}{3}\sqrt{dx^4+c}+\frac{2c}{3}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\,EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}\right)$$

$$-\frac{a}{b}\left(\frac{d}{b}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\,EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}-\frac{1}{8b^2}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{ad-bc}{\_alpha^3}\left(-1\cdots\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] 1/b*(1/3*x*(d*x^4+c)^(1/2)+2/3*c/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c
^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+
c)^(1/2)*EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I))-a/b*(1/b*d/(I/
c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/
2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d^(1
/2))^(1/2),I)-1/8/b^2*sum((a*d-b*c)/_alpha^3*(-1/((-a*d+b*c)/b)^(
1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x
^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2
)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1
/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alp
ha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_
alpha=RootOf(_Z^4*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}\,x^4}{bx^4+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^4/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)*x^4/(b*x^4 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^4/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4\sqrt{c+dx^4}}{a+bx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(x**4*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}\,x^4}{bx^4+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^4/(b*x^4 + a),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^4 + c)*x^4/(b*x^4 + a), x)
```

3.628 $\int \frac{x^2\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=786

$$-\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)}+\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)(bc-ad)\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{b}\sqrt{c}+a\sqrt{d}\right)}+\frac{a\sqrt[4]{c}d^{5/4}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{b\sqrt{c+dx^4}(ad+bc)}+\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{x\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4b}+\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4b}+\frac{\sqrt{d}x\sqrt{c+dx^4}}{b\left(\sqrt{c}+\sqrt{d}x^2\right)}-\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{b\sqrt{c+dx^4}}$$

```
[Out] (Sqrt[d]*x*Sqrt[c + d*x^4])/(b*(Sqrt[c] + Sqrt[d]*x^2)) + (Sqrt[-
((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqr
t[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(4*b) + (Sqrt[(b*c - a*d)/(
Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x
)/Sqrt[c + d*x^4]])/(4*b) - (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x
^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcTa
n[(d^(1/4)*x)/c^(1/4)], 1/2])/(b*Sqrt[c + d*x^4]) + (a*c^(1/4)*d^
(5/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]
*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(b*(b*c +
 a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b
*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqr
t[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4
*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)]
, 1/2])/(8*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])
*d^(1/4)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])
*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] +
Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d]
)/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/
c^(1/4)], 1/2])/(8*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*
Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi [A] time = 1.72677, antiderivative size = 1036, normalized size of antiderivative = 1.32, number

of steps used = 9, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$\frac{\sqrt{d}\sqrt{dx^4+cx}}{b\left(\sqrt{d}x^2+\sqrt{c}\right)}+\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4b}+\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4b}$$
$$-\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{b\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2b\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]   Int[(x^2*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (Sqrt[d]*x*Sqrt[c + d*x^4])/(b*(Sqrt[c] + Sqrt[d]*x^2)) + (Sqrt[-
((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqr
t[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(4*b) + (Sqrt[(b*c - a*d)/(
Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x
)/Sqrt[c + d*x^4]])/(4*b) - (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x
^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcTa
n[(d^(1/4)*x)/c^(1/4)], 1/2])/(b*Sqrt[c + d*x^4]) + (c^(1/4)*d^(1
/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x
^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(2*b*Sqrt[c
 + d*x^4]) - (d^(1/4)*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
 + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*
x)/c^(1/4)], 1/2])/(4*b^(3/2)*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]
*Sqrt[d])*Sqrt[c + d*x^4]) - (d^(1/4)*(b*c - a*d)*(Sqrt[c] + Sqrt
[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*
ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b^(3/2)*c^(1/4)*(Sqrt[b]*Sq
rt[c] + Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] -
Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d
*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sq
rt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[
(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*
Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c]
 + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
+ d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b]
 - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2
*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^(3/2)*c^(1/4)*(Sqrt[-a]*
Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 154.848, size = 945, normalized size = 1.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] -c**(1/4)*d**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)
*(sqrt(c) + sqrt(d)*x**2)*elliptic_e(2*atan(d**(1/4)*x/c**(1/4)),
 1/2)/(b*sqrt(c + d*x**4)) + c**(1/4)*d**(1/4)*sqrt((c + d*x**4)/
(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*elliptic_f(
2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(2*b*sqrt(c + d*x**4)) + sqrt(d
)*x*sqrt(c + d*x**4)/(b*(sqrt(c) + sqrt(d)*x**2)) + (a*d - b*c)*a
tan(x*sqrt((a*d - b*c)/(sqrt(b)*sqrt(-a)))/sqrt(c + d*x**4))/(4*b
**(3/2)*sqrt(-a)*sqrt((a*d - b*c)/(sqrt(b)*sqrt(-a)))) - (a*d - b
*c)*atan(x*sqrt((-a*d + b*c)/(sqrt(b)*sqrt(-a)))/sqrt(c + d*x**4)
)/(4*b**(3/2)*sqrt(-a)*sqrt((-a*d + b*c)/(sqrt(b)*sqrt(-a)))) + d
**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) +
 sqrt(d)*x**2)*(a*d - b*c)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4))
, 1/2)/(4*b**(3/2)*c**(1/4)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c) + s
qrt(d)*sqrt(-a))) + d**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)
*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(a*d - b*c)*elliptic_f(2*atan
(d**(1/4)*x/c**(1/4)), 1/2)/(4*b**(3/2)*c**(1/4)*sqrt(c + d*x**4)
*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a))) - sqrt((c + d*x**4)/(sqrt(
c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(a*d - b*c)*(sqrt
(b)*sqrt(c) + sqrt(d)*sqrt(-a))*elliptic_pi(-sqrt(c)*(sqrt(b) - s
qrt(d)*sqrt(-a)/sqrt(c))**2/(4*sqrt(b)*sqrt(d)*sqrt(-a)), 2*atan(
d**(1/4)*x/c**(1/4)), 1/2)/(8*b**(3/2)*c**(1/4)*d**(1/4)*sqrt(c +
 d*x**4)*(a*sqrt(d) + sqrt(b)*sqrt(c)*sqrt(-a))) - sqrt((c + d*x*
*4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(a*d -
b*c)*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a))*elliptic_pi((sqrt(b)*sq
rt(c) + sqrt(d)*sqrt(-a))**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-a))
, 2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(8*b**(3/2)*c**(1/4)*d**(1/4)
*sqrt(c + d*x**4)*(a*sqrt(d) - sqrt(b)*sqrt(c)*sqrt(-a)))
```

Mathematica [C] time = 0.243723, size = 165, normalized size = 0.21

$$\frac{7acx^3\sqrt{c+dx^4}F_1\left(\frac{3}{4};-\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{3\left(a+bx^4\right)\left(2x^4\left(adF_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)-2bcF_1\left(\frac{7}{4};-\frac{1}{2},2;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)+7acF_1\left(\frac{3}{4};-\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^2*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (7*a*c*x^3*Sqrt[c + d*x^4]*AppellF1[3/4, -1/2, 1, 7/4, -((d*x^4)/
c), -((b*x^4)/a)])/(3*(a + b*x^4)*(7*a*c*AppellF1[3/4, -1/2, 1, 7
/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(-2*b*c*AppellF1[7/4, -1/
2, 2, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[7/4, 1/2,
1, 11/4, -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [C] time = 0.01, size = 299, normalized size = 0.4

$$\frac{i}{b}\sqrt{d}\sqrt{c}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\left(EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)-EllipticE\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}$$

$$-\frac{1}{8\,b^2}\sum_{\_alpha=RootOf\left(\_Z^4b+a\right)}\frac{ad-bc}{\_alpha}\left(-1Artanh\left(\frac{2\,\_alpha^2dx^2+2\,c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\,\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}}{\sqrt{}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] I/b*d^(1/2)*c^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2
)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*(Ell
ipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I)-EllipticE(x*(I/c^(1/2)*d^(1
/2))^(1/2),I))-1/8/b^2*sum((a*d-b*c)/_alpha*(-1/((-a*d+b*c)/b)^(1
/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^
4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)
*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/
2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alph
a^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_a
lpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+cx^2}}{bx^4+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^2/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)*x^2/(b*x^4 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^2/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2\sqrt{c+dx^4}}{a+bx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(x**2*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+cx^2}}{bx^4+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*x^2/(b*x^4 + a),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^4 + c)*x^2/(b*x^4 + a), x)
```

3.629 $\int \frac{\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=679

$$\frac{c^{3/4}d^{3/4}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{\sqrt{c+dx^4}(ad+bc)}+\frac{(bc-ad)\tan^{-1}\left(\frac{x\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4ab\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{(bc-ad)\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4ab\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)(bc-ad)\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8ab\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}+\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8ab\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}$$

```
[Out] ((b*c - a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sq
rt[c + d*x^4]])/(4*a*b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) +
 ((b*c - a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqr
t[c + d*x^4]])/(4*a*b*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]) + (c^
(3/4)*d^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] +
 Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(
(b*c + a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[
d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c]
 + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d
])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c
^(1/4)], 1/2])/(8*a*b*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d]
)*d^(1/4)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d]
)*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] +
 Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^
2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1
/4)], 1/2])/(8*a*b*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d
^(1/4)*Sqrt[c + d*x^4])
```

Rubi [A] time = 1.54601, antiderivative size = 931, normalized size of antiderivative = 1.37, number

of steps used = 7, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.19

$$\frac{(bc-ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4ab\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{(bc-ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4ab\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^4+c}}+\frac{\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^4+c}}+\frac{d^{3/4}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2b\sqrt[4]{c}\sqrt{dx^4+c}}+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8ab\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}+\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8ab\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[Sqrt[c + d*x^4]/(a + b*x^4),x]
```

```
[Out] ((b*c - a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sq
rt[c + d*x^4]])/(4*a*b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) +
 ((b*c - a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqr
t[c + d*x^4]])/(4*a*b*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]) + (d^
(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]
*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(2*b*c^(1
/4)*Sqrt[c + d*x^4]) - (d^(1/4)*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^
2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan
[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[
c] - a*Sqrt[d])*Sqrt[c + d*x^4]) + (d^(1/4)*(b*c - a*d)*(Sqrt[c]
+ Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ellipt
icF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b*c^(1/4)*(Sqrt[-a]*S
qrt[b]*Sqrt[c] + a*Sqrt[d])*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c]
+ Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c +
 d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] -
 Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcT
an[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a*b*c^(1/4)*(Sqrt[b]*Sqrt[c] -
Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c] -
Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d
*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sq
rt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[
(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a*b*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqr
t[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 146.886, size = 813, normalized size = 1.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] d**(3/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c)
+ sqrt(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(2*b
*c**(1/4)*sqrt(c + d*x**4)) - d**(1/4)*sqrt((c + d*x**4)/(sqrt(c)
 + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(a*d - b*c)*ellipti
c_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(4*b*c**(1/4)*sqrt(c + d*x*
*4)*(a*sqrt(d) + sqrt(b)*sqrt(c)*sqrt(-a))) - d**(1/4)*sqrt((c +
d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(a*
d - b*c)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(4*b*c**(1/
4)*sqrt(c + d*x**4)*(a*sqrt(d) - sqrt(b)*sqrt(c)*sqrt(-a))) - (a*
d - b*c)*atan(x*sqrt(sqrt(-a)*(a*d - b*c)/(a*sqrt(b)))/sqrt(c + d
*x**4))/(4*a*b*sqrt(sqrt(-a)*(a*d - b*c)/(a*sqrt(b)))) - (a*d - b
*c)*atan(x*sqrt(sqrt(-a)*(-a*d + b*c)/(a*sqrt(b)))/sqrt(c + d*x**
4))/(4*a*b*sqrt(sqrt(-a)*(-a*d + b*c)/(a*sqrt(b)))) - sqrt((c + d
*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(a*d
 - b*c)*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a))*elliptic_pi((sqrt(b)
*sqrt(c) + sqrt(d)*sqrt(-a))**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-
a)), 2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(8*a*b*c**(1/4)*d**(1/4)*s
qrt(c + d*x**4)*(sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))) - sqrt((c +
 d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(a
*d - b*c)*(sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))*elliptic_pi(-(sqrt
(b)*sqrt(c) - sqrt(d)*sqrt(-a))**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqr
t(-a)), 2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(8*a*b*c**(1/4)*d**(1/4
)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a)))
```

Mathematica [C] time = 0.238726, size = 161, normalized size = 0.24

$$\frac{5acx\sqrt{c+dx^4}F_1\left(\frac{1}{4};-\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)\left(2x^4\left(adF_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)-2bcF_1\left(\frac{5}{4};-\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)+5acF_1\left(\frac{1}{4};-\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^4]/(a + b*x^4),x]
```

```
[Out] (5*a*c*x*Sqrt[c + d*x^4]*AppellF1[1/4, -1/2, 1, 5/4, -((d*x^4)/c)
, -((b*x^4)/a)])/((a + b*x^4)*(5*a*c*AppellF1[1/4, -1/2, 1, 5/4,
-((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(-2*b*c*AppellF1[5/4, -1/2, 2
, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[5/4, 1/2, 1, 9/
4, -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [C] time = 0.01, size = 273, normalized size = 0.4

$$\frac{d}{b}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}$$

$$-\frac{1}{8\,b^2}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{ad-bc}{\_alpha^3}\left(-1Artanh\left(\frac{2\,\_alpha^2dx^2+2\,c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}}{\sqrt{c}}\ldots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] 1/b*d/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(
1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(
1/2)*d^(1/2))^(1/2),I)-1/8/b^2*sum((a*d-b*c)/_alpha^3*(-1/((-a*d+
b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(
1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1
-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*
x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(
1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^
```

```
(1/2))),_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}}{bx^4+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)/(b*x^4 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^4}}{a+bx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}}{bx^4+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/(b*x^4 + a),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^4 + c)/(b*x^4 + a), x)
```

3.630 $\int \frac{\sqrt{c+dx^4}}{x^2(a+bx^4)}\,dx$

Optimal. Leaf size=809

$$\frac{b\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)c^{5/4}}{a(bc+ad)\sqrt{dx^4+c}} - \frac{\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)\sqrt[4]{c}}{a\sqrt{dx^4+c}} - \frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a} - \frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a} - \frac{\sqrt{dx^4+c}}{ax} + \frac{\sqrt{d}x\sqrt{dx^4+c}}{a\left(\sqrt{d}x^2+\sqrt{c}\right)} - \frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\left(\sqrt{d}a^2+(-a)^{3/2}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}\sqrt[4]{c}} - \frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt{b}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}\sqrt[4]{c}}$$

```
[Out] -(Sqrt[c + d*x^4]/(a*x)) + (Sqrt[d]*x*Sqrt[c + d*x^4])/(a*(Sqrt[c
] + Sqrt[d]*x^2)) - (Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcT
an[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/
(4*a) - (Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c -
 a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*a) - (c^(1/4)*d
^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d
]*x^2)^2]*EllipticE[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(a*Sqrt[
c + d*x^4]) + (b*c^(5/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
+ d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x
)/c^(1/4)], 1/2])/(a*(b*c + a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqr
t[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt
[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[
c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*
ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*Sqrt[b]*c^(1/4)*((-a)^(3/2)
*Sqrt[b]*Sqrt[c] + a^2*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) - ((Sqrt
[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^
2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[
c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*
Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a*Sqrt[b]*c^(1/
4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]
)
```

Rubi [A] time = 2.64682, antiderivative size = 1062, normalized size of antiderivative = 1.31, number

of steps used = 11, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$

$$\frac{\sqrt{d}\sqrt{dx^4+cx}}{a\left(\sqrt{d}x^2+\sqrt{c}\right)}-\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a}-\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a}$$
$$-\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{a\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4\sqrt{b}\sqrt[4]{c}\left(\sqrt{d}(-a)^{3/2}+a\sqrt{b}\sqrt{c}\right)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2a\sqrt{dx^4+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt{b}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt{b}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{\sqrt{dx^4+c}}{ax}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[Sqrt[c + d*x^4]/(x^2*(a + b*x^4)),x]
```

```
[Out] -(Sqrt[c + d*x^4]/(a*x)) + (Sqrt[d]*x*Sqrt[c + d*x^4])/(a*(Sqrt[c
] + Sqrt[d]*x^2)) - (Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcT
an[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/
(4*a) - (Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c -
 a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*a) - (c^(1/4)*d
^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d
]*x^2)^2]*EllipticE[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(a*Sqrt[
c + d*x^4]) + (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c +
d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/
c^(1/4)], 1/2])/(2*a*Sqrt[c + d*x^4]) + (d^(1/4)*(b*c - a*d)*(Sqr
t[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*E
llipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*a*Sqrt[b]*c^(1/4
)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^4]) + (d^(1/4
)*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] +
 Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(
4*Sqrt[b]*c^(1/4)*(a*Sqrt[b]*Sqrt[c] + (-a)^(3/2)*Sqrt[d])*Sqrt[c
 + d*x^4]) + ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(S
qrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]
*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sq
rt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a
*Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*S
qrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - a*
d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^
2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])
^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)],
1/2])/(8*a*Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])
*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/x**2/(b*x**4+a),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.446987, size = 343, normalized size = 0.42

$$\frac{\frac{49cx^4(bc-2ad)F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)\left(2x^4\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}-\frac{33bcd\cdots}{(a+bx^4)\left(2x^4\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\cdots\right.\right.}}{21x\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^4]/(x^2*(a + b*x^4)),x]
```

```
[Out] ((-21*(c + d*x^4))/a + (49*c*(b*c - 2*a*d)*x^4*AppellF1[3/4, 1/2,
 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)])/((a + b*x^4)*(-7*a*c*Appell
F1[3/4, 1/2, 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*A
ppellF1[7/4, 1/2, 2, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*Appe
llF1[7/4, 3/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)]))) - (33*b*c*
d*x^8*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)])/((
a + b*x^4)*(-11*a*c*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((
b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[11/4, 1/2, 2, 15/4, -((d*x^4)/
c), -((b*x^4)/a)] + a*d*AppellF1[11/4, 3/2, 1, 15/4, -((d*x^4)/c)
, -((b*x^4)/a)]))))/(21*x*Sqrt[c + d*x^4])
```

Maple [C] time = 0.02, size = 421, normalized size = 0.5

$$\frac{1}{a}\left(-\frac{1}{x}\sqrt{dx^4+c}+2i\sqrt{c}\sqrt{d}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\left(EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)-EllipticE\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\cdots\right.$$

$$-\frac{b}{a}\left(\frac{i}{b}\sqrt{c}\sqrt{d}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\left(EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)-EllipticE\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}-\frac{\cdots}{8\cdots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/x^2/(b*x^4+a),x)
```

```
[Out] 1/a*(-1/x*(d*x^4+c)^(1/2)+2*I*d^(1/2)*c^(1/2)/(I/c^(1/2)*d^(1/2))
^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^
(1/2)/(d*x^4+c)^(1/2)*(EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I)-E
llipticE(x*(I/c^(1/2)*d^(1/2))^(1/2),I)))-b/a*(I/b*d^(1/2)*c^(1/2
)/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/
c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*(EllipticF(x*(I/c^(1/2
)*d^(1/2))^(1/2),I)-EllipticE(x*(I/c^(1/2)*d^(1/2))^(1/2),I))-1/8
/b^2*sum((a*d-b*c)/_alpha*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2
*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c
^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2
)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I
/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2
)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b
+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}}{(bx^4 + a)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c + dx^4}}{x^2\,(a + bx^4)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/x**2/(b*x**4+a),x)
```

```
[Out] Integral(sqrt(c + d*x**4)/(x**2*(a + b*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}}{(bx^4 + a)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^2), x)
```

3.631 $\int \frac{\sqrt{c+dx^4}}{x^4(a+bx^4)}\,dx$

Optimal. Leaf size=703

$$-\frac{(bc-ad)\tan^{-1}\left(\frac{x\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4a^2\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{(bc-ad)\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4a^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$-\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)(bc-ad)\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}$$
$$-\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}$$
$$-\frac{d^{3/4}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}(2bc-ad)F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{3a\sqrt[4]{c}\sqrt{c+dx^4}(ad+bc)}-\frac{\sqrt{c+dx^4}}{3ax^3}$$

```
[Out] -Sqrt[c + d*x^4]/(3*a*x^3) - ((b*c - a*d)*ArcTan[(Sqrt[(Sqrt[-a]*
((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]])/(4*a^2*Sqrt[-((b*c -
 a*d)/(Sqrt[-a]*Sqrt[b]))]) - ((b*c - a*d)*ArcTan[(Sqrt[(b*c - a*
d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*a^2*Sqrt[(b*c - a*
d)/(Sqrt[-a]*Sqrt[b])]) - (d^(3/4)*(2*b*c - a*d)*(Sqrt[c] + Sqrt[
d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*A
rcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(3*a*c^(1/4)*(b*c + a*d)*Sqrt[c
 + d*x^4]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(S
qrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]
*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*S
qrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*
a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c +
 d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqr
t[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*E
llipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt
[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a^2
*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*
x^4])
```

Rubi [A] time = 1.94672, antiderivative size = 940, normalized size of antiderivative = 1.34, number

of steps used = 8, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{(bc-ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a^2\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{(bc-ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^4+c}}-\frac{\sqrt[4]{d}(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^4+c}}-\frac{d^{3/4}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{6a\sqrt[4]{c}\sqrt{dx^4+c}}-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}-\frac{\sqrt{dx^4+c}}{3ax^3}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[Sqrt[c + d*x^4]/(x^4*(a + b*x^4)),x]
```

```
[Out] -Sqrt[c + d*x^4]/(3*a*x^3) - ((b*c - a*d)*ArcTan[(Sqrt[(Sqrt[-a]*
((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]])/(4*a^2*Sqrt[-((b*c -
 a*d)/(Sqrt[-a]*Sqrt[b]))]) - ((b*c - a*d)*ArcTan[(Sqrt[(b*c - a*
d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*a^2*Sqrt[(b*c - a*
d)/(Sqrt[-a]*Sqrt[b])]) - (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(
c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)
*x)/c^(1/4)], 1/2])/(6*a*c^(1/4)*Sqrt[c + d*x^4]) + (d^(1/4)*(b*c
 - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[
d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*a*c^
(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqrt[c + d*x^4]) - (
d^(1/4)*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqr
t[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1
/2])/(4*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*Sqrt[c +
 d*x^4]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqr
t[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*E
llipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqr
t[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a^
2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d
*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*(Sqrt[
c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ell
ipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b
]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a^2*c
^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^
4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/x**4/(b*x**4+a),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.498542, size = 344, normalized size = 0.49

$$\frac{\frac{25cx^4(3bc-2ad)F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)\left(2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}+\frac{9bcdx^8F_1}{(a+bx^4)\left(2x^4\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+a\right.\right.}}{15x^3\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^4]/(x^4*(a + b*x^4)),x]
```

```
[Out] ((-5*(c + d*x^4))/a + (25*c*(3*b*c - 2*a*d)*x^4*AppellF1[1/4, 1/2
, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)])/((a + b*x^4)*(-5*a*c*Appel
lF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*
AppellF1[5/4, 1/2, 2, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*Appe
llF1[5/4, 3/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)]))) + (9*b*c*d*
x^8*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)])/((a +
 b*x^4)*(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4
)/a)] + 2*x^4*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^4)/c), -(
(b*x^4)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/c), -((b*
x^4)/a)]))))/(15*x^3*Sqrt[c + d*x^4])
```

Maple [C] time = 0.023, size = 370, normalized size = 0.5

$$\frac{1}{a}\left(-\frac{1}{3x^3}\sqrt{dx^4+c}+\frac{2d}{3}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}\right)$$
$$-\frac{b}{a}\left(\frac{d}{b}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}-\frac{1}{8b^2}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{ad-bc}{\_alpha^3}\left(-1\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/x^4/(b*x^4+a),x)
```

```
[Out] 1/a*(-1/3/x^3*(d*x^4+c)^(1/2)+2/3*d/(I/c^(1/2)*d^(1/2))^(1/2)*(1-
I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x
^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I))-b/a*(1/b*d/
(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^
(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d
^(1/2))^(1/2),I)-1/8/b^2*sum((a*d-b*c)/_alpha^3*(-1/((-a*d+b*c)/b
)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(
d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(
1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)
^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_
alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))
),_alpha=RootOf(_Z^4*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}}{(bx^4+a)x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^4),x, algorithm="maxima")

[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^4), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^4),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c + dx^4}}{x^4 \left(a + bx^4\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/x**4/(b*x**4+a),x)

[Out] Integral(sqrt(c + d*x**4)/(x**4*(a + b*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}}{(bx^4 + a)x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^4),x, algorithm="giac")

[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*x^4), x)
```

3.632 $\int \frac{(ex)^{3/2}\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=71

$$\frac{2(ex)^{5/2}\sqrt{c+dx^4}F_1\left(\frac{5}{8};1,-\frac{1}{2};\frac{13}{8};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{5ae\sqrt{\frac{dx^4}{c}+1}}$$

```
[Out] (2*(e*x)^(5/2)*Sqrt[c + d*x^4]*AppellF1[5/8, 1, -1/2, 13/8, -((b*
x^4)/a), -((d*x^4)/c)])/(5*a*e*Sqrt[1 + (d*x^4)/c])
```

Rubi [A] time = 0.381679, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.107$

$$\frac{2(ex)^{5/2}\sqrt{c+dx^4}F_1\left(\frac{5}{8};1,-\frac{1}{2};\frac{13}{8};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{5ae\sqrt{\frac{dx^4}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^(3/2)*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (2*(e*x)^(5/2)*Sqrt[c + d*x^4]*AppellF1[5/8, 1, -1/2, 13/8, -((b*
x^4)/a), -((d*x^4)/c)])/(5*a*e*Sqrt[1 + (d*x^4)/c])
```

Rubi in Sympy [A] time = 43.8723, size = 58, normalized size = 0.82

$$\frac{2\,(ex)^{\frac{5}{2}}\,\sqrt{c+dx^4}\,\mathrm{appellf_1}\left(\frac{5}{8},-\frac{1}{2},1,\frac{13}{8},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{5ae\sqrt{1+\frac{dx^4}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(3/2)*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] 2*(e*x)**(5/2)*sqrt(c + d*x**4)*appellf1(5/8, -1/2, 1, 13/8, -d*x
**4/c, -b*x**4/a)/(5*a*e*sqrt(1 + d*x**4/c))
```

Mathematica [B] time = 0.260022, size = 170, normalized size = 2.39

$$\frac{26acx(ex)^{3/2}\sqrt{c+dx^4}F_1\left(\frac{5}{8};-\frac{1}{2},1;\frac{13}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{5\,(a+bx^4)\left(4x^4\left(adF_1\left(\frac{13}{8};\frac{1}{2},1;\frac{21}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)-2bcF_1\left(\frac{13}{8};-\frac{1}{2},2;\frac{21}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)+13acF_1\left(\frac{5}{8};-\frac{1}{2},1;\frac{13}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((e*x)^(3/2)*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (26*a*c*x*(e*x)^(3/2)*Sqrt[c + d*x^4]*AppellF1[5/8, -1/2, 1, 13/8
, -((d*x^4)/c), -((b*x^4)/a)])/(5*(a + b*x^4)*(13*a*c*AppellF1[5/
8, -1/2, 1, 13/8, -((d*x^4)/c), -((b*x^4)/a)] + 4*x^4*(-2*b*c*App
ellF1[13/8, -1/2, 2, 21/8, -((d*x^4)/c), -((b*x^4)/a)] + a*d*Appe
llF1[13/8, 1/2, 1, 21/8, -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [F] time = 0.076, size = 0, normalized size = 0.

$$\int \frac{1}{b x^{4}+a} (e x)^{\frac{3}{2}} \sqrt{d x^{4}+c}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(3/2)*(d*x^4+c)^(1/2)/(b*x^4+a),x)

[Out] int((e*x)^(3/2)*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{d x^{4}+c}\, (e x)^{\frac{3}{2}}}{b x^{4}+a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*(e*x)^(3/2)/(b*x^4 + a),x, algorithm="maxima")

[Out] integrate(sqrt(d*x^4 + c)*(e*x)^(3/2)/(b*x^4 + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{d x^{4}+c} \sqrt{e x} e x}{b x^{4}+a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*(e*x)^(3/2)/(b*x^4 + a),x, algorithm="fricas")

[Out] integral(sqrt(d*x^4 + c)*sqrt(e*x)*e*x/(b*x^4 + a), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(e x)^{\frac{3}{2}} \sqrt{c+d x^{4}}}{a+b x^{4}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(3/2)*(d*x**4+c)**(1/2)/(b*x**4+a),x)

[Out] Integral((e*x)**(3/2)*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{d x^{4}+c}\, (e x)^{\frac{3}{2}}}{b x^{4}+a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)*(e*x)^(3/2)/(b*x^4 + a),x, algorithm="giac")

[Out] integrate(sqrt(d*x^4 + c)*(e*x)^(3/2)/(b*x^4 + a), x)
```

3.633 $\int \frac{\sqrt{ex}\sqrt{c+dx^4}}{a+bx^4}\,dx$

Optimal. Leaf size=71

$$\frac{2(ex)^{3/2}\sqrt{c+dx^4}F_1\left(\frac{3}{8};1,-\frac{1}{2};\frac{11}{8};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{3ae\sqrt{\frac{dx^4}{c}+1}}$$

```
[Out] (2*(e*x)^(3/2)*Sqrt[c + d*x^4]*AppellF1[3/8, 1, -1/2, 11/8, -((b*
x^4)/a), -((d*x^4)/c)])/(3*a*e*Sqrt[1 + (d*x^4)/c])
```

Rubi [A] time = 0.387444, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.107$

$$\frac{2(ex)^{3/2}\sqrt{c+dx^4}F_1\left(\frac{3}{8};1,-\frac{1}{2};\frac{11}{8};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{3ae\sqrt{\frac{dx^4}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[e*x]*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (2*(e*x)^(3/2)*Sqrt[c + d*x^4]*AppellF1[3/8, 1, -1/2, 11/8, -((b*
x^4)/a), -((d*x^4)/c)])/(3*a*e*Sqrt[1 + (d*x^4)/c])
```

Rubi in Sympy [A] time = 44.2358, size = 58, normalized size = 0.82

$$\frac{2\,(ex)^{\frac{3}{2}}\,\sqrt{c+dx^4}\,\mathrm{appellf_1}\left(\frac{3}{8},-\frac{1}{2},1,\frac{11}{8},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{3ae\sqrt{1+\frac{dx^4}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**(1/2)*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] 2*(e*x)**(3/2)*sqrt(c + d*x**4)*appellf1(3/8, -1/2, 1, 11/8, -d*x
**4/c, -b*x**4/a)/(3*a*e*sqrt(1 + d*x**4/c))
```

Mathematica [B] time = 0.258733, size = 170, normalized size = 2.39

$$\frac{22acx\sqrt{ex}\sqrt{c+dx^4}F_1\left(\frac{3}{8};-\frac{1}{2},1;\frac{11}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{3\left(a+bx^4\right)\left(4x^4\left(adF_1\left(\frac{11}{8};\frac{1}{2},1;\frac{19}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)-2bcF_1\left(\frac{11}{8};-\frac{1}{2},2;\frac{19}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)+11acF_1\left(\frac{3}{8};-\frac{1}{2},1;\frac{11}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[e*x]*Sqrt[c + d*x^4])/(a + b*x^4),x]
```

```
[Out] (22*a*c*x*Sqrt[e*x]*Sqrt[c + d*x^4]*AppellF1[3/8, -1/2, 1, 11/8,
-((d*x^4)/c), -((b*x^4)/a)])/(3*(a + b*x^4)*(11*a*c*AppellF1[3/8,
 -1/2, 1, 11/8, -((d*x^4)/c), -((b*x^4)/a)] + 4*x^4*(-2*b*c*Appel
lF1[11/8, -1/2, 2, 19/8, -((d*x^4)/c), -((b*x^4)/a)] + a*d*Appell
F1[11/8, 1/2, 1, 19/8, -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [F] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{1}{bx^4 + a}\sqrt{ex}\sqrt{dx^4 + c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^(1/2)*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

```
[Out] int((e*x)^(1/2)*(d*x^4+c)^(1/2)/(b*x^4+a),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}\sqrt{ex}}{bx^4 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^4 + c)*sqrt(e*x)/(b*x^4 + a),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)*sqrt(e*x)/(b*x^4 + a), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^4 + c)*sqrt(e*x)/(b*x^4 + a),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ex}\sqrt{c + dx^4}}{a + bx^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**(1/2)*(d*x**4+c)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(sqrt(e*x)*sqrt(c + d*x**4)/(a + b*x**4), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4 + c}\sqrt{ex}}{bx^4 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(d*x^4 + c)*sqrt(e*x)/(b*x^4 + a),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^4 + c)*sqrt(e*x)/(b*x^4 + a), x)
```

3.634 $\int \frac{\sqrt{c+dx^4}}{\sqrt{ex}(a+bx^4)}\,dx$

Optimal. Leaf size=69

$$\frac{2\sqrt{ex}\sqrt{c+dx^4}F_1\left(\frac{1}{8};1,-\frac{1}{2};\frac{9}{8};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ae\sqrt{\frac{dx^4}{c}+1}}$$

```
[Out] (2*Sqrt[e*x]*Sqrt[c + d*x^4]*AppellF1[1/8, 1, -1/2, 9/8, -((b*x^4
)/a), -((d*x^4)/c)])/(a*e*Sqrt[1 + (d*x^4)/c])
```

Rubi [A] time = 0.223926, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.107$

$$\frac{2\sqrt{ex}\sqrt{c+dx^4}F_1\left(\frac{1}{8};1,-\frac{1}{2};\frac{9}{8};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ae\sqrt{\frac{dx^4}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^4]/(Sqrt[e*x]*(a + b*x^4)),x]
```

```
[Out] (2*Sqrt[e*x]*Sqrt[c + d*x^4]*AppellF1[1/8, 1, -1/2, 9/8, -((b*x^4
)/a), -((d*x^4)/c)])/(a*e*Sqrt[1 + (d*x^4)/c])
```

Rubi in Sympy [A] time = 50.2075, size = 56, normalized size = 0.81

$$\frac{2\sqrt{ex}\sqrt{c+dx^4}\,\operatorname{appellf_1}\left(\frac{1}{8},-\frac{1}{2},1,\frac{9}{8},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{ae\sqrt{1+\frac{dx^4}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/(e*x)**(1/2)/(b*x**4+a),x)
```

```
[Out] 2*sqrt(e*x)*sqrt(c + d*x**4)*appellf1(1/8, -1/2, 1, 9/8, -d*x**4/
c, -b*x**4/a)/(a*e*sqrt(1 + d*x**4/c))
```

Mathematica [B] time = 0.263671, size = 168, normalized size = 2.43

$$\frac{18acx\sqrt{c+dx^4}F_1\left(\frac{1}{8};-\frac{1}{2},1;\frac{9}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{\sqrt{ex}\left(a+bx^4\right)\left(4x^4\left(adF_1\left(\frac{9}{8};\frac{1}{2},1;\frac{17}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)-2bcF_1\left(\frac{9}{8};-\frac{1}{2},2;\frac{17}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)+9acF_1\left(\frac{1}{8};-\frac{1}{2},1;\frac{9}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^4]/(Sqrt[e*x]*(a + b*x^4)),x]
```

```
[Out] (18*a*c*x*Sqrt[c + d*x^4]*AppellF1[1/8, -1/2, 1, 9/8, -((d*x^4)/c
), -((b*x^4)/a)])/(Sqrt[e*x]*(a + b*x^4)*(9*a*c*AppellF1[1/8, -1/
2, 1, 9/8, -((d*x^4)/c), -((b*x^4)/a)] + 4*x^4*(-2*b*c*AppellF1[9
/8, -1/2, 2, 17/8, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[9/8
, 1/2, 1, 17/8, -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [F] time = 0.078, size = 0, normalized size = 0.

$$\int \frac{1}{bx^4+a}\sqrt{dx^4+c}\,\frac{1}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/(e*x)^(1/2)/(b*x^4+a),x)
```

```
[Out] int((d*x^4+c)^(1/2)/(e*x)^(1/2)/(b*x^4+a),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}}{(bx^4+a)\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*sqrt(e*x)),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*sqrt(e*x)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*sqrt(e*x)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^4}}{\sqrt{ex}\,(a+bx^4)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/(e*x)**(1/2)/(b*x**4+a),x)
```

```
[Out] Integral(sqrt(c + d*x**4)/(sqrt(e*x)*(a + b*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}}{(bx^4+a)\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*sqrt(e*x)),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*sqrt(e*x)), x)
```

3.635 $\int \frac{\sqrt{c+dx^4}}{(ex)^{3/2}(a+bx^4)}\,dx$

Optimal. Leaf size=69

$$-\frac{2\sqrt{c+dx^4}F_1\left(-\frac{1}{8};1,-\frac{1}{2};\frac{7}{8};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ae\sqrt{ex}\sqrt{\frac{dx^4}{c}+1}}$$

```
[Out] (-2*Sqrt[c + d*x^4]*AppellF1[-1/8, 1, -1/2, 7/8, -((b*x^4)/a), -(
(d*x^4)/c)])/(a*e*Sqrt[e*x]*Sqrt[1 + (d*x^4)/c])
```

Rubi [A] time = 0.390963, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107

$$-\frac{2\sqrt{c+dx^4}F_1\left(-\frac{1}{8};1,-\frac{1}{2};\frac{7}{8};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ae\sqrt{ex}\sqrt{\frac{dx^4}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d*x^4]/((e*x)^(3/2)*(a + b*x^4)),x]
```

```
[Out] (-2*Sqrt[c + d*x^4]*AppellF1[-1/8, 1, -1/2, 7/8, -((b*x^4)/a), -(
(d*x^4)/c)])/(a*e*Sqrt[e*x]*Sqrt[1 + (d*x^4)/c])
```

Rubi in Sympy [A] time = 45.4652, size = 60, normalized size = 0.87

$$-\frac{2\sqrt{c+dx^4}\,\mathrm{appellf}_1\left(-\frac{1}{8},-\frac{1}{2},1,\frac{7}{8},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{ae\sqrt{ex}\sqrt{1+\frac{dx^4}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((d*x**4+c)**(1/2)/(e*x)**(3/2)/(b*x**4+a),x)
```

```
[Out] -2*sqrt(c + d*x**4)*appellf1(-1/8, -1/2, 1, 7/8, -d*x**4/c, -b*x*
*4/a)/(a*e*sqrt(e*x)*sqrt(1 + d*x**4/c))
```

Mathematica [B] time = 1.00336, size = 348, normalized size = 5.04

$$\frac{2x\left(\frac{75cx^4(bc-4ad)F_1\left(\frac{7}{8};\frac{1}{2},1;\frac{15}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)\left(4x^4\left(2bcF_1\left(\frac{15}{8};\frac{1}{2},2;\frac{23}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{15}{8};\frac{3}{2},1;\frac{23}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-15acF_1\left(\frac{7}{8};\frac{1}{2},1;\frac{15}{8};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}-\frac{\ldots}{(a+bx^4)\left(4x^4\left(2bcF_1\left(\frac{23}{8};\frac{1}{2},2;\frac{31}{8};-\frac{dx^4}{c}\ldots\right.\right.\right.}\right.}{35(ex)^{3/2}\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[c + d*x^4]/((e*x)^(3/2)*(a + b*x^4)),x]
```

```
[Out] (2*x*((-35*(c + d*x^4))/a + (75*c*(b*c - 4*a*d)*x^4*AppellF1[7/8,
 1/2, 1, 15/8, -((d*x^4)/c), -((b*x^4)/a)])/((a + b*x^4)*(-15*a*c
*AppellF1[7/8, 1/2, 1, 15/8, -((d*x^4)/c), -((b*x^4)/a)] + 4*x^4*
(2*b*c*AppellF1[15/8, 1/2, 2, 23/8, -((d*x^4)/c), -((b*x^4)/a)] +
 a*d*AppellF1[15/8, 3/2, 1, 23/8, -((d*x^4)/c), -((b*x^4)/a)])))
- (161*b*c*d*x^8*AppellF1[15/8, 1/2, 1, 23/8, -((d*x^4)/c), -((b*
x^4)/a)])/((a + b*x^4)*(-23*a*c*AppellF1[15/8, 1/2, 1, 23/8, -((d
```

```
*x^4)/c), -((b*x^4)/a)] + 4*x^4*(2*b*c*AppellF1[23/8, 1/2, 2, 31/
8, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[23/8, 3/2, 1, 31/8,
 -((d*x^4)/c), -((b*x^4)/a)])))))/(35*(e*x)^(3/2)*Sqrt[c + d*x^4]
)
```

Maple [F] time = 0.125, size = 0, normalized size = 0.

$$\int \frac{1}{bx^4+a}\sqrt{dx^4+c}\,(ex)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((d*x^4+c)^(1/2)/(e*x)^(3/2)/(b*x^4+a),x)

[Out] int((d*x^4+c)^(1/2)/(e*x)^(3/2)/(b*x^4+a),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}}{(bx^4+a)\,(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*(e*x)^(3/2)),x, algorithm="maxima")

[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*(e*x)^(3/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{dx^4+c}}{(bex^5+aex)\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*(e*x)^(3/2)),x, algorithm="fricas")

[Out] integral(sqrt(d*x^4 + c)/((b*e*x^5 + a*e*x)*sqrt(e*x)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+dx^4}}{(ex)^{\frac{3}{2}}\,(a+bx^4)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((d*x**4+c)**(1/2)/(e*x)**(3/2)/(b*x**4+a),x)

[Out] Integral(sqrt(c + d*x**4)/((e*x)**(3/2)*(a + b*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx^4+c}}{(bx^4+a)\,(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*(e*x)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x^4 + c)/((b*x^4 + a)*(e*x)^(3/2)), x)
```

3.636 $\int \frac{x^{11}}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=104

$$-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{5/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^4}(ad+bc)}{2b^2d^2}+\frac{\left(c+dx^4\right)^{3/2}}{6bd^2}$$

```
[Out] -((b*c + a*d)*Sqrt[c + d*x^4])/(2*b^2*d^2) + (c + d*x^4)^(3/2)/(6
*b*d^2) - (a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]]
)/(2*b^(5/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.285243, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{5/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^4}(ad+bc)}{2b^2d^2}+\frac{\left(c+dx^4\right)^{3/2}}{6bd^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -((b*c + a*d)*Sqrt[c + d*x^4])/(2*b^2*d^2) + (c + d*x^4)^(3/2)/(6
*b*d^2) - (a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]]
)/(2*b^(5/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 30.4491, size = 88, normalized size = 0.85

$$\frac{a^2\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2b^{\frac{5}{2}}\sqrt{ad-bc}}+\frac{\left(c+dx^4\right)^{\frac{3}{2}}}{6bd^2}-\frac{\sqrt{c+dx^4}\,(ad+bc)}{2b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] a**2*atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(2*b**(5/2)*s
qrt(a*d - b*c)) + (c + d*x**4)**(3/2)/(6*b*d**2) - sqrt(c + d*x**
4)*(a*d + b*c)/(2*b**2*d**2)
```

Mathematica [A] time = 0.266707, size = 91, normalized size = 0.88

$$\frac{\sqrt{c+dx^4}\left(-3ad-2bc+bdx^4\right)}{6b^2d^2}-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{5/2}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (Sqrt[c + d*x^4]*(-2*b*c - 3*a*d + b*d*x^4))/(6*b^2*d^2) - (a^2*A
rcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(2*b^(5/2)*Sqr
t[b*c - a*d])
```

Maple [B] time = 0.035, size = 378, normalized size = 3.6

$$\frac{x^4}{6\,bd}\sqrt{dx^4+c}-\frac{c}{3\,bd^2}\sqrt{dx^4+c}-\frac{a}{2\,b^2d}\sqrt{dx^4+c}$$
$$-\frac{a^2}{4\,b^3}\ln\left(1\left(-2\,\frac{ad-bc}{b}+2\,\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2d+2\,\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-b}{b}}\right.\right.$$
$$-\frac{a^2}{4\,b^3}\ln\left(1\left(-2\,\frac{ad-bc}{b}-2\,\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2d-2\,\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-b}{b}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/6/b*(d*x^4+c)^(1/2)/d*x^4-1/3/b*(d*x^4+c)^(1/2)/d^2*c-1/2/b^2*a
/d*(d*x^4+c)^(1/2)-1/4*a^2/b^3/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b
*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^
(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a
*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/4*a^2/b^
3/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2
+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))
^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)
)/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.239126, size = 1, normalized size = 0.01

$$\left[\frac{3\,a^2d^2\log\left(\frac{(bdx^4+2\,bc-ad)\sqrt{b^2c-abd}-2\,\sqrt{dx^4+c}(b^2c-abd)}{bx^4+a}\right)+2\,(bdx^4-2\,bc-3\,ad)\sqrt{dx^4+c}\sqrt{b^2c-abd}}{12\,\sqrt{b^2c-abd}b^2d^2},\right.$$
$$\left.-\frac{3\,a^2d^2\arctan\left(-\frac{bc-ad}{\sqrt{dx^4+c}\sqrt{-b^2c+abd}}\right)-(bdx^4-2\,bc-3\,ad)\sqrt{dx^4+c}\sqrt{-b^2c+abd}}{6\,\sqrt{-b^2c+abd}b^2d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/12*(3*a^2*d^2*log(((b*d*x^4 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d)
 - 2*sqrt(d*x^4 + c)*(b^2*c - a*b*d))/(b*x^4 + a)) + 2*(b*d*x^4 -
 2*b*c - 3*a*d)*sqrt(d*x^4 + c)*sqrt(b^2*c - a*b*d))/(sqrt(b^2*c
- a*b*d)*b^2*d^2), -1/6*(3*a^2*d^2*arctan(-(b*c - a*d)/(sqrt(d*x^
4 + c)*sqrt(-b^2*c + a*b*d))) - (b*d*x^4 - 2*b*c - 3*a*d)*sqrt(d*
x^4 + c)*sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^2*d^2)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{11}}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**11/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.21654, size = 143, normalized size = 1.38

$$\frac{a^2\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{2\sqrt{-b^2c+abd}b^2}+\frac{\left(dx^4+c\right)^{\frac{3}{2}}b^2d^4-3\sqrt{dx^4+c}b^2cd^4-3\sqrt{dx^4+c}abd^5}{6\,b^3d^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] 1/2*a^2*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2
*c + a*b*d)*b^2) + 1/6*((d*x^4 + c)^(3/2)*b^2*d^4 - 3*sqrt(d*x^4
+ c)*b^2*c*d^4 - 3*sqrt(d*x^4 + c)*a*b*d^5)/(b^3*d^6)
```

3.637 $\int \frac{x^7}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=74

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^4}}{2bd}$$

```
[Out] Sqrt[c + d*x^4]/(2*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sq
rt[b*c - a*d]])/(2*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.182875, antiderivative size = 74, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^4}}{2bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] Sqrt[c + d*x^4]/(2*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sq
rt[b*c - a*d]])/(2*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 19.331, size = 60, normalized size = 0.81

$$-\frac{a\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2b^{\frac{3}{2}}\sqrt{ad-bc}}+\frac{\sqrt{c+dx^4}}{2bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -a*atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(2*b**(3/2)*sqr
t(a*d - b*c)) + sqrt(c + d*x**4)/(2*b*d)
```

Mathematica [A] time = 0.0898224, size = 74, normalized size = 1.

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^4}}{2bd}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] Sqrt[c + d*x^4]/(2*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sq
rt[b*c - a*d]])/(2*b^(3/2)*Sqrt[b*c - a*d])
```

Maple [B] time = 0.012, size = 335, normalized size = 4.5

$$\frac{1}{2bd}\sqrt{dx^4+c} + \frac{a}{4b^2}\ln\left(1\left(-2\frac{ad-bc}{b}+2\frac{\sqrt{-abd}}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2 d+2\frac{\sqrt{-abd}}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}} \right. \right. + \frac{a}{4b^2}\ln\left(1\left(-2\frac{ad-bc}{b}-2\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2 d-2\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}} \right. \right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/2*(d*x^4+c)^(1/2)/b/d+1/4*a/b^2/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*
d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/
b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*
(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))+1/4*a/b
^2/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^
2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2)
)^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2
))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.250947, size = 1, normalized size = 0.01

$$\left[\frac{ad\log\left(\frac{(bdx^4+2bc-ad)\sqrt{b^2c-abd}+2\sqrt{dx^4+c}(b^2c-abd)}{bx^4+a}\right)+2\sqrt{dx^4+c}\sqrt{b^2c-abd}}{4\sqrt{b^2c-abd}bd}, \frac{ad\arctan\left(-\frac{bc-ad}{\sqrt{dx^4+c}\sqrt{-b^2c+abd}}\right)+\sqrt{dx^4+c}\sqrt{-b^2c+abd}}{2\sqrt{-b^2c+abd}bd}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/4*(a*d*log(((b*d*x^4 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) + 2*sq
rt(d*x^4 + c)*(b^2*c - a*b*d))/(b*x^4 + a)) + 2*sqrt(d*x^4 + c)*s
qrt(b^2*c - a*b*d))/(sqrt(b^2*c - a*b*d)*b*d), 1/2*(a*d*arctan(-(
b*c - a*d)/(sqrt(d*x^4 + c)*sqrt(-b^2*c + a*b*d))) + sqrt(d*x^4 +
 c)*sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**7/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.212602, size = 86, normalized size = 1.16

$$-\frac{\frac{ad\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}b}-\frac{\sqrt{dx^4+c}}{b}}{2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -1/2*(a*d*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*b) - sqrt(d*x^4 + c)/b)/d
```

3.638 $\int \frac{x^3}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=51

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2\sqrt{b}\sqrt{bc-ad}}$$

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]]/(2*Sqrt[b]*Sq
rt[b*c - a*d])
```

Rubi [A] time = 0.131971, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2\sqrt{b}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]]/(2*Sqrt[b]*Sq
rt[b*c - a*d])
```

Rubi in Sympy [A] time = 15.0644, size = 42, normalized size = 0.82

$$\frac{\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2\sqrt{b}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(2*sqrt(b)*sqrt(a*
d - b*c))
```

Mathematica [A] time = 0.0404209, size = 51, normalized size = 1.

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2\sqrt{b}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]]/(2*Sqrt[b]*Sq
rt[b*c - a*d])
```

Maple [B] time = 0.009, size = 316, normalized size = 6.2

$$-\frac{1}{4b}\ln\left(1\left(-2\frac{ad-bc}{b}+2\frac{\sqrt{-ab}\,d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2 d+2\frac{\sqrt{-ab}\,d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right.\right.$$

$$-\frac{1}{4b}\ln\left(1\left(-2\frac{ad-bc}{b}-2\frac{\sqrt{-ab}\,d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2 d-2\frac{\sqrt{-ab}\,d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/4/b/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b
*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(
1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^
(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/4/b/(-(a*d-b*c)/b)^(1/2)*ln((-2*
(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*
c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1
/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.239609, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(\frac{(bdx^4+2bc-ad)\sqrt{b^2c-abd}-2\sqrt{dx^4+c}\,(b^2c-abd)}{bx^4+a}\right)}{4\sqrt{b^2c-abd}},\ -\frac{\arctan\left(-\frac{bc-ad}{\sqrt{dx^4+c}\sqrt{-b^2c+abd}}\right)}{2\sqrt{-b^2c+abd}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/4*log(((b*d*x^4 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*
x^4 + c)*(b^2*c - a*b*d))/(b*x^4 + a))/sqrt(b^2*c - a*b*d), -1/2*
arctan(-(b*c - a*d)/(sqrt(d*x^4 + c)*sqrt(-b^2*c + a*b*d)))/sqrt(
-b^2*c + a*b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^3}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**3/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.211, size = 54, normalized size = 1.06

$$\frac{\arctan\left(\frac{\sqrt{dx^4+c}\,b}{\sqrt{-b^2c+abd}}\right)}{2\sqrt{-b^2c+abd}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] 1/2*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c + a*b*d))/sqrt(-b^2*c +
a*b*d)
```

3.639 $\int \frac{1}{x(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=85

$$\frac{\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2a\sqrt{bc-ad}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a\sqrt{c}}$$

```
[Out] -ArcTanh[Sqrt[c + d*x^4]/Sqrt[c]]/(2*a*Sqrt[c]) + (Sqrt[b]*ArcTan
h[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(2*a*Sqrt[b*c - a*d
])
```

Rubi [A] time = 0.208555, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2a\sqrt{bc-ad}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -ArcTanh[Sqrt[c + d*x^4]/Sqrt[c]]/(2*a*Sqrt[c]) + (Sqrt[b]*ArcTan
h[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(2*a*Sqrt[b*c - a*d
])
```

Rubi in Sympy [A] time = 22.4942, size = 71, normalized size = 0.84

$$-\frac{\sqrt{b}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2a\sqrt{ad-bc}}-\frac{\mathrm{atanh}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -sqrt(b)*atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(2*a*sqrt
(a*d - b*c)) - atanh(sqrt(c + d*x**4)/sqrt(c))/(2*a*sqrt(c))
```

Mathematica [C] time = 0.0764951, size = 162, normalized size = 1.91

$$\frac{5bdx^4F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)}{6\left(a+bx^4\right)\sqrt{c+dx^4}\left(-5bdx^4F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (5*b*d*x^4*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^4)), -(a/(b*x^4))]
)/(6*(a + b*x^4)*Sqrt[c + d*x^4]*(-5*b*d*x^4*AppellF1[3/2, 1/2, 1
, 5/2, -(c/(d*x^4)), -(a/(b*x^4))] + 2*a*d*AppellF1[5/2, 1/2, 2,
7/2, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*AppellF1[5/2, 3/2, 1, 7/2,
 -(c/(d*x^4)), -(a/(b*x^4))]))
```

Maple [B] time = 0.021, size = 347, normalized size = 4.1

$$-\frac{1}{2a}\ln\left(\frac{1}{x^2}\left(2c+2\sqrt{c}\sqrt{dx^4+c}\right)\right)\frac{1}{\sqrt{c}} + \frac{1}{4a}\ln\left(1\left(-2\frac{ad-bc}{b}+2\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2d+2\frac{\sqrt{-abd}}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right.\right. + \frac{1}{4a}\ln\left(1\left(-2\frac{ad-bc}{b}-2\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2d-2\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/2/a/c^(1/2)*ln((2*c+2*c^(1/2)*(d*x^4+c)^(1/2))/x^2)+1/4/a/(-(a
*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(
-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2
*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2
-1/b*(-a*b)^(1/2)))+1/4/a/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b
-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)
*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(
1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)\sqrt{dx^4+c}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x), x)
```

Fricas [A] time = 0.26572, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{c}\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^4+2bc-ad+2\sqrt{dx^4+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^4+a}\right)+\log\left(\frac{(dx^4+2c)\sqrt{c}-2\sqrt{dx^4+c}c}{x^4}\right)}{4a\sqrt{c}}, \frac{2\sqrt{c}\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^4+c}b}\right)\cdots}{4a\sqrt{c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/4*(sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^4 + 2*b*c - a*d + 2*
sqrt(d*x^4 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^4 + a)) + l
og(((d*x^4 + 2*c)*sqrt(c) - 2*sqrt(d*x^4 + c)*c)/x^4))/(a*sqrt(c)
), 1/4*(2*sqrt(c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-
b/(b*c - a*d))/(sqrt(d*x^4 + c)*b)) + log(((d*x^4 + 2*c)*sqrt(c)
- 2*sqrt(d*x^4 + c)*c)/x^4))/(a*sqrt(c)), 1/4*(sqrt(-c)*sqrt(b/(b
*c - a*d))*log((b*d*x^4 + 2*b*c - a*d + 2*sqrt(d*x^4 + c)*(b*c -
a*d)*sqrt(b/(b*c - a*d)))/(b*x^4 + a)) + 2*arctan(c/(sqrt(d*x^4 +
 c)*sqrt(-c))))/(a*sqrt(-c)), 1/2*(sqrt(-c)*sqrt(-b/(b*c - a*d))*
arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^4 + c)*b)) + a
rctan(c/(sqrt(d*x^4 + c)*sqrt(-c))))/(a*sqrt(-c))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+bx^{4}\right)\sqrt{c+dx^{4}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(1/(x*(a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.21277, size = 107, normalized size = 1.26

$$-\frac{1}{2}\,d\left(\frac{b\arctan\left(\frac{\sqrt{dx^{4}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{\sqrt{-b^{2}c+abd}ad}-\frac{\arctan\left(\frac{\sqrt{dx^{4}+c}}{\sqrt{-c}}\right)}{a\sqrt{-c}d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x),x, algorithm="giac")
```

```
[Out] -1/2*d*(b*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*a*d) - arctan(sqrt(d*x^4 + c)/sqrt(-c))/(a*sqrt(-c)
*d))
```

3.640 $\int \frac{1}{x^5(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=117

$$-\frac{b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2a^2\sqrt{bc-ad}}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{4a^2c^{3/2}}-\frac{\sqrt{c+dx^4}}{4acx^4}$$

```
[Out] -Sqrt[c + d*x^4]/(4*a*c*x^4) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d*
x^4]/Sqrt[c]])/(4*a^2*c^(3/2)) - (b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^4])/Sqrt[b*c - a*d]])/(2*a^2*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.354658, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{2a^2\sqrt{bc-ad}}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{4a^2c^{3/2}}-\frac{\sqrt{c+dx^4}}{4acx^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -Sqrt[c + d*x^4]/(4*a*c*x^4) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d*
x^4]/Sqrt[c]])/(4*a^2*c^(3/2)) - (b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^4])/Sqrt[b*c - a*d]])/(2*a^2*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 43.99, size = 100, normalized size = 0.85

$$-\frac{\sqrt{c+dx^4}}{4acx^4}+\frac{b^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2a^2\sqrt{ad-bc}}+\frac{\left(\frac{ad}{2}+bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a^2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**4)/(4*a*c*x**4) + b**(3/2)*atan(sqrt(b)*sqrt(c + d
*x**4)/sqrt(a*d - b*c))/(2*a**2*sqrt(a*d - b*c)) + (a*d/2 + b*c)*
atanh(sqrt(c + d*x**4)/sqrt(c))/(2*a**2*c**(3/2))
```

Mathematica [C] time = 0.548571, size = 409, normalized size = 3.5

$$\frac{\frac{6bdx^8F_1\left(1;\frac{1}{2},1;2;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{x^4\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{5bdx^4\left(3ac+2adx^4+bcx^4+3bdx^8\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)-}{ac\left(-5bdx^4F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+2}}{12x^4\left(a+bx^4\right)\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] ((6*b*d*x^8*AppellF1[1, 1/2, 1, 2, -((d*x^4)/c), -((b*x^4)/a)])/(
-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^4)/c), -((b*x^4)/a)] + x^4*(
2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^4)/c), -((b*x^4)/a)] + a*d*Ap
pellF1[2, 3/2, 1, 3, -((d*x^4)/c), -((b*x^4)/a)])) + (5*b*d*x^4*(
3*a*c + b*c*x^4 + 2*a*d*x^4 + 3*b*d*x^8)*AppellF1[3/2, 1/2, 1, 5/
2, -(c/(d*x^4)), -(a/(b*x^4))] - 3*(a + b*x^4)*(c + d*x^4)*(2*a*d
```

```
*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*App
ellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^4)), -(a/(b*x^4))]))/(a*c*(-5*b*
d*x^4*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^4)), -(a/(b*x^4))] + 2*
a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*
AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^4)), -(a/(b*x^4))])))/(12*x^4
*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [B] time = 0.023, size = 402, normalized size = 3.4

$$-\frac{1}{4\,acx^4}\sqrt{dx^4+c}+\frac{d}{4\,a}\ln\left(\frac{1}{x^2}\left(2\,c+2\,\sqrt{c}\sqrt{dx^4+c}\right)\right)c^{-\frac{3}{2}}$$
$$-\frac{b}{4\,a^2}\ln\left(1\left(-2\,\frac{ad-bc}{b}+2\,\frac{\sqrt{-abd}}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\,\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2d+2\,\frac{\sqrt{-abd}}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-b}{b}}\right.\right.$$
$$-\frac{b}{4\,a^2}\ln\left(1\left(-2\,\frac{ad-bc}{b}-2\,\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\,\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2d-2\,\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-b}{b}}\right.\right.$$
$$+\frac{b}{2\,a^2}\ln\left(\frac{1}{x^2}\left(2\,c+2\,\sqrt{c}\sqrt{dx^4+c}\right)\right)\frac{1}{\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/4*(d*x^4+c)^(1/2)/a/c/x^4+1/4/a*d/c^(3/2)*ln((2*c+2*c^(1/2)*(d
*x^4+c)^(1/2))/x^2)-1/4/a^2*b/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*
c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(
1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*
b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/4/a^2*b/(
-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/
b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*
d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(
x^2+1/b*(-a*b)^(1/2)))+1/2*b/a^2/c^(1/2)*ln((2*c+2*c^(1/2)*(d*x^4
+c)^(1/2))/x^2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)\sqrt{dx^4+c}x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^5),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^5), x)
```

Fricas [A] time = 0.286413, size = 1, normalized size = 0.01

$$\left[\frac{2\,bc^{\frac{3}{2}}x^4\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^4+2\,bc-ad-2\,\sqrt{dx^4+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^4+a}\right)+(2\,bc+ad)x^4\log\left(\frac{(dx^4+2\,c)\sqrt{c}+2\,\sqrt{dx^4+c}c}{x^4}\right)-2\,\sqrt{dx^4+c}a\sqrt{c}}{8\,a^2c^{\frac{3}{2}}x^4},\right.$$

$$-\frac{4\,bc^{\frac{3}{2}}x^4\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^4+c}b}\right)-(2\,bc+ad)x^4\log\left(\frac{(dx^4+2\,c)\sqrt{c}+2\,\sqrt{dx^4+c}c}{x^4}\right)+2\,\sqrt{dx^4+c}a\sqrt{c}}{8\,a^2c^{\frac{3}{2}}x^4},\ \frac{b\sqrt{-c}cx^4\sqrt{\frac{b}{bc-ad}}\cdots}{\cdots}$$

$$\left.-\frac{2\,b\sqrt{-c}cx^4\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^4+c}b}\right)+(2\,bc+ad)x^4\arctan\left(\frac{c}{\sqrt{dx^4+c}\sqrt{-c}}\right)+\sqrt{dx^4+c}a\sqrt{-c}}{4\,a^2\sqrt{-c}cx^4}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^5),x, algorithm="fricas")
```

```
[Out] [1/8*(2*b*c^(3/2)*x^4*sqrt(b/(b*c - a*d))*log((b*d*x^4 + 2*b*c -
a*d - 2*sqrt(d*x^4 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^4 +
 a)) + (2*b*c + a*d)*x^4*log(((d*x^4 + 2*c)*sqrt(c) + 2*sqrt(d*x^
4 + c)*c)/x^4) - 2*sqrt(d*x^4 + c)*a*sqrt(c))/(a^2*c^(3/2)*x^4),
-1/8*(4*b*c^(3/2)*x^4*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sq
rt(-b/(b*c - a*d))/(sqrt(d*x^4 + c)*b)) - (2*b*c + a*d)*x^4*log((
(d*x^4 + 2*c)*sqrt(c) + 2*sqrt(d*x^4 + c)*c)/x^4) + 2*sqrt(d*x^4
+ c)*a*sqrt(c))/(a^2*c^(3/2)*x^4), 1/4*(b*sqrt(-c)*c*x^4*sqrt(b/(
b*c - a*d))*log((b*d*x^4 + 2*b*c - a*d - 2*sqrt(d*x^4 + c)*(b*c -
 a*d)*sqrt(b/(b*c - a*d)))/(b*x^4 + a)) - (2*b*c + a*d)*x^4*arcta
n(c/(sqrt(d*x^4 + c)*sqrt(-c))) - sqrt(d*x^4 + c)*a*sqrt(-c))/(a^
2*sqrt(-c)*c*x^4), -1/4*(2*b*sqrt(-c)*c*x^4*sqrt(-b/(b*c - a*d))*
arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^4 + c)*b)) + (
2*b*c + a*d)*x^4*arctan(c/(sqrt(d*x^4 + c)*sqrt(-c))) + sqrt(d*x^
4 + c)*a*sqrt(-c))/(a^2*sqrt(-c)*c*x^4)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^5\,(a+bx^4)\,\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(1/(x**5*(a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.219547, size = 159, normalized size = 1.36

$$\frac{1}{4}\,d^2\left(\frac{2\,b^2\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}a^2d^2}-\frac{(2\,bc+ad)\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}cd^2}-\frac{\sqrt{dx^4+c}}{acd^2x^4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^5),x, algorithm="giac")
```

```
[Out] 1/4*d^2*(2*b^2*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c + a*b*d))/(sq
rt(-b^2*c + a*b*d)*a^2*d^2) - (2*b*c + a*d)*arctan(sqrt(d*x^4 + c
)/sqrt(-c))/(a^2*sqrt(-c)*c*d^2) - sqrt(d*x^4 + c)/(a*c*d^2*x^4))
```

3.641 $\int \frac{x^9}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=123

$$\frac{a^{3/2}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b^2\sqrt{bc-ad}}-\frac{(2ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^2d^{3/2}}+\frac{x^2\sqrt{c+dx^4}}{4bd}$$

```
[Out] (x^2*Sqrt[c + d*x^4])/(4*b*d) + (a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*
x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(2*b^2*Sqrt[b*c - a*d]) - ((b*c
+ 2*a*d)*ArcTanh[(Sqrt[d]*x^2)/Sqrt[c + d*x^4]])/(4*b^2*d^(3/2))
```

Rubi [A] time = 0.393122, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$\frac{a^{3/2}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b^2\sqrt{bc-ad}}-\frac{(2ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^2d^{3/2}}+\frac{x^2\sqrt{c+dx^4}}{4bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^9/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (x^2*Sqrt[c + d*x^4])/(4*b*d) + (a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*
x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(2*b^2*Sqrt[b*c - a*d]) - ((b*c
+ 2*a*d)*ArcTanh[(Sqrt[d]*x^2)/Sqrt[c + d*x^4]])/(4*b^2*d^(3/2))
```

Rubi in Sympy [A] time = 45.6418, size = 107, normalized size = 0.87

$$\frac{a^{\frac{3}{2}}\operatorname{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b^2\sqrt{ad-bc}}+\frac{x^2\sqrt{c+dx^4}}{4bd}-\frac{(2ad+bc)\operatorname{atanh}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^2d^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**9/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] a**(3/2)*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**4)))/(
2*b**2*sqrt(a*d - b*c)) + x**2*sqrt(c + d*x**4)/(4*b*d) - (2*a*d
+ b*c)*atanh(sqrt(d)*x**2/sqrt(c + d*x**4))/(4*b**2*d**(3/2))
```

Mathematica [A] time = 0.217319, size = 118, normalized size = 0.96

$$\frac{\frac{2a^{3/2}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{\sqrt{bc-ad}}-\frac{(2ad+bc)\log\left(\sqrt{d}\sqrt{c+dx^4}+dx^2\right)}{d^{3/2}}+\frac{bx^2\sqrt{c+dx^4}}{d}}{4b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^9/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] ((b*x^2*Sqrt[c + d*x^4])/d + (2*a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*x
^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/Sqrt[b*c - a*d] - ((b*c + 2*a*d)*
Log[d*x^2 + Sqrt[d]*Sqrt[c + d*x^4]])/d^(3/2))/(4*b^2)
```

Maple [B] time = 0.037, size = 408, normalized size = 3.3

$$\frac{x^2}{4bd}\sqrt{dx^4+c}-\frac{c}{4b}\ln\left(x^2\sqrt{d}+\sqrt{dx^4+c}\right)d^{-\frac{3}{2}}-\frac{a}{2b^2}\ln\left(x^2\sqrt{d}+\sqrt{dx^4+c}\right)\frac{1}{\sqrt{d}}$$
$$-\frac{a^2}{4b^2}\ln\left(1\left(-2\frac{ad-bc}{b}+2\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2d+2\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-b}{b}}\right.\right.$$
$$+\frac{a^2}{4b^2}\ln\left(1\left(-2\frac{ad-bc}{b}-2\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2d-2\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^9/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/4*x^2*(d*x^4+c)^(1/2)/b/d-1/4/b*c/d^(3/2)*ln(x^2*d^(1/2)+(d*x^4
+c)^(1/2))-1/2/b^2*a*ln(x^2*d^(1/2)+(d*x^4+c)^(1/2))/d^(1/2)-1/4*
a^2/b^2/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*
(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^
2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))
-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))+1/4*a^2/b^2/(-a*b)^(
1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(
x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/
2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1
/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.362422, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/8*(2*sqrt(d*x^4 + c)*b*sqrt(d)*x^2 + a*d^(3/2)*sqrt(-a/(b*c -
a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 -
 4*a^2*c*d)*x^4 + a^2*c^2 + 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*
x^6 - (a*b*c^2 - a^2*c*d)*x^2)*sqrt(d*x^4 + c)*sqrt(-a/(b*c - a*d
)))/(b^2*x^8 + 2*a*b*x^4 + a^2)) + (b*c + 2*a*d)*log(2*sqrt(d*x^4
 + c)*d*x^2 - (2*d*x^4 + c)*sqrt(d)))/(b^2*d^(3/2)), 1/8*(2*sqrt(
d*x^4 + c)*b*sqrt(-d)*x^2 + a*sqrt(-d)*d*sqrt(-a/(b*c - a*d))*log
(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*
d)*x^4 + a^2*c^2 + 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^6 - (a*
b*c^2 - a^2*c*d)*x^2)*sqrt(d*x^4 + c)*sqrt(-a/(b*c - a*d)))/(b^2*
x^8 + 2*a*b*x^4 + a^2)) - 2*(b*c + 2*a*d)*arctan(sqrt(-d)*x^2/sqr
t(d*x^4 + c)))/(b^2*sqrt(-d)*d), 1/8*(2*sqrt(d*x^4 + c)*b*sqrt(d)
*x^2 + 2*a*d^(3/2)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*
x^4 - a*c)/(sqrt(d*x^4 + c)*(b*c - a*d)*x^2*sqrt(a/(b*c - a*d))))
 + (b*c + 2*a*d)*log(2*sqrt(d*x^4 + c)*d*x^2 - (2*d*x^4 + c)*sqrt
(d)))/(b^2*d^(3/2)), 1/4*(sqrt(d*x^4 + c)*b*sqrt(-d)*x^2 + a*sqrt
(-d)*d*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^4 - a*c)/(
```

```
sqrt(d*x^4 + c)*(b*c - a*d)*x^2*sqrt(a/(b*c - a*d)))) - (b*c + 2*
a*d)*arctan(sqrt(-d)*x^2/sqrt(d*x^4 + c)))/(b^2*sqrt(-d)*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^9}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**9/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.292656, size = 140, normalized size = 1.14

$$\frac{\sqrt{dx^4+c}\,x^2}{4\,bd} - \frac{a^2\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{2\sqrt{abc-a^2d}\,b^2} + \frac{(bc+2\,ad)\arctan\left(\frac{\sqrt{d+\frac{c}{x^4}}}{\sqrt{-d}}\right)}{4\,b^2\sqrt{-d}d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] 1/4*sqrt(d*x^4 + c)*x^2/(b*d) - 1/2*a^2*arctan(a*sqrt(d + c/x^4)/
sqrt(a*b*c - a^2*d))/(sqrt(a*b*c - a^2*d)*b^2) + 1/4*(b*c + 2*a*d
)*arctan(sqrt(d + c/x^4)/sqrt(-d))/(b^2*sqrt(-d)*d)
```

3.642 $\int \frac{x^5}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=91

$$\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b\sqrt{bc-ad}}$$

```
[Out] -(Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])]
)/(2*b*Sqrt[b*c - a*d]) + ArcTanh[(Sqrt[d]*x^2)/Sqrt[c + d*x^4]]/
(2*b*Sqrt[d])
```

Rubi [A] time = 0.247128, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -(Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])]
)/(2*b*Sqrt[b*c - a*d]) + ArcTanh[(Sqrt[d]*x^2)/Sqrt[c + d*x^4]]/
(2*b*Sqrt[d])
```

Rubi in Sympy [A] time = 30.208, size = 76, normalized size = 0.84

$$-\frac{\sqrt{a}\,\text{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2b\sqrt{ad-bc}}+\frac{\text{atanh}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -sqrt(a)*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**4)))/(
2*b*sqrt(a*d - b*c)) + atanh(sqrt(d)*x**2/sqrt(c + d*x**4))/(2*b*
sqrt(d))
```

Mathematica [A] time = 0.0879368, size = 90, normalized size = 0.99

$$\frac{\frac{\log\left(\sqrt{d}\sqrt{c+dx^4}+dx^2\right)}{\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{\sqrt{bc-ad}}}{2b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (-((Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4]
)])/Sqrt[b*c - a*d]) + Log[d*x^2 + Sqrt[d]*Sqrt[c + d*x^4]]/Sqrt[
d])/(2*b)
```

Maple [B] time = 0.013, size = 356, normalized size = 3.9

$$\frac{1}{2b}\ln\left(x^2\sqrt{d}+\sqrt{dx^4+c}\right)\frac{1}{\sqrt{d}} + \frac{a}{4b}\ln\left(1\left(-2\frac{ad-bc}{b}+2\frac{\sqrt{-abd}}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2 d+2\frac{\sqrt{-abd}}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}} - \frac{a}{4b}\ln\left(1\left(-2\frac{ad-bc}{b}-2\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2 d-2\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/2/b*ln(x^2*d^(1/2)+(d*x^4+c)^(1/2))/d^(1/2)+1/4*a/b/(-a*b)^(1/2
)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2
-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))
^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)
)/(x^2-1/b*(-a*b)^(1/2)))-1/4*a/b/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/
2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2
*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2
)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1
/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.346451, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{d}\sqrt{-\frac{a}{bc-ad}}\log\left(\frac{(b^2c^2-8\,abcd+8\,a^2d^2)x^8-2\,(3\,abc^2-4\,a^2cd)x^4+a^2c^2-4\,((b^2c^2-3\,abcd+2\,a^2d^2)x^6-(abc^2-a^2cd)x^2)\sqrt{dx^4+c}\sqrt{-\frac{a}{bc-ad}}}{b^2x^8+2\,abx^4+a^2}\right)+2\log}{8\,b\sqrt{d}}\right.$$

$$-\frac{\sqrt{d}\sqrt{\frac{a}{bc-ad}}\arctan\left(\frac{(bc-2\,ad)x^4-ac}{2\sqrt{dx^4+c}(bc-ad)x^2\sqrt{\frac{a}{bc-ad}}}\right)-\log\left(-2\sqrt{dx^4+c}dx^2-\left(2\,dx^4+c\right)\sqrt{d}\right)}{4\,b\sqrt{d}},$$

$$\left.-\frac{\sqrt{-d}\sqrt{\frac{a}{bc-ad}}\arctan\left(\frac{(bc-2\,ad)x^4-ac}{2\sqrt{dx^4+c}(bc-ad)x^2\sqrt{\frac{a}{bc-ad}}}\right)-2\arctan\left(\frac{\sqrt{-d}x^2}{\sqrt{dx^4+c}}\right)}{4\,b\sqrt{-d}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/8*(sqrt(d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8*
a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2 - 4*((b^2*
c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^6 - (a*b*c^2 - a^2*c*d)*x^2)*sqrt(
```

```
d*x^4 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^8 + 2*a*b*x^4 + a^2)) + 2
*log(-2*sqrt(d*x^4 + c)*d*x^2 - (2*d*x^4 + c)*sqrt(d)))/(b*sqrt(d
)), 1/8*(sqrt(-d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*c*d
+ 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2 - 4*((
b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^6 - (a*b*c^2 - a^2*c*d)*x^2)*s
qrt(d*x^4 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^8 + 2*a*b*x^4 + a^2))
 + 4*arctan(sqrt(-d)*x^2/sqrt(d*x^4 + c)))/(b*sqrt(-d)), -1/4*(sq
rt(d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^4 - a*c)/(s
qrt(d*x^4 + c)*(b*c - a*d)*x^2*sqrt(a/(b*c - a*d)))) - log(-2*sqr
t(d*x^4 + c)*d*x^2 - (2*d*x^4 + c)*sqrt(d)))/(b*sqrt(d)), -1/4*(s
qrt(-d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^4 - a*c)/
(sqrt(d*x^4 + c)*(b*c - a*d)*x^2*sqrt(a/(b*c - a*d)))) - 2*arctan
(sqrt(-d)*x^2/sqrt(d*x^4 + c)))/(b*sqrt(-d))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**5/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.224328, size = 107, normalized size = 1.18

$$\frac{1}{2}c\left(\frac{a\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}bc}-\frac{\arctan\left(\frac{\sqrt{d+\frac{c}{x^4}}}{\sqrt{-d}}\right)}{bc\sqrt{-d}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] 1/2*c*(a*arctan(a*sqrt(d + c/x^4)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*b*c) - arctan(sqrt(d + c/x^4)/sqrt(-d))/(b*c*sqrt(-d))
)
```

3.643 $\int \frac{x}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=54

$$\frac{\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2\sqrt{a}\sqrt{bc-ad}}$$

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])]/(2*Sqrt[a
]*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.118259, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2\sqrt{a}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])]/(2*Sqrt[a
]*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 16.1979, size = 46, normalized size = 0.85

$$\frac{\operatorname{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2\sqrt{a}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**4)))/(2*sqrt(a)
*sqrt(a*d - b*c))
```

Mathematica [A] time = 0.0389525, size = 54, normalized size = 1.

$$\frac{\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2\sqrt{a}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])]/(2*Sqrt[a
]*Sqrt[b*c - a*d])
```

Maple [B] time = 0.008, size = 322, normalized size = 6.

$$-\frac{1}{4}\ln\left(1\left(-2\frac{ad-bc}{b}+2\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2d+2\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right)\right.$$
$$+\frac{1}{4}\ln\left(1\left(-2\frac{ad-bc}{b}-2\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2d-2\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/4/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a
*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1
/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a
*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))+1/4/(-a*b)^(1/2)/(-(a*d
-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a
*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d
*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1
/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.290364, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(\frac{4\left(\left(ab^2c^2-3\,a^2bcd+2\,a^3d^2\right)x^6-\left(a^2bc^2-a^3cd\right)x^2\right)\sqrt{dx^4+c}+\left(\left(b^2c^2-8\,abcd+8\,a^2d^2\right)x^8-2\left(3\,abc^2-4\,a^2cd\right)x^4+a^2c^2\right)\sqrt{-abc+a^2d}}{b^2x^8+2\,abx^4+a^2}\right)}{8\sqrt{-abc+a^2d}}, \frac{\arctan\left(\frac{(bc}{2\sqrt{dx}}\right.}{4\sqrt{ab}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/8*log((4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^6 - (a^2*b*c
^2 - a^3*c*d)*x^2)*sqrt(d*x^4 + c) + ((b^2*c^2 - 8*a*b*c*d + 8*a^
2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2)*sqrt(-a*b*c
 + a^2*d))/(b^2*x^8 + 2*a*b*x^4 + a^2))/sqrt(-a*b*c + a^2*d), 1/4
*arctan(1/2*((b*c - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*sqrt(a*b*c
 - a^2*d)*x^2))/sqrt(a*b*c - a^2*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.223819, size = 97, normalized size = 1.8

$$-\frac{\sqrt{d}\arctan\left(\frac{\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^2 b-bc+2\,ad}{2\,\sqrt{abcd-a^2d^2}}\right)}{2\,\sqrt{abcd-a^2d^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -1/2*sqrt(d)*arctan(1/2*((sqrt(d)*x^2 - sqrt(d*x^4 + c))^2*b - b*
c + 2*a*d)/sqrt(a*b*c*d - a^2*d^2))/sqrt(a*b*c*d - a^2*d^2)
```

3.644 $\int \frac{1}{x^3(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=80

$$-\frac{b\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^4}}{2acx^2}$$

```
[Out] -Sqrt[c + d*x^4]/(2*a*c*x^2) - (b*ArcTan[(Sqrt[b*c - a*d]*x^2)/(S
qrt[a]*Sqrt[c + d*x^4])])/(2*a^(3/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.242398, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{b\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^4}}{2acx^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -Sqrt[c + d*x^4]/(2*a*c*x^2) - (b*ArcTan[(Sqrt[b*c - a*d]*x^2)/(S
qrt[a]*Sqrt[c + d*x^4])])/(2*a^(3/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 30.8796, size = 68, normalized size = 0.85

$$-\frac{\sqrt{c+dx^4}}{2acx^2}-\frac{b\,\mathrm{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{\frac{3}{2}}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**4)/(2*a*c*x**2) - b*atanh(x**2*sqrt(a*d - b*c)/(sq
rt(a)*sqrt(c + d*x**4)))/(2*a**(3/2)*sqrt(a*d - b*c))
```

Mathematica [A] time = 1.13067, size = 129, normalized size = 1.61

$$\frac{\sqrt{c+dx^4}\left(-\frac{bx^4\sin^{-1}\left(\frac{\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^4}{a}+1}}\right)}{\sqrt{\frac{bx^4}{a}+1}\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}\sqrt{\frac{a\left(c+dx^4\right)}{c\left(a+bx^4\right)}}}-a\right)}{2a^2cx^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (Sqrt[c + d*x^4]*(-a - (b*x^4*ArcSin[Sqrt[(b/a - d/c)*x^4]/Sqrt[1
 + (b*x^4)/a]])/(Sqrt[(b/a - d/c)*x^4]*Sqrt[1 + (b*x^4)/a]*Sqrt[(
a*(c + d*x^4))/(c*(a + b*x^4))])))/(2*a^2*c*x^2)
```

Maple [B] time = 0.022, size = 350, normalized size = 4.4

$$-\frac{1}{2\,acx^{2}}\sqrt{dx^{4}+c}$$
$$+\frac{b}{4\,a}\ln\left(1\left(-2\,\frac{ad-bc}{b}+2\,\frac{\sqrt{-ab}d}{b}\left(x^{2}-\frac{\sqrt{-ab}}{b}\right)+2\,\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^{2}-\frac{\sqrt{-ab}}{b}\right)^{2}d+2\,\frac{\sqrt{-abd}}{b}\left(x^{2}-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right.\right.$$
$$-\frac{b}{4\,a}\ln\left(1\left(-2\,\frac{ad-bc}{b}-2\,\frac{\sqrt{-ab}d}{b}\left(x^{2}+\frac{\sqrt{-ab}}{b}\right)+2\,\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^{2}+\frac{\sqrt{-ab}}{b}\right)^{2}d-2\,\frac{\sqrt{-abd}}{b}\left(x^{2}+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/2*(d*x^4+c)^(1/2)/a/c/x^2+1/4*b/a/(-a*b)^(1/2)/(-(a*d-b*c)/b)^
(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2)
)+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(
1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)
^(1/2)))-1/4*b/a/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*
c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(
1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*
b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^{4}+a)\sqrt{dx^{4}+c}x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^3), x)
```

Fricas [A] time = 0.327371, size = 1, normalized size = 0.01

$$\left[\frac{bcx^{2}\log\left(-\frac{4\left(\left(ab^{2}c^{2}-3\,a^{2}bcd+2\,a^{3}d^{2}\right)x^{6}-\left(a^{2}bc^{2}-a^{3}cd\right)x^{2}\right)\sqrt{dx^{4}+c}-\left(\left(b^{2}c^{2}-8\,abcd+8\,a^{2}d^{2}\right)x^{8}-2\left(3\,abc^{2}-4\,a^{2}cd\right)x^{4}+a^{2}c^{2}\right)\sqrt{-abc+a^{2}d}}{b^{2}x^{8}+2\,abx^{4}+a^{2}}\right)-4\,\sqrt{dx}}{8\,\sqrt{-abc+a^{2}d}acx^{2}}\right.$$
$$\left.-\frac{bcx^{2}\arctan\left(\frac{(bc-2\,ad)x^{4}-ac}{2\,\sqrt{dx^{4}+c}\sqrt{abc-a^{2}d}x^{2}}\right)+2\,\sqrt{dx^{4}+c}\sqrt{abc-a^{2}d}}{4\,\sqrt{abc-a^{2}d}acx^{2}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^3),x, algorithm="fricas")
```

```
[Out] [1/8*(b*c*x^2*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^6
- (a^2*b*c^2 - a^3*c*d)*x^2)*sqrt(d*x^4 + c) - ((b^2*c^2 - 8*a*b*
c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2)*s
qrt(-a*b*c + a^2*d))/(b^2*x^8 + 2*a*b*x^4 + a^2)) - 4*sqrt(d*x^4
+ c)*sqrt(-a*b*c + a^2*d))/(sqrt(-a*b*c + a^2*d)*a*c*x^2), -1/4*(
b*c*x^2*arctan(1/2*((b*c - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*sqr
t(a*b*c - a^2*d)*x^2)) + 2*sqrt(d*x^4 + c)*sqrt(a*b*c - a^2*d))/(
sqrt(a*b*c - a^2*d)*a*c*x^2)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3 (a + bx^4) \sqrt{c + dx^4}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(1/(x**3*(a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.223636, size = 86, normalized size = 1.08

$$\frac{\frac{bc \arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}a} - \frac{\sqrt{d+\frac{c}{x^4}}}{a}}{2\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^3),x, algorithm="giac")
```

```
[Out] 1/2*(b*c*arctan(a*sqrt(d + c/x^4)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*a) - sqrt(d + c/x^4)/a)/c
```

3.645 $\int \frac{1}{x^7(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=115

$$\frac{b^2\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{5/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^4}(2ad+3bc)}{6a^2c^2x^2}-\frac{\sqrt{c+dx^4}}{6acx^6}$$

```
[Out] -Sqrt[c + d*x^4]/(6*a*c*x^6) + ((3*b*c + 2*a*d)*Sqrt[c + d*x^4])/
(6*a^2*c^2*x^2) + (b^2*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt
[c + d*x^4])])/(2*a^(5/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.471375, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$\frac{b^2\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{5/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^4}(2ad+3bc)}{6a^2c^2x^2}-\frac{\sqrt{c+dx^4}}{6acx^6}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -Sqrt[c + d*x^4]/(6*a*c*x^6) + ((3*b*c + 2*a*d)*Sqrt[c + d*x^4])/
(6*a^2*c^2*x^2) + (b^2*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt
[c + d*x^4])])/(2*a^(5/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 63.3789, size = 100, normalized size = 0.87

$$-\frac{\sqrt{c+dx^4}}{6acx^6}+\frac{\sqrt{c+dx^4}\,(2ad+3bc)}{6a^2c^2x^2}+\frac{b^2\operatorname{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{2a^{\frac{5}{2}}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**4)/(6*a*c*x**6) + sqrt(c + d*x**4)*(2*a*d + 3*b*c)
/(6*a**2*c**2*x**2) + b**2*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sq
rt(c + d*x**4)))/(2*a**(5/2)*sqrt(a*d - b*c))
```

Mathematica [A] time = 1.28554, size = 149, normalized size = 1.3

$$\frac{\sqrt{c+dx^4}\left(-a^2c+\frac{3b^2cx^8\sin^{-1}\left(\frac{\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^4}{a}+1}}\right)}{\sqrt{\frac{bx^4}{a}+1}\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}\sqrt{\frac{a\left(c+dx^4\right)}{c\left(a+bx^4\right)}}}+ax^4(2ad+3bc)\right)}{6a^3c^2x^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^7*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (Sqrt[c + d*x^4]*(-(a^2*c) + a*(3*b*c + 2*a*d)*x^4 + (3*b^2*c*x^8
*ArcSin[Sqrt[(b/a - d/c)*x^4]/Sqrt[1 + (b*x^4)/a]])/(Sqrt[(b/a -
d/c)*x^4]*Sqrt[1 + (b*x^4)/a]*Sqrt[(a*(c + d*x^4))/(c*(a + b*x^4)
```

```
)]))))/(6*a^3*c^2*x^6)
```

Maple [B] time = 0.026, size = 383, normalized size = 3.3

$$-\frac{-2\,dx^4+c}{6\,ax^6c^2}\sqrt{dx^4+c}$$
$$-\frac{b^2}{4\,a^2}\ln\left(1\left(-2\,\frac{ad-bc}{b}+2\,\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\,\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2d+2\,\frac{\sqrt{-abd}}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-b}{b}}\right.\right.$$
$$+\frac{b^2}{4\,a^2}\ln\left(1\left(-2\,\frac{ad-bc}{b}-2\,\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\,\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2d-2\,\frac{\sqrt{-abd}}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\right.\right.$$
$$+\frac{b}{2\,a^2cx^2}\sqrt{dx^4+c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/6/a*(d*x^4+c)^(1/2)*(-2*d*x^4+c)/x^6/c^2-1/4/a^2*b^2/(-a*b)^(1
/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x
^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2
))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/
2))/(x^2-1/b*(-a*b)^(1/2)))+1/4/a^2*b^2/(-a*b)^(1/2)/(-(a*d-b*c)/
b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1
/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b
)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a
*b)^(1/2)))+1/2*b/a^2/c/x^2*(d*x^4+c)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{(bx^4+a)\sqrt{dx^4+c}x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^7),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^7), x)
```

Fricas [A] time = 0.329006, size = 1, normalized size = 0.01

$$\left[\frac{3\,b^2c^2x^6\log\left(\frac{4\left(\left(ab^2c^2-3\,a^2bcd+2\,a^3d^2\right)x^6-\left(a^2bc^2-a^3cd\right)x^2\right)\sqrt{dx^4+c}+\left(\left(b^2c^2-8\,abcd+8\,a^2d^2\right)x^8-2\left(3\,abc^2-4\,a^2cd\right)x^4+a^2c^2\right)\sqrt{-abc+a^2d}}{b^2x^8+2\,abx^4+a^2}\right)+4\,((\cdots}{24\sqrt{-abc+a^2d}a^2c^2x^6}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^7),x, algorithm="fricas")
```

```
[Out] [1/24*(3*b^2*c^2*x^6*log((4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2
)*x^6 - (a^2*b*c^2 - a^3*c*d)*x^2)*sqrt(d*x^4 + c) + ((b^2*c^2 -
8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*
c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^8 + 2*a*b*x^4 + a^2)) + 4*((3*b
*c + 2*a*d)*x^4 - a*c)*sqrt(d*x^4 + c)*sqrt(-a*b*c + a^2*d))/(sqr
t(-a*b*c + a^2*d)*a^2*c^2*x^6), 1/12*(3*b^2*c^2*x^6*arctan(1/2*((
```

```
b*c - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*sqrt(a*b*c - a^2*d)*x^2)
) + 2*((3*b*c + 2*a*d)*x^4 - a*c)*sqrt(d*x^4 + c)*sqrt(a*b*c - a^
2*d))/(sqrt(a*b*c - a^2*d)*a^2*c^2*x^6)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^7 (a + bx^4) \sqrt{c + dx^4}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(1/(x**7*(a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [A] time = 0.223181, size = 144, normalized size = 1.25

$$-\frac{b^2 \arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{2\sqrt{abc-a^2d}a^2} + \frac{3\,abc^5\sqrt{d+\frac{c}{x^4}} - a^2c^4\left(d+\frac{c}{x^4}\right)^{\frac{3}{2}} + 3\,a^2c^4\sqrt{d+\frac{c}{x^4}}d}{6\,a^3c^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^7),x, algorithm="giac")
```

```
[Out] -1/2*b^2*arctan(a*sqrt(d + c/x^4)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*a^2) + 1/6*(3*a*b*c^5*sqrt(d + c/x^4) - a^2*c^4*(d + c
/x^4)^(3/2) + 3*a^2*c^4*sqrt(d + c/x^4)*d)/(a^3*c^6)
```

3.646 $\int \frac{x^8}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=911

result too large to display

```
[Out] (x*Sqrt[c + d*x^4])/(3*b*d) + (a*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a
- d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[-((b*c - a*d)/(Sq
rt[-a]*Sqrt[b]))]) + (a*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b
])]*x)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b
])]) - (a^2*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqr
t[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1
/2])/(4*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqrt[c
 + d*x^4]) + (a^2*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4
)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/
4)], 1/2])/(4*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*
Sqrt[c + d*x^4]) - ((b*c + 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
 + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*
x)/c^(1/4)], 1/2])/(6*b^2*c^(1/4)*d^(5/4)*Sqrt[c + d*x^4]) + (a*(
Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[
(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[
c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*
ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c
] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) + (a*(Sqrt[b]*Sqrt
[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/
(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]
*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/
4)*x)/c^(1/4)], 1/2])/(8*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*
Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi [A] time = 2.11345, antiderivative size = 911, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$
\begin{aligned}
&-\frac{\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)a^2}{4b^2\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^4+c}}\\
&+\frac{\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)a^2}{4b^2\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^4+c}}\\
&+\frac{\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)a}{4b^2\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)a}{4b^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}\\
&+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)a}{8b^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}\\
&+\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)a}{8b^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}\\
&-\frac{(bc+3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{6b^2\sqrt[4]{c}d^{5/4}\sqrt{dx^4+c}}+\frac{x\sqrt{dx^4+c}}{3bd}
\end{aligned}
$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^8/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (x*Sqrt[c + d*x^4])/(3*b*d) + (a*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a
- d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[-((b*c - a*d)/(Sq
rt[-a]*Sqrt[b]))]) + (a*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b
])]*x)/Sqrt[c + d*x^4]])/(4*b^2*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b
])]) - (a^2*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqr
t[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1
/2])/(4*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqrt[c
 + d*x^4]) + (a^2*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4
)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/
4)], 1/2])/(4*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*
Sqrt[c + d*x^4]) - ((b*c + 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
 + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*
x)/c^(1/4)], 1/2])/(6*b^2*c^(1/4)*d^(5/4)*Sqrt[c + d*x^4]) + (a*(
Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[
(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[
c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*
ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c
] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) + (a*(Sqrt[b]*Sqrt
[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/
(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]
*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/
4)*x)/c^(1/4)], 1/2])/(8*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*
Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.631336, size = 429, normalized size = 0.47

$$\frac{x\left(\frac{25a^2c^2F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{10x^4(a+bx^4)(c+dx^4)\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\cdots}{2x^4\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\cdots\right.\right.}\right)}{15bd\,(a+bx^4)\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^8/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (x*((25*a^2*c^2*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4
)/a)])/(-5*a*c*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4)
/a)] + 2*x^4*(2*b*c*AppellF1[5/4, 1/2, 2, 9/4, -((d*x^4)/c), -((b
*x^4)/a)] + a*d*AppellF1[5/4, 3/2, 1, 9/4, -((d*x^4)/c), -((b*x^4
)/a)])) + (-9*a*c*(5*a*c + 4*b*c*x^4 + 2*a*d*x^4 + 5*b*d*x^8)*App
ellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + 10*x^4*(a +
 b*x^4)*(c + d*x^4)*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^4)/
c), -((b*x^4)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/c),
 -((b*x^4)/a)]))/(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c),
 -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^
4)/c), -((b*x^4)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/
c), -((b*x^4)/a)]))))/(15*b*d*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [C] time = 0.036, size = 363, normalized size = 0.4

$$\frac{1}{b^2}\left(b\left(\frac{x}{3\,d}\sqrt{dx^4+c}-\frac{c}{3\,d}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}\right)-a\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\right.$$

$$+\frac{a^2}{8\,b^3}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{1}{\_alpha^3}\left(-1Artanh\left(\frac{2\_alpha^2dx^2+2\,c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{b\_alpha^3}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}}{\sqrt{c}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/b^2*(b*(1/3/d*x*(d*x^4+c)^(1/2)-1/3*c/d/(I/c^(1/2)*d^(1/2))^(1/
2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2
)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I))-a/(I/
c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/
2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d^(1
/2))^(1/2),I))+1/8*a^2/b^3*sum(1/_alpha^3*(-1/((-a*d+b*c)/b)^(1/2
)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+
c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d
^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)
*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^
2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alp
ha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^8}{(bx^4+a)\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^8/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^8}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**8/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{(bx^4 + a)\sqrt{dx^4 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^8/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

3.647 $\int \frac{x^4}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=638

$$\frac{c^{3/4}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2\sqrt[4]{d}\sqrt{c+dx^4}(ad+bc)}-\frac{\tan^{-1}\left(\frac{x\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4b\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4b\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}-\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}$$

```
[Out] -ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4
]]/(4*b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) - ArcTan[(Sqrt[(
b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]]/(4*b*Sqrt[(b*c
 - a*d)/(Sqrt[-a]*Sqrt[b])]) + (c^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*S
qrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^
(1/4)*x)/c^(1/4)], 1/2])/(2*d^(1/4)*(b*c + a*d)*Sqrt[c + d*x^4])
- ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*S
qrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*S
qrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d])
, 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b*c^(1/4)*(Sqrt[b]*Sqrt
[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt
[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/
(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]
*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/
4)*x)/c^(1/4)], 1/2])/(8*b*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sq
rt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi [A] time = 1.30484, antiderivative size = 873, normalized size of antiderivative = 1.37, number

of steps used = 7, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$-\frac{\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{4b\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{4b\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$+\frac{a\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$-\frac{a\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^4+c}}$$
$$+\frac{\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2b\sqrt[4]{c}\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^4/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4
]]/(4*b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) - ArcTan[(Sqrt[(
b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]]/(4*b*Sqrt[(b*c
 - a*d)/(Sqrt[-a]*Sqrt[b])]) + ((Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c +
 d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)
/c^(1/4)], 1/2])/(2*b*c^(1/4)*d^(1/4)*Sqrt[c + d*x^4]) + (a*d^(1/
4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^
2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b*c^(1/4)
*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqrt[c + d*x^4]) - (a*d^(
1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*
x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b*c^(1/
4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*Sqrt[c + d*x^4]) - ((Sq
rt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
 + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c]
 - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*Ar
cTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b*c^(1/4)*(Sqrt[b]*Sqrt[c] -
Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] -
Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[
c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[
d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/
c^(1/4)], 1/2])/(8*b*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])
*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 140.487, size = 768, normalized size = 1.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -a*d**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(
c) + sqrt(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(
4*b*c**(1/4)*sqrt(c + d*x**4)*(a*sqrt(d) + sqrt(b)*sqrt(c)*sqrt(-
a))) - a*d**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*
(sqrt(c) + sqrt(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)),
1/2)/(4*b*c**(1/4)*sqrt(c + d*x**4)*(a*sqrt(d) - sqrt(b)*sqrt(c)*
sqrt(-a))) - atan(x*sqrt(sqrt(-a)*(a*d - b*c)/(a*sqrt(b)))/sqrt(c
 + d*x**4))/(4*b*sqrt(sqrt(-a)*(a*d - b*c)/(a*sqrt(b)))) - atan(x
*sqrt(sqrt(-a)*(-a*d + b*c)/(a*sqrt(b)))/sqrt(c + d*x**4))/(4*b*s
qrt(sqrt(-a)*(-a*d + b*c)/(a*sqrt(b)))) - sqrt((c + d*x**4)/(sqrt
(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(sqrt(b)*sqrt(c)
 - sqrt(d)*sqrt(-a))*elliptic_pi((sqrt(b)*sqrt(c) + sqrt(d)*sqrt(
-a))**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-a)), 2*atan(d**(1/4)*x/c
**(1/4)), 1/2)/(8*b*c**(1/4)*d**(1/4)*sqrt(c + d*x**4)*(sqrt(b)*s
qrt(c) + sqrt(d)*sqrt(-a))) + sqrt((c + d*x**4)/(sqrt(c) + sqrt(d
)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x
/c**(1/4)), 1/2)/(2*b*c**(1/4)*d**(1/4)*sqrt(c + d*x**4)) - sqrt(
(c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2
)*(sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))*elliptic_pi(-(sqrt(b)*sqrt
(c) - sqrt(d)*sqrt(-a))**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-a)),
2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(8*b*c**(1/4)*d**(1/4)*sqrt(c +
 d*x**4)*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a)))
```

Mathematica [C] time = 0.0831277, size = 165, normalized size = 0.26

$$-\frac{9acx^5F_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{5\left(a+bx^4\right)\sqrt{c+dx^4}\left(2x^4\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{9}{4};\frac{3}{2},1;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-9acF_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx}{a}\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (-9*a*c*x^5*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)
])/(5*(a + b*x^4)*Sqrt[c + d*x^4]*(-9*a*c*AppellF1[5/4, 1/2, 1, 9
/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[9/4, 1/2,
 2, 13/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[9/4, 3/2, 1,
 13/4, -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [C] time = 0.012, size = 265, normalized size = 0.4

$$\frac{1}{b}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}$$

$$-\frac{a}{8\,b^2}\sum_{\_alpha=RootOf\left(\_Z^4b+a\right)}\frac{1}{\_alpha^3}\left(-1Artanh\left(\frac{2\,\_alpha^2dx^2+2\,c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\,\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{c}}{\sqrt{}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/b/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+
I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/
2)*d^(1/2))^(1/2),I)-1/8*a/b^2*sum(1/_alpha^3*(-1/((-a*d+b*c)/b)^
(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*
x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/
2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(
1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_al
pha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),
_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^4+a)\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**4/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^4+a)\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

3.648 $\int \frac{1}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=638

$$\frac{d^{3/4}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2\sqrt[4]{c}\sqrt{c+dx^4}(ad+bc)}+\frac{\tan^{-1}\left(\frac{x\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}+\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}$$

```
[Out] ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]
]/(4*a*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) + ArcTan[(Sqrt[(b
*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]]/(4*a*Sqrt[(b*c
- a*d)/(Sqrt[-a]*Sqrt[b])]) + (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sq
rt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(2*c^(1/4)*(b*c + a*d)*Sqrt[c + d*x^4]) +
 ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sq
rt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sq
rt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]),
 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[b]*Sqrt[
c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[
c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(
Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*
Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4
)*x)/c^(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqr
t[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi [A] time = 0.817015, antiderivative size = 774, normalized size of antiderivative = 1.21, number of steps used = 5, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{\tan^{-1}\left(\frac{x\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{\sqrt[4]{d}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4\sqrt[4]{c}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)}+\frac{\sqrt[4]{d}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4\sqrt[4]{c}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{b}\sqrt{c}+a\sqrt{d}\right)}+\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}+\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]
]/(4*a*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) + ArcTan[(Sqrt[(b
*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]]/(4*a*Sqrt[(b*c
- a*d)/(Sqrt[-a]*Sqrt[b])]) - (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sq
rt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(4*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*
Sqrt[d])*Sqrt[c + d*x^4]) + (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt
[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/
4)*x)/c^(1/4)], 1/2])/(4*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sq
rt[d])*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(
Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2
]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*
Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8
*a*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c +
d*x^4]) + ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d
]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sq
rt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*S
qrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[
b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 98.0022, size = 690, normalized size = 1.08

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -d**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c)
 + sqrt(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(4*
c**(1/4)*sqrt(-a)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c) + sqrt(d)*sqr
t(-a))) + d**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)
*(sqrt(c) + sqrt(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)),
 1/2)/(4*c**(1/4)*sqrt(-a)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c) - sq
rt(d)*sqrt(-a))) + atan(x*sqrt(sqrt(-a)*(a*d - b*c)/(a*sqrt(b)))/
sqrt(c + d*x**4))/(4*a*sqrt(sqrt(-a)*(a*d - b*c)/(a*sqrt(b)))) +
atan(x*sqrt(sqrt(-a)*(-a*d + b*c)/(a*sqrt(b)))/sqrt(c + d*x**4))/
(4*a*sqrt(sqrt(-a)*(-a*d + b*c)/(a*sqrt(b)))) + sqrt((c + d*x**4)
/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(sqrt(b)*s
qrt(c) - sqrt(d)*sqrt(-a))*elliptic_pi((sqrt(b)*sqrt(c) + sqrt(d)
*sqrt(-a))**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-a)), 2*atan(d**(1/
4)*x/c**(1/4)), 1/2)/(8*a*c**(1/4)*d**(1/4)*sqrt(c + d*x**4)*(sqr
t(b)*sqrt(c) + sqrt(d)*sqrt(-a))) + sqrt((c + d*x**4)/(sqrt(c) +
sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*(sqrt(b)*sqrt(c) + sqr
t(d)*sqrt(-a))*elliptic_pi(-(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a))*
*2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-a)), 2*atan(d**(1/4)*x/c**(1/
4)), 1/2)/(8*a*c**(1/4)*d**(1/4)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c
) - sqrt(d)*sqrt(-a)))
```

Mathematica [C] time = 0.082906, size = 161, normalized size = 0.25

$$-\frac{5acxF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)\sqrt{c+dx^4}\left(2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (-5*a*c*x*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)])
/((a + b*x^4)*Sqrt[c + d*x^4]*(-5*a*c*AppellF1[1/4, 1/2, 1, 5/4,
-((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[5/4, 1/2, 2,
9/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[5/4, 3/2, 1, 9/4,
 -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [C] time = 0.007, size = 191, normalized size = 0.3

$$\frac{1}{8b}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{1}{\_alpha^3}\left(-1Artanh\left(\frac{2\_alpha^2dx^2+2c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}x^2}{\sqrt{c}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/8/b*sum(1/_alpha^3*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alp
ha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2
)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+
I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1
/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(
1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{(bx^4+a)\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(1/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{(bx^4+a)\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")

[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

3.649 $\int \frac{1}{x^4(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=677

$$-\frac{b\tan^{-1}\left(\frac{x\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4a^2\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{b\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4a^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$-\frac{b\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}$$
$$-\frac{b\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}$$
$$-\frac{d^{3/4}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}(ad+4bc)F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{6ac^{5/4}\sqrt{c+dx^4}(ad+bc)}-\frac{\sqrt{c+dx^4}}{3acx^3}$$

```
[Out] -Sqrt[c + d*x^4]/(3*a*c*x^3) - (b*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a
 - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]])/(4*a^2*Sqrt[-((b*c - a*d)/(S
qrt[-a]*Sqrt[b]))]) - (b*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[
b])]*x)/Sqrt[c + d*x^4]])/(4*a^2*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[
b])]) - (d^(3/4)*(4*b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c +
d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/
c^(1/4)], 1/2])/(6*a*c^(5/4)*(b*c + a*d)*Sqrt[c + d*x^4]) - (b*(S
qrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(
c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c
] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*A
rcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c]
 - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) - (b*(Sqrt[b]*Sqrt[
c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(
Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*
Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4
)*x)/c^(1/4)], 1/2])/(8*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*S
qrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi [A] time = 1.57011, antiderivative size = 901, normalized size of antiderivative = 1.33, number

of steps used = 8, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.208$

$$-\frac{b\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a^2\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{b\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$-\frac{d^{3/4}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{6ac^{5/4}\sqrt{dx^4+c}}$$
$$+\frac{b\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$-\frac{b\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^4+c}}$$
$$-\frac{b\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{b\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{\sqrt{dx^4+c}}{3acx^3}$$

Warning: Unable to verify antiderivative.

```
[In]   Int[1/(x^4*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -Sqrt[c + d*x^4]/(3*a*c*x^3) - (b*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a
 - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]])/(4*a^2*Sqrt[-((b*c - a*d)/(S
qrt[-a]*Sqrt[b]))]) - (b*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[
b])]*x)/Sqrt[c + d*x^4]])/(4*a^2*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[
b])]) + (b*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt
[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/
2])/(4*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqrt[c +
d*x^4]) - (b*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sq
rt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)],
1/2])/(4*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*Sqrt[c
+ d*x^4]) - (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sq
rt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)],
1/2])/(6*a*c^(5/4)*Sqrt[c + d*x^4]) - (b*(Sqrt[b]*Sqrt[c] + Sqrt[
-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] +
Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^
2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1
/4)], 1/2])/(8*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d
^(1/4)*Sqrt[c + d*x^4]) - (b*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])
*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)
^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]
*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(
8*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c
 + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.488468, size = 344, normalized size = 0.51

$$\frac{\frac{25x^4(ad+3bc)F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)\left(2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}+\frac{9bdx^8F_1}{(a+bx^4)\left(2x^4\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+a\right.\right.}}{15x^3\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] ((-5*(c + d*x^4))/(a*c) + (25*(3*b*c + a*d)*x^4*AppellF1[1/4, 1/2
, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)])/((a + b*x^4)*(-5*a*c*Appel
lF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*
AppellF1[5/4, 1/2, 2, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*Appe
llF1[5/4, 3/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)]))) + (9*b*d*x^
8*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)])/((a + b
*x^4)*(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/
a)] + 2*x^4*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^4)/c), -((b
*x^4)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/c), -((b*x^
4)/a)]))))/(15*x^3*Sqrt[c + d*x^4])
```

Maple [C] time = 0.023, size = 288, normalized size = 0.4

$$\frac{1}{a}\left(-\frac{1}{3\,cx^3}\sqrt{dx^4+c}-\frac{d}{3\,c}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}\right)$$

$$-\frac{1}{8\,a}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{1}{\_alpha^3}\left(-1Artanh\left(\frac{2\,\_alpha^2dx^2+2\,c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}}{\sqrt{c}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/a*(-1/3/c*(d*x^4+c)^(1/2)/x^3-1/3*d/c/(I/c^(1/2)*d^(1/2))^(1/2)
*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/
(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I))-1/8/a*s
um(1/_alpha^3*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*
x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/
2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/
2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(
1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(
1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)\sqrt{dx^4+c}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^4), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^4),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^4 \left(a + bx^4\right) \sqrt{c + dx^4}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(1/(x**4*(a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4 + a)\sqrt{dx^4 + c}x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^4),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^4), x)
```

3.650 $\int \frac{x^6}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=804

$$\frac{\sqrt{dx^4+c}\,x}{b\sqrt{d}\left(\sqrt{d}x^2+\sqrt{c}\right)}-\frac{a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{4b(bc-ad)}-\frac{a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{4b(bc-ad)}$$
$$-\frac{\sqrt[4]{c}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\,E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{bd^{3/4}\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{c}(bc+2ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\,F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2bd^{3/4}(bc+ad)\sqrt{dx^4+c}}$$
$$+\frac{a\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\,\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{a\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\,\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$

```
[Out] (x*Sqrt[c + d*x^4])/(b*Sqrt[d]*(Sqrt[c] + Sqrt[d]*x^2)) - (a*Sqrt
[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(S
qrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(4*b*(b*c - a*d)) - (a*Sq
rt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt
[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*b*(b*c - a*d)) - (c^(1/4)*
(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^
2]*EllipticE[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(b*d^(3/4)*Sqrt
[c + d*x^4]) + (c^(1/4)*(b*c + 2*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqr
t[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1
/4)*x)/c^(1/4)], 1/2])/(2*b*d^(3/4)*(b*c + a*d)*Sqrt[c + d*x^4])
+ (a*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)
*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*
Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]
), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^(3/2)*c^(1/4)*(Sqrt[
-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) - (a*(S
qrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(
c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[
b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]),
 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^(3/2)*c^(1/4)*(Sqrt[-a
]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi [A] time = 1.87129, antiderivative size = 1030, normalized size of antiderivative = 1.28, number

of steps used = 9, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\sqrt{dx^4+c}\,x}{b\sqrt{d}\left(\sqrt{d}x^2+\sqrt{c}\right)}-\frac{a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4b(bc-ad)}-\frac{a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4b(bc-ad)}$$
$$-\frac{\sqrt[4]{c}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{bd^{3/4}\sqrt{dx^4+c}}$$
$$+\frac{a\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$+\frac{a\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{c}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2bd^{3/4}\sqrt{dx^4+c}}$$
$$+\frac{a\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$-\frac{a\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^6/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (x*Sqrt[c + d*x^4])/(b*Sqrt[d]*(Sqrt[c] + Sqrt[d]*x^2)) - (a*Sqrt
[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(S
qrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(4*b*(b*c - a*d)) - (a*Sq
rt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt
[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*b*(b*c - a*d)) - (c^(1/4)*
(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^
2]*EllipticE[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(b*d^(3/4)*Sqrt
[c + d*x^4]) + (c^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/
(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)
], 1/2])/(2*b*d^(3/4)*Sqrt[c + d*x^4]) + (a*d^(1/4)*(Sqrt[c] + Sq
rt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[
2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b^(3/2)*c^(1/4)*(Sqrt[b]*
Sqrt[c] - Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^4]) + (a*d^(1/4)*(Sqrt[c
] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Elli
pticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*b^(3/2)*c^(1/4)*(Sq
rt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^4]) + (a*(Sqrt[b]*
Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x
^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt
[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d
^(1/4)*x)/c^(1/4)], 1/2])/(8*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sq
rt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) - (a*(Sqrt[b]*Sqrt[c]
 + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sq
rt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]
*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(8*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt
[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 152.809, size = 911, normalized size = 1.13

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] a*d**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c
) + sqrt(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(4
*b**(3/2)*c**(1/4)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c) + sqrt(d)*sq
rt(-a))) + a*d**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)*
*2)*(sqrt(c) + sqrt(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4
)), 1/2)/(4*b**(3/2)*c**(1/4)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c) -
 sqrt(d)*sqrt(-a))) - a*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2
)**2)*(sqrt(c) + sqrt(d)*x**2)*(sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a
))*elliptic_pi(-sqrt(c)*(sqrt(b) - sqrt(d)*sqrt(-a)/sqrt(c))**2/(
4*sqrt(b)*sqrt(d)*sqrt(-a)), 2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(8
*b**(3/2)*c**(1/4)*d**(1/4)*sqrt(c + d*x**4)*(a*sqrt(d) + sqrt(b)
*sqrt(c)*sqrt(-a))) - a*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2
)**2)*(sqrt(c) + sqrt(d)*x**2)*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a
))*elliptic_pi((sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))**2/(4*sqrt(b)
*sqrt(c)*sqrt(d)*sqrt(-a)), 2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(8*
b**(3/2)*c**(1/4)*d**(1/4)*sqrt(c + d*x**4)*(a*sqrt(d) - sqrt(b)*
sqrt(c)*sqrt(-a))) - c**(1/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d
)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*elliptic_e(2*atan(d**(1/4)*x
/c**(1/4)), 1/2)/(b*d**(3/4)*sqrt(c + d*x**4)) + c**(1/4)*sqrt((c
 + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**2)*
elliptic_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(2*b*d**(3/4)*sqrt(c
 + d*x**4)) + x*sqrt(c + d*x**4)/(b*sqrt(d)*(sqrt(c) + sqrt(d)*x*
*2)) - sqrt(-a)*atan(x*sqrt((a*d - b*c)/(sqrt(b)*sqrt(-a)))/sqrt(
c + d*x**4))/(4*b**(3/2)*sqrt((a*d - b*c)/(sqrt(b)*sqrt(-a)))) +
sqrt(-a)*atan(x*sqrt((-a*d + b*c)/(sqrt(b)*sqrt(-a)))/sqrt(c + d*
x**4))/(4*b**(3/2)*sqrt((-a*d + b*c)/(sqrt(b)*sqrt(-a))))
```

Mathematica [C] time = 0.100905, size = 165, normalized size = 0.21

$$-\frac{11acx^7F_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{7\left(a+bx^4\right)\sqrt{c+dx^4}\left(2x^4\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{11}{4};\frac{3}{2},1;\frac{15}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-11acF_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^4}{c},\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^6/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (-11*a*c*x^7*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/
a)])/(7*(a + b*x^4)*Sqrt[c + d*x^4]*(-11*a*c*AppellF1[7/4, 1/2, 1
, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[11/4,
 1/2, 2, 15/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[11/4, 3
/2, 1, 15/4, -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [C] time = 0.029, size = 292, normalized size = 0.4

$$\frac{i}{b}\sqrt{c}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\left(EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)-EllipticE\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}}\frac{1}{\sqrt{d}}$$

$$-\frac{a}{8b^2}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{1}{\_alpha}\left(-1Artanh\left(\frac{2\_alpha^2dx^2+2c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}}{\sqrt{c}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] I/b*c^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(
1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)/d^(1/2)*(Ell
ipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I)-EllipticE(x*(I/c^(1/2)*d^(1
/2))^(1/2),I))-1/8*a/b^2*sum(1/_alpha*(-1/((-a*d+b*c)/b)^(1/2)*ar
ctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(
1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/
2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*Ell
ipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*
b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=R
ootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(bx^4 + a)\sqrt{dx^4 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^6/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^6}{(bx^4 + a)\sqrt{dx^4 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] integral(x^6/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(a + bx^4)\sqrt{c + dx^4}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**6/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(bx^4 + a)\sqrt{dx^4 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^6/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

3.651 $\int \frac{x^2}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=656

$$\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{x\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4(bc-ad)}+\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{x\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^4}}\right)}{4(bc-ad)}-\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2\sqrt{c+dx^4}(ad+bc)}-\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)}+\frac{\left(\sqrt{c}+\sqrt{d}x^2\right)\sqrt{\frac{c+dx^4}{\left(\sqrt{c}+\sqrt{d}x^2\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^4}\left(\sqrt{-a}\sqrt{b}\sqrt{c}+a\sqrt{d}\right)}$$

```
[Out] (Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*
d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(4*(b*c - a*d)) + (S
qrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqr
t[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*(b*c - a*d)) - (c^(1/4)*d
^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d
]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(2*(b*c
+ a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(
Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2
]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*S
qrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*
Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sq
rt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] +
 Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ellipti
cPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-
a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*Sqrt
[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c
 + d*x^4])
```

Rubi [A] time = 0.963092, antiderivative size = 800, normalized size of antiderivative = 1.22, number of steps used = 5, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4(bc-ad)}+\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4(bc-ad)}-\frac{\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}-\frac{\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^2/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*
d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(4*(b*c - a*d)) + (S
qrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqr
t[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(4*(b*c - a*d)) - (d^(1/4)*(
Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2
]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*Sqrt[b]*c^(1/
4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^4]) - (d^(1/
4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^
2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*Sqrt[b]*c
^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^4]) - ((
Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[
(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c
] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*A
rcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sq
rt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4]) + ((Sqrt[b]*S
qrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^
4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sq
rt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTa
n[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b
]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 89.6148, size = 711, normalized size = 1.08

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] -atan(x*sqrt((a*d - b*c)/(sqrt(b)*sqrt(-a)))/sqrt(c + d*x**4))/(4
*sqrt(b)*sqrt(-a)*sqrt((a*d - b*c)/(sqrt(b)*sqrt(-a)))) + atan(x*
sqrt((-a*d + b*c)/(sqrt(b)*sqrt(-a)))/sqrt(c + d*x**4))/(4*sqrt(b
)*sqrt(-a)*sqrt((-a*d + b*c)/(sqrt(b)*sqrt(-a)))) - d**(1/4)*sqrt
((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)*x**
2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(4*sqrt(b)*c**(1/
4)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))) - d**(1
/4)*sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqr
t(d)*x**2)*elliptic_f(2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(4*sqrt(b
)*c**(1/4)*sqrt(c + d*x**4)*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a)))
 + sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt
(d)*x**2)*(sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))*elliptic_pi(-sqrt(
c)*(sqrt(b) - sqrt(d)*sqrt(-a)/sqrt(c))**2/(4*sqrt(b)*sqrt(d)*sqr
t(-a)), 2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(8*sqrt(b)*c**(1/4)*d**
(1/4)*sqrt(c + d*x**4)*(a*sqrt(d) + sqrt(b)*sqrt(c)*sqrt(-a))) +
sqrt((c + d*x**4)/(sqrt(c) + sqrt(d)*x**2)**2)*(sqrt(c) + sqrt(d)
*x**2)*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a))*elliptic_pi((sqrt(b)*
sqrt(c) + sqrt(d)*sqrt(-a))**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-a
)), 2*atan(d**(1/4)*x/c**(1/4)), 1/2)/(8*sqrt(b)*c**(1/4)*d**(1/4
)*sqrt(c + d*x**4)*(a*sqrt(d) - sqrt(b)*sqrt(c)*sqrt(-a)))
```

Mathematica [C] time = 0.0975071, size = 165, normalized size = 0.25

$$-\frac{7acx^3F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{3\left(a+bx^4\right)\sqrt{c+dx^4}\left(2x^4\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^2/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (-7*a*c*x^3*AppellF1[3/4, 1/2, 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)
])/(3*(a + b*x^4)*Sqrt[c + d*x^4]*(-7*a*c*AppellF1[3/4, 1/2, 1, 7
/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[7/4, 1/2,
 2, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[7/4, 3/2, 1,
 11/4, -((d*x^4)/c), -((b*x^4)/a)])))
```

Maple [C] time = 0.008, size = 191, normalized size = 0.3

$$\frac{1}{8b}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{1}{\_alpha}\left(-1Artanh\left(\frac{2\_alpha^2dx^2+2c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}x^2}{\sqrt{c}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/8/b*sum(1/_alpha*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha
^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*
d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/
c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2
)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/
2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^2}{(bx^4+a)\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^2/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^2}{(a+bx^4)\sqrt{c+dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(x**2/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^4 + a)\sqrt{dx^4 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^2/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

3.652 $\int \frac{1}{x^2(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=833

$$\frac{\sqrt{d}\sqrt{dx^4+cx}}{ac\left(\sqrt{d}x^2+\sqrt{c}\right)}-\frac{b\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a(bc-ad)}-\frac{b\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a(bc-ad)}$$
$$-\frac{\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{ac^{3/4}\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{d}(2bc+ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2ac^{3/4}(bc+ad)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt{b}\left(\frac{\sqrt{b}\sqrt[4]{c}}{\sqrt[4]{d}}-\frac{\sqrt{-a}\sqrt[4]{d}}{\sqrt[4]{c}}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt{b}\left(\frac{\sqrt[4]{d}\sqrt{-a}}{\sqrt[4]{c}}+\frac{\sqrt{b}\sqrt[4]{c}}{\sqrt[4]{d}}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt{dx^4+c}}{acx}$$

```
[Out] -(Sqrt[c + d*x^4]/(a*c*x)) + (Sqrt[d]*x*Sqrt[c + d*x^4])/(a*c*(Sq
rt[c] + Sqrt[d]*x^2)) - (b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))
]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x
^4]])/(4*a*(b*c - a*d)) - (b*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]
*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]]
)/(4*a*(b*c - a*d)) - (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c +
d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcTan[(d^(1/4)*x)/
c^(1/4)], 1/2])/(a*c^(3/4)*Sqrt[c + d*x^4]) + (d^(1/4)*(2*b*c + a
*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x
^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(2*a*c^(3/4
)*(b*c + a*d)*Sqrt[c + d*x^4]) + (Sqrt[b]*((Sqrt[b]*c^(1/4))/d^(1
/4) - (Sqrt[-a]*d^(1/4))/c^(1/4))*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
 + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c]
+ Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*Arc
Tan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a*(Sqrt[-a]*Sqrt[b]*Sqrt[c] -
a*Sqrt[d])*Sqrt[c + d*x^4]) - (Sqrt[b]*((Sqrt[b]*c^(1/4))/d^(1/4)
 + (Sqrt[-a]*d^(1/4))/c^(1/4))*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c +
d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] -
 (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*A
rcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a*(Sqrt[-a]*Sqrt[b]*Sqrt[c]
+ a*Sqrt[d])*Sqrt[c + d*x^4])
```

Rubi [A] time = 2.3975, antiderivative size = 1063, normalized size of antiderivative = 1.28, number

of steps used = 11, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$

$$\frac{\sqrt{d}\sqrt{dx^4+c}x}{ac\left(\sqrt{d}x^2+\sqrt{c}\right)} - \frac{b\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a(bc-ad)} - \frac{b\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{4a(bc-ad)}$$
$$- \frac{\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{ac^{3/4}\sqrt{dx^4+c}}$$
$$+ \frac{\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2ac^{3/4}\sqrt{dx^4+c}}$$
$$+ \frac{\sqrt{b}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$+ \frac{\sqrt{b}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^4+c}}$$
$$+ \frac{\sqrt{b}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$- \frac{\sqrt{b}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^4+c}}$$
$$- \frac{\sqrt{dx^4+c}}{acx}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/(x^2*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] -(Sqrt[c + d*x^4]/(a*c*x)) + (Sqrt[d]*x*Sqrt[c + d*x^4])/(a*c*(Sq
rt[c] + Sqrt[d]*x^2)) - (b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))
]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x
^4]])/(4*a*(b*c - a*d)) - (b*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]
*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]]
)/(4*a*(b*c - a*d)) - (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c +
d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcTan[(d^(1/4)*x)/
c^(1/4)], 1/2])/(a*c^(3/4)*Sqrt[c + d*x^4]) + (d^(1/4)*(Sqrt[c] +
 Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ellipti
cF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(2*a*c^(3/4)*Sqrt[c + d*x
^4]) + (Sqrt[b]*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/
(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)
], 1/2])/(4*a*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*Sqrt[c
 + d*x^4]) + (Sqrt[b]*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d
*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c
^(1/4)], 1/2])/(4*a*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*
Sqrt[c + d*x^4]) + (Sqrt[b]*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*
(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^
2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*
Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8
*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c
+ d*x^4]) - (Sqrt[b]*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c
] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Elli
pticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqr
t[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*a
*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c +
d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.488435, size = 344, normalized size = 0.41

$$\frac{\frac{49x^4(bc-ad)F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)\left(2x^4\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}-\frac{33bdx}{(a+bx^4)\left(2x^4\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right.\right.}}{21x\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] ((-21*(c + d*x^4))/(a*c) + (49*(b*c - a*d)*x^4*AppellF1[3/4, 1/2,
 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)])/((a + b*x^4)*(-7*a*c*Appell
F1[3/4, 1/2, 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*A
ppellF1[7/4, 1/2, 2, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*Appe
llF1[7/4, 3/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)]))) - (33*b*d*
x^8*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)])/((a
+ b*x^4)*(-11*a*c*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*
x^4)/a)] + 2*x^4*(2*b*c*AppellF1[11/4, 1/2, 2, 15/4, -((d*x^4)/c)
, -((b*x^4)/a)] + a*d*AppellF1[11/4, 3/2, 1, 15/4, -((d*x^4)/c),
-((b*x^4)/a)]))))/(21*x*Sqrt[c + d*x^4])
```

Maple [C] time = 0.02, size = 310, normalized size = 0.4

$$\frac{1}{a}\left(-\frac{1}{cx}\sqrt{dx^4+c}+i\sqrt{d}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\left(EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)-EllipticE\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\right)\frac{1}{\sqrt{c}}\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\right.$$

$$-\frac{1}{8a}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{1}{\_alpha}\left(-1Artanh\left(\frac{2\_alpha^2dx^2+2c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}x}{\sqrt{c}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/a*(-1/c*(d*x^4+c)^(1/2)/x+I*d^(1/2)/c^(1/2)/(I/c^(1/2)*d^(1/2))
^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^
(1/2)/(d*x^4+c)^(1/2)*(EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I)-E
llipticE(x*(I/c^(1/2)*d^(1/2))^(1/2),I)))-1/8/a*sum(1/_alpha*(-1/
((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*
c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3
*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1
/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1
/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^
(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4 + a)\sqrt{dx^4 + cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\left(a + bx^4\right)\sqrt{c + dx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral(1/(x**2*(a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4 + a)\sqrt{dx^4 + cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^4 + a)*sqrt(d*x^4 + c)*x^2), x)
```

3.653 $\int \frac{x^{15}}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=175

$$-\frac{a^2(6bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4b^{7/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^4}\left(-15a^2d^2-bdx^4(2bc-5ad)+8abcd+4b^2c^2\right)}{12b^3d^2(bc-ad)}+\frac{ax^8\sqrt{c+dx^4}}{4b\left(a+bx^4\right)(bc-ad)}$$

```
[Out] (a*x^8*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) - (Sqrt[c +
 d*x^4]*(4*b^2*c^2 + 8*a*b*c*d - 15*a^2*d^2 - b*d*(2*b*c - 5*a*d)
*x^4))/(12*b^3*d^2*(b*c - a*d)) - (a^2*(6*b*c - 5*a*d)*ArcTanh[(S
qrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*b^(7/2)*(b*c - a*d)^
(3/2))
```

Rubi [A] time = 0.495988, antiderivative size = 175, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{a^2(6bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4b^{7/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^4}\left(-15a^2d^2-bdx^4(2bc-5ad)+8abcd+4b^2c^2\right)}{12b^3d^2(bc-ad)}+\frac{ax^8\sqrt{c+dx^4}}{4b\left(a+bx^4\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^15/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (a*x^8*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) - (Sqrt[c +
 d*x^4]*(4*b^2*c^2 + 8*a*b*c*d - 15*a^2*d^2 - b*d*(2*b*c - 5*a*d)
*x^4))/(12*b^3*d^2*(b*c - a*d)) - (a^2*(6*b*c - 5*a*d)*ArcTanh[(S
qrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*b^(7/2)*(b*c - a*d)^
(3/2))
```

Rubi in Sympy [A] time = 41.7839, size = 158, normalized size = 0.9

$$\frac{a^2\left(5ad-6bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{4b^{\frac{7}{2}}\left(ad-bc\right)^{\frac{3}{2}}}-\frac{ax^8\sqrt{c+dx^4}}{4b\left(a+bx^4\right)\left(ad-bc\right)}-\frac{\sqrt{c+dx^4}\left(\frac{15a^2d^2}{4}-2abcd-b^2c^2-\frac{bdx^4(5ad-2bc)}{4}\right)}{3b^3d^2\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**15/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] a**2*(5*a*d - 6*b*c)*atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c
))/(4*b**(7/2)*(a*d - b*c)**(3/2)) - a*x**8*sqrt(c + d*x**4)/(4*b
*(a + b*x**4)*(a*d - b*c)) - sqrt(c + d*x**4)*(15*a**2*d**2/4 - 2
*a*b*c*d - b**2*c**2 - b*d*x**4*(5*a*d - 2*b*c)/4)/(3*b**3*d**2*(
a*d - b*c))
```

Mathematica [A] time = 0.551468, size = 130, normalized size = 0.74

$$\frac{1}{4}\left(\frac{\sqrt{c+dx^4}\left(\frac{3a^3}{(a+bx^4)(bc-ad)}-\frac{4(3ad+bc)}{d^2}+\frac{2bx^4}{d}\right)}{3b^3}+\frac{a^2(5ad-6bc)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{b^{7/2}(bc-ad)^{3/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^15/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((Sqrt[c + d*x^4]*((-4*(b*c + 3*a*d))/d^2 + (2*b*x^4)/d + (3*a^3)
/((b*c - a*d)*(a + b*x^4))))/(3*b^3) + (a^2*(-6*b*c + 5*a*d)*ArcT
anh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(b^(7/2)*(b*c - a
*d)^(3/2)))/4
```

Maple [B] time = 0.05, size = 923, normalized size = 5.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^15/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/6/b^2*(d*x^4+c)^(1/2)/d*x^4-1/3/b^2*(d*x^4+c)^(1/2)/d^2*c-1/b^3
*a/d*(d*x^4+c)^(1/2)-3/4*a^2/b^4/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d
-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b
)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(
-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-3/4*a^2/
b^4/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x
^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2
))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/
2))/(x^2+1/b*(-a*b)^(1/2)))+1/8*a^2/b^4*(-a*b)^(1/2)/(a*d-b*c)/(x
^2-1/b*(-a*b)^(1/2))*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)
/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/8*a^3/b^4*d/(a*d-b
*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x
^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2
))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/
2))/(x^2-1/b*(-a*b)^(1/2)))-1/8*a^2/b^4*(-a*b)^(1/2)/(a*d-b*c)/(x
^2+1/b*(-a*b)^(1/2))*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)
/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/8*a^3/b^4*d/(a*d-b
*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x
^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2
))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/
2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.256738, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2\left(b^{3}cd-ab^{2}d^{2}\right)x^{8}-4\,ab^{2}c^{2}-8\,a^{2}bcd+15\,a^{3}d^{2}-2\left(2\,b^{3}c^{2}+3\,ab^{2}cd-5\,a^{2}bd^{2}\right)x^{4}\right)\sqrt{dx^{4}+c}\sqrt{b^{2}c-abd}+3\left(6\,a^{3}bcd\right.}{24\left(ab^{4}cd^{2}-a^{2}b^{3}d^{3}+\left(b^{5}cd^{2}-ab^{4}d^{3}\right)x^{4}\right)\sqrt{b^{2}\cdots}} \right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/24*(2*(2*(b^3*c*d - a*b^2*d^2)*x^8 - 4*a*b^2*c^2 - 8*a^2*b*c*d
 + 15*a^3*d^2 - 2*(2*b^3*c^2 + 3*a*b^2*c*d - 5*a^2*b*d^2)*x^4)*sq
```

```
rt(d*x^4 + c)*sqrt(b^2*c - a*b*d) + 3*(6*a^3*b*c*d^2 - 5*a^4*d^3
+ (6*a^2*b^2*c*d^2 - 5*a^3*b*d^3)*x^4)*log(((b*d*x^4 + 2*b*c - a*
d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*x^4 + c)*(b^2*c - a*b*d))/(b*x^
4 + a)))/((a*b^4*c*d^2 - a^2*b^3*d^3 + (b^5*c*d^2 - a*b^4*d^3)*x^
4)*sqrt(b^2*c - a*b*d)), 1/12*((2*(b^3*c*d - a*b^2*d^2)*x^8 - 4*a
*b^2*c^2 - 8*a^2*b*c*d + 15*a^3*d^2 - 2*(2*b^3*c^2 + 3*a*b^2*c*d
- 5*a^2*b*d^2)*x^4)*sqrt(d*x^4 + c)*sqrt(-b^2*c + a*b*d) - 3*(6*a
^3*b*c*d^2 - 5*a^4*d^3 + (6*a^2*b^2*c*d^2 - 5*a^3*b*d^3)*x^4)*arc
tan(-(b*c - a*d)/(sqrt(d*x^4 + c)*sqrt(-b^2*c + a*b*d))))/((a*b^4
*c*d^2 - a^2*b^3*d^3 + (b^5*c*d^2 - a*b^4*d^3)*x^4)*sqrt(-b^2*c +
 a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**15/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221737, size = 243, normalized size = 1.39

$$\frac{\sqrt{dx^4 + c}a^3 d}{4\left(b^4 c - ab^3 d\right)\left((dx^4 + c)b - bc + ad\right)} + \frac{\left(6\,a^2 bc - 5\,a^3 d\right)\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2 c+abd}}\right)}{4\left(b^4 c - ab^3 d\right)\sqrt{-b^2 c + abd}} + \frac{\left(dx^4 + c\right)^{\frac{3}{2}} b^4 d^4 - 3\sqrt{dx^4 + c}b^4 cd^4 - 6\sqrt{dx^4 + c}ab^3 d^5}{6\,b^6 d^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] 1/4*sqrt(d*x^4 + c)*a^3*d/((b^4*c - a*b^3*d)*((d*x^4 + c)*b - b*c
 + a*d)) + 1/4*(6*a^2*b*c - 5*a^3*d)*arctan(sqrt(d*x^4 + c)*b/sqr
t(-b^2*c + a*b*d))/((b^4*c - a*b^3*d)*sqrt(-b^2*c + a*b*d)) + 1/6
*((d*x^4 + c)^(3/2)*b^4*d^4 - 3*sqrt(d*x^4 + c)*b^4*c*d^4 - 6*sqr
t(d*x^4 + c)*a*b^3*d^5)/(b^6*d^6)
```

3.654 $\int \frac{x^{11}}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=123

$$-\frac{a^2\sqrt{c+dx^4}}{4b^2(a+bx^4)(bc-ad)}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4b^{5/2}(bc-ad)^{3/2}}+\frac{\sqrt{c+dx^4}}{2b^2d}$$

```
[Out] Sqrt[c + d*x^4]/(2*b^2*d) - (a^2*Sqrt[c + d*x^4])/(4*b^2*(b*c - a
*d)*(a + b*x^4)) + (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d
*x^4])/Sqrt[b*c - a*d]])/(4*b^(5/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.37161, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{a^2\sqrt{c+dx^4}}{4b^2(a+bx^4)(bc-ad)}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4b^{5/2}(bc-ad)^{3/2}}+\frac{\sqrt{c+dx^4}}{2b^2d}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] Sqrt[c + d*x^4]/(2*b^2*d) - (a^2*Sqrt[c + d*x^4])/(4*b^2*(b*c - a
*d)*(a + b*x^4)) + (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d
*x^4])/Sqrt[b*c - a*d]])/(4*b^(5/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 35.2634, size = 104, normalized size = 0.85

$$\frac{a^2\sqrt{c+dx^4}}{4b^2(a+bx^4)(ad-bc)}-\frac{a(3ad-4bc)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{4b^{\frac{5}{2}}(ad-bc)^{\frac{3}{2}}}+\frac{\sqrt{c+dx^4}}{2b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] a**2*sqrt(c + d*x**4)/(4*b**2*(a + b*x**4)*(a*d - b*c)) - a*(3*a*
d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(4*b**(
5/2)*(a*d - b*c)**(3/2)) + sqrt(c + d*x**4)/(2*b**2*d)
```

Mathematica [A] time = 0.369529, size = 107, normalized size = 0.87

$$\frac{1}{4}\left(\frac{\sqrt{c+dx^4}\left(\frac{a^2}{(a+bx^4)(ad-bc)}+\frac{2}{d}\right)}{b^2}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{b^{5/2}(bc-ad)^{3/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((Sqrt[c + d*x^4]*(2/d + a^2/((-(b*c) + a*d)*(a + b*x^4))))/b^2 +
 (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c -
a*d]])/(b^(5/2)*(b*c - a*d)^(3/2)))/4
```

Maple [B] time = 0.02, size = 876, normalized size = 7.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/2*(d*x^4+c)^(1/2)/b^2/d-1/8*a/b^3*(-a*b)^(1/2)/(a*d-b*c)/(x^2-1
/b*(-a*b)^(1/2))*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(
x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8*a^2/b^3*d/(a*d-b*c)/
(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1
/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2
*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/
(x^2-1/b*(-a*b)^(1/2)))+1/8*a/b^3*(-a*b)^(1/2)/(a*d-b*c)/(x^2+1/b
*(-a*b)^(1/2))*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^
2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8*a^2/b^3*d/(a*d-b*c)/(-
(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b
*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d
-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x
^2+1/b*(-a*b)^(1/2)))+1/2*a/b^3/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-
b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)
^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-
a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))+1/2*a/b^3
/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+
1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^
2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))
/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.234089, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2\left(b^2c-abd\right)x^4+2abc-3a^2d\right)\sqrt{dx^4+c}\sqrt{b^2c-abd}+\left(4a^2bcd-3a^3d^2+\left(4ab^2cd-3a^2bd^2\right)x^4\right)\log\left(\frac{(bdx^4+2bc-ad)}{}\right.}{8\left(ab^3cd-a^2b^2d^2+(b^4cd-ab^3d^2)x^4\right)\sqrt{b^2c-abd}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/8*(2*(2*(b^2*c - a*b*d)*x^4 + 2*a*b*c - 3*a^2*d)*sqrt(d*x^4 +
c)*sqrt(b^2*c - a*b*d) + (4*a^2*b*c*d - 3*a^3*d^2 + (4*a*b^2*c*d
- 3*a^2*b*d^2)*x^4)*log(((b*d*x^4 + 2*b*c - a*d)*sqrt(b^2*c - a*b
*d) + 2*sqrt(d*x^4 + c)*(b^2*c - a*b*d))/(b*x^4 + a)))/((a*b^3*c*
d - a^2*b^2*d^2 + (b^4*c*d - a*b^3*d^2)*x^4)*sqrt(b^2*c - a*b*d))
, 1/4*((2*(b^2*c - a*b*d)*x^4 + 2*a*b*c - 3*a^2*d)*sqrt(d*x^4 + c
)*sqrt(-b^2*c + a*b*d) + (4*a^2*b*c*d - 3*a^3*d^2 + (4*a*b^2*c*d
- 3*a^2*b*d^2)*x^4)*arctan(-(b*c - a*d)/(sqrt(d*x^4 + c)*sqrt(-b^
2*c + a*b*d))))/((a*b^3*c*d - a^2*b^2*d^2 + (b^4*c*d - a*b^3*d^2)
*x^4)*sqrt(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216983, size = 181, normalized size = 1.47

$$-\frac{\sqrt{dx^4+c}a^2d}{4\,(b^3c-ab^2d)((dx^4+c)b-bc+ad)}-\frac{\left(4\,abc-3\,a^2d\right)\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{4\,(b^3c-ab^2d)\sqrt{-b^2c+abd}}+\frac{\sqrt{dx^4+c}}{2\,b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -1/4*sqrt(d*x^4 + c)*a^2*d/((b^3*c - a*b^2*d)*((d*x^4 + c)*b - b*
c + a*d)) - 1/4*(4*a*b*c - 3*a^2*d)*arctan(sqrt(d*x^4 + c)*b/sqrt
(-b^2*c + a*b*d))/((b^3*c - a*b^2*d)*sqrt(-b^2*c + a*b*d)) + 1/2*
sqrt(d*x^4 + c)/(b^2*d)
```

3.655 $\int \frac{x^7}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=99

$$\frac{a\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4b^{3/2}(bc-ad)^{3/2}}$$

```
[Out] (a*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*b^(3/2)*
(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.228526, antiderivative size = 99, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{a\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4b^{3/2}(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (a*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*b^(3/2)*
(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 24.071, size = 80, normalized size = 0.81

$$-\frac{a\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(ad-bc)}+\frac{\left(\frac{ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2b^{\frac{3}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] -a*sqrt(c + d*x**4)/(4*b*(a + b*x**4)*(a*d - b*c)) + (a*d/2 - b*c
)*atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(2*b**(3/2)*(a*d
 - b*c)**(3/2))
```

Mathematica [A] time = 0.125253, size = 99, normalized size = 1.

$$\frac{a\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4b^{3/2}(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (a*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*b^(3/2)*
(b*c - a*d)^(3/2))
```

Maple [B] time = 0.016, size = 851, normalized size = 8.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/4/b^2/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)
/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)
^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b
)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/4/b^2/(-(a*d-b*c)/b)^(1/2)*ln(
(-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*
d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x
^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))+
1/8/b^2*(-a*b)^(1/2)/(a*d-b*c)/(x^2-1/b*(-a*b)^(1/2))*((x^2-1/b*(
-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b
*c)/b)^(1/2)+1/8*a/b^2*d/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a
*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)
/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b
*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/8/b^
2*(-a*b)^(1/2)/(a*d-b*c)/(x^2+1/b*(-a*b)^(1/2))*((x^2+1/b*(-a*b)^
(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)
^(1/2)+1/8*a/b^2*d/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c
)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1
/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b
)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.243263, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{dx^4+c}\sqrt{b^2c-abd}a+\left(\left(2b^2c-abd\right)x^4+2abc-a^2d\right)\log\left(\frac{\left(bdx^4+2bc-ad\right)\sqrt{b^2c-abd}-2\sqrt{dx^4+c}\left(b^2c-abd\right)}{bx^4+a}\right)}{8\left(\left(b^3c-ab^2d\right)x^4+ab^2c-a^2bd\right)\sqrt{b^2c-abd}}, \frac{\sqrt{dx^4+c}\sqrt{-b^2}\ldots}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/8*(2*sqrt(d*x^4 + c)*sqrt(b^2*c - a*b*d)*a + ((2*b^2*c - a*b*d
)*x^4 + 2*a*b*c - a^2*d)*log(((b*d*x^4 + 2*b*c - a*d)*sqrt(b^2*c
- a*b*d) - 2*sqrt(d*x^4 + c)*(b^2*c - a*b*d))/(b*x^4 + a)))/(((b^
3*c - a*b^2*d)*x^4 + a*b^2*c - a^2*b*d)*sqrt(b^2*c - a*b*d)), 1/4
*(sqrt(d*x^4 + c)*sqrt(-b^2*c + a*b*d)*a - ((2*b^2*c - a*b*d)*x^4
 + 2*a*b*c - a^2*d)*arctan(-(b*c - a*d)/(sqrt(d*x^4 + c)*sqrt(-b^
2*c + a*b*d))))/(((b^3*c - a*b^2*d)*x^4 + a*b^2*c - a^2*b*d)*sqrt
(-b^2*c + a*b*d))]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [A] time = 0.215374, size = 157, normalized size = 1.59

$$\frac{\frac{\sqrt{dx^4+c}ad^2}{(b^2c-abd)((dx^4+c)b-bc+ad)} + \frac{(2\,bcd-ad^2)\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{(b^2c-abd)\sqrt{-b^2c+abd}}}{4\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] 1/4*(sqrt(d*x^4 + c)*a*d^2/((b^2*c - a*b*d)*((d*x^4 + c)*b - b*c
+ a*d)) + (2*b*c*d - a*d^2)*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c
+ a*b*d))/((b^2*c - a*b*d)*sqrt(-b^2*c + a*b*d)))/d
```

3.656 $\int \frac{x^3}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=87

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4\sqrt{b}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^4}}{4\,(a+bx^4)\,(bc-ad)}$$

```
[Out] -Sqrt[c + d*x^4]/(4*(b*c - a*d)*(a + b*x^4)) + (d*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*Sqrt[b]*(b*c - a*d)^(3/2)
)
```

Rubi [A] time = 0.188381, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4\sqrt{b}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^4}}{4\,(a+bx^4)\,(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -Sqrt[c + d*x^4]/(4*(b*c - a*d)*(a + b*x^4)) + (d*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*Sqrt[b]*(b*c - a*d)^(3/2)
)
```

Rubi in Sympy [A] time = 20.4234, size = 70, normalized size = 0.8

$$\frac{\sqrt{c+dx^4}}{4\,(a+bx^4)\,(ad-bc)}+\frac{d\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{4\sqrt{b}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] sqrt(c + d*x**4)/(4*(a + b*x**4)*(a*d - b*c)) + d*atan(sqrt(b)*sq
rt(c + d*x**4)/sqrt(a*d - b*c))/(4*sqrt(b)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 0.144848, size = 84, normalized size = 0.97

$$\frac{\frac{\sqrt{c+dx^4}}{a+bx^4}-\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{\sqrt{b}\sqrt{bc-ad}}}{4ad-4bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (Sqrt[c + d*x^4]/(a + b*x^4) - (d*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4
])/Sqrt[b*c - a*d]])/(Sqrt[b]*Sqrt[b*c - a*d]))/(-4*b*c + 4*a*d)
```

Maple [B] time = 0.01, size = 541, normalized size = 6.2

$$-\frac{1}{8\,ab\,(ad-bc)}\sqrt{-ab}\sqrt{\left(x^2-\frac{1}{b}\sqrt{-ab}\right)^2 d+2\,\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\left(x^2-\frac{1}{b}\sqrt{-ab}\right)^{-1}$$
$$-\frac{d}{8\,(ad-bc)\,b}\ln\left(1\left(-2\,\frac{ad-bc}{b}+2\,\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)+2\,\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2-\frac{\sqrt{-ab}}{b}\right)^2 d+2\,\frac{\sqrt{-ab}d}{b}\left(x^2-\frac{\sqrt{-ab}}{b}\right)\right.\right.$$
$$+\frac{1}{8\,ab\,(ad-bc)}\sqrt{-ab}\sqrt{\left(x^2+\frac{1}{b}\sqrt{-ab}\right)^2 d-2\,\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)-\frac{ad-bc}{b}}\left(x^2+\frac{1}{b}\sqrt{-ab}\right)^{-1}$$
$$-\frac{d}{8\,(ad-bc)\,b}\ln\left(1\left(-2\,\frac{ad-bc}{b}-2\,\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)+2\,\sqrt{-\frac{ad-bc}{b}}\sqrt{\left(x^2+\frac{\sqrt{-ab}}{b}\right)^2 d-2\,\frac{\sqrt{-ab}d}{b}\left(x^2+\frac{\sqrt{-ab}}{b}\right)\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/8*(-a*b)^(1/2)/a/b/(a*d-b*c)/(x^2-1/b*(-a*b)^(1/2))*((x^2-1/b*
(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-
b*c)/b)^(1/2)-1/8/b*d/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-
b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)
^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-
a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))+1/8*(-a*b
)^(1/2)/a/b/(a*d-b*c)/(x^2+1/b*(-a*b)^(1/2))*((x^2+1/b*(-a*b)^(1/
2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1
/2)-1/8/b*d/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d
*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x
^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2)
)-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238405, size = 1, normalized size = 0.01

$$\left[-\frac{\left(bdx^4+ad\right)\log\left(\frac{(bdx^4+2\,bc-ad)\sqrt{b^2c-abd}-2\,\sqrt{dx^4+c}(b^2c-abd)}{bx^4+a}\right)+2\,\sqrt{dx^4+c}\sqrt{b^2c-abd}}{8\left((b^2c-abd)x^4+abc-a^2d\right)\sqrt{b^2c-abd}},\ \frac{\left(bdx^4+ad\right)\arctan\left(-\frac{bc-ad}{\sqrt{dx^4+c}\sqrt{-b^2c}}\right.}{4\left((b^2c-abd)x^4+abc\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [-1/8*((b*d*x^4 + a*d)*log(((b*d*x^4 + 2*b*c - a*d)*sqrt(b^2*c -
a*b*d) - 2*sqrt(d*x^4 + c)*(b^2*c - a*b*d))/(b*x^4 + a)) + 2*sqrt
(d*x^4 + c)*sqrt(b^2*c - a*b*d))/(((b^2*c - a*b*d)*x^4 + a*b*c -
a^2*d)*sqrt(b^2*c - a*b*d)), 1/4*((b*d*x^4 + a*d)*arctan(-(b*c -
a*d)/(sqrt(d*x^4 + c)*sqrt(-b^2*c + a*b*d))) - sqrt(d*x^4 + c)*sq
rt(-b^2*c + a*b*d))/(((b^2*c - a*b*d)*x^4 + a*b*c - a^2*d)*sqrt(-
```

```
b^2*c + a*b*d))]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [A] time = 0.214091, size = 124, normalized size = 1.43

$$-\frac{1}{4}\,d\left(\frac{\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}(bc-ad)}+\frac{\sqrt{dx^4+c}}{((dx^4+c)b-bc+ad)(bc-ad)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -1/4*d*(arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2
*c + a*b*d)*(b*c - a*d)) + sqrt(d*x^4 + c)/(((d*x^4 + c)*b - b*c
+ a*d)*(b*c - a*d)))
```

3.657 $\int \frac{1}{x(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=132

$$\frac{\sqrt{b}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4a^2(bc-ad)^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a^2\sqrt{c}}+\frac{b\sqrt{c+dx^4}}{4a\left(a+bx^4\right)(bc-ad)}$$

```
[Out] (b*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(a + b*x^4)) - ArcTanh[Sqrt[
c + d*x^4]/Sqrt[c]]/(2*a^2*Sqrt[c]) + (Sqrt[b]*(2*b*c - 3*a*d)*Ar
cTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*a^2*(b*c - a
*d)^(3/2))
```

Rubi [A] time = 0.384089, antiderivative size = 132, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\sqrt{b}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4a^2(bc-ad)^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a^2\sqrt{c}}+\frac{b\sqrt{c+dx^4}}{4a\left(a+bx^4\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (b*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(a + b*x^4)) - ArcTanh[Sqrt[
c + d*x^4]/Sqrt[c]]/(2*a^2*Sqrt[c]) + (Sqrt[b]*(2*b*c - 3*a*d)*Ar
cTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*a^2*(b*c - a
*d)^(3/2))
```

Rubi in Sympy [A] time = 47.7179, size = 114, normalized size = 0.86

$$-\frac{b\sqrt{c+dx^4}}{4a\left(a+bx^4\right)(ad-bc)}-\frac{\sqrt{b}\left(\frac{3ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{2a^2\left(ad-bc\right)^{\frac{3}{2}}}-\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{2a^2\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**4)/(4*a*(a + b*x**4)*(a*d - b*c)) - sqrt(b)*(3*a
*d/2 - b*c)*atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(2*a**
2*(a*d - b*c)**(3/2)) - atanh(sqrt(c + d*x**4)/sqrt(c))/(2*a**2*s
qrt(c))
```

Mathematica [C] time = 0.442581, size = 396, normalized size = 3.

$$\frac{b\left(\frac{6cdx^4F_1\left(1;\frac{1}{2},1;2;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{x^4\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{5dx^4\left(2ad+b\left(c+3dx^4\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)-3(c+dx}{a\left(-5bdx^4F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+2adF_1\left(\right.\right.}\right.}{12\left(a+bx^4\right)\sqrt{c+dx^4}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (b*((6*c*d*x^4*AppellF1[1, 1/2, 1, 2, -((d*x^4)/c), -((b*x^4)/a)]
)/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^4)/c), -((b*x^4)/a)] + x^
```

```
4*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^4)/c), -((b*x^4)/a)] + a*d
*AppellF1[2, 3/2, 1, 3, -((d*x^4)/c), -((b*x^4)/a)])) + (5*d*x^4*
(2*a*d + b*(c + 3*d*x^4))*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^4))
, -(a/(b*x^4))] - 3*(c + d*x^4)*(2*a*d*AppellF1[5/2, 1/2, 2, 7/2,
 -(c/(d*x^4)), -(a/(b*x^4))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c
/(d*x^4)), -(a/(b*x^4))]))/(a*(-5*b*d*x^4*AppellF1[3/2, 1/2, 1, 5
/2, -(c/(d*x^4)), -(a/(b*x^4))] + 2*a*d*AppellF1[5/2, 1/2, 2, 7/2
, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(
c/(d*x^4)), -(a/(b*x^4))]))))/(12*(-(b*c) + a*d)*(a + b*x^4)*Sqrt
[c + d*x^4])
```

Maple [B] time = 0.02, size = 880, normalized size = 6.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/2/a^2/c^(1/2)*ln((2*c+2*c^(1/2)*(d*x^4+c)^(1/2))/x^2)+1/8/a^2*
(-a*b)^(1/2)/(a*d-b*c)/(x^2-1/b*(-a*b)^(1/2))*((x^2-1/b*(-a*b)^(1
/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(
1/2)+1/8/a*d/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*
d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((
x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2
))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/8/a^2*(-a*b)^(1/
2)/(a*d-b*c)/(x^2+1/b*(-a*b)^(1/2))*((x^2+1/b*(-a*b)^(1/2))^2*d-2
*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/8/a
*d/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(
1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-
a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*
c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))+1/4/a^2/(-(a*d-b*c)/b)^(1/2)
*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(
-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/
b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2
)))+1/4/a^2/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1
/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a
*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c
)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^4+a\right)^2\sqrt{dx^4+c}\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x), x)
```

Fricas [A] time = 0.286573, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/8*(2*sqrt(d*x^4 + c)*a*b*sqrt(c) + ((2*b^2*c - 3*a*b*d)*x^4 +
2*a*b*c - 3*a^2*d)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^4 + 2*b
```

```
*c - a*d + 2*sqrt(d*x^4 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*
x^4 + a)) + 2*((b^2*c - a*b*d)*x^4 + a*b*c - a^2*d)*log(((d*x^4 +
 2*c)*sqrt(c) - 2*sqrt(d*x^4 + c)*c)/x^4))/((a^3*b*c - a^4*d + (a
^2*b^2*c - a^3*b*d)*x^4)*sqrt(c)), 1/4*(sqrt(d*x^4 + c)*a*b*sqrt(
c) + ((2*b^2*c - 3*a*b*d)*x^4 + 2*a*b*c - 3*a^2*d)*sqrt(c)*sqrt(-
b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x
^4 + c)*b)) + ((b^2*c - a*b*d)*x^4 + a*b*c - a^2*d)*log(((d*x^4 +
 2*c)*sqrt(c) - 2*sqrt(d*x^4 + c)*c)/x^4))/((a^3*b*c - a^4*d + (a
^2*b^2*c - a^3*b*d)*x^4)*sqrt(c)), 1/8*(2*sqrt(d*x^4 + c)*a*b*sqr
t(-c) + ((2*b^2*c - 3*a*b*d)*x^4 + 2*a*b*c - 3*a^2*d)*sqrt(-c)*sq
rt(b/(b*c - a*d))*log((b*d*x^4 + 2*b*c - a*d + 2*sqrt(d*x^4 + c)*
(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^4 + a)) + 4*((b^2*c - a*b*d
)*x^4 + a*b*c - a^2*d)*arctan(c/(sqrt(d*x^4 + c)*sqrt(-c))))/((a^
3*b*c - a^4*d + (a^2*b^2*c - a^3*b*d)*x^4)*sqrt(-c)), 1/4*(sqrt(d
*x^4 + c)*a*b*sqrt(-c) + ((2*b^2*c - 3*a*b*d)*x^4 + 2*a*b*c - 3*a
^2*d)*sqrt(-c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(
b*c - a*d))/(sqrt(d*x^4 + c)*b)) + 2*((b^2*c - a*b*d)*x^4 + a*b*c
 - a^2*d)*arctan(c/(sqrt(d*x^4 + c)*sqrt(-c))))/((a^3*b*c - a^4*d
 + (a^2*b^2*c - a^3*b*d)*x^4)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.215774, size = 207, normalized size = 1.57

$$-\frac{1}{4}\,d^2\left(\frac{\left(2\,b^2c-3\,abd\right)\,\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{\left(a^2bcd^2-a^3d^3\right)\sqrt{-b^2c+abd}}-\frac{\sqrt{dx^4+c}b}{\left(abcd-a^2d^2\right)\left(\left(dx^4+c\right)b-bc+ad\right)}-\frac{2\,\arctan\left(\frac{\sqrt{dx^4+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x),x, algorithm="giac")
```

```
[Out] -1/4*d^2*((2*b^2*c - 3*a*b*d)*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2*
c + a*b*d))/((a^2*b*c*d^2 - a^3*d^3)*sqrt(-b^2*c + a*b*d)) - sqrt
(d*x^4 + c)*b/((a*b*c*d - a^2*d^2)*((d*x^4 + c)*b - b*c + a*d)) -
 2*arctan(sqrt(d*x^4 + c)/sqrt(-c))/(a^2*sqrt(-c)*d^2))
```

3.658 $\int \frac{1}{x^5(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=185

$$-\frac{b^{3/2}(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4a^3(bc-ad)^{3/2}}+\frac{(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{4a^3c^{3/2}}-\frac{b\sqrt{c+dx^4}(2bc-ad)}{4a^2c\left(a+bx^4\right)(bc-ad)}-\frac{\sqrt{c+dx^4}}{4acx^4\left(a+bx^4\right)}$$

```
[Out] -(b*(2*b*c - a*d)*Sqrt[c + d*x^4])/(4*a^2*c*(b*c - a*d)*(a + b*x^
4)) - Sqrt[c + d*x^4]/(4*a*c*x^4*(a + b*x^4)) + ((4*b*c + a*d)*Ar
cTanh[Sqrt[c + d*x^4]/Sqrt[c]])/(4*a^3*c^(3/2)) - (b^(3/2)*(4*b*c
 - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*
a^3*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.648915, antiderivative size = 185, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{b^{3/2}(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{bc-ad}}\right)}{4a^3(bc-ad)^{3/2}}+\frac{(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{4a^3c^{3/2}}-\frac{b\sqrt{c+dx^4}(2bc-ad)}{4a^2c\left(a+bx^4\right)(bc-ad)}-\frac{\sqrt{c+dx^4}}{4acx^4\left(a+bx^4\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -(b*(2*b*c - a*d)*Sqrt[c + d*x^4])/(4*a^2*c*(b*c - a*d)*(a + b*x^
4)) - Sqrt[c + d*x^4]/(4*a*c*x^4*(a + b*x^4)) + ((4*b*c + a*d)*Ar
cTanh[Sqrt[c + d*x^4]/Sqrt[c]])/(4*a^3*c^(3/2)) - (b^(3/2)*(4*b*c
 - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^4])/Sqrt[b*c - a*d]])/(4*
a^3*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 75.4899, size = 158, normalized size = 0.85

$$-\frac{\sqrt{c+dx^4}}{4acx^4\left(a+bx^4\right)}-\frac{b\sqrt{c+dx^4}\,(ad-2bc)}{4a^2c\left(a+bx^4\right)(ad-bc)}+\frac{b^{\frac{3}{2}}\,(5ad-4bc)\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^4}}{\sqrt{ad-bc}}\right)}{4a^3\,(ad-bc)^{\frac{3}{2}}}+\frac{(ad+4bc)\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^4}}{\sqrt{c}}\right)}{4a^3c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**4)/(4*a*c*x**4*(a + b*x**4)) - b*sqrt(c + d*x**4)*
(a*d - 2*b*c)/(4*a**2*c*(a + b*x**4)*(a*d - b*c)) + b**(3/2)*(5*a
*d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**4)/sqrt(a*d - b*c))/(4*a**
3*(a*d - b*c)**(3/2)) + (a*d + 4*b*c)*atanh(sqrt(c + d*x**4)/sqrt
(c))/(4*a**3*c**(3/2))
```

Mathematica [C] time = 1.21083, size = 489, normalized size = 2.64

$$\frac{\frac{5bdx^4\left(-a^2d\left(3c+2dx^4\right)+3ab\left(c^2+cdx^4-d^2x^8\right)+2b^2cx^4\left(c+3dx^4\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+3\left(c+dx^4\right)\left(a^2d+ab\left(dx^4-c\right)-2b^2cx^4\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^4},-\frac{}{b}\right.\right.}{c(bc-ad)\left(-5bdx^4F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^4},-\frac{a}{bx^4}\right)\right)}}{12a^2x^4\left(a+bx^4\right)\sqrt{c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((6*a*b*d*(-2*b*c + a*d)*x^8*AppellF1[1, 1/2, 1, 2, -((d*x^4)/c),
 -((b*x^4)/a)])/((-(b*c) + a*d)*(-4*a*c*AppellF1[1, 1/2, 1, 2, -(
(d*x^4)/c), -((b*x^4)/a)] + x^4*(2*b*c*AppellF1[2, 1/2, 2, 3, -((
d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^4)/c
), -((b*x^4)/a)]))) + (5*b*d*x^4*(-(a^2*d*(3*c + 2*d*x^4)) + 2*b^
2*c*x^4*(c + 3*d*x^4) + 3*a*b*(c^2 + c*d*x^4 - d^2*x^8))*AppellF1
[3/2, 1/2, 1, 5/2, -(c/(d*x^4)), -(a/(b*x^4))] + 3*(c + d*x^4)*(a
^2*d - 2*b^2*c*x^4 + a*b*(-c + d*x^4))*(2*a*d*AppellF1[5/2, 1/2,
2, 7/2, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*AppellF1[5/2, 3/2, 1, 7
/2, -(c/(d*x^4)), -(a/(b*x^4))]))/(c*(b*c - a*d)*(-5*b*d*x^4*Appe
llF1[3/2, 1/2, 1, 5/2, -(c/(d*x^4)), -(a/(b*x^4))] + 2*a*d*Appell
F1[5/2, 1/2, 2, 7/2, -(c/(d*x^4)), -(a/(b*x^4))] + b*c*AppellF1[5
/2, 3/2, 1, 7/2, -(c/(d*x^4)), -(a/(b*x^4))]))))/(12*a^2*x^4*(a +
b*x^4)*Sqrt[c + d*x^4])
```

Maple [B] time = 0.02, size = 938, normalized size = 5.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/4/a^2/c/x^4*(d*x^4+c)^(1/2)+1/4/a^2*d/c^(3/2)*ln((2*c+2*c^(1/2
)*(d*x^4+c)^(1/2))/x^2)-1/8/a^3*b*(-a*b)^(1/2)/(a*d-b*c)/(x^2-1/b
*(-a*b)^(1/2))*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^
2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8/a^2*b*d/(a*d-b*c)/(-(a
*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(
-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2
*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2
-1/b*(-a*b)^(1/2)))+1/8/a^3*b*(-a*b)^(1/2)/(a*d-b*c)/(x^2+1/b*(-a
*b)^(1/2))*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/
b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8/a^2*b*d/(a*d-b*c)/(-(a*d-b
*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b
)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(
-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b
*(-a*b)^(1/2)))+b/a^3/c^(1/2)*ln((2*c+2*c^(1/2)*(d*x^4+c)^(1/2))/
x^2)-1/2/a^3*b/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)
^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*
(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-
b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/2/a^3*b/(-(a*d-b*c)/b)^(
1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))
+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1
/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^
(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)^2\sqrt{dx^4+c}\,x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^5),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^5), x)
```

Fricas [A] time = 0.358729, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^5),x, algorithm="fricas")
```

```
[Out] [1/8*(((4*b^3*c^2 - 5*a*b^2*c*d)*x^8 + (4*a*b^2*c^2 - 5*a^2*b*c*d
)*x^4)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^4 + 2*b*c - a*d - 2
*sqrt(d*x^4 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^4 + a)) -
2*((2*a*b^2*c - a^2*b*d)*x^4 + a^2*b*c - a^3*d)*sqrt(d*x^4 + c)*s
qrt(c) + ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^8 + (4*a*b^2*c^
2 - 3*a^2*b*c*d - a^3*d^2)*x^4)*log(((d*x^4 + 2*c)*sqrt(c) + 2*sq
rt(d*x^4 + c)*c)/x^4))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^8 + (a^4*b*c
^2 - a^5*c*d)*x^4)*sqrt(c)), -1/8*(2*((4*b^3*c^2 - 5*a*b^2*c*d)*x
^8 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^4)*sqrt(c)*sqrt(-b/(b*c - a*d)
)*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^4 + c)*b)) +
 2*((2*a*b^2*c - a^2*b*d)*x^4 + a^2*b*c - a^3*d)*sqrt(d*x^4 + c)*
sqrt(c) - ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^8 + (4*a*b^2*c
^2 - 3*a^2*b*c*d - a^3*d^2)*x^4)*log(((d*x^4 + 2*c)*sqrt(c) + 2*s
qrt(d*x^4 + c)*c)/x^4))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^8 + (a^4*b*
c^2 - a^5*c*d)*x^4)*sqrt(c)), 1/8*(((4*b^3*c^2 - 5*a*b^2*c*d)*x^8
 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^4)*sqrt(-c)*sqrt(b/(b*c - a*d))*
log((b*d*x^4 + 2*b*c - a*d - 2*sqrt(d*x^4 + c)*(b*c - a*d)*sqrt(b
/(b*c - a*d)))/(b*x^4 + a)) - 2*((2*a*b^2*c - a^2*b*d)*x^4 + a^2*
b*c - a^3*d)*sqrt(d*x^4 + c)*sqrt(-c) - 2*((4*b^3*c^2 - 3*a*b^2*c
*d - a^2*b*d^2)*x^8 + (4*a*b^2*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^4)*
arctan(c/(sqrt(d*x^4 + c)*sqrt(-c))))/(((a^3*b^2*c^2 - a^4*b*c*d)
*x^8 + (a^4*b*c^2 - a^5*c*d)*x^4)*sqrt(-c)), -1/4*(((4*b^3*c^2 -
5*a*b^2*c*d)*x^8 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^4)*sqrt(-c)*sqrt
(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d
*x^4 + c)*b)) + ((2*a*b^2*c - a^2*b*d)*x^4 + a^2*b*c - a^3*d)*sqr
t(d*x^4 + c)*sqrt(-c) + ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^
8 + (4*a*b^2*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^4)*arctan(c/(sqrt(d*x
^4 + c)*sqrt(-c))))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^8 + (a^4*b*c^2
- a^5*c*d)*x^4)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222698, size = 362, normalized size = 1.96

$$\frac{1}{4}\,d^3\left(\frac{\left(4\,b^3c-5\,ab^2d\right)\arctan\left(\frac{\sqrt{dx^4+c}b}{\sqrt{-b^2c+abd}}\right)}{(a^3bcd^3-a^4d^4)\sqrt{-b^2c+abd}}-\frac{2\,(dx^4+c)^{\frac{3}{2}}b^2c-2\,\sqrt{dx^4+c}b^2c^2-(dx^4+c)^{\frac{3}{2}}abd+2\,\sqrt{dx^4+c}abcd-\sqrt{dx^4}}{(a^2bc^2d^2-a^3cd^3)\left((dx^4+c)^2b-2\,(dx^4+c)bc+bc^2+(dx^4+c)ad-ac\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^5),x, algorithm="giac")
```

```
[Out] 1/4*d^3*((4*b^3*c - 5*a*b^2*d)*arctan(sqrt(d*x^4 + c)*b/sqrt(-b^2
*c + a*b*d))/((a^3*b*c*d^3 - a^4*d^4)*sqrt(-b^2*c + a*b*d)) - (2*
(d*x^4 + c)^(3/2)*b^2*c - 2*sqrt(d*x^4 + c)*b^2*c^2 - (d*x^4 + c)
^(3/2)*a*b*d + 2*sqrt(d*x^4 + c)*a*b*c*d - sqrt(d*x^4 + c)*a^2*d^
2)/((a^2*b*c^2*d^2 - a^3*c*d^3)*((d*x^4 + c)^2*b - 2*(d*x^4 + c)*
b*c + b*c^2 + (d*x^4 + c)*a*d - a*c*d)) - (4*b*c + a*d)*arctan(sq
rt(d*x^4 + c)/sqrt(-c))/(a^3*sqrt(-c)*c*d^3))
```

3.659 $\int \frac{x^{13}}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=191

$$\frac{a^{3/2}(5bc-4ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4b^3(bc-ad)^{3/2}}-\frac{(4ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^3d^{3/2}}+\frac{x^2\sqrt{c+dx^4}(bc-2ad)}{4b^2d(bc-ad)}+\frac{ax^6\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(bc-ad)}$$

```
[Out] ((b*c - 2*a*d)*x^2*Sqrt[c + d*x^4])/(4*b^2*d*(b*c - a*d)) + (a*x^
6*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) + (a^(3/2)*(5*b*
c - 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])
])/(4*b^3*(b*c - a*d)^(3/2)) - ((b*c + 4*a*d)*ArcTanh[(Sqrt[d]*x^
2)/Sqrt[c + d*x^4]])/(4*b^3*d^(3/2))
```

Rubi [A] time = 0.806463, antiderivative size = 191, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333

$$\frac{a^{3/2}(5bc-4ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4b^3(bc-ad)^{3/2}}-\frac{(4ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^3d^{3/2}}+\frac{x^2\sqrt{c+dx^4}(bc-2ad)}{4b^2d(bc-ad)}+\frac{ax^6\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^13/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((b*c - 2*a*d)*x^2*Sqrt[c + d*x^4])/(4*b^2*d*(b*c - a*d)) + (a*x^
6*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) + (a^(3/2)*(5*b*
c - 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])
])/(4*b^3*(b*c - a*d)^(3/2)) - ((b*c + 4*a*d)*ArcTanh[(Sqrt[d]*x^
2)/Sqrt[c + d*x^4]])/(4*b^3*d^(3/2))
```

Rubi in Sympy [A] time = 84.7295, size = 167, normalized size = 0.87

$$\frac{a^{\frac{3}{2}}\,(4ad-5bc)\,\text{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4b^3\,(ad-bc)^{\frac{3}{2}}}-\frac{ax^6\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(ad-bc)}+\frac{x^2\sqrt{c+dx^4}\,(2ad-bc)}{4b^2d\,(ad-bc)}-\frac{(4ad+bc)\,\text{atanh}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{4b^3d^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**13/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] a**(3/2)*(4*a*d - 5*b*c)*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt
(c + d*x**4)))/(4*b**3*(a*d - b*c)**(3/2)) - a*x**6*sqrt(c + d*x*
*4)/(4*b*(a + b*x**4)*(a*d - b*c)) + x**2*sqrt(c + d*x**4)*(2*a*d
 - b*c)/(4*b**2*d*(a*d - b*c)) - (4*a*d + b*c)*atanh(sqrt(d)*x**2
/sqrt(c + d*x**4))/(4*b**3*d**(3/2))
```

Mathematica [A] time = 0.631068, size = 150, normalized size = 0.79

$$\frac{\frac{a^{3/2}(5bc-4ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{(bc-ad)^{3/2}}+bx^2\sqrt{c+dx^4}\left(\frac{a^2}{(a+bx^4)(ad-bc)}+\frac{1}{d}\right)-\frac{(4ad+bc)\log\left(\sqrt{d}\sqrt{c+dx^4}+dx^2\right)}{d^{3/2}}}{4b^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^13/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (b*x^2*Sqrt[c + d*x^4]*(d^(-1) + a^2/((-(b*c) + a*d)*(a + b*x^4))
) + (a^(3/2)*(5*b*c - 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a
]*Sqrt[c + d*x^4])])/(b*c - a*d)^(3/2) - ((b*c + 4*a*d)*Log[d*x^2
 + Sqrt[d]*Sqrt[c + d*x^4]])/d^(3/2))/(4*b^3)
```

Maple [B] time = 0.045, size = 953, normalized size = 5.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^13/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/4/b^2*x^2/d*(d*x^4+c)^(1/2)-1/4/b^2*c/d^(3/2)*ln(x^2*d^(1/2)+(d
*x^4+c)^(1/2))-1/b^3*a*ln(x^2*d^(1/2)+(d*x^4+c)^(1/2))/d^(1/2)-5/
8*a^2/b^3/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*
d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((
x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2
))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))+5/8*a^2/b^3/(-a*b)
^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b
*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(
1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^
(1/2))/(x^2+1/b*(-a*b)^(1/2)))+1/8*a^2/b^3/(a*d-b*c)/(x^2-1/b*(-a
*b)^(1/2))*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/
b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8*a^2/b^4*d*(-a*b)^(1/2)/(a*
d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b
*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(
1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^
(1/2))/(x^2-1/b*(-a*b)^(1/2)))+1/8*a^2/b^3/(a*d-b*c)/(x^2+1/b*(-a
*b)^(1/2))*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/
b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/8*a^2/b^4*d*(-a*b)^(1/2)/(a*
d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b
*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(
1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^
(1/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{13}}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^13/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [A] time = 1.02205, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/16*((5*a^2*b*c*d - 4*a^3*d^2 + (5*a*b^2*c*d - 4*a^2*b*d^2)*x^4
)*sqrt(d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*
d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2 + 4*((b^2*c^2
- 3*a*b*c*d + 2*a^2*d^2)*x^6 - (a*b*c^2 - a^2*c*d)*x^2)*sqrt(d*x^
4 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^8 + 2*a*b*x^4 + a^2)) + 4*((b
^3*c - a*b^2*d)*x^6 + (a*b^2*c - 2*a^2*b*d)*x^2)*sqrt(d*x^4 + c)*
sqrt(d) + 2*(a*b^2*c^2 + 3*a^2*b*c*d - 4*a^3*d^2 + (b^3*c^2 + 3*a
*b^2*c*d - 4*a^2*b*d^2)*x^4)*log(2*sqrt(d*x^4 + c)*d*x^2 - (2*d*x
^4 + c)*sqrt(d)))/((a*b^4*c*d - a^2*b^3*d^2 + (b^5*c*d - a*b^4*d^
2)*x^4)*sqrt(d)), 1/16*((5*a^2*b*c*d - 4*a^3*d^2 + (5*a*b^2*c*d -
 4*a^2*b*d^2)*x^4)*sqrt(-d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 -
8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*
c^2 + 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^6 - (a*b*c^2 - a^2*c
*d)*x^2)*sqrt(d*x^4 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^8 + 2*a*b*x
^4 + a^2)) + 4*((b^3*c - a*b^2*d)*x^6 + (a*b^2*c - 2*a^2*b*d)*x^2
)*sqrt(d*x^4 + c)*sqrt(-d) - 4*(a*b^2*c^2 + 3*a^2*b*c*d - 4*a^3*d
^2 + (b^3*c^2 + 3*a*b^2*c*d - 4*a^2*b*d^2)*x^4)*arctan(sqrt(-d)*x
^2/sqrt(d*x^4 + c)))/((a*b^4*c*d - a^2*b^3*d^2 + (b^5*c*d - a*b^4
*d^2)*x^4)*sqrt(-d)), 1/8*((5*a^2*b*c*d - 4*a^3*d^2 + (5*a*b^2*c*
d - 4*a^2*b*d^2)*x^4)*sqrt(d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*
c - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*(b*c - a*d)*x^2*sqrt(a/(b*
c - a*d)))) + 2*((b^3*c - a*b^2*d)*x^6 + (a*b^2*c - 2*a^2*b*d)*x^
2)*sqrt(d*x^4 + c)*sqrt(d) + (a*b^2*c^2 + 3*a^2*b*c*d - 4*a^3*d^2
 + (b^3*c^2 + 3*a*b^2*c*d - 4*a^2*b*d^2)*x^4)*log(2*sqrt(d*x^4 +
c)*d*x^2 - (2*d*x^4 + c)*sqrt(d)))/((a*b^4*c*d - a^2*b^3*d^2 + (b
^5*c*d - a*b^4*d^2)*x^4)*sqrt(d)), 1/8*((5*a^2*b*c*d - 4*a^3*d^2
+ (5*a*b^2*c*d - 4*a^2*b*d^2)*x^4)*sqrt(-d)*sqrt(a/(b*c - a*d))*a
rctan(1/2*((b*c - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*(b*c - a*d)*
x^2*sqrt(a/(b*c - a*d)))) + 2*((b^3*c - a*b^2*d)*x^6 + (a*b^2*c -
 2*a^2*b*d)*x^2)*sqrt(d*x^4 + c)*sqrt(-d) - 2*(a*b^2*c^2 + 3*a^2*
b*c*d - 4*a^3*d^2 + (b^3*c^2 + 3*a*b^2*c*d - 4*a^2*b*d^2)*x^4)*ar
ctan(sqrt(-d)*x^2/sqrt(d*x^4 + c)))/((a*b^4*c*d - a^2*b^3*d^2 + (
b^5*c*d - a*b^4*d^2)*x^4)*sqrt(-d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**13/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.367785, size = 238, normalized size = 1.25

$$-\frac{a^{2} c \sqrt{d + \frac{c}{x^{4}}}}{4 \, {\left(b^{3} c - a b^{2} d\right)} {\left(b c + a {\left(d + \frac{c}{x^{4}}\right)} - a d\right)}} - \frac{{\left(5 \, a^{2} b c - 4 \, a^{3} d\right)} \arctan\left(\frac{a \sqrt{d + \frac{c}{x^{4}}}}{\sqrt{a b c - a^{2} d}}\right)}{4 \, {\left(b^{4} c - a b^{3} d\right)} \sqrt{a b c - a^{2} d}} + \frac{\sqrt{d x^{4} + c} x^{2}}{4 \, b^{2} d} + \frac{{\left(b c + 4 \, a d\right)} \arctan\left(\frac{\sqrt{d + \frac{c}{x^{4}}}}{\sqrt{-d}}\right)}{4 \, b^{3} \sqrt{-d} d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -1/4*a^2*c*sqrt(d + c/x^4)/((b^3*c - a*b^2*d)*(b*c + a*(d + c/x^4
) - a*d)) - 1/4*(5*a^2*b*c - 4*a^3*d)*arctan(a*sqrt(d + c/x^4)/sq
rt(a*b*c - a^2*d))/((b^4*c - a*b^3*d)*sqrt(a*b*c - a^2*d)) + 1/4*
sqrt(d*x^4 + c)*x^2/(b^2*d) + 1/4*(b*c + 4*a*d)*arctan(sqrt(d + c
/x^4)/sqrt(-d))/(b^3*sqrt(-d)*d)
```

3.660 $\int \frac{x^9}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=141

$$-\frac{\sqrt{a}(3bc-2ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4b^2(bc-ad)^{3/2}}+\frac{ax^2\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(bc-ad)}+\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b^2\sqrt{d}}$$

```
[Out] (a*x^2*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) - (Sqrt[a]*
(3*b*c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*
x^4])])/(4*b^2*(b*c - a*d)^(3/2)) + ArcTanh[(Sqrt[d]*x^2)/Sqrt[c
+ d*x^4]]/(2*b^2*Sqrt[d])
```

Rubi [A] time = 0.418507, antiderivative size = 141, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{\sqrt{a}(3bc-2ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4b^2(bc-ad)^{3/2}}+\frac{ax^2\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(bc-ad)}+\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b^2\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^9/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (a*x^2*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) - (Sqrt[a]*
(3*b*c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*
x^4])])/(4*b^2*(b*c - a*d)^(3/2)) + ArcTanh[(Sqrt[d]*x^2)/Sqrt[c
+ d*x^4]]/(2*b^2*Sqrt[d])
```

Rubi in Sympy [A] time = 50.2296, size = 122, normalized size = 0.87

$$-\frac{\sqrt{a}\,(2ad-3bc)\,\text{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4b^2\,(ad-bc)^{\frac{3}{2}}}-\frac{ax^2\sqrt{c+dx^4}}{4b\,(a+bx^4)\,(ad-bc)}+\frac{\text{atanh}\left(\frac{\sqrt{d}x^2}{\sqrt{c+dx^4}}\right)}{2b^2\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**9/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] -sqrt(a)*(2*a*d - 3*b*c)*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt
(c + d*x**4)))/(4*b**2*(a*d - b*c)**(3/2)) - a*x**2*sqrt(c + d*x*
*4)/(4*b*(a + b*x**4)*(a*d - b*c)) + atanh(sqrt(d)*x**2/sqrt(c +
d*x**4))/(2*b**2*sqrt(d))
```

Mathematica [A] time = 0.317793, size = 135, normalized size = 0.96

$$\frac{\frac{abx^2\sqrt{c+dx^4}}{(a+bx^4)(bc-ad)}+\frac{\sqrt{a}(2ad-3bc)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{(bc-ad)^{3/2}}+\frac{2\log\left(\sqrt{d}\sqrt{c+dx^4}+dx^2\right)}{\sqrt{d}}}{4b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^9/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((a*b*x^2*Sqrt[c + d*x^4])/((b*c - a*d)*(a + b*x^4)) + (Sqrt[a]*(
-3*b*c + 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*
x^4])])/(b*c - a*d)^(3/2) + (2*Log[d*x^2 + Sqrt[d]*Sqrt[c + d*x^4
```

```
]])/Sqrt[d])/(4*b^2)
```

Maple [B] time = 0.019, size = 893, normalized size = 6.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^9/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/2/b^2*ln(x^2*d^(1/2)+(d*x^4+c)^(1/2))/d^(1/2)-1/8*a/b^2/(a*d-b*
c)/(x^2-1/b*(-a*b)^(1/2))*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^
(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/8*a/b^3*d*(-a
*b)^(1/2)/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(
-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2
-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-
(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/8*a/b^2/(a*d-b*c)/(
x^2+1/b*(-a*b)^(1/2))*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2
)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8*a/b^3*d*(-a*b)^
(1/2)/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b
)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b
*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d
-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))+3/8*a/b^2/(-a*b)^(1/2)/(-
(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b
*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d
+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x
^2-1/b*(-a*b)^(1/2)))-3/8*a/b^2/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)
*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(
-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/
b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2
)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^9}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^9/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [A] time = 0.618587, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/16*(4*sqrt(d*x^4 + c)*a*b*sqrt(d)*x^2 + ((3*b^2*c - 2*a*b*d)*x
^4 + 3*a*b*c - 2*a^2*d)*sqrt(d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^
2 - 8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 +
a^2*c^2 - 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^6 - (a*b*c^2 - a
^2*c*d)*x^2)*sqrt(d*x^4 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^8 + 2*a
*b*x^4 + a^2)) + 4*((b^2*c - a*b*d)*x^4 + a*b*c - a^2*d)*log(-2*s
qrt(d*x^4 + c)*d*x^2 - (2*d*x^4 + c)*sqrt(d)))/((a*b^3*c - a^2*b^
2*d + (b^4*c - a*b^3*d)*x^4)*sqrt(d)), 1/16*(4*sqrt(d*x^4 + c)*a*
b*sqrt(-d)*x^2 + ((3*b^2*c - 2*a*b*d)*x^4 + 3*a*b*c - 2*a^2*d)*sq
```

```
rt(-d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2
)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2 - 4*((b^2*c^2 - 3
*a*b*c*d + 2*a^2*d^2)*x^6 - (a*b*c^2 - a^2*c*d)*x^2)*sqrt(d*x^4 +
 c)*sqrt(-a/(b*c - a*d)))/(b^2*x^8 + 2*a*b*x^4 + a^2)) + 8*((b^2*
c - a*b*d)*x^4 + a*b*c - a^2*d)*arctan(sqrt(-d)*x^2/sqrt(d*x^4 +
c)))/((a*b^3*c - a^2*b^2*d + (b^4*c - a*b^3*d)*x^4)*sqrt(-d)), 1/
8*(2*sqrt(d*x^4 + c)*a*b*sqrt(d)*x^2 - ((3*b^2*c - 2*a*b*d)*x^4 +
 3*a*b*c - 2*a^2*d)*sqrt(d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c
- 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*(b*c - a*d)*x^2*sqrt(a/(b*c
- a*d)))) + 2*((b^2*c - a*b*d)*x^4 + a*b*c - a^2*d)*log(-2*sqrt(d
*x^4 + c)*d*x^2 - (2*d*x^4 + c)*sqrt(d)))/((a*b^3*c - a^2*b^2*d +
 (b^4*c - a*b^3*d)*x^4)*sqrt(d)), 1/8*(2*sqrt(d*x^4 + c)*a*b*sqrt
(-d)*x^2 - ((3*b^2*c - 2*a*b*d)*x^4 + 3*a*b*c - 2*a^2*d)*sqrt(-d)
*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^4 - a*c)/(sqrt(d
*x^4 + c)*(b*c - a*d)*x^2*sqrt(a/(b*c - a*d)))) + 4*((b^2*c - a*b
*d)*x^4 + a*b*c - a^2*d)*arctan(sqrt(-d)*x^2/sqrt(d*x^4 + c)))/((
a*b^3*c - a^2*b^2*d + (b^4*c - a*b^3*d)*x^4)*sqrt(-d))]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [A] time = 0.230959, size = 205, normalized size = 1.45

$$\frac{1}{4}c^2\left(\frac{\left(3\,abc-2\,a^2d\right)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{\left(b^3c^3-ab^2c^2d\right)\sqrt{abc-a^2d}}+\frac{a\sqrt{d+\frac{c}{x^4}}}{\left(b^2c^2-abcd\right)\left(bc+a\left(d+\frac{c}{x^4}\right)-ad\right)}-\frac{2\,\arctan\left(\frac{\sqrt{d+\frac{c}{x^4}}}{\sqrt{-d}}\right)}{b^2c^2\sqrt{-d}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] 1/4*c^2*((3*a*b*c - 2*a^2*d)*arctan(a*sqrt(d + c/x^4)/sqrt(a*b*c
- a^2*d))/((b^3*c^3 - a*b^2*c^2*d)*sqrt(a*b*c - a^2*d)) + a*sqrt(
d + c/x^4)/((b^2*c^2 - a*b*c*d)*(b*c + a*(d + c/x^4) - a*d)) - 2*
arctan(sqrt(d + c/x^4)/sqrt(-d))/(b^2*c^2*sqrt(-d)))
```

3.661 $\int \frac{x^5}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=93

$$\frac{c\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4\sqrt{a}(bc-ad)^{3/2}}-\frac{x^2\sqrt{c+dx^4}}{4\left(a+bx^4\right)(bc-ad)}$$

```
[Out] -(x^2*Sqrt[c + d*x^4])/(4*(b*c - a*d)*(a + b*x^4)) + (c*ArcTan[(S
qrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(4*Sqrt[a]*(b*c -
 a*d)^(3/2))
```

Rubi [A] time = 0.252799, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{c\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4\sqrt{a}(bc-ad)^{3/2}}-\frac{x^2\sqrt{c+dx^4}}{4\left(a+bx^4\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -(x^2*Sqrt[c + d*x^4])/(4*(b*c - a*d)*(a + b*x^4)) + (c*ArcTan[(S
qrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(4*Sqrt[a]*(b*c -
 a*d)^(3/2))
```

Rubi in Sympy [A] time = 29.4446, size = 76, normalized size = 0.82

$$\frac{x^2\sqrt{c+dx^4}}{4\left(a+bx^4\right)(ad-bc)}-\frac{c\,\text{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4\sqrt{a}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] x**2*sqrt(c + d*x**4)/(4*(a + b*x**4)*(a*d - b*c)) - c*atanh(x**2
*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**4)))/(4*sqrt(a)*(a*d - b*
c)**(3/2))
```

Mathematica [A] time = 0.163808, size = 90, normalized size = 0.97

$$\frac{\frac{x^2\sqrt{c+dx^4}}{a+bx^4}-\frac{c\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{\sqrt{a}\sqrt{bc-ad}}}{4ad-4bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((x^2*Sqrt[c + d*x^4])/(a + b*x^4) - (c*ArcTan[(Sqrt[b*c - a*d]*x
^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(Sqrt[a]*Sqrt[b*c - a*d]))/(-4*b*
c + 4*a*d)
```

Maple [B] time = 0.017, size = 861, normalized size = 9.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/8/b/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(
-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2
-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-
(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))+1/8/b/(-a*b)^(1/2)/(-
(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b
*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d
-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x
^2+1/b*(-a*b)^(1/2)))+1/8/b/(a*d-b*c)/(x^2-1/b*(-a*b)^(1/2))*((x^
2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))
-(a*d-b*c)/b)^(1/2)-1/8/b^2*d*(-a*b)^(1/2)/(a*d-b*c)/(-(a*d-b*c)/
b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1
/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b
)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a
*b)^(1/2)))+1/8/b/(a*d-b*c)/(x^2+1/b*(-a*b)^(1/2))*((x^2+1/b*(-a*
b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)
/b)^(1/2)+1/8/b^2*d*(-a*b)^(1/2)/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*l
n((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(
a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*
(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2))
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^5/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [A] time = 0.344302, size = 1, normalized size = 0.01

$$\Bigg[-\frac{4\sqrt{dx^4+c}\sqrt{-abc+a^2d}\,x^2+\left(bcx^4+ac\right)\log\Bigg(-\frac{4\left(\left(ab^2c^2-3\,a^2bcd+2\,a^3d^2\right)x^6-\left(a^2bc^2-a^3cd\right)x^2\right)\sqrt{dx^4+c}-\left(\left(b^2c^2-8\,abcd+8\,a^2d^2\right)x^8-2\,(3\,a \cdots}{b^2x^8+2\,abx^4+a^2} \cdots}{16\left(\left(b^2c-abd\right)x^4+abc-a^2d\right)\sqrt{-abc+a^2d}} \cdots$$

$$-\frac{2\sqrt{dx^4+c}\sqrt{abc-a^2d}\,x^2-\left(bcx^4+ac\right)\arctan\left(\frac{(bc-2\,ad)x^4-ac}{2\sqrt{dx^4+c}\sqrt{abc-a^2d}\,x^2}\right)}{8\left(\left(b^2c-abd\right)x^4+abc-a^2d\right)\sqrt{abc-a^2d}}\Bigg]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [-1/16*(4*sqrt(d*x^4 + c)*sqrt(-a*b*c + a^2*d)*x^2 + (b*c*x^4 + a
*c)*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^6 - (a^2*b*c
^2 - a^3*c*d)*x^2)*sqrt(d*x^4 + c) - ((b^2*c^2 - 8*a*b*c*d + 8*a^
2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2)*sqrt(-a*b*c
 + a^2*d))/(b^2*x^8 + 2*a*b*x^4 + a^2)))/(((b^2*c - a*b*d)*x^4 +
a*b*c - a^2*d)*sqrt(-a*b*c + a^2*d)), -1/8*(2*sqrt(d*x^4 + c)*sqr
```

```
t(a*b*c - a^2*d)*x^2 - (b*c*x^4 + a*c)*arctan(1/2*((b*c - 2*a*d)*
x^4 - a*c)/(sqrt(d*x^4 + c)*sqrt(a*b*c - a^2*d)*x^2)))/(((b^2*c -
 a*b*d)*x^4 + a*b*c - a^2*d)*sqrt(a*b*c - a^2*d))]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [A] time = 0.224907, size = 124, normalized size = 1.33

$$-\frac{1}{4}c\left(\frac{\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}(bc-ad)}+\frac{\sqrt{d+\frac{c}{x^4}}}{\left(bc+a\left(d+\frac{c}{x^4}\right)-ad\right)(bc-ad)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -1/4*c*(arctan(a*sqrt(d + c/x^4)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*c
 - a^2*d)*(b*c - a*d)) + sqrt(d + c/x^4)/((b*c + a*(d + c/x^4) -
a*d)*(b*c - a*d)))
```

3.662 $\int \frac{x}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=104

$$\frac{(bc-2ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{3/2}(bc-ad)^{3/2}}+\frac{bx^2\sqrt{c+dx^4}}{4a\,(a+bx^4)\,(bc-ad)}$$

```
[Out] (b*x^2*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(a + b*x^4)) + ((b*c - 2
*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(4
*a^(3/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.222582, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{(bc-2ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{3/2}(bc-ad)^{3/2}}+\frac{bx^2\sqrt{c+dx^4}}{4a\,(a+bx^4)\,(bc-ad)}$$

Antiderivative was successfully verified.

```
[In] Int[x/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (b*x^2*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(a + b*x^4)) + ((b*c - 2
*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/(4
*a^(3/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 27.1056, size = 87, normalized size = 0.84

$$-\frac{bx^2\sqrt{c+dx^4}}{4a\,(a+bx^4)\,(ad-bc)}+\frac{(2ad-bc)\,\text{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{\frac{3}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] -b*x**2*sqrt(c + d*x**4)/(4*a*(a + b*x**4)*(a*d - b*c)) + (2*a*d
- b*c)*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**4)))/(4*
a**(3/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 0.176686, size = 104, normalized size = 1.

$$\frac{\frac{\sqrt{a}bx^2\sqrt{c+dx^4}}{(a+bx^4)(bc-ad)}+\frac{(bc-2ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{(bc-ad)^{3/2}}}{4a^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((Sqrt[a]*b*x^2*Sqrt[c + d*x^4])/((b*c - a*d)*(a + b*x^4)) + ((b*
c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])
])/(b*c - a*d)^(3/2))/(4*a^(3/2))
```

Maple [B] time = 0.009, size = 867, normalized size = 8.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/8/a/(a*d-b*c)/(x^2-1/b*(-a*b)^(1/2))*((x^2-1/b*(-a*b)^(1/2))^2
*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1
/8/b/a*d*(-a*b)^(1/2)/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-
b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)
^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-
a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/8/a/(a*
d-b*c)/(x^2+1/b*(-a*b)^(1/2))*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a
*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8/b/a*d*(
-a*b)^(1/2)/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d
*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x
^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2)
)-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))-1/8/a/(-a*b)^(1/2)/
(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1
/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2
*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/
(x^2-1/b*(-a*b)^(1/2)))+1/8/a/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*l
n((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(
a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*
(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2))
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [A] time = 0.377797, size = 1, normalized size = 0.01

$$\left[\frac{4\sqrt{dx^4+c}\sqrt{-abc+a^2d}\,bx^2+\left(\left(b^2c-2\,abd\right)x^4+abc-2\,a^2d\right)\log\left(\frac{4\left(\left(ab^2c^2-3\,a^2bcd+2\,a^3d^2\right)x^6-\left(a^2bc^2-a^3cd\right)x^2\right)\sqrt{dx^4+c}+\left(\left(b^2c^2-8\right.\right.}{b^2x^8+2\,abx^4\cdots}\right.}{16\left((ab^2c-a^2bd)x^4+a^2bc-a^3d\right)\sqrt{-abc+a^2d}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] [1/16*(4*sqrt(d*x^4 + c)*sqrt(-a*b*c + a^2*d)*b*x^2 + ((b^2*c - 2
*a*b*d)*x^4 + a*b*c - 2*a^2*d)*log((4*((a*b^2*c^2 - 3*a^2*b*c*d +
 2*a^3*d^2)*x^6 - (a^2*b*c^2 - a^3*c*d)*x^2)*sqrt(d*x^4 + c) + ((
b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)*
x^4 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^8 + 2*a*b*x^4 + a^2))
)/(((a*b^2*c - a^2*b*d)*x^4 + a^2*b*c - a^3*d)*sqrt(-a*b*c + a^2*
d)), 1/8*(2*sqrt(d*x^4 + c)*sqrt(a*b*c - a^2*d)*b*x^2 + ((b^2*c -
 2*a*b*d)*x^4 + a*b*c - 2*a^2*d)*arctan(1/2*((b*c - 2*a*d)*x^4 -
a*c)/(sqrt(d*x^4 + c)*sqrt(a*b*c - a^2*d)*x^2)))/(((a*b^2*c - a^2
*b*d)*x^4 + a^2*b*c - a^3*d)*sqrt(a*b*c - a^2*d))]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [A] time = 0.230097, size = 320, normalized size = 3.08

$$-\frac{1}{4}\,d^{\frac{3}{2}}\left(\frac{(bc-2\,ad)\arctan\left(\frac{\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^2 b-bc+2\,ad}{2\,\sqrt{abcd-a^2d^2}}\right)}{\left(abcd-a^2d^2\right)^{\frac{3}{2}}}+\frac{2\left(\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^2 bc-2\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^2 ad-bc^2\right)}{\left(\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^4 b-2\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^2 bc+4\left(\sqrt{d}x^2-\sqrt{dx^4+c}\right)^2 ad+bc^2\right)\left(abcd-a^2d^2\right)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] -1/4*d^(3/2)*((b*c - 2*a*d)*arctan(1/2*((sqrt(d)*x^2 - sqrt(d*x^4
 + c))^2*b - b*c + 2*a*d)/sqrt(a*b*c*d - a^2*d^2))/(a*b*c*d - a^2
*d^2)^(3/2) + 2*((sqrt(d)*x^2 - sqrt(d*x^4 + c))^2*b*c - 2*(sqrt(
d)*x^2 - sqrt(d*x^4 + c))^2*a*d - b*c^2)/(((sqrt(d)*x^2 - sqrt(d*
x^4 + c))^4*b - 2*(sqrt(d)*x^2 - sqrt(d*x^4 + c))^2*b*c + 4*(sqrt
(d)*x^2 - sqrt(d*x^4 + c))^2*a*d + b*c^2)*(a*b*c*d - a^2*d^2)))
```

3.663 $\int \frac{1}{x^3(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=149

$$-\frac{b(3bc-4ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{5/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^4}(3bc-2ad)}{4a^2cx^2(bc-ad)}+\frac{b\sqrt{c+dx^4}}{4ax^2\left(a+bx^4\right)(bc-ad)}$$

```
[Out] -((3*b*c - 2*a*d)*Sqrt[c + d*x^4])/(4*a^2*c*(b*c - a*d)*x^2) + (b
*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*x^2*(a + b*x^4)) - (b*(3*b*c -
 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/
(4*a^(5/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.515258, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{b(3bc-4ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{5/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^4}(3bc-2ad)}{4a^2cx^2(bc-ad)}+\frac{b\sqrt{c+dx^4}}{4ax^2\left(a+bx^4\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -((3*b*c - 2*a*d)*Sqrt[c + d*x^4])/(4*a^2*c*(b*c - a*d)*x^2) + (b
*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*x^2*(a + b*x^4)) - (b*(3*b*c -
 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqrt[a]*Sqrt[c + d*x^4])])/
(4*a^(5/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 66.9363, size = 129, normalized size = 0.87

$$-\frac{b\sqrt{c+dx^4}}{4ax^2\left(a+bx^4\right)(ad-bc)}-\frac{\sqrt{c+dx^4}\,(2ad-3bc)}{4a^2cx^2\,(ad-bc)}-\frac{b\,(4ad-3bc)\,\mathrm{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{\frac{5}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**4)/(4*a*x**2*(a + b*x**4)*(a*d - b*c)) - sqrt(c
+ d*x**4)*(2*a*d - 3*b*c)/(4*a**2*c*x**2*(a*d - b*c)) - b*(4*a*d
- 3*b*c)*atanh(x**2*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**4)))/(
4*a**(5/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 2.24231, size = 172, normalized size = 1.15

$$\frac{1}{4}\sqrt{c+dx^4}\left(\frac{bx^6(4ad-3bc)\sin^{-1}\left(\frac{\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^4}{a}+1}}\right)}{a^4c^2\sqrt{\frac{bx^4}{a}+1}\left(\frac{x^4(bc-ad)}{ac}\right)^{3/2}\sqrt{\frac{a(c+dx^4)}{c(a+bx^4)}}}+\frac{\frac{b^2x^4}{(a+bx^4)(ad-bc)}-\frac{2}{c}}{a^2x^2}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (Sqrt[c + d*x^4]*((-2/c + (b^2*x^4)/((-(b*c) + a*d)*(a + b*x^4)))
/(a^2*x^2) + (b*(-3*b*c + 4*a*d)*x^6*ArcSin[Sqrt[(b/a - d/c)*x^4]
/Sqrt[1 + (b*x^4)/a]])/(a^4*c^2*(((b*c - a*d)*x^4)/(a*c))^(3/2)*S
qrt[1 + (b*x^4)/a]*Sqrt[(a*(c + d*x^4))/(c*(a + b*x^4))])))/4
```

Maple [B] time = 0.021, size = 885, normalized size = 5.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/2/a^2/c/x^2*(d*x^4+c)^(1/2)+1/8*b/a^2/(a*d-b*c)/(x^2-1/b*(-a*b
)^(1/2))*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*
(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8/a^2*d*(-a*b)^(1/2)/(a*d-b*c)
/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-
1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^
2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))
/(x^2-1/b*(-a*b)^(1/2)))+1/8*b/a^2/(a*d-b*c)/(x^2+1/b*(-a*b)^(1/2
))*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)
^(1/2))-(a*d-b*c)/b)^(1/2)+1/8/a^2*d*(-a*b)^(1/2)/(a*d-b*c)/(-(a*
d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-
a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*
d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+
1/b*(-a*b)^(1/2)))+3/8*b/a^2/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln
((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a
*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(
x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))
-3/8*b/a^2/(-a*b)^(1/2)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2
*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*(
(x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/
2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^4+a\right)^2\sqrt{dx^4+c}\,x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^3), x)
```

Fricas [A] time = 0.404334, size = 1, normalized size = 0.01

$$\left[-\frac{4\left(\left(3\,b^2c-2\,abd\right)x^4+2\,abc-2\,a^2d\right)\sqrt{dx^4+c}\sqrt{-abc+a^2d}-\left(\left(3\,b^3c^2-4\,ab^2cd\right)x^6+\left(3\,ab^2c^2-4\,a^2bcd\right)x^2\right)\log\left(-\frac{4((c}{}\right.}{16\left((a^2b^2c^2-a^3bcd)x^6+(a^3bc^2-a^4cd\right.}\right.$$

$$-\frac{2\left(\left(3\,b^2c-2\,abd\right)x^4+2\,abc-2\,a^2d\right)\sqrt{dx^4+c}\sqrt{abc-a^2d}+\left(\left(3\,b^3c^2-4\,ab^2cd\right)x^6+\left(3\,ab^2c^2-4\,a^2bcd\right)x^2\right)\arctan\left(\frac{(b}{2\sqrt{dx}}\right.}{8\left((a^2b^2c^2-a^3bcd)x^6+(a^3bc^2-a^4cd)x^2\right)\sqrt{abc-a^2d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^3),x, algorithm="fricas")
```

```
[Out] [-1/16*(4*((3*b^2*c - 2*a*b*d)*x^4 + 2*a*b*c - 2*a^2*d)*sqrt(d*x^
4 + c)*sqrt(-a*b*c + a^2*d) - ((3*b^3*c^2 - 4*a*b^2*c*d)*x^6 + (3
*a*b^2*c^2 - 4*a^2*b*c*d)*x^2)*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d
+ 2*a^3*d^2)*x^6 - (a^2*b*c^2 - a^3*c*d)*x^2)*sqrt(d*x^4 + c) - (
(b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b*c^2 - 4*a^2*c*d)
*x^4 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^8 + 2*a*b*x^4 + a^2)
))/(((a^2*b^2*c^2 - a^3*b*c*d)*x^6 + (a^3*b*c^2 - a^4*c*d)*x^2)*s
qrt(-a*b*c + a^2*d)), -1/8*(2*((3*b^2*c - 2*a*b*d)*x^4 + 2*a*b*c
- 2*a^2*d)*sqrt(d*x^4 + c)*sqrt(a*b*c - a^2*d) + ((3*b^3*c^2 - 4*
a*b^2*c*d)*x^6 + (3*a*b^2*c^2 - 4*a^2*b*c*d)*x^2)*arctan(1/2*((b*
c - 2*a*d)*x^4 - a*c)/(sqrt(d*x^4 + c)*sqrt(a*b*c - a^2*d)*x^2)))
/(((a^2*b^2*c^2 - a^3*b*c*d)*x^6 + (a^3*b*c^2 - a^4*c*d)*x^2)*sqr
t(a*b*c - a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.225331, size = 181, normalized size = 1.21

$$-\frac{b^2c\sqrt{d+\frac{c}{x^4}}}{4\,(a^2bc-a^3d)\left(bc+a\left(d+\frac{c}{x^4}\right)-ad\right)}+\frac{(3\,b^2c-4\,abd)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{4\,(a^2bc-a^3d)\sqrt{abc-a^2d}}-\frac{\sqrt{d+\frac{c}{x^4}}}{2\,a^2c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^3),x, algorithm="giac")
```

```
[Out] -1/4*b^2*c*sqrt(d + c/x^4)/((a^2*b*c - a^3*d)*(b*c + a*(d + c/x^4
) - a*d)) + 1/4*(3*b^2*c - 4*a*b*d)*arctan(a*sqrt(d + c/x^4)/sqrt
(a*b*c - a^2*d))/((a^2*b*c - a^3*d)*sqrt(a*b*c - a^2*d)) - 1/2*sq
rt(d + c/x^4)/(a^2*c)
```

3.664 $\int \frac{1}{x^7(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=208

$$\frac{b^2(5bc-6ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{7/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^4}(5bc-2ad)}{12a^2cx^6(bc-ad)}+\frac{\sqrt{c+dx^4}\left(-4a^2d^2-8abcd+15b^2c^2\right)}{12a^3c^2x^2(bc-ad)}+\frac{b\sqrt{c+dx^4}}{4ax^6(a+bx^4)(bc-ad)}$$

```
[Out] -((5*b*c - 2*a*d)*Sqrt[c + d*x^4])/(12*a^2*c*(b*c - a*d)*x^6) + (
(15*b^2*c^2 - 8*a*b*c*d - 4*a^2*d^2)*Sqrt[c + d*x^4])/(12*a^3*c^2
*(b*c - a*d)*x^2) + (b*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*x^6*(a +
 b*x^4)) + (b^2*(5*b*c - 6*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqr
t[a]*Sqrt[c + d*x^4])])/(4*a^(7/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.869462, antiderivative size = 208, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{b^2(5bc-6ad)\tan^{-1}\left(\frac{x^2\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{7/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^4}(5bc-2ad)}{12a^2cx^6(bc-ad)}+\frac{\sqrt{c+dx^4}\left(-4a^2d^2-8abcd+15b^2c^2\right)}{12a^3c^2x^2(bc-ad)}+\frac{b\sqrt{c+dx^4}}{4ax^6(a+bx^4)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -((5*b*c - 2*a*d)*Sqrt[c + d*x^4])/(12*a^2*c*(b*c - a*d)*x^6) + (
(15*b^2*c^2 - 8*a*b*c*d - 4*a^2*d^2)*Sqrt[c + d*x^4])/(12*a^3*c^2
*(b*c - a*d)*x^2) + (b*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*x^6*(a +
 b*x^4)) + (b^2*(5*b*c - 6*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^2)/(Sqr
t[a]*Sqrt[c + d*x^4])])/(4*a^(7/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 136.229, size = 184, normalized size = 0.88

$$-\frac{b\sqrt{c+dx^4}}{4ax^6\left(a+bx^4\right)(ad-bc)}-\frac{\sqrt{c+dx^4}\left(2ad-5bc\right)}{12a^2cx^6\left(ad-bc\right)}+\frac{\sqrt{c+dx^4}\left(4a^2d^2+8abcd-15b^2c^2\right)}{12a^3c^2x^2\left(ad-bc\right)}+\frac{b^2\left(6ad-5bc\right)\operatorname{atanh}\left(\frac{x^2\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^4}}\right)}{4a^{\frac{7}{2}}\left(ad-bc\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**4)/(4*a*x**6*(a + b*x**4)*(a*d - b*c)) - sqrt(c
+ d*x**4)*(2*a*d - 5*b*c)/(12*a**2*c*x**6*(a*d - b*c)) + sqrt(c +
 d*x**4)*(4*a**2*d**2 + 8*a*b*c*d - 15*b**2*c**2)/(12*a**3*c**2*x
**2*(a*d - b*c)) + b**2*(6*a*d - 5*b*c)*atanh(x**2*sqrt(a*d - b*c
)/(sqrt(a)*sqrt(c + d*x**4)))/(4*a**(7/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 2.13903, size = 195, normalized size = 0.94

$$\frac{\sqrt{c+dx^4}\left(-\frac{2a^2}{c}+\frac{3ab^3x^8}{(a+bx^4)(bc-ad)}+\frac{3b^2x^{12}(5bc-6ad)\sin^{-1}\left(\frac{\sqrt{x^4\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^4}{a}+1}}\right)}{ac^2\sqrt{\frac{bx^4}{a}+1}\left(\frac{x^4(bc-ad)}{ac}\right)^{3/2}\sqrt{\frac{a\left(c+dx^4\right)}{c\left(a+bx^4\right)}}}+\frac{4ax^4(ad+3bc)}{c^2}\right)}{12a^4x^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^7*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (Sqrt[c + d*x^4]*((-2*a^2)/c + (4*a*(3*b*c + a*d)*x^4)/c^2 + (3*a
*b^3*x^8)/((b*c - a*d)*(a + b*x^4)) + (3*b^2*(5*b*c - 6*a*d)*x^12
*ArcSin[Sqrt[(b/a - d/c)*x^4]/Sqrt[1 + (b*x^4)/a]])/(a*c^2*(((b*c
 - a*d)*x^4)/(a*c))^(3/2)*Sqrt[1 + (b*x^4)/a]*Sqrt[(a*(c + d*x^4)
)/(c*(a + b*x^4))])))/(12*a^4*x^6)
```

Maple [B] time = 0.024, size = 923, normalized size = 4.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/6/a^2*(d*x^4+c)^(1/2)*(-2*d*x^4+c)/x^6/c^2-1/8/a^3*b^2/(a*d-b*
c)/(x^2-1/b*(-a*b)^(1/2))*((x^2-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^
(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)+1/8/a^3*b*d*(-a
*b)^(1/2)/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(
-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2
-1/b*(-a*b)^(1/2))^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-
(a*d-b*c)/b)^(1/2))/(x^2-1/b*(-a*b)^(1/2)))-1/8/a^3*b^2/(a*d-b*c)
/(x^2+1/b*(-a*b)^(1/2))*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1
/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)-1/8/a^3*b*d*(-a*b
)^(1/2)/(a*d-b*c)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a
*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1
/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a
*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b)^(1/2)))-5/8/a^3*b^2/(-a*b)^(1/2
)/(-(a*d-b*c)/b)^(1/2)*ln((-2*(a*d-b*c)/b+2*d*(-a*b)^(1/2)/b*(x^2
-1/b*(-a*b)^(1/2))+2*(-(a*d-b*c)/b)^(1/2)*((x^2-1/b*(-a*b)^(1/2))
^2*d+2*d*(-a*b)^(1/2)/b*(x^2-1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2)
)/(x^2-1/b*(-a*b)^(1/2)))+5/8/a^3*b^2/(-a*b)^(1/2)/(-(a*d-b*c)/b)
^(1/2)*ln((-2*(a*d-b*c)/b-2*d*(-a*b)^(1/2)/b*(x^2+1/b*(-a*b)^(1/2
))+2*(-(a*d-b*c)/b)^(1/2)*((x^2+1/b*(-a*b)^(1/2))^2*d-2*d*(-a*b)^
(1/2)/b*(x^2+1/b*(-a*b)^(1/2))-(a*d-b*c)/b)^(1/2))/(x^2+1/b*(-a*b
)^(1/2)))+b/a^3/c/x^2*(d*x^4+c)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)^2\sqrt{dx^4+c}x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^7),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^7), x)
```

Fricas [A] time = 0.60998, size = 1, normalized size = 0.

$$\left[\frac{4\left(\left(15\,b^3c^2 - 8\,ab^2cd - 4\,a^2bd^2\right)x^8 - 2\,a^2bc^2 + 2\,a^3cd + 2\left(5\,ab^2c^2 - 3\,a^2bcd - 2\,a^3d^2\right)x^4\right)\sqrt{dx^4+c}\sqrt{-abc+a^2d} + 3\left(\left(5\,b^4\right.\right.}{48\left(\left(a^3b^2c^3 - \right.\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^7),x, algorithm="fricas")
```

```
[Out] [1/48*(4*((15*b^3*c^2 - 8*a*b^2*c*d - 4*a^2*b*d^2)*x^8 - 2*a^2*b*
c^2 + 2*a^3*c*d + 2*(5*a*b^2*c^2 - 3*a^2*b*c*d - 2*a^3*d^2)*x^4)*
sqrt(d*x^4 + c)*sqrt(-a*b*c + a^2*d) + 3*((5*b^4*c^3 - 6*a*b^3*c^
2*d)*x^10 + (5*a*b^3*c^3 - 6*a^2*b^2*c^2*d)*x^6)*log((4*((a*b^2*c
^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^6 - (a^2*b*c^2 - a^3*c*d)*x^2)*sq
rt(d*x^4 + c) + ((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^8 - 2*(3*a*b
*c^2 - 4*a^2*c*d)*x^4 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^8 +
 2*a*b*x^4 + a^2)))/(((a^3*b^2*c^3 - a^4*b*c^2*d)*x^10 + (a^4*b*c
^3 - a^5*c^2*d)*x^6)*sqrt(-a*b*c + a^2*d)), 1/24*(2*((15*b^3*c^2
- 8*a*b^2*c*d - 4*a^2*b*d^2)*x^8 - 2*a^2*b*c^2 + 2*a^3*c*d + 2*(5
*a*b^2*c^2 - 3*a^2*b*c*d - 2*a^3*d^2)*x^4)*sqrt(d*x^4 + c)*sqrt(a
*b*c - a^2*d) + 3*((5*b^4*c^3 - 6*a*b^3*c^2*d)*x^10 + (5*a*b^3*c^
3 - 6*a^2*b^2*c^2*d)*x^6)*arctan(1/2*((b*c - 2*a*d)*x^4 - a*c)/(s
qrt(d*x^4 + c)*sqrt(a*b*c - a^2*d)*x^2)))/(((a^3*b^2*c^3 - a^4*b*
c^2*d)*x^10 + (a^4*b*c^3 - a^5*c^2*d)*x^6)*sqrt(a*b*c - a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**7/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.226708, size = 244, normalized size = 1.17

$$\frac{b^3c\sqrt{d+\frac{c}{x^4}}}{4\left(a^3bc - a^4d\right)\left(bc + a\left(d+\frac{c}{x^4}\right) - ad\right)} - \frac{\left(5\,b^3c - 6\,ab^2d\right)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^4}}}{\sqrt{abc-a^2d}}\right)}{4\left(a^3bc - a^4d\right)\sqrt{abc-a^2d}} + \frac{6\,a^3bc^5\sqrt{d+\frac{c}{x^4}} - a^4c^4\left(d+\frac{c}{x^4}\right)^{\frac{3}{2}} + 3\,a^4c^4\sqrt{d+\frac{c}{x^4}}\,d}{6\,a^6c^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^7),x, algorithm="giac")
```

```
[Out] 1/4*b^3*c*sqrt(d + c/x^4)/((a^3*b*c - a^4*d)*(b*c + a*(d + c/x^4)
 - a*d)) - 1/4*(5*b^3*c - 6*a*b^2*d)*arctan(a*sqrt(d + c/x^4)/sqr
t(a*b*c - a^2*d))/((a^3*b*c - a^4*d)*sqrt(a*b*c - a^2*d)) + 1/6*(
6*a^3*b*c^5*sqrt(d + c/x^4) - a^4*c^4*(d + c/x^4)^(3/2) + 3*a^4*c
^4*sqrt(d + c/x^4)*d)/(a^6*c^6)
```

3.665 $\int \frac{x^8}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=1043

result too large to display

```
[Out] (a*x*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) + ((5*b*c - 3
*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c +
d*x^4]])/(16*Sqrt[-a]*b^(5/2)*(-((b*c - a*d)/(Sqrt[-a]*Sqrt[b])))
^(3/2)) - ((5*b*c - 3*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqr
t[b])]*x)/Sqrt[c + d*x^4]])/(16*Sqrt[-a]*b^(5/2)*((b*c - a*d)/(Sq
rt[-a]*Sqrt[b]))^(3/2)) + ((4*b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2
)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[
(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^2*c^(1/4)*d^(1/4)*(b*c - a*d)*Sq
rt[c + d*x^4]) + (a*d^(1/4)*(5*b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^
2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan
[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sq
rt[c] - a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) - (a*d^(1/4)*(5*b
*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + S
qrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16
*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*(b*c - a*d)*S
qrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(5*b*c -
3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d
]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*S
qrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)],
1/2])/(32*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4
)*(b*c - a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqr
t[d])*(5*b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(S
qrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*S
qrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)
*x)/c^(1/4)], 1/2])/(32*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*S
qrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4])
```

Rubi [A] time = 3.35699, antiderivative size = 1043, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{a\sqrt{dx^4+c}\,x}{4b(bc-ad)(bx^4+a)}+\frac{(5bc-3ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{16\sqrt{-a}b^{5/2}\left(-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}\right)^{3/2}}-\frac{(5bc-3ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{16\sqrt{-a}b^{5/2}\left(\frac{bc-ad}{\sqrt{-a}\sqrt{b}}\right)^{3/2}}$$
$$+\frac{(4bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^2\sqrt[4]{c}\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{a\sqrt[4]{d}(5bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b^2\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{a\sqrt[4]{d}(5bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b^2\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(5bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32b^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(5bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32b^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^8/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (a*x*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(a + b*x^4)) + ((5*b*c - 3
*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c +
d*x^4]])/(16*Sqrt[-a]*b^(5/2)*(-((b*c - a*d)/(Sqrt[-a]*Sqrt[b])))
^(3/2)) - ((5*b*c - 3*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqr
t[b])]*x)/Sqrt[c + d*x^4]])/(16*Sqrt[-a]*b^(5/2)*((b*c - a*d)/(Sq
rt[-a]*Sqrt[b]))^(3/2)) + ((4*b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2
)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[
(d^(1/4)*x)/c^(1/4)], 1/2])/(8*b^2*c^(1/4)*d^(1/4)*(b*c - a*d)*Sq
rt[c + d*x^4]) + (a*d^(1/4)*(5*b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^
2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan
[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sq
rt[c] - a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) - (a*d^(1/4)*(5*b
*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + S
qrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16
*b^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*(b*c - a*d)*S
qrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(5*b*c -
3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d
]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*S
qrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)],
1/2])/(32*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4
)*(b*c - a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqr
t[d])*(5*b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(S
qrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*S
qrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)
*x)/c^(1/4)], 1/2])/(32*b^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*S
qrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.574204, size = 420, normalized size = 0.4

$$\frac{ax\left(\frac{25ac^2F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{10x^4(c+dx^4)\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1(\cdots}{2x^4\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+a\cdots}\right.}{20b\left(a+bx^4\right)\sqrt{c+dx^4}(bc-ad)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^8/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (a*x*((25*a*c^2*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4
)/a)])/(-5*a*c*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4)/c), -((b*x^4)
/a)] + 2*x^4*(2*b*c*AppellF1[5/4, 1/2, 2, 9/4, -((d*x^4)/c), -((b
*x^4)/a)] + a*d*AppellF1[5/4, 3/2, 1, 9/4, -((d*x^4)/c), -((b*x^4
)/a)])) + (-9*c*(5*a*c + 4*b*c*x^4 + 2*a*d*x^4)*AppellF1[5/4, 1/2
, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + 10*x^4*(c + d*x^4)*(2*b*c
*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*Ap
pellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/c), -((b*x^4)/a)]))/(-9*a*c*A
ppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*
b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d
*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/c), -((b*x^4)/a)]))))/(20*
b*(b*c - a*d)*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [C] time = 0.044, size = 604, normalized size = 0.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/b^2/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(
1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(
1/2)*d^(1/2))^(1/2),I)+a^2/b^2*(-1/4*b/a/(a*d-b*c)*x*(d*x^4+c)^(1
/2)/(b*x^4+a)-1/4*d/(a*d-b*c)/a/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^
(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c
)^(1/2)*EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I)-1/32/b/a*sum((-5
*a*d+3*b*c)/(a*d-b*c)/_alpha^3*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1
/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2
/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)
^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi
(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c
^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_
Z^4*b+a)))-1/4*a/b^3*sum(1/_alpha^3*(-1/((-a*d+b*c)/b)^(1/2)*arct
anh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/
2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)
*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*Ellip
ticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,
(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=Roo
tOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^8/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^8/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

3.666 $\int \frac{x^4}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=1026

result too large to display

```
[Out] -(x*Sqrt[c + d*x^4])/(4*(b*c - a*d)*(a + b*x^4)) + ((b*c + a*d)*A
rcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]]
)/(16*a*b*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) -
((b*c + a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt
[c + d*x^4]])/(16*(-a)^(3/2)*b^(3/2)*((b*c - a*d)/(Sqrt[-a]*Sqrt[
b]))^(3/2)) - (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(
Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)]
, 1/2])/(8*b*c^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) - (d^(1/4)*(b*c
 + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[
d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*b*c
^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a*d)*Sqrt[c
+ d*x^4]) + (d^(1/4)*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
+ d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x
)/c^(1/4)], 1/2])/(16*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqr
t[d])*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]
*Sqrt[d])*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(S
qrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*
Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4
)*x)/c^(1/4)], 1/2])/(32*a*b*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*
Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c]
 - Sqrt[-a]*Sqrt[d])*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
+ d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] +
 Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcT
an[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a*b*c^(1/4)*(Sqrt[b]*Sqrt[c] +
 Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4])
```

Rubi [A] time = 2.488, antiderivative size = 1026, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{\sqrt{dx^4+c}\,x}{4(bc-ad)\left(bx^4+a\right)}+\frac{(bc+ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{16ab(bc-ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{(bc+ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{16(-a)^{3/2}b^{3/2}\left(\frac{bc-ad}{\sqrt{-a}\sqrt{b}}\right)^{3/2}}-\frac{\sqrt[4]{d}(bc+ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}+\frac{\sqrt[4]{d}(bc+ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)(bc-ad)\sqrt{dx^4+c}}-\frac{d^{3/4}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}(bc-ad)\sqrt{dx^4+c}}+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc+ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32ab\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}+\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc+ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32ab\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^4/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -(x*Sqrt[c + d*x^4])/(4*(b*c - a*d)*(a + b*x^4)) + ((b*c + a*d)*A
rcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c + d*x^4]]
)/(16*a*b*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) -
((b*c + a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt
[c + d*x^4]])/(16*(-a)^(3/2)*b^(3/2)*((b*c - a*d)/(Sqrt[-a]*Sqrt[
b]))^(3/2)) - (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(
Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)]
, 1/2])/(8*b*c^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) - (d^(1/4)*(b*c
 + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[
d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*b*c
^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a*d)*Sqrt[c
+ d*x^4]) + (d^(1/4)*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
+ d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x
)/c^(1/4)], 1/2])/(16*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqr
t[d])*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]
*Sqrt[d])*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(S
qrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*
Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4
)*x)/c^(1/4)], 1/2])/(32*a*b*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*
Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c]
 - Sqrt[-a]*Sqrt[d])*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c
+ d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] +
 Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcT
an[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a*b*c^(1/4)*(Sqrt[b]*Sqrt[c] +
 Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.329179, size = 331, normalized size = 0.32

$$\frac{x\left(\frac{25ac^2F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}-\frac{9acdx^4F_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\right.}{2x^4\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{9}{4};\frac{3}{2},1;\frac{13}{4};-\right.\right.}\right.}{20\left(a+bx^4\right)\sqrt{c+dx^4}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (x*(5*(c + d*x^4) + (25*a*c^2*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4
)/c), -((b*x^4)/a)])/(-5*a*c*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^4)
/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[5/4, 1/2, 2, 9/4, -((d
*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[5/4, 3/2, 1, 9/4, -((d*x^4
)/c), -((b*x^4)/a)])) - (9*a*c*d*x^4*AppellF1[5/4, 1/2, 1, 9/4, -
((d*x^4)/c), -((b*x^4)/a)])/(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4, -(
(d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[9/4, 1/2, 2, 13
/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4,
 -((d*x^4)/c), -((b*x^4)/a)]))))/(20*(-(b*c) + a*d)*(a + b*x^4)*S
qrt[c + d*x^4])
```

Maple [C] time = 0.017, size = 530, normalized size = 0.5

$$\frac{1}{8\,b^2}\sum_{\_alpha=RootOf(\_Z^4 b+a)}\frac{1}{\_alpha^3}\left(-1 Artanh\left(\frac{2\,\_alpha^2 dx^2+2\,c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\,\frac{\_alpha^3 b}{a\sqrt{dx^4+c}}\sqrt{1-\frac{i\sqrt{d}x}{\sqrt{c}}}\right.$$

$$-\frac{a}{b}\left(-\frac{bx}{4\,a\,(ad-bc)\,(bx^4+a)}\sqrt{dx^4+c}-\frac{d}{(4\,ad-4\,bc)\,a}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/8/b^2*sum(1/_alpha^3*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_a
lpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1
/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(
1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^
(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d
^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a)
)-a/b*(-1/4*b/a/(a*d-b*c)*x*(d*x^4+c)^(1/2)/(b*x^4+a)-1/4*d/(a*d-
b*c)/a/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*
(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^
(1/2)*d^(1/2))^(1/2),I)-1/32/b/a*sum((-5*a*d+3*b*c)/(a*d-b*c)/_al
pha^3*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)
/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2
)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/
2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1
/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/
c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^4+a)^2 \sqrt{dx^4+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

3.667 $\int \frac{1}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=1034

result too large to display

```
[Out] (b*x*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(a + b*x^4)) + ((3*b*c - 5
*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c +
d*x^4]])/(16*a^2*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]
))]) + ((3*b*c - 5*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b
])]*x)/Sqrt[c + d*x^4]])/(16*a^2*(b*c - a*d)*Sqrt[(b*c - a*d)/(Sq
rt[-a]*Sqrt[b])]) + (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*
x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^
(1/4)], 1/2])/(8*a*c^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) - (d^(1/4
)*(3*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[
c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2
])/(16*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a*
d)*Sqrt[c + d*x^4]) + (d^(1/4)*(3*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]
*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*Arc
Tan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*S
qrt[c] + a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt
[c] + Sqrt[-a]*Sqrt[d])*(3*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*S
qrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*S
qrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d])
, 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[b]*S
qrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) +
 ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(3*b*c - 5*a*d)*(Sqrt[c] +
 Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ellipti
cPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sq
rt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a^2*c^(1
/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt
[c + d*x^4])
```

Rubi [A] time = 2.28837, antiderivative size = 1034, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238

$$\frac{b\sqrt{dx^4+c}\,x}{4a(bc-ad)\left(bx^4+a\right)}+\frac{(3bc-5ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{16a^2(bc-ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{(3bc-5ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)}{16a^2(bc-ad)\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$-\frac{\sqrt[4]{d}(3bc-5ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{d}(3bc-5ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{d^{3/4}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(3bc-5ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(3bc-5ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (b*x*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(a + b*x^4)) + ((3*b*c - 5
*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c +
d*x^4]])/(16*a^2*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]
))]) + ((3*b*c - 5*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b
])]*x)/Sqrt[c + d*x^4]])/(16*a^2*(b*c - a*d)*Sqrt[(b*c - a*d)/(Sq
rt[-a]*Sqrt[b])]) + (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*
x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^
(1/4)], 1/2])/(8*a*c^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) - (d^(1/4
)*(3*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[
c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2
])/(16*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a*
d)*Sqrt[c + d*x^4]) + (d^(1/4)*(3*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]
*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*Arc
Tan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*S
qrt[c] + a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt
[c] + Sqrt[-a]*Sqrt[d])*(3*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*S
qrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*S
qrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d])
, 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[b]*S
qrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) +
 ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(3*b*c - 5*a*d)*(Sqrt[c] +
 Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ellipti
cPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sq
rt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a^2*c^(1
/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt
[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.529924, size = 341, normalized size = 0.33

$$\frac{x\left(\frac{9bcdx^4F_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{9}{4};\frac{3}{2},1;\frac{13}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-9acF_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{25c(3bc-4ad)F_1\left(\frac{1}{4};\frac{1}{2},1;\right.}{2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\right.\right.}\right.}{20\left(a+bx^4\right)\sqrt{c+dx^4}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (x*((-5*b*(c + d*x^4))/a + (25*c*(3*b*c - 4*a*d)*AppellF1[1/4, 1/
2, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)])/(-5*a*c*AppellF1[1/4, 1/2
, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[5/4
, 1/2, 2, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[5/4, 3/
2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)])) + (9*b*c*d*x^4*AppellF1[
5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)])/(-9*a*c*AppellF1[5
/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*Appel
lF1[9/4, 1/2, 2, 13/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1
[9/4, 3/2, 1, 13/4, -((d*x^4)/c), -((b*x^4)/a)]))))/(20*(-(b*c) +
 a*d)*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [C] time = 0.01, size = 333, normalized size = 0.3

$$-\frac{bx}{4a(ad-bc)(bx^4+a)}\sqrt{dx^4+c} - \frac{d}{(4ad-4bc)a}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+c}} - \frac{1}{32ab}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{-5ad+3bc}{(ad-bc)\_alpha^3}\left(-1Artanh\left(\frac{2\_alpha^2dx^2+2c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{\_alpha^3b}{a\sqrt{dx^4+}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/4*b/a/(a*d-b*c)*x*(d*x^4+c)^(1/2)/(b*x^4+a)-1/4*d/(a*d-b*c)/a/
(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^
(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d
^(1/2))^(1/2),I)-1/32/b/a*sum((-5*a*d+3*b*c)/(a*d-b*c)/_alpha^3*(
-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d
+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alph
a^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)
^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c
^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)
*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

3.668 $\int \frac{1}{x^4(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=1094

result too large to display

```
[Out] -((7*b*c - 4*a*d)*Sqrt[c + d*x^4])/(12*a^2*c*(b*c - a*d)*x^3) + (
b*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*x^3*(a + b*x^4)) - (b*(7*b*c
- 9*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c
 + d*x^4]])/(16*a^3*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt
[b]))]) - (b*(7*b*c - 9*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*S
qrt[b])]*x)/Sqrt[c + d*x^4]])/(16*a^3*(b*c - a*d)*Sqrt[(b*c - a*d
)/(Sqrt[-a]*Sqrt[b])]) + (b*d^(1/4)*(7*b*c - 9*a*d)*(Sqrt[c] + Sq
rt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[
2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*a^2*c^(1/4)*(Sqrt[-a]*Sq
rt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) - (b*d^(1
/4)*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqr
t[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1
/2])/(16*a^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*(b*c
- a*d)*Sqrt[c + d*x^4]) - (d^(3/4)*(7*b*c - 4*a*d)*(Sqrt[c] + Sqr
t[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2
*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(24*a^2*c^(5/4)*(b*c - a*d)*S
qrt[c + d*x^4]) - (b*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(7*b*c
- 9*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt
[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4
*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)]
, 1/2])/(32*a^3*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1
/4)*(b*c - a*d)*Sqrt[c + d*x^4]) - (b*(Sqrt[b]*Sqrt[c] - Sqrt[-a]
*Sqrt[d])*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4
)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-
a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(32*a^3*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-
a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4])
```

Rubi [A] time = 3.38484, antiderivative size = 1094, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{(7bc-9ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)b}{16a^3(bc-ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{(7bc-9ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x}{\sqrt{dx^4+c}}\right)b}{16a^3(bc-ad)\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$+\frac{\sqrt[4]{d}(7bc-9ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)b}{16a^2\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{d}(7bc-9ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)b}{16a^2\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(7bc-9ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)b}{32a^3\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(7bc-9ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)b}{32a^3\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt{dx^4+c}\,b}{4a(bc-ad)x^3\left(bx^4+a\right)}-\frac{d^{3/4}(7bc-4ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{24a^2c^{5/4}(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{(7bc-4ad)\sqrt{dx^4+c}}{12a^2c(bc-ad)x^3}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/(x^4*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -((7*b*c - 4*a*d)*Sqrt[c + d*x^4])/(12*a^2*c*(b*c - a*d)*x^3) + (
b*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*x^3*(a + b*x^4)) - (b*(7*b*c
- 9*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x)/Sqrt[c
 + d*x^4]])/(16*a^3*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt
[b]))]) - (b*(7*b*c - 9*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*S
qrt[b])]*x)/Sqrt[c + d*x^4]])/(16*a^3*(b*c - a*d)*Sqrt[(b*c - a*d
)/(Sqrt[-a]*Sqrt[b])]) + (b*d^(1/4)*(7*b*c - 9*a*d)*(Sqrt[c] + Sq
rt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[
2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*a^2*c^(1/4)*(Sqrt[-a]*Sq
rt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) - (b*d^(1
/4)*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqr
t[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1
/2])/(16*a^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*(b*c
- a*d)*Sqrt[c + d*x^4]) - (d^(3/4)*(7*b*c - 4*a*d)*(Sqrt[c] + Sqr
t[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2
*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(24*a^2*c^(5/4)*(b*c - a*d)*S
qrt[c + d*x^4]) - (b*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(7*b*c
- 9*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt
[d]*x^2)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4
*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)]
, 1/2])/(32*a^3*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1
/4)*(b*c - a*d)*Sqrt[c + d*x^4]) - (b*(Sqrt[b]*Sqrt[c] - Sqrt[-a]
*Sqrt[d])*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4
)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-
a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(32*a^3*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-
a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 1.2227, size = 399, normalized size = 0.36

$$\frac{\frac{25ax^4(4a^2d^2+20abcd-21b^2c^2)F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{5(c+dx^4)(-4a^2d+4ab(c-dx^4)+7b^2cx^4)}{c}+\frac{\cdots}{2x^4\left(2bcF_1\left(\cdots\right.\right.}}{60a^2x^3(a+bx^4)\sqrt{c+dx^4}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((5*(c + d*x^4)*(-4*a^2*d + 7*b^2*c*x^4 + 4*a*b*(c - d*x^4)))/c +
 (25*a*(-21*b^2*c^2 + 20*a*b*c*d + 4*a^2*d^2)*x^4*AppellF1[1/4, 1
/2, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)])/(-5*a*c*AppellF1[1/4, 1/
2, 1, 5/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[5/
4, 1/2, 2, 9/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[5/4, 3
/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)])) + (9*a*b*d*(-7*b*c + 4*
a*d)*x^8*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)])/
(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^4)/c), -((b*x^4)/a)] +
2*x^4*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^4)/c), -((b*x^4)/
a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^4)/c), -((b*x^4)/a)]
)))/(60*a^2*(-(b*c) + a*d)*x^3*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [C] time = 0.021, size = 626, normalized size = 0.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/a^2*(-1/3/c*(d*x^4+c)^(1/2)/x^3-1/3*d/c/(I/c^(1/2)*d^(1/2))^(1/
2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2
)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I))-b/a*(
-1/4*b/a/(a*d-b*c)*x*(d*x^4+c)^(1/2)/(b*x^4+a)-1/4*d/(a*d-b*c)/a/
(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^
(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticF(x*(I/c^(1/2)*d
^(1/2))^(1/2),I)-1/32/b/a*sum((-5*a*d+3*b*c)/(a*d-b*c)/_alpha^3*(
-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d
+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alph
a^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)
^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c
^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)
*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a))-1/8/a^2*sum(1/_alpha^
3*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-
a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_a
lpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x
^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),
I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1
/2)*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)^2\sqrt{dx^4+c}\,x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^4), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^4),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4 + a)^2 \sqrt{dx^4 + c}x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^4),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^4), x)
```

3.669 $\int \frac{x^6}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=1190

result too large to display

```
[Out] (Sqrt[d]*x*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x
^2)) - (x^3*Sqrt[c + d*x^4])/(4*(b*c - a*d)*(a + b*x^4)) + (Sqrt[
-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*(3*b*c - a*d)*ArcTan[(Sqrt[-((
b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(16*b*(b*c -
 a*d)^2) + (Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*(3*b*c - a*d)*Ar
cTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(
16*b*(b*c - a*d)^2) - (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sq
rt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(4*b*(b*c - a*d)*Sqrt[c + d*x^4]) + (c^(1
/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + S
qrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*
b*(b*c - a*d)*Sqrt[c + d*x^4]) - (d^(1/4)*(3*b*c - a*d)*(Sqrt[c]
+ Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ellipt
icF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*b^(3/2)*c^(1/4)*(Sqr
t[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) - (
d^(1/4)*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(S
qrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)],
 1/2])/(16*b^(3/2)*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(
b*c - a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d
])*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c
] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d
])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c
^(1/4)], 1/2])/(32*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*
Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c]
 + Sqrt[-a]*Sqrt[d])*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(
c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[
b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]),
 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*b^(3/2)*c^(1/4)*(Sqrt[-
a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^
4])
```

Rubi [A] time = 2.90306, antiderivative size = 1190, normalized size of antiderivative = 1., number

of steps used = 11, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$

$$-\frac{\sqrt{dx^4+c}\,x^3}{4(bc-ad)(bx^4+a)}+\frac{\sqrt{d}\sqrt{dx^4+c}\,x}{4b(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)}+\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}(3bc-ad)\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{16b(bc-ad)^2}$$
$$+\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}(3bc-ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{16b(bc-ad)^2}-\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{d}(3bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{d}(3bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(3bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32b^{3/2}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(3bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32b^{3/2}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^6/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (Sqrt[d]*x*Sqrt[c + d*x^4])/(4*b*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*x
^2)) - (x^3*Sqrt[c + d*x^4])/(4*(b*c - a*d)*(a + b*x^4)) + (Sqrt[
-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*(3*b*c - a*d)*ArcTan[(Sqrt[-((
b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(16*b*(b*c -
 a*d)^2) + (Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*(3*b*c - a*d)*Ar
cTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4]])/(
16*b*(b*c - a*d)^2) - (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sq
rt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(4*b*(b*c - a*d)*Sqrt[c + d*x^4]) + (c^(1
/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + S
qrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*
b*(b*c - a*d)*Sqrt[c + d*x^4]) - (d^(1/4)*(3*b*c - a*d)*(Sqrt[c]
+ Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*Ellipt
icF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*b^(3/2)*c^(1/4)*(Sqr
t[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) - (
d^(1/4)*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(S
qrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)],
 1/2])/(16*b^(3/2)*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(
b*c - a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d
])*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c
] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d
])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c
^(1/4)], 1/2])/(32*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*
Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt[b]*Sqrt[c]
 + Sqrt[-a]*Sqrt[d])*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(
c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[
b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]),
 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*b^(3/2)*c^(1/4)*(Sqrt[-
a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^
4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.313491, size = 333, normalized size = 0.28

$$\frac{x^3\left(\frac{49ac^2F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{11acdx^4F_1\left(\frac{7}{4};\frac{1}{2},1\cdots\right.}{2x^4\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{11}{4};\frac{3}{2},1;\cdots\right.\right.}\right.}{28\left(a+bx^4\right)\sqrt{c+dx^4}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^6/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (x^3*(7*(c + d*x^4) + (49*a*c^2*AppellF1[3/4, 1/2, 1, 7/4, -((d*x
^4)/c), -((b*x^4)/a)])/(-7*a*c*AppellF1[3/4, 1/2, 1, 7/4, -((d*x^
4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[7/4, 1/2, 2, 11/4, -
((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[7/4, 3/2, 1, 11/4, -((d
*x^4)/c), -((b*x^4)/a)])) + (11*a*c*d*x^4*AppellF1[7/4, 1/2, 1, 1
1/4, -((d*x^4)/c), -((b*x^4)/a)])/(-11*a*c*AppellF1[7/4, 1/2, 1,
11/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[11/4, 1
/2, 2, 15/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[11/4, 3/2
, 1, 15/4, -((d*x^4)/c), -((b*x^4)/a)]))))/(28*(-(b*c) + a*d)*(a
+ b*x^4)*Sqrt[c + d*x^4])
```

Maple [C] time = 0.049, size = 556, normalized size = 0.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/8/b^2*sum(1/_alpha*(-1/((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alp
ha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2
)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+
I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1
/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(
1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a))-
a/b*(-1/4*b/a/(a*d-b*c)*x^3*(d*x^4+c)^(1/2)/(b*x^4+a)+1/4*I*d^(1/
2)/(a*d-b*c)/a*c^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(
1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*(
EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I)-EllipticE(x*(I/c^(1/2)*d
^(1/2))^(1/2),I))-1/32/b/a*sum((-3*a*d+b*c)/(a*d-b*c)/_alpha*(-1/
((-a*d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*
c)/b)^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3
*b/a*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1
/2)/(d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1
/2)/d^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^
(1/2))^(1/2))),_alpha=RootOf(_Z^4*b+a)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\left(bx^4+a\right)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^6/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(bx^4 + a)^2 \sqrt{dx^4 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^6/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

3.670 $\int \frac{x^2}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=1200

result too large to display

```
[Out] -(Sqrt[d]*x*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*
x^2)) + (b*x^3*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(a + b*x^4)) + (
(b*c - 3*a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqr
t[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(16*a*(
b*c - a*d)^2) + ((b*c - 3*a*d)*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b]
)]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4
]])/(16*a*(b*c - a*d)^2) + (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^
2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcTan
[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*a*(b*c - a*d)*Sqrt[c + d*x^4]) -
(c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c
] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2]
)/(8*a*(b*c - a*d)*Sqrt[c + d*x^4]) - (d^(1/4)*(b*c - 3*a*d)*(Sqr
t[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*E
llipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*a*Sqrt[b]*c^(1/
4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^
4]) - (d^(1/4)*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*
x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^
(1/4)], 1/2])/(16*a*Sqrt[b]*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*S
qrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-
a]*Sqrt[d])*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4
)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-
a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(32*a*Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b]*S
qrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt
[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*
x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqr
t[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b
]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a*Sqrt[b]*c^
(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*(b*c - a*d)*
Sqrt[c + d*x^4])
```

Rubi [A] time = 2.79421, antiderivative size = 1200, normalized size of antiderivative = 1., number

of steps used = 11, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$

$$\frac{b\sqrt{dx^4+c}x^3}{4a(bc-ad)(bx^4+a)}-\frac{\sqrt{d}\sqrt{dx^4+c}x}{4a(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)}+\frac{(bc-3ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{16a(bc-ad)^2}$$
$$+\frac{(bc-3ad)\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)}{16a(bc-ad)^2}+\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{d}(bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{d}(bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a\sqrt{b}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-3ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a\sqrt{b}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^2/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -(Sqrt[d]*x*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(Sqrt[c] + Sqrt[d]*
x^2)) + (b*x^3*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*(a + b*x^4)) + (
(b*c - 3*a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqr
t[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c + d*x^4]])/(16*a*(
b*c - a*d)^2) + ((b*c - 3*a*d)*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b]
)]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x)/Sqrt[c + d*x^4
]])/(16*a*(b*c - a*d)^2) + (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^
2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticE[2*ArcTan
[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*a*(b*c - a*d)*Sqrt[c + d*x^4]) -
(c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c
] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2]
)/(8*a*(b*c - a*d)*Sqrt[c + d*x^4]) - (d^(1/4)*(b*c - 3*a*d)*(Sqr
t[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*E
llipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*a*Sqrt[b]*c^(1/
4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^
4]) - (d^(1/4)*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*
x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^
(1/4)], 1/2])/(16*a*Sqrt[b]*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*S
qrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-
a]*Sqrt[d])*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4
)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-
a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(
1/4)*x)/c^(1/4)], 1/2])/(32*a*Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b]*S
qrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + ((Sqrt
[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*
x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[-(Sqr
t[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b
]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a*Sqrt[b]*c^
(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*(b*c - a*d)*
Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.560904, size = 342, normalized size = 0.28

$$\frac{x^3\left(-\frac{33bcdx^4F_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{11}{4};\frac{3}{2},1;\frac{15}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-11acF_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{49c(bc-4ad)F_1}{2x^4\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{7}{4};\right.\right.}\right.}{84\left(a+bx^4\right)\sqrt{c+dx^4}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^2/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (x^3*((-21*b*(c + d*x^4))/a + (49*c*(b*c - 4*a*d)*AppellF1[3/4, 1
/2, 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)])/(-7*a*c*AppellF1[3/4, 1/
2, 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[7/
4, 1/2, 2, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[7/4,
3/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)])) - (33*b*c*d*x^4*Appel
lF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)])/(-11*a*c*Appe
llF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*
c*AppellF1[11/4, 1/2, 2, 15/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*
AppellF1[11/4, 3/2, 1, 15/4, -((d*x^4)/c), -((b*x^4)/a)]))))/(84*
(-(b*c) + a*d)*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [C] time = 0.012, size = 359, normalized size = 0.3

$$-\frac{bx^3}{4a(ad-bc)(bx^4+a)}\sqrt{dx^4+c}$$
$$+\frac{\frac{i}{4}}{a(ad-bc)}\sqrt{d}\sqrt{c}\sqrt{1-ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\sqrt{1+ix^2\sqrt{d}\frac{1}{\sqrt{c}}}\left(EllipticF\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)-EllipticE\left(x\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}},i\right)\right)\frac{1}{\sqrt{i\sqrt{d}\frac{1}{\sqrt{c}}}}\frac{1}{\sqrt{dx^4+}}$$
$$-\frac{1}{32ab}\sum_{\_alpha=RootOf(\_Z^4b+a)}\frac{-3ad+bc}{(ad-bc)\_alpha}\left(-1Artanh\left(\frac{2\_alpha^2dx^2+2c}{2}\frac{1}{\sqrt{\frac{-ad+bc}{b}}}\frac{1}{\sqrt{dx^4+c}}\right)\frac{1}{\sqrt{\frac{-ad+bc}{b}}}+2\frac{\_alpha^3b}{a\sqrt{dx^4+c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] -1/4*b/a/(a*d-b*c)*x^3*(d*x^4+c)^(1/2)/(b*x^4+a)+1/4*I*d^(1/2)/(a
*d-b*c)/a*c^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*
x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*(Ellip
ticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I)-EllipticE(x*(I/c^(1/2)*d^(1/2
))^(1/2),I))-1/32/b/a*sum((-3*a*d+b*c)/(a*d-b*c)/_alpha*(-1/((-a*
d+b*c)/b)^(1/2)*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)
^(1/2)/(d*x^4+c)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*
(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(
d*x^4+c)^(1/2)*EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d
^(1/2)*_alpha^2/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2)
)^(1/2))),_alpha=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^2/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Exception raised: ValueError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^2/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

3.671 $\int \frac{1}{x^2(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=1281

result too large to display

```
[Out] -((5*b*c - 4*a*d)*Sqrt[c + d*x^4])/(4*a^2*c*(b*c - a*d)*x) + (Sqr
t[d]*(5*b*c - 4*a*d)*x*Sqrt[c + d*x^4])/(4*a^2*c*(b*c - a*d)*(Sqr
t[c] + Sqrt[d]*x^2)) + (b*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*x*(a
+ b*x^4)) - (b*(5*b*c - 7*a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[
b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c +
 d*x^4]])/(16*a^2*(b*c - a*d)^2) - (b*(5*b*c - 7*a*d)*Sqrt[(b*c -
 a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt
[b])]*x)/Sqrt[c + d*x^4]])/(16*a^2*(b*c - a*d)^2) - (d^(1/4)*(5*b
*c - 4*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + S
qrt[d]*x^2)^2]*EllipticE[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*
a^2*c^(3/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + (Sqrt[b]*d^(1/4)*(5*b*
c - 7*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sq
rt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*
a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt
[c + d*x^4]) + (Sqrt[b]*d^(1/4)*(5*b*c - 7*a*d)*(Sqrt[c] + Sqrt[d
]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*Ar
cTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c]
 + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) + (d^(1/4)*(5*b
*c - 4*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + S
qrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*
a^2*c^(3/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + (Sqrt[b]*(Sqrt[b]*Sqrt
[c] - Sqrt[-a]*Sqrt[d])*(5*b*c - 7*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*S
qrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sq
rt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]),
 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[-a]*S
qrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4])
- (Sqrt[b]*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(5*b*c - 7*a*d)*(
Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2
]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/
(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2]
)/(32*a^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*
(b*c - a*d)*Sqrt[c + d*x^4])
```

Rubi [A] time = 3.78897, antiderivative size = 1281, normalized size of antiderivative = 1., number

of steps used = 12, number of rules used = 8, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$

$$-\frac{(5bc-7ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)b}{16a^2(bc-ad)^2}-\frac{(5bc-7ad)\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x}{\sqrt{dx^4+c}}\right)b}{16a^2(bc-ad)^2}$$
$$+\frac{\sqrt{dx^4+c}\,b}{4a(bc-ad)x\,(bx^4+a)}+\frac{\sqrt[4]{d}(5bc-7ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)\sqrt{b}}{16a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{d}(5bc-7ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)\sqrt{b}}{16a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(5bc-7ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)\sqrt{b}}{32a^2\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(5bc-7ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)\sqrt{b}}{32a^2\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{\sqrt[4]{d}(5bc-4ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4a^2c^{3/4}(bc-ad)\sqrt{dx^4+c}}$$
$$+\frac{\sqrt[4]{d}(5bc-4ad)\left(\sqrt{d}x^2+\sqrt{c}\right)\sqrt{\frac{dx^4+c}{\left(\sqrt{d}x^2+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2c^{3/4}(bc-ad)\sqrt{dx^4+c}}$$
$$-\frac{(5bc-4ad)\sqrt{dx^4+c}}{4a^2c(bc-ad)x}+\frac{\sqrt{d}(5bc-4ad)x\sqrt{dx^4+c}}{4a^2c(bc-ad)\left(\sqrt{d}x^2+\sqrt{c}\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/(x^2*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] -((5*b*c - 4*a*d)*Sqrt[c + d*x^4])/(4*a^2*c*(b*c - a*d)*x) + (Sqr
t[d]*(5*b*c - 4*a*d)*x*Sqrt[c + d*x^4])/(4*a^2*c*(b*c - a*d)*(Sqr
t[c] + Sqrt[d]*x^2)) + (b*Sqrt[c + d*x^4])/(4*a*(b*c - a*d)*x*(a
+ b*x^4)) - (b*(5*b*c - 7*a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[
b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x)/Sqrt[c +
 d*x^4]])/(16*a^2*(b*c - a*d)^2) - (b*(5*b*c - 7*a*d)*Sqrt[(b*c -
 a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt
[b])]*x)/Sqrt[c + d*x^4]])/(16*a^2*(b*c - a*d)^2) - (d^(1/4)*(5*b
*c - 4*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + S
qrt[d]*x^2)^2]*EllipticE[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(4*
a^2*c^(3/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + (Sqrt[b]*d^(1/4)*(5*b*
c - 7*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sq
rt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*
a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt
[c + d*x^4]) + (Sqrt[b]*d^(1/4)*(5*b*c - 7*a*d)*(Sqrt[c] + Sqrt[d
]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticF[2*Ar
cTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(16*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c]
 + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^4]) + (d^(1/4)*(5*b
*c - 4*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + S
qrt[d]*x^2)^2]*EllipticF[2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(8*
a^2*c^(3/4)*(b*c - a*d)*Sqrt[c + d*x^4]) + (Sqrt[b]*(Sqrt[b]*Sqrt
[c] - Sqrt[-a]*Sqrt[d])*(5*b*c - 7*a*d)*(Sqrt[c] + Sqrt[d]*x^2)*S
qrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2]*EllipticPi[(Sqrt[b]*Sq
rt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]),
 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[-a]*S
qrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^4])
- (Sqrt[b]*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(5*b*c - 7*a*d)*(
Sqrt[c] + Sqrt[d]*x^2)*Sqrt[(c + d*x^4)/(Sqrt[c] + Sqrt[d]*x^2)^2
]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/
(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x)/c^(1/4)], 1/2]
```

```
)/(32*a^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*
(b*c - a*d)*Sqrt[c + d*x^4])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 1.34036, size = 399, normalized size = 0.31

$$\frac{-\frac{49ax^4\left(4a^2d^2-12abcd+5b^2c^2\right)F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{2x^4\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}+\frac{21\left(c+dx^4\right)\left(-4a^2d+4ab\left(c-dx^4\right)+5b^2cx^4\right)}{c}+\frac{\cdots}{2x^4\left(2b\cdots\right.}}{84a^2x\left(a+bx^4\right)\sqrt{c+dx^4}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((21*(c + d*x^4)*(-4*a^2*d + 5*b^2*c*x^4 + 4*a*b*(c - d*x^4)))/c
- (49*a*(5*b^2*c^2 - 12*a*b*c*d + 4*a^2*d^2)*x^4*AppellF1[3/4, 1/
2, 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)])/(-7*a*c*AppellF1[3/4, 1/2
, 1, 7/4, -((d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(2*b*c*AppellF1[7/4
, 1/2, 2, 11/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[7/4, 3
/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)])) + (33*a*b*d*(5*b*c - 4
*a*d)*x^8*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)]
)/(-11*a*c*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^4)/c), -((b*x^4)/a)
] + 2*x^4*(2*b*c*AppellF1[11/4, 1/2, 2, 15/4, -((d*x^4)/c), -((b*
x^4)/a)] + a*d*AppellF1[11/4, 3/2, 1, 15/4, -((d*x^4)/c), -((b*x^
4)/a)])))/(84*a^2*(-(b*c) + a*d)*x*(a + b*x^4)*Sqrt[c + d*x^4])
```

Maple [C] time = 0.02, size = 674, normalized size = 0.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] 1/a^2*(-1/c*(d*x^4+c)^(1/2)/x+I*d^(1/2)/c^(1/2)/(I/c^(1/2)*d^(1/2
))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2
)^(1/2)/(d*x^4+c)^(1/2)*(EllipticF(x*(I/c^(1/2)*d^(1/2))^(1/2),I)
-EllipticE(x*(I/c^(1/2)*d^(1/2))^(1/2),I)))-b/a*(-1/4*b/a/(a*d-b*
c)*x^3*(d*x^4+c)^(1/2)/(b*x^4+a)+1/4*I*d^(1/2)/(a*d-b*c)/a*c^(1/2
)/(I/c^(1/2)*d^(1/2))^(1/2)*(1-I/c^(1/2)*d^(1/2)*x^2)^(1/2)*(1+I/
c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*(EllipticF(x*(I/c^(1/2
)*d^(1/2))^(1/2),I)-EllipticE(x*(I/c^(1/2)*d^(1/2))^(1/2),I))-1/3
2/b/a*sum((-3*a*d+b*c)/(a*d-b*c)/_alpha*(-1/((-a*d+b*c)/b)^(1/2)*
arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c)
^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^(
1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*E
llipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2/
a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alpha
=RootOf(_Z^4*b+a)))-1/8/a^2*sum(1/_alpha*(-1/((-a*d+b*c)/b)^(1/2)
*arctanh(1/2*(2*_alpha^2*d*x^2+2*c)/((-a*d+b*c)/b)^(1/2)/(d*x^4+c
```

```
)^(1/2))+2/(I/c^(1/2)*d^(1/2))^(1/2)*_alpha^3*b/a*(1-I/c^(1/2)*d^
(1/2)*x^2)^(1/2)*(1+I/c^(1/2)*d^(1/2)*x^2)^(1/2)/(d*x^4+c)^(1/2)*
EllipticPi(x*(I/c^(1/2)*d^(1/2))^(1/2),I*c^(1/2)/d^(1/2)*_alpha^2
/a*b,(-I/c^(1/2)*d^(1/2))^(1/2)/(I/c^(1/2)*d^(1/2))^(1/2))),_alph
a=RootOf(_Z^4*b+a))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)^2 \sqrt{dx^4+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^4+a)^2 \sqrt{dx^4+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^4 + a)^2*sqrt(d*x^4 + c)*x^2), x)
```

3.672 $\int \frac{(ex)^m (a+bx^4)^2}{\sqrt{c+dx^4}} \, dx$

Optimal. Leaf size=200

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\left(a^2d^2(m+3)(m+7)+bc(m+1)(bc(m+5)-2ad(m+7))\right)\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{d^2e(m+1)(m+3)(m+7)\sqrt{c+dx^4}} - \frac{b\sqrt{c+dx^4}(ex)^{m+1}(bc(m+5)-2ad(m+7))}{d^2e(m+3)(m+7)} + \frac{b^2\sqrt{c+dx^4}(ex)^{m+5}}{de^5(m+7)}$$

```
[Out] -((b*(b*c*(5 + m) - 2*a*d*(7 + m))*(e*x)^(1 + m)*Sqrt[c + d*x^4])
/(d^2*e*(3 + m)*(7 + m))) + (b^2*(e*x)^(5 + m)*Sqrt[c + d*x^4])/(
d*e^5*(7 + m)) + ((a^2*d^2*(3 + m)*(7 + m) + b*c*(1 + m)*(b*c*(5
+ m) - 2*a*d*(7 + m)))*(e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeo
metric2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)])/(d^2*e*(1 + m
)*(3 + m)*(7 + m)*Sqrt[c + d*x^4])
```

Rubi [A] time = 0.566222, antiderivative size = 194, normalized size of antiderivative = 0.97, number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\left(\frac{a^2d^2(m+7)}{m+1}+\frac{bc(bc(m+5)-2ad(m+7))}{m+3}\right)\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{d^2e(m+7)\sqrt{c+dx^4}} - \frac{b\sqrt{c+dx^4}(ex)^{m+1}(bc(m+5)-2ad(m+7))}{d^2e(m+3)(m+7)} + \frac{b^2\sqrt{c+dx^4}(ex)^{m+5}}{de^5(m+7)}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^m*(a + b*x^4)^2)/Sqrt[c + d*x^4],x]
```

```
[Out] -((b*(b*c*(5 + m) - 2*a*d*(7 + m))*(e*x)^(1 + m)*Sqrt[c + d*x^4])
/(d^2*e*(3 + m)*(7 + m))) + (b^2*(e*x)^(5 + m)*Sqrt[c + d*x^4])/(
d*e^5*(7 + m)) + (((a^2*d^2*(7 + m))/(1 + m) + (b*c*(b*c*(5 + m)
- 2*a*d*(7 + m)))/(3 + m))*(e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hype
rgeometric2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)])/(d^2*e*(7
 + m)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 46.3791, size = 180, normalized size = 0.9

$$\frac{b^2(ex)^{m+5}\sqrt{c+dx^4}}{de^5(m+7)} + \frac{b(ex)^{m+1}\sqrt{c+dx^4}(4ad+(m+5)(2ad-bc))}{d^2e(m+3)(m+7)} + \frac{(ex)^{m+1}\sqrt{c+dx^4}\left(a^2d^2(m+3)(m+7)-bc(m+1)(4ad+(m+5)(2ad-bc))\right)\,{}_2F_1\left(\left.\begin{matrix}\frac{1}{2},\frac{m}{4}+\frac{1}{4}\\\frac{m}{4}+\frac{5}{4}\end{matrix}\right|-\frac{dx^4}{c}\right)}{cd^2e\sqrt{1+\frac{dx^4}{c}}(m+1)(m+3)(m+7)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] b**2*(e*x)**(m + 5)*sqrt(c + d*x**4)/(d*e**5*(m + 7)) + b*(e*x)**
(m + 1)*sqrt(c + d*x**4)*(4*a*d + (m + 5)*(2*a*d - b*c))/(d**2*e*
(m + 3)*(m + 7)) + (e*x)**(m + 1)*sqrt(c + d*x**4)*(a**2*d**2*(m
+ 3)*(m + 7) - b*c*(m + 1)*(4*a*d + (m + 5)*(2*a*d - b*c)))*hyper
((1/2, m/4 + 1/4), (m/4 + 5/4,), -d*x**4/c)/(c*d**2*e*sqrt(1 + d*
x**4/c)*(m + 1)*(m + 3)*(m + 7))
```

Mathematica [A] time = 0.218335, size = 164, normalized size = 0.82

$$\frac{x\sqrt{\frac{dx^4}{c}+1}(ex)^m\left(a^2\left(m^2+14m+45\right)\ {}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)+b(m+1)x^4\left(2a(m+9)\,{}_2F_1\left(\frac{1}{2},\frac{m+5}{4};\frac{m+9}{4};-\frac{dx^4}{c}\right)+b(m+5)\right.\right.}{(m+1)(m+5)(m+9)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^m*(a + b*x^4)^2)/Sqrt[c + d*x^4],x]
```

```
[Out] (x*(e*x)^m*Sqrt[1 + (d*x^4)/c]*(a^2*(45 + 14*m + m^2)*Hypergeomet
ric2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)] + b*(1 + m)*x^4*(
2*a*(9 + m)*Hypergeometric2F1[1/2, (5 + m)/4, (9 + m)/4, -((d*x^4
)/c)] + b*(5 + m)*x^4*Hypergeometric2F1[1/2, (9 + m)/4, (13 + m)/
4, -((d*x^4)/c)])))/((1 + m)*(5 + m)*(9 + m)*Sqrt[c + d*x^4])
```

Maple [F] time = 0.047, size = 0, normalized size = 0.

$$\int (ex)^m \left(bx^4+a\right)^2 \frac{1}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m*(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

```
[Out] int((e*x)^m*(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^4+a\right)^2(ex)^m}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^4 + a)^2*(e*x)^m/sqrt(d*x^4 + c),x, algorithm="maxima")
```

```
[Out] integrate((b*x^4 + a)^2*(e*x)^m/sqrt(d*x^4 + c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(b^2x^8+2\,abx^4+a^2\right)(ex)^m}{\sqrt{dx^4+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^4 + a)^2*(e*x)^m/sqrt(d*x^4 + c),x, algorithm="fricas")
```

```
[Out] integral((b^2*x^8 + 2*a*b*x^4 + a^2)*(e*x)^m/sqrt(d*x^4 + c), x)
```

Sympy [A] time = 133.659, size = 185, normalized size = 0.92

$$\frac{a^2e^mxx^m\,\Gamma\left(\frac{m}{4}+\frac{1}{4}\right)\,{}_2F_1\left(\left.\begin{matrix}\frac{1}{2},\frac{m}{4}+\frac{1}{4}\\\frac{m}{4}+\frac{5}{4}\end{matrix}\right|\frac{dx^4e^{i\pi}}{c}\right)}{4\sqrt{c}\,\Gamma\left(\frac{m}{4}+\frac{5}{4}\right)}+\frac{abe^mx^5x^m\,\Gamma\left(\frac{m}{4}+\frac{5}{4}\right)\,{}_2F_1\left(\left.\begin{matrix}\frac{1}{2},\frac{m}{4}+\frac{5}{4}\\\frac{m}{4}+\frac{9}{4}\end{matrix}\right|\frac{dx^4e^{i\pi}}{c}\right)}{2\sqrt{c}\,\Gamma\left(\frac{m}{4}+\frac{9}{4}\right)}+\frac{b^2e^mx^9x^m\,\Gamma\left(\frac{m}{4}+\frac{9}{4}\right)\,{}_2F_1\left(\left.\begin{matrix}\frac{1}{2},\frac{m}{4}+\frac{9}{4}\\\frac{m}{4}+\frac{13}{4}\end{matrix}\right|\frac{dx^4e^{i\pi}}{c}\right)}{4\sqrt{c}\,\Gamma\left(\frac{m}{4}+\frac{13}{4}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m*(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] a**2*e**m*x*x**m*gamma(m/4 + 1/4)*hyper((1/2, m/4 + 1/4), (m/4 +
5/4,), d*x**4*exp_polar(I*pi)/c)/(4*sqrt(c)*gamma(m/4 + 5/4)) + a
*b*e**m*x**5*x**m*gamma(m/4 + 5/4)*hyper((1/2, m/4 + 5/4), (m/4 +
 9/4,), d*x**4*exp_polar(I*pi)/c)/(2*sqrt(c)*gamma(m/4 + 9/4)) +
b**2*e**m*x**9*x**m*gamma(m/4 + 9/4)*hyper((1/2, m/4 + 9/4), (m/4
 + 13/4,), d*x**4*exp_polar(I*pi)/c)/(4*sqrt(c)*gamma(m/4 + 13/4)
)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^4+a)^2(ex)^m}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^4 + a)^2*(e*x)^m/sqrt(d*x^4 + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^4 + a)^2*(e*x)^m/sqrt(d*x^4 + c), x)
```

3.673 $\int \frac{(ex)^m(a+bx^4)}{\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=123

$$\frac{b\sqrt{c+dx^4}(ex)^{m+1}}{de(m+3)}-\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}(bc(m+1)-ad(m+3))\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{de(m+1)(m+3)\sqrt{c+dx^4}}$$

```
[Out] (b*(e*x)^(1 + m)*Sqrt[c + d*x^4])/(d*e*(3 + m)) - ((b*c*(1 + m) -
 a*d*(3 + m))*(e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1
[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)])/(d*e*(1 + m)*(3 + m)*S
qrt[c + d*x^4])
```

Rubi [A] time = 0.183351, antiderivative size = 115, normalized size of antiderivative = 0.93, number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\left(\frac{a}{m+1}-\frac{bc}{d(m+3)}\right)\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{e\sqrt{c+dx^4}}+\frac{b\sqrt{c+dx^4}(ex)^{m+1}}{de(m+3)}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^m*(a + b*x^4))/Sqrt[c + d*x^4],x]
```

```
[Out] (b*(e*x)^(1 + m)*Sqrt[c + d*x^4])/(d*e*(3 + m)) + ((a/(1 + m) - (
b*c)/(d*(3 + m)))*(e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeometri
c2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)])/(e*Sqrt[c + d*x^4]
)
```

Rubi in Sympy [A] time = 18.3996, size = 100, normalized size = 0.81

$$\frac{b\,(ex)^{m+1}\sqrt{c+dx^4}}{de\,(m+3)}+\frac{(ex)^{m+1}\sqrt{c+dx^4}\,(ad\,(m+3)-bc\,(m+1))\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{m}{4}+\frac{1}{4}\\ \frac{m}{4}+\frac{5}{4}\end{matrix}\middle|-\frac{dx^4}{c}\right)}{cde\sqrt{1+\frac{dx^4}{c}}\,(m+1)\,(m+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] b*(e*x)**(m + 1)*sqrt(c + d*x**4)/(d*e*(m + 3)) + (e*x)**(m + 1)*
sqrt(c + d*x**4)*(a*d*(m + 3) - b*c*(m + 1))*hyper((1/2, m/4 + 1/
4), (m/4 + 5/4,), -d*x**4/c)/(c*d*e*sqrt(1 + d*x**4/c)*(m + 1)*(m
 + 3))
```

Mathematica [A] time = 0.133493, size = 110, normalized size = 0.89

$$\frac{x\sqrt{c+dx^4}(ex)^m\left((ad-bc)\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)+bc\,{}_2F_1\left(-\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)\right)}{cd(m+1)\sqrt{\frac{dx^4}{c}+1}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^m*(a + b*x^4))/Sqrt[c + d*x^4],x]
```

```
[Out] (x*(e*x)^m*Sqrt[c + d*x^4]*(b*c*Hypergeometric2F1[-1/2, (1 + m)/4
, (5 + m)/4, -((d*x^4)/c)] + (-(b*c) + a*d)*Hypergeometric2F1[1/2
```

```
, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)]))/(c*d*(1 + m)*Sqrt[1 + (d*
x^4)/c])
```

Maple [F] time = 0.036, size = 0, normalized size = 0.

$$\int (ex)^m \left(bx^4 + a\right) \frac{1}{\sqrt{dx^4 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m*(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] int((e*x)^m*(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^4 + a\right)(ex)^m}{\sqrt{dx^4 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^4 + a)*(e*x)^m/sqrt(d*x^4 + c),x, algorithm="maxima")
```

```
[Out] integrate((b*x^4 + a)*(e*x)^m/sqrt(d*x^4 + c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(bx^4 + a\right)(ex)^m}{\sqrt{dx^4 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^4 + a)*(e*x)^m/sqrt(d*x^4 + c),x, algorithm="fricas")
```

```
[Out] integral((b*x^4 + a)*(e*x)^m/sqrt(d*x^4 + c), x)
```

Sympy [A] time = 11.5919, size = 119, normalized size = 0.97

$$\frac{ae^m x x^m \Gamma\left(\frac{m}{4} + \frac{1}{4}\right) {}_2F_1\left(\left.\begin{matrix} \frac{1}{2}, \frac{m}{4} + \frac{1}{4} \\ \frac{m}{4} + \frac{5}{4} \end{matrix}\right| \frac{dx^4 e^{i\pi}}{c}\right)}{4\sqrt{c}\,\Gamma\left(\frac{m}{4} + \frac{5}{4}\right)} + \frac{be^m x^5 x^m \Gamma\left(\frac{m}{4} + \frac{5}{4}\right) {}_2F_1\left(\left.\begin{matrix} \frac{1}{2}, \frac{m}{4} + \frac{5}{4} \\ \frac{m}{4} + \frac{9}{4} \end{matrix}\right| \frac{dx^4 e^{i\pi}}{c}\right)}{4\sqrt{c}\,\Gamma\left(\frac{m}{4} + \frac{9}{4}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m*(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] a*e**m*x*x**m*gamma(m/4 + 1/4)*hyper((1/2, m/4 + 1/4), (m/4 + 5/4
,), d*x**4*exp_polar(I*pi)/c)/(4*sqrt(c)*gamma(m/4 + 5/4)) + b*e*
*m*x**5*x**m*gamma(m/4 + 5/4)*hyper((1/2, m/4 + 5/4), (m/4 + 9/4,
), d*x**4*exp_polar(I*pi)/c)/(4*sqrt(c)*gamma(m/4 + 9/4))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^4+a\right)(ex)^m}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^4 + a)*(e*x)^m/sqrt(d*x^4 + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^4 + a)*(e*x)^m/sqrt(d*x^4 + c), x)
```

3.674 $\int \frac{(ex)^m}{\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=68

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{e(m+1)\sqrt{c+dx^4}}$$

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[1/2, (1 + m)
/4, (5 + m)/4, -((d*x^4)/c)])/(e*(1 + m)*Sqrt[c + d*x^4])
```

Rubi [A] time = 0.0658659, antiderivative size = 68, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{e(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/Sqrt[c + d*x^4],x]
```

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[1/2, (1 + m)
/4, (5 + m)/4, -((d*x^4)/c)])/(e*(1 + m)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 8.21844, size = 56, normalized size = 0.82

$$\frac{(ex)^{m+1}\sqrt{c+dx^4}\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{m}{4}+\frac{1}{4}\\ \frac{m}{4}+\frac{5}{4}\end{matrix}\middle|-\frac{dx^4}{c}\right)}{ce\sqrt{1+\frac{dx^4}{c}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(d*x**4+c)**(1/2),x)
```

```
[Out] (e*x)**(m + 1)*sqrt(c + d*x**4)*hyper((1/2, m/4 + 1/4), (m/4 + 5/
4,), -d*x**4/c)/(c*e*sqrt(1 + d*x**4/c)*(m + 1))
```

Mathematica [A] time = 0.0318658, size = 64, normalized size = 0.94

$$\frac{x\sqrt{\frac{dx^4}{c}+1}(ex)^m\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^m/Sqrt[c + d*x^4],x]
```

```
[Out] (x*(e*x)^m*Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[1/2, (1 + m)/4,
(5 + m)/4, -((d*x^4)/c)])/((1 + m)*Sqrt[c + d*x^4])
```

Maple [F] time = 0.033, size = 0, normalized size = 0.

$$\int (ex)^m \frac{1}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(d*x^4+c)^(1/2),x)
```

```
[Out] int((e*x)^m/(d*x^4+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/sqrt(d*x^4 + c),x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m/sqrt(d*x^4 + c), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{\sqrt{dx^4+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/sqrt(d*x^4 + c),x, algorithm="fricas")
```

```
[Out] integral((e*x)^m/sqrt(d*x^4 + c), x)
```

Sympy [A] time = 1.52013, size = 56, normalized size = 0.82

$$\frac{e^m x x^m \left(\frac{m}{4}+\frac{1}{4}\right) {}_2F_1\left(\left.\begin{matrix}\frac{1}{2}, \frac{m}{4}+\frac{1}{4}\\ \frac{m}{4}+\frac{5}{4}\end{matrix}\right|\frac{dx^4 e^{i\pi}}{c}\right)}{4\sqrt{c}\left(\frac{m}{4}+\frac{5}{4}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(d*x**4+c)**(1/2),x)
```

```
[Out] e**m*x*x**m*gamma(m/4 + 1/4)*hyper((1/2, m/4 + 1/4), (m/4 + 5/4,)
, d*x**4*exp_polar(I*pi)/c)/(4*sqrt(c)*gamma(m/4 + 5/4))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/sqrt(d*x^4 + c),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/sqrt(d*x^4 + c), x)
```

3.675 $\int \frac{(ex)^m}{(a+bx^4)\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=81

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};1,\frac{1}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ae(m+1)\sqrt{c+dx^4}}$$

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 1, 1/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a*e*(1 + m)*Sqrt[c + d*x^4
])
```

Rubi [A] time = 0.19969, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};1,\frac{1}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ae(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 1, 1/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a*e*(1 + m)*Sqrt[c + d*x^4
])
```

Rubi in Sympy [A] time = 29.314, size = 65, normalized size = 0.8

$$\frac{(ex)^{m+1}\sqrt{c+dx^4}\,\text{appellf}_1\left(\frac{m}{4}+\frac{1}{4},\frac{1}{2},1,\frac{m}{4}+\frac{5}{4},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{ace\sqrt{1+\frac{dx^4}{c}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] (e*x)**(m + 1)*sqrt(c + d*x**4)*appellf1(m/4 + 1/4, 1/2, 1, m/4 +
 5/4, -d*x**4/c, -b*x**4/a)/(a*c*e*sqrt(1 + d*x**4/c)*(m + 1))
```

Mathematica [B] time = 0.614377, size = 282, normalized size = 3.48

$$\frac{x(ex)^m\left(-\frac{abc(m+5)(c+dx^4)F_1\left(\frac{m+1}{4};-\frac{1}{2},1;\frac{m+5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)(ad-bc)\left(2x^4\left(adF_1\left(\frac{m+5}{4};\frac{1}{2},1;\frac{m+9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)-2bcF_1\left(\frac{m+5}{4};-\frac{1}{2},2;\frac{m+9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)+ac(m+5)F_1\left(\frac{m+1}{4};-\frac{1}{2},1;\frac{m+5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}-\right.}{(m+1)\sqrt{c+dx^4}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^m/((a + b*x^4)*Sqrt[c + d*x^4]),x]
```

```
[Out] (x*(e*x)^m*(-((a*b*c*(5 + m)*(c + d*x^4)*AppellF1[(1 + m)/4, -1/2
, 1, (5 + m)/4, -((d*x^4)/c), -((b*x^4)/a)])/((-(b*c) + a*d)*(a +
 b*x^4)*(a*c*(5 + m)*AppellF1[(1 + m)/4, -1/2, 1, (5 + m)/4, -((d
*x^4)/c), -((b*x^4)/a)] + 2*x^4*(-2*b*c*AppellF1[(5 + m)/4, -1/2,
 2, (9 + m)/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[(5 + m)
```

```
/4, 1/2, 1, (9 + m)/4, -((d*x^4)/c), -((b*x^4)/a)])))) - (d*Sqrt[
1 + (d*x^4)/c]*Hypergeometric2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*
x^4)/c)])/(b*c - a*d)))/((1 + m)*Sqrt[c + d*x^4])
```

Maple [F] time = 0.052, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{bx^4 + a} \frac{1}{\sqrt{dx^4 + c}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

```
[Out] int((e*x)^m/(b*x^4+a)/(d*x^4+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4 + a)\sqrt{dx^4 + c}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{(bx^4 + a)\sqrt{dx^4 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] integral((e*x)^m/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(a + bx^4)\sqrt{c + dx^4}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(b*x**4+a)/(d*x**4+c)**(1/2),x)
```

```
[Out] Integral((e*x)**m/((a + b*x**4)*sqrt(c + d*x**4)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4 + a)\sqrt{dx^4 + c}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)*sqrt(d*x^4 + c)), x)
```

3.676 $\int \frac{(ex)^m}{(a+bx^4)^2\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=81

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};2,\frac{1}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{a^2e(m+1)\sqrt{c+dx^4}}$$

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 2, 1/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a^2*e*(1 + m)*Sqrt[c + d*x
^4])
```

Rubi [A] time = 0.198591, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};2,\frac{1}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{a^2e(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 2, 1/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a^2*e*(1 + m)*Sqrt[c + d*x
^4])
```

Rubi in Sympy [A] time = 28.0564, size = 66, normalized size = 0.81

$$\frac{(ex)^{m+1}\sqrt{c+dx^4}\,\text{appellf}_1\left(\frac{m}{4}+\frac{1}{4},\frac{1}{2},2,\frac{m}{4}+\frac{5}{4},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{a^2ce\sqrt{1+\frac{dx^4}{c}}(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)
```

```
[Out] (e*x)**(m + 1)*sqrt(c + d*x**4)*appellf1(m/4 + 1/4, 1/2, 2, m/4 +
 5/4, -d*x**4/c, -b*x**4/a)/(a**2*c*e*sqrt(1 + d*x**4/c)*(m + 1))
```

Mathematica [B] time = 1.36066, size = 488, normalized size = 6.02

$$x(ex)^m\left(-\frac{abcd(m+5)(c+dx^4)F_1\left(\frac{m+1}{4};-\frac{1}{2},1;\frac{m+5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)(bc-ad)^2\left(2x^4\left(adF_1\left(\frac{m+5}{4};\frac{1}{2},1;\frac{m+9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)-2bcF_1\left(\frac{m+5}{4};-\frac{1}{2},2;\frac{m+9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)+ac(m+5)F_1\left(\frac{m+1}{4};-\frac{1}{2},1;\frac{m+5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)} -$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^m/((a + b*x^4)^2*Sqrt[c + d*x^4]),x]
```

```
[Out] (x*(e*x)^m*(-((a*b*c*d*(5 + m)*(c + d*x^4)*AppellF1[(1 + m)/4, -1
/2, 1, (5 + m)/4, -((d*x^4)/c), -((b*x^4)/a)])/((b*c - a*d)^2*(a
+ b*x^4)*(a*c*(5 + m)*AppellF1[(1 + m)/4, -1/2, 1, (5 + m)/4, -((
d*x^4)/c), -((b*x^4)/a)] + 2*x^4*(-2*b*c*AppellF1[(5 + m)/4, -1/2
, 2, (9 + m)/4, -((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[(5 + m
```

```
)/4, 1/2, 1, (9 + m)/4, -((d*x^4)/c), -((b*x^4)/a)])))) - (a*b*c*
(5 + m)*(c + d*x^4)*AppellF1[(1 + m)/4, 2, -1/2, (5 + m)/4, -((b*
x^4)/a), -((d*x^4)/c)])/((-(b*c) + a*d)*(a + b*x^4)^2*(a*c*(5 + m
)*AppellF1[(1 + m)/4, 2, -1/2, (5 + m)/4, -((b*x^4)/a), -((d*x^4)
/c)] + 2*x^4*(a*d*AppellF1[(5 + m)/4, 2, 1/2, (9 + m)/4, -((b*x^4
)/a), -((d*x^4)/c)] - 4*b*c*AppellF1[(5 + m)/4, 3, -1/2, (9 + m)/
4, -((b*x^4)/a), -((d*x^4)/c)]))) + (d^2*Sqrt[1 + (d*x^4)/c]*Hype
rgeometric2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)])/(b*c - a*
d)^2))/((1 + m)*Sqrt[c + d*x^4])
```

Maple [F] time = 0.051, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^2}\frac{1}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)

[Out] int((e*x)^m/(b*x^4+a)^2/(d*x^4+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^2\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="maxima")

[Out] integrate((e*x)^m/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{(ex)^m}{(b^2x^8+2\,abx^4+a^2)\sqrt{dx^4+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="fricas")

[Out] integral((e*x)^m/((b^2*x^8 + 2*a*b*x^4 + a^2)*sqrt(d*x^4 + c)), x
)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(b*x**4+a)**2/(d*x**4+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4 + a)^2 \sqrt{dx^4 + c}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)^2*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)^2*sqrt(d*x^4 + c)), x)
```

3.677 $\int \frac{(ex)^m}{(a+bx^4)^3\sqrt{c+dx^4}}\,dx$

Optimal. Leaf size=81

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};3,\frac{1}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{a^3e(m+1)\sqrt{c+dx^4}}$$

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 3, 1/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a^3*e*(1 + m)*Sqrt[c + d*x
^4])
```

Rubi [A] time = 0.19977, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};3,\frac{1}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{a^3e(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/((a + b*x^4)^3*Sqrt[c + d*x^4]),x]
```

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 3, 1/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a^3*e*(1 + m)*Sqrt[c + d*x
^4])
```

Rubi in Sympy [A] time = 28.1405, size = 66, normalized size = 0.81

$$\frac{(ex)^{m+1}\sqrt{c+dx^4}\,\text{appellf}_1\left(\frac{m}{4}+\frac{1}{4},\frac{1}{2},3,\frac{m}{4}+\frac{5}{4},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{a^3ce\sqrt{1+\frac{dx^4}{c}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(b*x**4+a)**3/(d*x**4+c)**(1/2),x)
```

```
[Out] (e*x)**(m + 1)*sqrt(c + d*x**4)*appellf1(m/4 + 1/4, 1/2, 3, m/4 +
 5/4, -d*x**4/c, -b*x**4/a)/(a**3*c*e*sqrt(1 + d*x**4/c)*(m + 1))
```

Mathematica [B] time = 0.590451, size = 209, normalized size = 2.58

$$-\frac{ac(m+5)x(ex)^mF_1\left(\frac{m+1}{4};3,\frac{1}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{(m+1)\left(a+bx^4\right)^3\sqrt{c+dx^4}\left(2x^4\left(adF_1\left(\frac{m+5}{4};3,\frac{3}{2};\frac{m+9}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)+6bcF_1\left(\frac{m+5}{4};4,\frac{1}{2};\frac{m+9}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)\right)-ac(m+5)F_1\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^m/((a + b*x^4)^3*Sqrt[c + d*x^4]),x]
```

```
[Out] -((a*c*(5 + m)*x*(e*x)^m*AppellF1[(1 + m)/4, 3, 1/2, (5 + m)/4, -
((b*x^4)/a), -((d*x^4)/c)])/((1 + m)*(a + b*x^4)^3*Sqrt[c + d*x^4
]*(-(a*c*(5 + m)*AppellF1[(1 + m)/4, 3, 1/2, (5 + m)/4, -((b*x^4)
/a), -((d*x^4)/c)]) + 2*x^4*(a*d*AppellF1[(5 + m)/4, 3, 3/2, (9 +
 m)/4, -((b*x^4)/a), -((d*x^4)/c)] + 6*b*c*AppellF1[(5 + m)/4, 4,
```

```
1/2, (9 + m)/4, -((b*x^4)/a), -((d*x^4)/c)]))))
```

Maple [F] time = 0.05, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^3}\frac{1}{\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(b*x^4+a)^3/(d*x^4+c)^(1/2),x)
```

```
[Out] int((e*x)^m/(b*x^4+a)^3/(d*x^4+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^3\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)^3*sqrt(d*x^4 + c)),x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)^3*sqrt(d*x^4 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{(b^3x^{12}+3\,ab^2x^8+3\,a^2bx^4+a^3)\sqrt{dx^4+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)^3*sqrt(d*x^4 + c)),x, algorithm="fricas")
```

```
[Out] integral((e*x)^m/((b^3*x^12 + 3*a*b^2*x^8 + 3*a^2*b*x^4 + a^3)*sq
rt(d*x^4 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(b*x**4+a)**3/(d*x**4+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^3\sqrt{dx^4+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^4 + a)^3*sqrt(d*x^4 + c)),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)^3*sqrt(d*x^4 + c)), x)
```

3.678 $\int \frac{(ex)^m (a+bx^4)^2}{(c+dx^4)^{3/2}} \, dx$

Optimal. Leaf size=198

$$-\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\left(2b^2c^2(m+1)-(m+3)\left(2a^2d^2-(m+1)(bc-ad)^2\right)\right)\,_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{2cd^2e(m+1)(m+3)\sqrt{c+dx^4}}+\frac{(ex)^{m+1}(bc-ad)^2}{2cd^2e\sqrt{c+dx^4}}+\frac{b^2\sqrt{c+dx^4}(ex)^{m+1}}{d^2e(m+3)}$$

```
[Out] ((b*c - a*d)^2*(e*x)^(1 + m))/(2*c*d^2*e*Sqrt[c + d*x^4]) + (b^2*
(e*x)^(1 + m)*Sqrt[c + d*x^4])/(d^2*e*(3 + m)) - ((2*b^2*c^2*(1 +
 m) - (3 + m)*(2*a^2*d^2 - (b*c - a*d)^2*(1 + m)))*(e*x)^(1 + m)*
Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[1/2, (1 + m)/4, (5 + m)/4,
-((d*x^4)/c)])/(2*c*d^2*e*(1 + m)*(3 + m)*Sqrt[c + d*x^4])
```

Rubi [A] time = 0.477012, antiderivative size = 198, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$-\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\left(2b^2c^2(m+1)-(m+3)\left(2a^2d^2-(m+1)(bc-ad)^2\right)\right)\,_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{2cd^2e(m+1)(m+3)\sqrt{c+dx^4}}+\frac{(ex)^{m+1}(bc-ad)^2}{2cd^2e\sqrt{c+dx^4}}+\frac{b^2\sqrt{c+dx^4}(ex)^{m+1}}{d^2e(m+3)}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^m*(a + b*x^4)^2)/(c + d*x^4)^(3/2),x]
```

```
[Out] ((b*c - a*d)^2*(e*x)^(1 + m))/(2*c*d^2*e*Sqrt[c + d*x^4]) + (b^2*
(e*x)^(1 + m)*Sqrt[c + d*x^4])/(d^2*e*(3 + m)) - ((2*b^2*c^2*(1 +
 m) - (3 + m)*(2*a^2*d^2 - (b*c - a*d)^2*(1 + m)))*(e*x)^(1 + m)*
Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[1/2, (1 + m)/4, (5 + m)/4,
-((d*x^4)/c)])/(2*c*d^2*e*(1 + m)*(3 + m)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 50.8435, size = 165, normalized size = 0.83

$$\frac{b^2\left(ex\right)^{m+1}\sqrt{c+dx^4}}{d^2e\left(m+3\right)}+\frac{\left(ex\right)^{m+1}\left(ad-bc\right)^2}{2cd^2e\sqrt{c+dx^4}}+\frac{\left(ex\right)^{m+1}\sqrt{c+dx^4}\left(-2b^2c^2\left(m+1\right)+\left(m+3\right)\left(2a^2d^2-\left(m+1\right)\left(ad-bc\right)^2\right)\right)\,_2F_1\left(\left.\begin{matrix}\frac{1}{2},\frac{m}{4}+\frac{1}{4}\\\frac{m}{4}+\frac{5}{4}\end{matrix}\right|-\frac{dx^4}{c}\right)}{2c^2d^2e\sqrt{1+\frac{dx^4}{c}}\left(m+1\right)\left(m+3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(b*x**4+a)**2/(d*x**4+c)**(3/2),x)
```

```
[Out] b**2*(e*x)**(m + 1)*sqrt(c + d*x**4)/(d**2*e*(m + 3)) + (e*x)**(m
 + 1)*(a*d - b*c)**2/(2*c*d**2*e*sqrt(c + d*x**4)) + (e*x)**(m +
1)*sqrt(c + d*x**4)*(-2*b**2*c**2*(m + 1) + (m + 3)*(2*a**2*d**2
- (m + 1)*(a*d - b*c)**2))*hyper((1/2, m/4 + 1/4), (m/4 + 5/4,),
-d*x**4/c)/(2*c**2*d**2*e*sqrt(1 + d*x**4/c)*(m + 1)*(m + 3))
```

Mathematica [A] time = 0.243799, size = 167, normalized size = 0.84

$$\frac{x\sqrt{\frac{dx^4}{c}+1}(ex)^m\left(a^2\left(m^2+14m+45\right)\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)+b(m+1)x^4\left(2a(m+9)\,{}_2F_1\left(\frac{3}{2},\frac{m+5}{4};\frac{m+9}{4};-\frac{dx^4}{c}\right)+b(m+5)\right.\right.}{c(m+1)(m+5)(m+9)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^m*(a + b*x^4)^2)/(c + d*x^4)^(3/2),x]
```

```
[Out] (x*(e*x)^m*Sqrt[1 + (d*x^4)/c]*(a^2*(45 + 14*m + m^2)*Hypergeomet
ric2F1[3/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)] + b*(1 + m)*x^4*(
2*a*(9 + m)*Hypergeometric2F1[3/2, (5 + m)/4, (9 + m)/4, -((d*x^4
)/c)] + b*(5 + m)*x^4*Hypergeometric2F1[3/2, (9 + m)/4, (13 + m)/
4, -((d*x^4)/c)])))/(c*(1 + m)*(5 + m)*(9 + m)*Sqrt[c + d*x^4])
```

Maple [F] time = 0.044, size = 0, normalized size = 0.

$$\int (ex)^m\left(bx^4+a\right)^2\left(dx^4+c\right)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m*(b*x^4+a)^2/(d*x^4+c)^(3/2),x)
```

```
[Out] int((e*x)^m*(b*x^4+a)^2/(d*x^4+c)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^4+a\right)^2(ex)^m}{\left(dx^4+c\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^4 + a)^2*(e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((b*x^4 + a)^2*(e*x)^m/(d*x^4 + c)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(b^2x^8+2\,abx^4+a^2\right)(ex)^m}{\left(dx^4+c\right)^{\frac{3}{2}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^4 + a)^2*(e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((b^2*x^8 + 2*a*b*x^4 + a^2)*(e*x)^m/(d*x^4 + c)^(3/2), x
)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m*(b*x**4+a)**2/(d*x**4+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^4+a\right)^2(ex)^m}{\left(dx^4+c\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^4 + a)^2*(e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*x^4 + a)^2*(e*x)^m/(d*x^4 + c)^(3/2), x)
```

3.679 $\int \frac{(ex)^m(a+bx^4)}{(c+dx^4)^{3/2}}\,dx$

Optimal. Leaf size=132

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}(ad(1-m)+bc(m+1))\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{2cde(m+1)\sqrt{c+dx^4}}-\frac{(ex)^{m+1}(bc-ad)}{2cde\sqrt{c+dx^4}}$$

```
[Out] -((b*c - a*d)*(e*x)^(1 + m))/(2*c*d*e*Sqrt[c + d*x^4]) + ((a*d*(1
 - m) + b*c*(1 + m))*(e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeome
tric2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)])/(2*c*d*e*(1 + m
)*Sqrt[c + d*x^4])
```

Rubi [A] time = 0.188099, antiderivative size = 132, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}(ad(1-m)+bc(m+1))\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{2cde(m+1)\sqrt{c+dx^4}}-\frac{(ex)^{m+1}(bc-ad)}{2cde\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[((e*x)^m*(a + b*x^4))/(c + d*x^4)^(3/2),x]
```

```
[Out] -((b*c - a*d)*(e*x)^(1 + m))/(2*c*d*e*Sqrt[c + d*x^4]) + ((a*d*(1
 - m) + b*c*(1 + m))*(e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeome
tric2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)])/(2*c*d*e*(1 + m
)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 18.1395, size = 105, normalized size = 0.8

$$\frac{(ex)^{m+1}(ad-bc)}{2cde\sqrt{c+dx^4}}+\frac{(ex)^{m+1}\sqrt{c+dx^4}\,(ad(-m+1)+bc(m+1))\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{m}{4}+\frac{1}{4}\\ \frac{m}{4}+\frac{5}{4}\end{matrix}\middle|-\frac{dx^4}{c}\right)}{2c^2de\sqrt{1+\frac{dx^4}{c}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m*(b*x**4+a)/(d*x**4+c)**(3/2),x)
```

```
[Out] (e*x)**(m + 1)*(a*d - b*c)/(2*c*d*e*sqrt(c + d*x**4)) + (e*x)**(m
 + 1)*sqrt(c + d*x**4)*(a*d*(-m + 1) + b*c*(m + 1))*hyper((1/2, m
/4 + 1/4), (m/4 + 5/4,), -d*x**4/c)/(2*c**2*d*e*sqrt(1 + d*x**4/c
)*(m + 1))
```

Mathematica [A] time = 0.132366, size = 110, normalized size = 0.83

$$\frac{x\sqrt{\frac{dx^4}{c}+1}(ex)^m\left((ad-bc)\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)+bc\,{}_2F_1\left(\frac{1}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)\right)}{cd(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((e*x)^m*(a + b*x^4))/(c + d*x^4)^(3/2),x]
```

```
[Out] (x*(e*x)^m*Sqrt[1 + (d*x^4)/c]*(b*c*Hypergeometric2F1[1/2, (1 + m
)/4, (5 + m)/4, -((d*x^4)/c)] + (-(b*c) + a*d)*Hypergeometric2F1[
```

```
3/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)]))/(c*d*(1 + m)*Sqrt[c +
d*x^4])
```

Maple [F] time = 0.032, size = 0, normalized size = 0.

$$\int (ex)^m \left(bx^4+a\right)\left(dx^4+c\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m*(b*x^4+a)/(d*x^4+c)^(3/2),x)
```

```
[Out] int((e*x)^m*(b*x^4+a)/(d*x^4+c)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^4+a\right)(ex)^m}{\left(dx^4+c\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^4 + a)*(e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((b*x^4 + a)*(e*x)^m/(d*x^4 + c)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(bx^4+a\right)(ex)^m}{\left(dx^4+c\right)^{\frac{3}{2}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^4 + a)*(e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((b*x^4 + a)*(e*x)^m/(d*x^4 + c)^(3/2), x)
```

Sympy [A] time = 178.942, size = 119, normalized size = 0.9

$$\frac{ae^m xx^m\,\Gamma\left(\frac{m}{4}+\frac{1}{4}\right){}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{m}{4}+\frac{1}{4}\\ \frac{m}{4}+\frac{5}{4}\end{matrix}\middle|\frac{dx^4e^{i\pi}}{c}\right)}{4c^{\frac{3}{2}}\,\Gamma\left(\frac{m}{4}+\frac{5}{4}\right)}+\frac{be^m x^5x^m\,\Gamma\left(\frac{m}{4}+\frac{5}{4}\right){}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{m}{4}+\frac{5}{4}\\ \frac{m}{4}+\frac{9}{4}\end{matrix}\middle|\frac{dx^4e^{i\pi}}{c}\right)}{4c^{\frac{3}{2}}\,\Gamma\left(\frac{m}{4}+\frac{9}{4}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m*(b*x**4+a)/(d*x**4+c)**(3/2),x)
```

```
[Out] a*e**m*x*x**m*gamma(m/4 + 1/4)*hyper((3/2, m/4 + 1/4), (m/4 + 5/4
,), d*x**4*exp_polar(I*pi)/c)/(4*c**(3/2)*gamma(m/4 + 5/4)) + b*e
**m*x**5*x**m*gamma(m/4 + 5/4)*hyper((3/2, m/4 + 5/4), (m/4 + 9/4
,), d*x**4*exp_polar(I*pi)/c)/(4*c**(3/2)*gamma(m/4 + 9/4))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^4 + a)(ex)^m}{(dx^4 + c)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^4 + a)*(e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*x^4 + a)*(e*x)^m/(d*x^4 + c)^(3/2), x)
```

3.680 $\int \frac{(ex)^m}{(c+dx^4)^{3/2}}\, dx$

Optimal. Leaf size=71

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{ce(m+1)\sqrt{c+dx^4}}$$

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[3/2, (1 + m)
/4, (5 + m)/4, -((d*x^4)/c)])/(c*e*(1 + m)*Sqrt[c + d*x^4])
```

Rubi [A] time = 0.0695755, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{ce(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/(c + d*x^4)^(3/2),x]
```

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[3/2, (1 + m)
/4, (5 + m)/4, -((d*x^4)/c)])/(c*e*(1 + m)*Sqrt[c + d*x^4])
```

Rubi in Sympy [A] time = 8.23275, size = 58, normalized size = 0.82

$$\frac{(ex)^{m+1}\sqrt{c+dx^4}\,{}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{m}{4}+\frac{1}{4}\\ \frac{m}{4}+\frac{5}{4}\end{matrix}\middle|-\frac{dx^4}{c}\right)}{c^2e\sqrt{1+\frac{dx^4}{c}}(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(d*x**4+c)**(3/2),x)
```

```
[Out] (e*x)**(m + 1)*sqrt(c + d*x**4)*hyper((3/2, m/4 + 1/4), (m/4 + 5/
4,), -d*x**4/c)/(c**2*e*sqrt(1 + d*x**4/c)*(m + 1))
```

Mathematica [A] time = 0.0354781, size = 67, normalized size = 0.94

$$\frac{x\sqrt{\frac{dx^4}{c}+1}(ex)^m\,{}_2F_1\left(\frac{3}{2},\frac{m+1}{4};\frac{m+5}{4};-\frac{dx^4}{c}\right)}{c(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^m/(c + d*x^4)^(3/2),x]
```

```
[Out] (x*(e*x)^m*Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[3/2, (1 + m)/4,
(5 + m)/4, -((d*x^4)/c)])/(c*(1 + m)*Sqrt[c + d*x^4])
```

Maple [F] time = 0.031, size = 0, normalized size = 0.

$$\int (ex)^m \left(dx^4+c\right)^{-\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((e*x)^m/(d*x^4+c)^(3/2),x)
```

```
[Out] int((e*x)^m/(d*x^4+c)^(3/2),x)
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(dx^4+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m/(d*x^4 + c)^(3/2), x)
```

Fricas [F]   time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{(dx^4+c)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((e*x)^m/(d*x^4 + c)^(3/2), x)
```

Sympy [A]   time = 2.79688, size = 56, normalized size = 0.79

$$\frac{e^m x x^m \Gamma\left(\frac{m}{4}+\frac{1}{4}\right) {}_2F_1\left(\begin{matrix}\frac{3}{2}, \frac{m}{4}+\frac{1}{4} \\ \frac{m}{4}+\frac{5}{4}\end{matrix}\middle| \frac{dx^4 e^{i\pi}}{c}\right)}{4c^{\frac{3}{2}}\Gamma\left(\frac{m}{4}+\frac{5}{4}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((e*x)**m/(d*x**4+c)**(3/2),x)
```

```
[Out] e**m*x*x**m*gamma(m/4 + 1/4)*hyper((3/2, m/4 + 1/4), (m/4 + 5/4,)
, d*x**4*exp_polar(I*pi)/c)/(4*c**(3/2)*gamma(m/4 + 5/4))
```

GIAC/XCAS [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(dx^4+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((e*x)^m/(d*x^4 + c)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/(d*x^4 + c)^(3/2), x)
```

3.681 $\int \frac{(ex)^m}{(a+bx^4)(c+dx^4)^{3/2}}\,dx$

Optimal. Leaf size=84

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};1,\frac{3}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ace(m+1)\sqrt{c+dx^4}}$$

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 1, 3/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a*c*e*(1 + m)*Sqrt[c + d*x
^4])
```

Rubi [A] time = 0.205882, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};1,\frac{3}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ace(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/((a + b*x^4)*(c + d*x^4)^(3/2)),x]
```

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 1, 3/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a*c*e*(1 + m)*Sqrt[c + d*x
^4])
```

Rubi in Sympy [A] time = 29.5444, size = 66, normalized size = 0.79

$$\frac{(ex)^{m+1}\sqrt{c+dx^4}\,\text{appellf}_1\left(\frac{m}{4}+\frac{1}{4},1,\frac{3}{2},\frac{m}{4}+\frac{5}{4},-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{ac^2e\sqrt{1+\frac{dx^4}{c}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(b*x**4+a)/(d*x**4+c)**(3/2),x)
```

```
[Out] (e*x)**(m + 1)*sqrt(c + d*x**4)*appellf1(m/4 + 1/4, 1, 3/2, m/4 +
 5/4, -b*x**4/a, -d*x**4/c)/(a*c**2*e*sqrt(1 + d*x**4/c)*(m + 1))
```

Mathematica [B] time = 0.651638, size = 329, normalized size = 3.92

$$\frac{x(ex)^m\left(\frac{ab^2c(m+5)(c+dx^4)F_1\left(\frac{m+1}{4};-\frac{1}{2},1;\frac{m+5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{(a+bx^4)\left(2x^4\left(adF_1\left(\frac{m+5}{4};\frac{1}{2},1;\frac{m+9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)-2bcF_1\left(\frac{m+5}{4};-\frac{1}{2},2;\frac{m+9}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)+ac(m+5)F_1\left(\frac{m+1}{4};-\frac{1}{2},1;\frac{m+5}{4};-\frac{dx^4}{c},-\frac{bx^4}{a}\right)\right)}-\frac{d\sqrt{\frac{dx^4}{c}+1}}{\ldots}\right.}{(m+1)\sqrt{c+dx^4}(bc-ad)^2}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^m/((a + b*x^4)*(c + d*x^4)^(3/2)),x]
```

```
[Out] (x*(e*x)^m*((a*b^2*c*(5 + m)*(c + d*x^4)*AppellF1[(1 + m)/4, -1/2
, 1, (5 + m)/4, -((d*x^4)/c), -((b*x^4)/a)])/((a + b*x^4)*(a*c*(5
 + m)*AppellF1[(1 + m)/4, -1/2, 1, (5 + m)/4, -((d*x^4)/c), -((b*
x^4)/a)] + 2*x^4*(-2*b*c*AppellF1[(5 + m)/4, -1/2, 2, (9 + m)/4,
-((d*x^4)/c), -((b*x^4)/a)] + a*d*AppellF1[(5 + m)/4, 1/2, 1, (9
```

```
+ m)/4, -((d*x^4)/c), -((b*x^4)/a)]))) - b*d*Sqrt[1 + (d*x^4)/c]*
Hypergeometric2F1[1/2, (1 + m)/4, (5 + m)/4, -((d*x^4)/c)] - (d*(
b*c - a*d)*Sqrt[1 + (d*x^4)/c]*Hypergeometric2F1[3/2, (1 + m)/4,
(5 + m)/4, -((d*x^4)/c)])/c))/((b*c - a*d)^2*(1 + m)*Sqrt[c + d*x
^4])
```

Maple [F] time = 0.049, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{bx^4 + a}\left(dx^4 + c\right)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(b*x^4+a)/(d*x^4+c)^(3/2),x)
```

```
[Out] int((e*x)^m/(b*x^4+a)/(d*x^4+c)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4 + a)(dx^4 + c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)*(d*x^4 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)*(d*x^4 + c)^(3/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{(bdx^8 + (bc + ad)x^4 + ac)\sqrt{dx^4 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)*(d*x^4 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] integral((e*x)^m/((b*d*x^8 + (b*c + a*d)*x^4 + a*c)*sqrt(d*x^4 +
c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(b*x**4+a)/(d*x**4+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4 + a)(dx^4 + c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^4 + a)*(d*x^4 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)*(d*x^4 + c)^(3/2)), x)
```

3.682 $\int \frac{(ex)^m}{(a+bx^4)^2(c+dx^4)^{3/2}}\,dx$

Optimal. Leaf size=84

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};2,\frac{3}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{a^2ce(m+1)\sqrt{c+dx^4}}$$

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 2, 3/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a^2*c*e*(1 + m)*Sqrt[c + d
*x^4])
```

Rubi [A] time = 0.207861, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};2,\frac{3}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{a^2ce(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/((a + b*x^4)^2*(c + d*x^4)^(3/2)),x]
```

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 2, 3/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a^2*c*e*(1 + m)*Sqrt[c + d
*x^4])
```

Rubi in Sympy [A] time = 28.494, size = 68, normalized size = 0.81

$$\frac{(ex)^{m+1}\sqrt{c+dx^4}\,\operatorname{appellf}_1\left(\frac{m}{4}+\frac{1}{4},\frac{3}{2},2,\frac{m}{4}+\frac{5}{4},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{a^2c^2e\sqrt{1+\frac{dx^4}{c}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(b*x**4+a)**2/(d*x**4+c)**(3/2),x)
```

```
[Out] (e*x)**(m + 1)*sqrt(c + d*x**4)*appellf1(m/4 + 1/4, 3/2, 2, m/4 +
 5/4, -d*x**4/c, -b*x**4/a)/(a**2*c**2*e*sqrt(1 + d*x**4/c)*(m +
1))
```

Mathematica [B] time = 0.665575, size = 210, normalized size = 2.5

$$-\frac{ac(m+5)x(ex)^mF_1\left(\frac{m+1}{4};2,\frac{3}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{(m+1)\left(a+bx^4\right)^2\left(c+dx^4\right)^{3/2}\left(2x^4\left(3adF_1\left(\frac{m+5}{4};2,\frac{5}{2};\frac{m+9}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)+4bcF_1\left(\frac{m+5}{4};3,\frac{3}{2};\frac{m+9}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)\right)-ac(m+\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^m/((a + b*x^4)^2*(c + d*x^4)^(3/2)),x]
```

```
[Out] -((a*c*(5 + m)*x*(e*x)^m*AppellF1[(1 + m)/4, 2, 3/2, (5 + m)/4, -
((b*x^4)/a), -((d*x^4)/c)])/((1 + m)*(a + b*x^4)^2*(c + d*x^4)^(3
/2)*(-(a*c*(5 + m)*AppellF1[(1 + m)/4, 2, 3/2, (5 + m)/4, -((b*x^
4)/a), -((d*x^4)/c)]) + 2*x^4*(3*a*d*AppellF1[(5 + m)/4, 2, 5/2,
(9 + m)/4, -((b*x^4)/a), -((d*x^4)/c)] + 4*b*c*AppellF1[(5 + m)/4
```

```
, 3, 3/2, (9 + m)/4, -((b*x^4)/a), -((d*x^4)/c)]))))
```

Maple [F] time = 0.049, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^2}\left(dx^4+c\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(b*x^4+a)^2/(d*x^4+c)^(3/2),x)
```

```
[Out] int((e*x)^m/(b*x^4+a)^2/(d*x^4+c)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^2(dx^4+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)^2*(d*x^4 + c)^(3/2)),x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)^2*(d*x^4 + c)^(3/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{(b^2dx^{12}+(b^2c+2\,abd)x^8+(2\,abc+a^2d)x^4+a^2c)\sqrt{dx^4+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)^2*(d*x^4 + c)^(3/2)),x, algorithm="fricas")
```

```
[Out] integral((e*x)^m/((b^2*d*x^12 + (b^2*c + 2*a*b*d)*x^8 + (2*a*b*c
+ a^2*d)*x^4 + a^2*c)*sqrt(d*x^4 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(b*x**4+a)**2/(d*x**4+c)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^2(dx^4+c)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)^2*(d*x^4 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)^2*(d*x^4 + c)^(3/2)), x)
```

3.683 $\int \frac{(ex)^m}{(a+bx^4)^3(c+dx^4)^{3/2}}\,dx$

Optimal. Leaf size=84

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};3,\frac{3}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{a^3ce(m+1)\sqrt{c+dx^4}}$$

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 3, 3/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a^3*c*e*(1 + m)*Sqrt[c + d
*x^4])
```

Rubi [A] time = 0.208167, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{\sqrt{\frac{dx^4}{c}+1}(ex)^{m+1}F_1\left(\frac{m+1}{4};3,\frac{3}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{a^3ce(m+1)\sqrt{c+dx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/((a + b*x^4)^3*(c + d*x^4)^(3/2)),x]
```

```
[Out] ((e*x)^(1 + m)*Sqrt[1 + (d*x^4)/c]*AppellF1[(1 + m)/4, 3, 3/2, (5
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)])/(a^3*c*e*(1 + m)*Sqrt[c + d
*x^4])
```

Rubi in Sympy [A] time = 28.5962, size = 68, normalized size = 0.81

$$\frac{(ex)^{m+1}\sqrt{c+dx^4}\,\text{appellf}_1\left(\frac{m}{4}+\frac{1}{4},\frac{3}{2},3,\frac{m}{4}+\frac{5}{4},-\frac{dx^4}{c},-\frac{bx^4}{a}\right)}{a^3c^2e\sqrt{1+\frac{dx^4}{c}}\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(b*x**4+a)**3/(d*x**4+c)**(3/2),x)
```

```
[Out] (e*x)**(m + 1)*sqrt(c + d*x**4)*appellf1(m/4 + 1/4, 3/2, 3, m/4 +
 5/4, -d*x**4/c, -b*x**4/a)/(a**3*c**2*e*sqrt(1 + d*x**4/c)*(m +
1))
```

Mathematica [B] time = 0.736128, size = 209, normalized size = 2.49

$$-\frac{ac(m+5)x(ex)^mF_1\left(\frac{m+1}{4};3,\frac{3}{2};\frac{m+5}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)}{(m+1)\left(a+bx^4\right)^3\left(c+dx^4\right)^{3/2}\left(6x^4\left(adF_1\left(\frac{m+5}{4};3,\frac{5}{2};\frac{m+9}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)+2bcF_1\left(\frac{m+5}{4};4,\frac{3}{2};\frac{m+9}{4};-\frac{bx^4}{a},-\frac{dx^4}{c}\right)\right)-ac(m+5\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(e*x)^m/((a + b*x^4)^3*(c + d*x^4)^(3/2)),x]
```

```
[Out] -((a*c*(5 + m)*x*(e*x)^m*AppellF1[(1 + m)/4, 3, 3/2, (5 + m)/4, -
((b*x^4)/a), -((d*x^4)/c)])/((1 + m)*(a + b*x^4)^3*(c + d*x^4)^(3
/2)*(-(a*c*(5 + m)*AppellF1[(1 + m)/4, 3, 3/2, (5 + m)/4, -((b*x^
4)/a), -((d*x^4)/c)]) + 6*x^4*(a*d*AppellF1[(5 + m)/4, 3, 5/2, (9
 + m)/4, -((b*x^4)/a), -((d*x^4)/c)] + 2*b*c*AppellF1[(5 + m)/4,
```

```
4, 3/2, (9 + m)/4, -((b*x^4)/a), -((d*x^4)/c)]))))
```

Maple [F] time = 0.049, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^3} \left(dx^4+c\right)^{-\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(b*x^4+a)^3/(d*x^4+c)^(3/2),x)

[Out] int((e*x)^m/(b*x^4+a)^3/(d*x^4+c)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^3(dx^4+c)^{\frac{3}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)^3*(d*x^4 + c)^(3/2)),x, algorithm="maxima")

[Out] integrate((e*x)^m/((b*x^4 + a)^3*(d*x^4 + c)^(3/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{(b^3dx^{16}+(b^3c+3\,ab^2d)x^{12}+3\,(ab^2c+a^2bd)x^8+(3\,a^2bc+a^3d)x^4+a^3c)\sqrt{dx^4+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^4 + a)^3*(d*x^4 + c)^(3/2)),x, algorithm="fricas")

[Out] integral((e*x)^m/((b^3*d*x^16 + (b^3*c + 3*a*b^2*d)*x^12 + 3*(a*b
^2*c + a^2*b*d)*x^8 + (3*a^2*b*c + a^3*d)*x^4 + a^3*c)*sqrt(d*x^4
 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(b*x**4+a)**3/(d*x**4+c)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^4+a)^3(dx^4+c)^{\frac{3}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^4 + a)^3*(d*x^4 + c)^(3/2)),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/((b*x^4 + a)^3*(d*x^4 + c)^(3/2)), x)
```

3.684 $\int \frac{x^{17}}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=104

$$-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3b^{5/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^6}(ad+bc)}{3b^2d^2}+\frac{\left(c+dx^6\right)^{3/2}}{9bd^2}$$

```
[Out] -((b*c + a*d)*Sqrt[c + d*x^6])/(3*b^2*d^2) + (c + d*x^6)^(3/2)/(9
*b*d^2) - (a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]]
)/(3*b^(5/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.291659, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3b^{5/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^6}(ad+bc)}{3b^2d^2}+\frac{\left(c+dx^6\right)^{3/2}}{9bd^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^17/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -((b*c + a*d)*Sqrt[c + d*x^6])/(3*b^2*d^2) + (c + d*x^6)^(3/2)/(9
*b*d^2) - (a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]]
)/(3*b^(5/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 30.4419, size = 88, normalized size = 0.85

$$\frac{a^2\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{3b^{\frac{5}{2}}\sqrt{ad-bc}}+\frac{\left(c+dx^6\right)^{\frac{3}{2}}}{9bd^2}-\frac{\sqrt{c+dx^6}\,(ad+bc)}{3b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**17/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] a**2*atan(sqrt(b)*sqrt(c + d*x**6)/sqrt(a*d - b*c))/(3*b**(5/2)*s
qrt(a*d - b*c)) + (c + d*x**6)**(3/2)/(9*b*d**2) - sqrt(c + d*x**
6)*(a*d + b*c)/(3*b**2*d**2)
```

Mathematica [A] time = 0.272446, size = 91, normalized size = 0.88

$$\frac{\sqrt{c+dx^6}\left(-3ad-2bc+bdx^6\right)}{9b^2d^2}-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3b^{5/2}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^17/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (Sqrt[c + d*x^6]*(-2*b*c - 3*a*d + b*d*x^6))/(9*b^2*d^2) - (a^2*A
rcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(3*b^(5/2)*Sqr
t[b*c - a*d])
```

Maple [F] time = 0.098, size = 0, normalized size = 0.

$$\int \frac{x^{17}}{b x^6 + a} \frac{1}{\sqrt{d x^6 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^17/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^17/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^17/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.217275, size = 1, normalized size = 0.01

$$\left[\frac{3\,a^2d^2\log\left(\frac{\left(bdx^6+2\,bc-ad\right)\sqrt{b^2c-abd}-2\,\sqrt{dx^6+c}\left(b^2c-abd\right)}{bx^6+a}\right)+2\,\left(bdx^6-2\,bc-3\,ad\right)\sqrt{dx^6+c}\sqrt{b^2c-abd}}{18\,\sqrt{b^2c-abd}b^2d^2},\right.$$
$$\left.-\frac{3\,a^2d^2\arctan\left(-\frac{bc-ad}{\sqrt{dx^6+c}\sqrt{-b^2c+abd}}\right)-\left(bdx^6-2\,bc-3\,ad\right)\sqrt{dx^6+c}\sqrt{-b^2c+abd}}{9\,\sqrt{-b^2c+abd}b^2d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^17/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/18*(3*a^2*d^2*log(((b*d*x^6 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d)
 - 2*sqrt(d*x^6 + c)*(b^2*c - a*b*d))/(b*x^6 + a)) + 2*(b*d*x^6 -
 2*b*c - 3*a*d)*sqrt(d*x^6 + c)*sqrt(b^2*c - a*b*d))/(sqrt(b^2*c
- a*b*d)*b^2*d^2), -1/9*(3*a^2*d^2*arctan(-(b*c - a*d)/(sqrt(d*x^
6 + c)*sqrt(-b^2*c + a*b*d))) - (b*d*x^6 - 2*b*c - 3*a*d)*sqrt(d*
x^6 + c)*sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^2*d^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**17/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217833, size = 143, normalized size = 1.38

$$\frac{a^2 \arctan\left(\frac{\sqrt{dx^6+c}b}{\sqrt{-b^2c+abd}}\right)}{3\sqrt{-b^2c+abd}b^2} + \frac{\left(dx^6+c\right)^{\frac{3}{2}}b^2d^4 - 3\sqrt{dx^6+c}b^2cd^4 - 3\sqrt{dx^6+c}abd^5}{9\,b^3d^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^17/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] 1/3*a^2*arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2
*c + a*b*d)*b^2) + 1/9*((d*x^6 + c)^(3/2)*b^2*d^4 - 3*sqrt(d*x^6
+ c)*b^2*c*d^4 - 3*sqrt(d*x^6 + c)*a*b*d^5)/(b^3*d^6)
```

3.685 $\int \frac{x^{11}}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=74

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^6}}{3bd}$$

```
[Out] Sqrt[c + d*x^6]/(3*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sq
rt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.183051, antiderivative size = 74, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^6}}{3bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] Sqrt[c + d*x^6]/(3*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sq
rt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 19.3827, size = 60, normalized size = 0.81

$$-\frac{a\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{3b^{\frac{3}{2}}\sqrt{ad-bc}}+\frac{\sqrt{c+dx^6}}{3bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -a*atan(sqrt(b)*sqrt(c + d*x**6)/sqrt(a*d - b*c))/(3*b**(3/2)*sqr
t(a*d - b*c)) + sqrt(c + d*x**6)/(3*b*d)
```

Mathematica [A] time = 0.0927724, size = 74, normalized size = 1.

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^6}}{3bd}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] Sqrt[c + d*x^6]/(3*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sq
rt[b*c - a*d]])/(3*b^(3/2)*Sqrt[b*c - a*d])
```

Maple [F] time = 0.081, size = 0, normalized size = 0.

$$\int \frac{x^{11}}{bx^6+a}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^11/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.218021, size = 1, normalized size = 0.01

$$\left[\frac{ad\log\left(\frac{(bdx^6+2bc-ad)\sqrt{b^2c-abd}+2\sqrt{dx^6+c}(b^2c-abd)}{bx^6+a}\right)+2\sqrt{dx^6+c}\sqrt{b^2c-abd}}{6\sqrt{b^2c-abd}bd}, \frac{ad\arctan\left(-\frac{bc-ad}{\sqrt{dx^6+c}\sqrt{-b^2c+abd}}\right)+\sqrt{dx^6+c}\sqrt{-\right.}{3\sqrt{-b^2c+abd}bd}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/6*(a*d*log(((b*d*x^6 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) + 2*sq
rt(d*x^6 + c)*(b^2*c - a*b*d))/(b*x^6 + a)) + 2*sqrt(d*x^6 + c)*s
qrt(b^2*c - a*b*d))/(sqrt(b^2*c - a*b*d)*b*d), 1/3*(a*d*arctan(-(
b*c - a*d)/(sqrt(d*x^6 + c)*sqrt(-b^2*c + a*b*d))) + sqrt(d*x^6 +
 c)*sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{11}}{(a+bx^6)\sqrt{c+dx^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Integral(x**11/((a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [A] time = 0.212741, size = 86, normalized size = 1.16

$$-\frac{\frac{ad\arctan\left(\frac{\sqrt{dx^6+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}b}-\frac{\sqrt{dx^6+c}}{b}}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] -1/3*(a*d*arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*b) - sqrt(d*x^6 + c)/b)/d
```

3.686 $\int \frac{x^5}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=51

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}\sqrt{bc-ad}}$$

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]]/(3*Sqrt[b]*Sq
rt[b*c - a*d])
```

Rubi [A] time = 0.13127, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]]/(3*Sqrt[b]*Sq
rt[b*c - a*d])
```

Rubi in Sympy [A] time = 15.0472, size = 42, normalized size = 0.82

$$\frac{\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{3\sqrt{b}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] atan(sqrt(b)*sqrt(c + d*x**6)/sqrt(a*d - b*c))/(3*sqrt(b)*sqrt(a*
d - b*c))
```

Mathematica [A] time = 0.0392107, size = 51, normalized size = 1.

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3\sqrt{b}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]]/(3*Sqrt[b]*Sq
rt[b*c - a*d])
```

Maple [F] time = 0.051, size = 0, normalized size = 0.

$$\int \frac{x^5}{bx^6+a}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^5/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.218899, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(\frac{(bdx^6+2\,bc-ad)\,\sqrt{b^2c-abd}-2\,\sqrt{dx^6+c}(b^2c-abd)}{bx^6+a}\right)}{6\,\sqrt{b^2c-abd}}, -\frac{\arctan\left(-\frac{bc-ad}{\sqrt{dx^6+c}\sqrt{-b^2c+abd}}\right)}{3\,\sqrt{-b^2c+abd}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/6*log(((b*d*x^6 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*
x^6 + c)*(b^2*c - a*b*d))/(b*x^6 + a))/sqrt(b^2*c - a*b*d), -1/3*
arctan(-(b*c - a*d)/(sqrt(d*x^6 + c)*sqrt(-b^2*c + a*b*d)))/sqrt(
-b^2*c + a*b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{(a+bx^6)\,\sqrt{c+dx^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Integral(x**5/((a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [A] time = 0.211612, size = 54, normalized size = 1.06

$$\frac{\arctan\left(\frac{\sqrt{dx^6+c}b}{\sqrt{-b^2c+abd}}\right)}{3\,\sqrt{-b^2c+abd}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] 1/3*arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2*c + a*b*d))/sqrt(-b^2*c +
a*b*d)
```

3.687 $\int \frac{1}{x(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=85

$$\frac{\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3a\sqrt{bc-ad}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{3a\sqrt{c}}$$

```
[Out] -ArcTanh[Sqrt[c + d*x^6]/Sqrt[c]]/(3*a*Sqrt[c]) + (Sqrt[b]*ArcTan
h[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(3*a*Sqrt[b*c - a*d
])
```

Rubi [A] time = 0.20916, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3a\sqrt{bc-ad}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{3a\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -ArcTanh[Sqrt[c + d*x^6]/Sqrt[c]]/(3*a*Sqrt[c]) + (Sqrt[b]*ArcTan
h[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(3*a*Sqrt[b*c - a*d
])
```

Rubi in Sympy [A] time = 22.6735, size = 71, normalized size = 0.84

$$-\frac{\sqrt{b}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{3a\sqrt{ad-bc}}-\frac{\mathrm{atanh}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{3a\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(b)*atan(sqrt(b)*sqrt(c + d*x**6)/sqrt(a*d - b*c))/(3*a*sqrt
(a*d - b*c)) - atanh(sqrt(c + d*x**6)/sqrt(c))/(3*a*sqrt(c))
```

Mathematica [C] time = 0.327681, size = 162, normalized size = 1.91

$$\frac{5bdx^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)}{9\left(a+bx^6\right)\sqrt{c+dx^6}\left(-5bdx^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (5*b*d*x^6*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^6)), -(a/(b*x^6))]
)/(9*(a + b*x^6)*Sqrt[c + d*x^6]*(-5*b*d*x^6*AppellF1[3/2, 1/2, 1
, 5/2, -(c/(d*x^6)), -(a/(b*x^6))] + 2*a*d*AppellF1[5/2, 1/2, 2,
7/2, -(c/(d*x^6)), -(a/(b*x^6))] + b*c*AppellF1[5/2, 3/2, 1, 7/2,
 -(c/(d*x^6)), -(a/(b*x^6))]))
```

Maple [F] time = 0.075, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(bx^{6}+a\right)}\frac{1}{\sqrt{dx^{6}+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(1/x/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^{6}+a\right)\sqrt{dx^{6}+c}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x), x)
```

Fricas [A] time = 0.271203, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{c}\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^{6}+2\,bc-ad+2\,\sqrt{dx^{6}+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^{6}+a}\right)+\log\left(\frac{\left(dx^{6}+2\,c\right)\sqrt{c}-2\,\sqrt{dx^{6}+c}c}{x^{6}}\right)}{6\,a\sqrt{c}},\ \frac{2\,\sqrt{c}\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^{6}+c}b}\right.}{6\,a\sqrt{c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/6*(sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^6 + 2*b*c - a*d + 2*
sqrt(d*x^6 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^6 + a)) + l
og(((d*x^6 + 2*c)*sqrt(c) - 2*sqrt(d*x^6 + c)*c)/x^6))/(a*sqrt(c)
), 1/6*(2*sqrt(c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-
b/(b*c - a*d))/(sqrt(d*x^6 + c)*b)) + log(((d*x^6 + 2*c)*sqrt(c)
- 2*sqrt(d*x^6 + c)*c)/x^6))/(a*sqrt(c)), 1/6*(sqrt(-c)*sqrt(b/(b
*c - a*d))*log((b*d*x^6 + 2*b*c - a*d + 2*sqrt(d*x^6 + c)*(b*c -
a*d)*sqrt(b/(b*c - a*d)))/(b*x^6 + a)) + 2*arctan(c/(sqrt(d*x^6 +
 c)*sqrt(-c))))/(a*sqrt(-c)), 1/3*(sqrt(-c)*sqrt(-b/(b*c - a*d))*
arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^6 + c)*b)) + a
rctan(c/(sqrt(d*x^6 + c)*sqrt(-c))))/(a*sqrt(-c))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+bx^{6}\right)\sqrt{c+dx^{6}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Integral(1/(x*(a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [A] time = 0.215345, size = 107, normalized size = 1.26

$$-\frac{1}{3}\,d\left(\frac{b\arctan\left(\frac{\sqrt{dx^6+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}ad}-\frac{\arctan\left(\frac{\sqrt{dx^6+c}}{\sqrt{-c}}\right)}{a\sqrt{-c}d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x),x, algorithm="giac")
```

```
[Out] -1/3*d*(b*arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*a*d) - arctan(sqrt(d*x^6 + c)/sqrt(-c))/(a*sqrt(-c)
*d))
```

3.688 $\int \frac{1}{x^7(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=117

$$-\frac{b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3a^2\sqrt{bc-ad}}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{6a^2c^{3/2}}-\frac{\sqrt{c+dx^6}}{6acx^6}$$

```
[Out] -Sqrt[c + d*x^6]/(6*a*c*x^6) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d*
x^6]/Sqrt[c]])/(6*a^2*c^(3/2)) - (b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^6])/Sqrt[b*c - a*d]])/(3*a^2*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.357349, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{3a^2\sqrt{bc-ad}}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{6a^2c^{3/2}}-\frac{\sqrt{c+dx^6}}{6acx^6}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -Sqrt[c + d*x^6]/(6*a*c*x^6) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d*
x^6]/Sqrt[c]])/(6*a^2*c^(3/2)) - (b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^6])/Sqrt[b*c - a*d]])/(3*a^2*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 44.2555, size = 100, normalized size = 0.85

$$-\frac{\sqrt{c+dx^6}}{6acx^6}+\frac{b^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{3a^2\sqrt{ad-bc}}+\frac{\left(\frac{ad}{2}+bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{3a^2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)/(6*a*c*x**6) + b**(3/2)*atan(sqrt(b)*sqrt(c + d
*x**6)/sqrt(a*d - b*c))/(3*a**2*sqrt(a*d - b*c)) + (a*d/2 + b*c)*
atanh(sqrt(c + d*x**6)/sqrt(c))/(3*a**2*c**(3/2))
```

Mathematica [C] time = 0.790981, size = 410, normalized size = 3.5

$$\frac{\frac{5bdx^6\left(a\left(3c+2dx^6\right)+bx^6\left(c+3dx^6\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)-3\left(a+bx^6\right)\left(c+dx^6\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)\right)}{ac\left(-5bdx^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)\right)}+\frac{\ldots}{x^6\left(2bcF_1\left(\ldots\right.\right.}}{18x^6\left(a+bx^6\right)\sqrt{c+dx^6}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^7*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] ((6*b*d*x^12*AppellF1[1, 1/2, 1, 2, -((d*x^6)/c), -((b*x^6)/a)])/
(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^6)/c), -((b*x^6)/a)] + x^6*
(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*A
ppellF1[2, 3/2, 1, 3, -((d*x^6)/c), -((b*x^6)/a)])) + (5*b*d*x^6*
(a*(3*c + 2*d*x^6) + b*x^6*(c + 3*d*x^6))*AppellF1[3/2, 1/2, 1, 5
/2, -(c/(d*x^6)), -(a/(b*x^6))] - 3*(a + b*x^6)*(c + d*x^6)*(2*a*
```

```
d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^6)), -(a/(b*x^6))] + b*c*Ap
pellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^6)), -(a/(b*x^6))]))/(a*c*(-5*b
*d*x^6*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^6)), -(a/(b*x^6))] + 2
*a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^6)), -(a/(b*x^6))] + b*c
*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^6)), -(a/(b*x^6))])))/(18*x^
6*(a + b*x^6)*Sqrt[c + d*x^6])
```

Maple [F] time = 0.125, size = 0, normalized size = 0.

$$\int \frac{1}{x^7\left(bx^6+a\right)}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(1/x^7/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^6+a\right)\sqrt{dx^6+c}\,x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^7),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^7), x)
```

Fricas [A] time = 0.248566, size = 1, normalized size = 0.01

$$\left[\frac{2\,bc^{\frac{3}{2}}x^6\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^6+2\,bc-ad-2\,\sqrt{dx^6+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^6+a}\right)+(2\,bc+ad)x^6\log\left(\frac{(dx^6+2\,c)\,\sqrt{c}+2\,\sqrt{dx^6+c}c}{x^6}\right)-2\,\sqrt{dx^6+c}a\sqrt{c}}{12\,a^2c^{\frac{3}{2}}x^6},\ -\frac{4\,bc^{\frac{3}{2}}x^6\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^6+c}b}\right)-(2\,bc+ad)x^6\log\left(\frac{(dx^6+2\,c)\,\sqrt{c}+2\,\sqrt{dx^6+c}c}{x^6}\right)+2\,\sqrt{dx^6+c}a\sqrt{c}}{12\,a^2c^{\frac{3}{2}}x^6},\ \frac{b\sqrt{-c}cx^6\sqrt{\frac{b}{bc-ad}}\cdots}{\cdots},\ -\frac{2\,b\sqrt{-c}cx^6\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^6+c}b}\right)+(2\,bc+ad)x^6\arctan\left(\frac{c}{\sqrt{dx^6+c}\sqrt{-c}}\right)+\sqrt{dx^6+c}a\sqrt{-c}}{6\,a^2\sqrt{-c}cx^6}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^7),x, algorithm="fricas")
```

```
[Out] [1/12*(2*b*c^(3/2)*x^6*sqrt(b/(b*c - a*d))*log((b*d*x^6 + 2*b*c -
 a*d - 2*sqrt(d*x^6 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^6
+ a)) + (2*b*c + a*d)*x^6*log(((d*x^6 + 2*c)*sqrt(c) + 2*sqrt(d*x
^6 + c)*c)/x^6) - 2*sqrt(d*x^6 + c)*a*sqrt(c))/(a^2*c^(3/2)*x^6),
 -1/12*(4*b*c^(3/2)*x^6*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*
sqrt(-b/(b*c - a*d))/(sqrt(d*x^6 + c)*b)) - (2*b*c + a*d)*x^6*log
(((d*x^6 + 2*c)*sqrt(c) + 2*sqrt(d*x^6 + c)*c)/x^6) + 2*sqrt(d*x^
6 + c)*a*sqrt(c))/(a^2*c^(3/2)*x^6), 1/6*(b*sqrt(-c)*c*x^6*sqrt(b
```

```
/(b*c - a*d))*log((b*d*x^6 + 2*b*c - a*d - 2*sqrt(d*x^6 + c)*(b*c
 - a*d)*sqrt(b/(b*c - a*d)))/(b*x^6 + a)) - (2*b*c + a*d)*x^6*arc
tan(c/(sqrt(d*x^6 + c)*sqrt(-c))) - sqrt(d*x^6 + c)*a*sqrt(-c))/(
a^2*sqrt(-c)*c*x^6), -1/6*(2*b*sqrt(-c)*c*x^6*sqrt(-b/(b*c - a*d)
)*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^6 + c)*b)) +
 (2*b*c + a*d)*x^6*arctan(c/(sqrt(d*x^6 + c)*sqrt(-c))) + sqrt(d*
x^6 + c)*a*sqrt(-c))/(a^2*sqrt(-c)*c*x^6)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217019, size = 159, normalized size = 1.36

$$\frac{1}{6}\,d^{2}\left(\frac{2\,b^{2}\arctan\left(\frac{\sqrt{dx^{6}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{\sqrt{-b^{2}c+abd}a^{2}d^{2}}-\frac{(2\,bc+ad)\arctan\left(\frac{\sqrt{dx^{6}+c}}{\sqrt{-c}}\right)}{a^{2}\sqrt{-c}cd^{2}}-\frac{\sqrt{dx^{6}+c}}{acd^{2}x^{6}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^7),x, algorithm="giac")
```

```
[Out] 1/6*d^2*(2*b^2*arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2*c + a*b*d))/(sq
rt(-b^2*c + a*b*d)*a^2*d^2) - (2*b*c + a*d)*arctan(sqrt(d*x^6 + c
)/sqrt(-c))/(a^2*sqrt(-c)*c*d^2) - sqrt(d*x^6 + c)/(a*c*d^2*x^6))
```

3.689 $\int \frac{x^{14}}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=123

$$\frac{a^{3/2}\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3b^2\sqrt{bc-ad}}-\frac{(2ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{6b^2d^{3/2}}+\frac{x^3\sqrt{c+dx^6}}{6bd}$$

```
[Out] (x^3*Sqrt[c + d*x^6])/(6*b*d) + (a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*
x^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/(3*b^2*Sqrt[b*c - a*d]) - ((b*c
+ 2*a*d)*ArcTanh[(Sqrt[d]*x^3)/Sqrt[c + d*x^6]])/(6*b^2*d^(3/2))
```

Rubi [A] time = 0.399147, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$\frac{a^{3/2}\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3b^2\sqrt{bc-ad}}-\frac{(2ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{6b^2d^{3/2}}+\frac{x^3\sqrt{c+dx^6}}{6bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^14/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^3*Sqrt[c + d*x^6])/(6*b*d) + (a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*
x^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/(3*b^2*Sqrt[b*c - a*d]) - ((b*c
+ 2*a*d)*ArcTanh[(Sqrt[d]*x^3)/Sqrt[c + d*x^6]])/(6*b^2*d^(3/2))
```

Rubi in Sympy [A] time = 45.7396, size = 107, normalized size = 0.87

$$\frac{a^{\frac{3}{2}}\operatorname{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3b^2\sqrt{ad-bc}}+\frac{x^3\sqrt{c+dx^6}}{6bd}-\frac{(2ad+bc)\operatorname{atanh}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{6b^2d^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**14/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] a**(3/2)*atanh(x**3*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**6)))/(
3*b**2*sqrt(a*d - b*c)) + x**3*sqrt(c + d*x**6)/(6*b*d) - (2*a*d
+ b*c)*atanh(sqrt(d)*x**3/sqrt(c + d*x**6))/(6*b**2*d**(3/2))
```

Mathematica [A] time = 0.248955, size = 118, normalized size = 0.96

$$\frac{\frac{2a^{3/2}\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{\sqrt{bc-ad}}-\frac{(2ad+bc)\log\left(\sqrt{d}\sqrt{c+dx^6}+dx^3\right)}{d^{3/2}}+\frac{bx^3\sqrt{c+dx^6}}{d}}{6b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^14/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] ((b*x^3*Sqrt[c + d*x^6])/d + (2*a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*x
^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/Sqrt[b*c - a*d] - ((b*c + 2*a*d)*
Log[d*x^3 + Sqrt[d]*Sqrt[c + d*x^6]])/d^(3/2))/(6*b^2)
```

Maple [F] time = 0.115, size = 0, normalized size = 0.

$$\int \frac{x^{14}}{b x^{6}+a}\frac{1}{\sqrt{d x^{6}+c}}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^14/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^14/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^14/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.36286, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^14/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/12*(2*sqrt(d*x^6 + c)*b*sqrt(d)*x^3 + a*d^(3/2)*sqrt(-a/(b*c -
 a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^12 - 2*(3*a*b*c^2
 - 4*a^2*c*d)*x^6 + a^2*c^2 + 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2
)*x^9 - (a*b*c^2 - a^2*c*d)*x^3)*sqrt(d*x^6 + c)*sqrt(-a/(b*c - a
*d)))/(b^2*x^12 + 2*a*b*x^6 + a^2)) + (b*c + 2*a*d)*log(2*sqrt(d*
x^6 + c)*d*x^3 - (2*d*x^6 + c)*sqrt(d)))/(b^2*d^(3/2)), 1/12*(2*s
qrt(d*x^6 + c)*b*sqrt(-d)*x^3 + a*sqrt(-d)*d*sqrt(-a/(b*c - a*d))
*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a
^2*c*d)*x^6 + a^2*c^2 + 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^9
- (a*b*c^2 - a^2*c*d)*x^3)*sqrt(d*x^6 + c)*sqrt(-a/(b*c - a*d)))/
(b^2*x^12 + 2*a*b*x^6 + a^2)) - 2*(b*c + 2*a*d)*arctan(sqrt(-d)*x
^3/sqrt(d*x^6 + c)))/(b^2*sqrt(-d)*d), 1/12*(2*sqrt(d*x^6 + c)*b*
sqrt(d)*x^3 + 2*a*d^(3/2)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c -
2*a*d)*x^6 - a*c)/(sqrt(d*x^6 + c)*(b*c - a*d)*x^3*sqrt(a/(b*c -
a*d)))) + (b*c + 2*a*d)*log(2*sqrt(d*x^6 + c)*d*x^3 - (2*d*x^6 +
c)*sqrt(d)))/(b^2*d^(3/2)), 1/6*(sqrt(d*x^6 + c)*b*sqrt(-d)*x^3 +
 a*sqrt(-d)*d*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^6 -
 a*c)/(sqrt(d*x^6 + c)*(b*c - a*d)*x^3*sqrt(a/(b*c - a*d)))) - (b
*c + 2*a*d)*arctan(sqrt(-d)*x^3/sqrt(d*x^6 + c)))/(b^2*sqrt(-d)*d
)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**14/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{14}}{(bx^6+a)\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^14/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^14/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

3.690 $\int \frac{x^8}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=91

$$\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{3b\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3b\sqrt{bc-ad}}$$

```
[Out] -(Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])]
)/(3*b*Sqrt[b*c - a*d]) + ArcTanh[(Sqrt[d]*x^3)/Sqrt[c + d*x^6]]/
(3*b*Sqrt[d])
```

Rubi [A] time = 0.255327, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{3b\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3b\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -(Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])]
)/(3*b*Sqrt[b*c - a*d]) + ArcTanh[(Sqrt[d]*x^3)/Sqrt[c + d*x^6]]/
(3*b*Sqrt[d])
```

Rubi in Sympy [A] time = 30.1934, size = 76, normalized size = 0.84

$$-\frac{\sqrt{a}\,\mathrm{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3b\sqrt{ad-bc}}+\frac{\mathrm{atanh}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{3b\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(a)*atanh(x**3*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**6)))/(
3*b*sqrt(a*d - b*c)) + atanh(sqrt(d)*x**3/sqrt(c + d*x**6))/(3*b*
sqrt(d))
```

Mathematica [A] time = 0.0857718, size = 90, normalized size = 0.99

$$\frac{\frac{\log\left(\sqrt{d}\sqrt{c+dx^6}+dx^3\right)}{\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{\sqrt{bc-ad}}}{3b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (-((Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6]
)])/Sqrt[b*c - a*d]) + Log[d*x^3 + Sqrt[d]*Sqrt[c + d*x^6]]/Sqrt[
d])/(3*b)
```

Maple [F] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{x^8}{bx^6+a}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^8/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.304182, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{d}\sqrt{-\frac{a}{bc-ad}}\log\left(\frac{(b^2c^2-8\,abcd+8\,a^2d^2)x^{12}-2\,(3\,abc^2-4\,a^2cd)x^6+a^2c^2-4\left((b^2c^2-3\,abcd+2\,a^2d^2)x^9-(abc^2-a^2cd)x^3\right)\sqrt{dx^6+c}\sqrt{-\frac{a}{bc-ad}}}{b^2x^{12}+2\,abx^6+a^2}\right)+2\log}{12\,b\sqrt{d}}\right.$$

$$-\frac{\sqrt{d}\sqrt{\frac{a}{bc-ad}}\arctan\left(\frac{(bc-2\,ad)x^6-ac}{2\sqrt{dx^6+c}(bc-ad)x^3\sqrt{\frac{a}{bc-ad}}}\right)-\log\left(-2\sqrt{dx^6+c}dx^3-\left(2\,dx^6+c\right)\sqrt{d}\right)}{6\,b\sqrt{d}},$$

$$\left.-\frac{\sqrt{-d}\sqrt{\frac{a}{bc-ad}}\arctan\left(\frac{(bc-2\,ad)x^6-ac}{2\sqrt{dx^6+c}(bc-ad)x^3\sqrt{\frac{a}{bc-ad}}}\right)-2\arctan\left(\frac{\sqrt{-d}x^3}{\sqrt{dx^6+c}}\right)}{6\,b\sqrt{-d}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/12*(sqrt(d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8
*a^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^6 + a^2*c^2 - 4*((b^
2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^9 - (a*b*c^2 - a^2*c*d)*x^3)*sqr
t(d*x^6 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^12 + 2*a*b*x^6 + a^2))
+ 2*log(-2*sqrt(d*x^6 + c)*d*x^3 - (2*d*x^6 + c)*sqrt(d)))/(b*sqr
t(d)), 1/12*(sqrt(-d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*
c*d + 8*a^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^6 + a^2*c^2 -
 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^9 - (a*b*c^2 - a^2*c*d)*x
^3)*sqrt(d*x^6 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^12 + 2*a*b*x^6 +
 a^2)) + 4*arctan(sqrt(-d)*x^3/sqrt(d*x^6 + c)))/(b*sqrt(-d)), -1
/6*(sqrt(d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^6 - a
*c)/(sqrt(d*x^6 + c)*(b*c - a*d)*x^3*sqrt(a/(b*c - a*d)))) - log(
-2*sqrt(d*x^6 + c)*d*x^3 - (2*d*x^6 + c)*sqrt(d)))/(b*sqrt(d)), -
1/6*(sqrt(-d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^6 -
 a*c)/(sqrt(d*x^6 + c)*(b*c - a*d)*x^3*sqrt(a/(b*c - a*d)))) - 2*
arctan(sqrt(-d)*x^3/sqrt(d*x^6 + c)))/(b*sqrt(-d))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{(a+bx^6)\sqrt{c+dx^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Integral(x**8/((a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [A] time = 0.232113, size = 223, normalized size = 2.45

$$\frac{1}{3}c\left(\frac{a\arctan\left(\frac{a\sqrt{d+\frac{c}{x^6}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}bc\operatorname{sign}(x)}-\frac{\arctan\left(\frac{\sqrt{d+\frac{c}{x^6}}}{\sqrt{-d}}\right)}{bc\sqrt{-d}\operatorname{sign}(x)}\right)-\frac{\left(a\sqrt{-d}\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^2d}}\right)-\sqrt{abc-a^2d}\arctan\left(\frac{\sqrt{d}}{\sqrt{-d}}\right)\right)\operatorname{sign}(x)}{3\sqrt{abc-a^2d}b\sqrt{-d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] 1/3*c*(a*arctan(a*sqrt(d + c/x^6)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*b*c*sign(x)) - arctan(sqrt(d + c/x^6)/sqrt(-d))/(b*c*s
qrt(-d)*sign(x))) - 1/3*(a*sqrt(-d)*arctan(a*sqrt(d)/sqrt(a*b*c -
 a^2*d)) - sqrt(a*b*c - a^2*d)*arctan(sqrt(d)/sqrt(-d)))*sign(x)/
(sqrt(a*b*c - a^2*d)*b*sqrt(-d))
```

3.691 $\int \frac{x^2}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=54

$$\frac{\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3\sqrt{a}\sqrt{bc-ad}}$$

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])]/(3*Sqrt[a
]*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.137993, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3\sqrt{a}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])]/(3*Sqrt[a
]*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 17.3923, size = 46, normalized size = 0.85

$$\frac{\operatorname{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3\sqrt{a}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] atanh(x**3*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**6)))/(3*sqrt(a)
*sqrt(a*d - b*c))
```

Mathematica [A] time = 0.0417379, size = 54, normalized size = 1.

$$\frac{\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3\sqrt{a}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])]/(3*Sqrt[a
]*Sqrt[b*c - a*d])
```

Maple [F] time = 0.061, size = 0, normalized size = 0.

$$\int \frac{x^2}{bx^6+a}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^2/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.259833, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(\frac{4\left(\left(ab^2c^2-3\,a^2bcd+2\,a^3d^2\right)x^9-\left(a^2bc^2-a^3cd\right)x^3\right)\sqrt{dx^6+c}+\left(\left(b^2c^2-8\,abcd+8\,a^2d^2\right)x^{12}-2\left(3\,abc^2-4\,a^2cd\right)x^6+a^2c^2\right)\sqrt{-abc+a^2d}}{b^2x^{12}+2\,abx^6+a^2}\right)}{12\sqrt{-abc+a^2d}}, \frac{\arctan\left(\frac{(b}{2\sqrt{dx}}\right.}{6\sqrt{ab}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/12*log((4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^9 - (a^2*b*
c^2 - a^3*c*d)*x^3)*sqrt(d*x^6 + c) + ((b^2*c^2 - 8*a*b*c*d + 8*a
^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^6 + a^2*c^2)*sqrt(-a*b
*c + a^2*d))/(b^2*x^12 + 2*a*b*x^6 + a^2))/sqrt(-a*b*c + a^2*d),
1/6*arctan(1/2*((b*c - 2*a*d)*x^6 - a*c)/(sqrt(d*x^6 + c)*sqrt(a*
b*c - a^2*d)*x^3))/sqrt(a*b*c - a^2*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+bx^6)\sqrt{c+dx^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Integral(x**2/((a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [A] time = 0.223548, size = 97, normalized size = 1.8

$$-\frac{\sqrt{d}\arctan\left(\frac{\left(\sqrt{d}x^3-\sqrt{dx^6+c}\right)^2b-bc+2\,ad}{2\sqrt{abcd-a^2d^2}}\right)}{3\sqrt{abcd-a^2d^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] -1/3*sqrt(d)*arctan(1/2*((sqrt(d)*x^3 - sqrt(d*x^6 + c))^2*b - b*
c + 2*a*d)/sqrt(a*b*c*d - a^2*d^2))/sqrt(a*b*c*d - a^2*d^2)
```

3.692 $\int \frac{1}{x^4(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=80

$$-\frac{b\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3a^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^6}}{3acx^3}$$

```
[Out] -Sqrt[c + d*x^6]/(3*a*c*x^3) - (b*ArcTan[(Sqrt[b*c - a*d]*x^3)/(S
qrt[a]*Sqrt[c + d*x^6])])/(3*a^(3/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.245905, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{b\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3a^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^6}}{3acx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -Sqrt[c + d*x^6]/(3*a*c*x^3) - (b*ArcTan[(Sqrt[b*c - a*d]*x^3)/(S
qrt[a]*Sqrt[c + d*x^6])])/(3*a^(3/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 30.7548, size = 68, normalized size = 0.85

$$-\frac{\sqrt{c+dx^6}}{3acx^3}-\frac{b\,\mathrm{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3a^{\frac{3}{2}}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)/(3*a*c*x**3) - b*atanh(x**3*sqrt(a*d - b*c)/(sq
rt(a)*sqrt(c + d*x**6)))/(3*a**(3/2)*sqrt(a*d - b*c))
```

Mathematica [A] time = 1.29092, size = 129, normalized size = 1.61

$$\frac{\sqrt{c+dx^6}\left(-\frac{bx^6\sin^{-1}\left(\frac{\sqrt{x^6\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^6}{a}+1}}\right)}{\sqrt{\frac{bx^6}{a}+1}\sqrt{x^6\left(\frac{b}{a}-\frac{d}{c}\right)}\sqrt{\frac{a\left(c+dx^6\right)}{c\left(a+bx^6\right)}}}-a\right)}{3a^2cx^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^4*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (Sqrt[c + d*x^6]*(-a - (b*x^6*ArcSin[Sqrt[(b/a - d/c)*x^6]/Sqrt[1
 + (b*x^6)/a]])/(Sqrt[(b/a - d/c)*x^6]*Sqrt[1 + (b*x^6)/a]*Sqrt[(
a*(c + d*x^6))/(c*(a + b*x^6))])))/(3*a^2*c*x^3)
```

Maple [F] time = 0.092, size = 0, normalized size = 0.

$$\int \frac{1}{x^4 \left(b x^6+a\right)} \frac{1}{\sqrt{d x^6+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^6+a)/(d*x^6+c)^(1/2),x)

[Out] int(1/x^4/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b x^6+a)\sqrt{d x^6+c}\, x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^4),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^4), x)
```

Fricas [A] time = 0.288729, size = 1, normalized size = 0.01

$$\left[\frac{b c x^3 \log\left(-\frac{4\left(\left(a b^2 c^2-3 a^2 b c d+2 a^3 d^2\right) x^9-\left(a^2 b c^2-a^3 c d\right) x^3\right)\sqrt{d x^6+c}-\left(\left(b^2 c^2-8 a b c d+8 a^2 d^2\right) x^{12}-2\left(3 a b c^2-4 a^2 c d\right) x^6+a^2 c^2\right)\sqrt{-a b c+a^2 d}}{b^2 x^{12}+2 a b x^6+a^2}\right)-4\sqrt{d x^6+c}\sqrt{-a b c+a^2 d}}{12\sqrt{-a b c+a^2 d}\, a c x^3}, -\frac{b c x^3 \arctan\left(\frac{(b c-2 a d) x^6-a c}{2\sqrt{d x^6+c}\sqrt{a b c-a^2 d}\, x^3}\right)+2\sqrt{d x^6+c}\sqrt{a b c-a^2 d}}{6\sqrt{a b c-a^2 d}\, a c x^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^4),x, algorithm="fricas")

[Out] [1/12*(b*c*x^3*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^9
 - (a^2*b*c^2 - a^3*c*d)*x^3)*sqrt(d*x^6 + c) - ((b^2*c^2 - 8*a*b
*c*d + 8*a^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^6 + a^2*c^2)
*sqrt(-a*b*c + a^2*d))/(b^2*x^12 + 2*a*b*x^6 + a^2)) - 4*sqrt(d*x
^6 + c)*sqrt(-a*b*c + a^2*d))/(sqrt(-a*b*c + a^2*d)*a*c*x^3), -1/
6*(b*c*x^3*arctan(1/2*((b*c - 2*a*d)*x^6 - a*c)/(sqrt(d*x^6 + c)*
sqrt(a*b*c - a^2*d)*x^3)) + 2*sqrt(d*x^6 + c)*sqrt(a*b*c - a^2*d)
)/(sqrt(a*b*c - a^2*d)*a*c*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^4 \left(a+b x^6\right)\sqrt{c+d x^6}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**6+a)/(d*x**6+c)**(1/2),x)

[Out] Integral(1/(x**4*(a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [A] time = 0.254104, size = 185, normalized size = 2.31

$$\frac{\frac{bc\arctan\left(\frac{a\sqrt{d+\frac{c}{x^6}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}a\mathrm{sign}(x)}-\frac{\sqrt{d+\frac{c}{x^6}}}{a\mathrm{sign}(x)}}{3\,c}-\frac{\left(bc\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^2d}}\right)-\sqrt{abc-a^2d}\sqrt{d}\right)\mathrm{sign}\left(x\right)}{3\,\sqrt{abc-a^2d}ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^4),x, algorithm="giac")
```

```
[Out] 1/3*(b*c*arctan(a*sqrt(d + c/x^6)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*a*sign(x)) - sqrt(d + c/x^6)/(a*sign(x)))/c - 1/3*(b*c
*arctan(a*sqrt(d)/sqrt(a*b*c - a^2*d)) - sqrt(a*b*c - a^2*d)*sqrt
(d))*sign(x)/(sqrt(a*b*c - a^2*d)*a*c)
```

3.693 $\int \frac{1}{x^{10}(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=115

$$\frac{b^2\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3a^{5/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^6}(2ad+3bc)}{9a^2c^2x^3}-\frac{\sqrt{c+dx^6}}{9acx^9}$$

```
[Out] -Sqrt[c + d*x^6]/(9*a*c*x^9) + ((3*b*c + 2*a*d)*Sqrt[c + d*x^6])/
(9*a^2*c^2*x^3) + (b^2*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt
[c + d*x^6])])/(3*a^(5/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.479913, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$\frac{b^2\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3a^{5/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^6}(2ad+3bc)}{9a^2c^2x^3}-\frac{\sqrt{c+dx^6}}{9acx^9}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^10*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -Sqrt[c + d*x^6]/(9*a*c*x^9) + ((3*b*c + 2*a*d)*Sqrt[c + d*x^6])/
(9*a^2*c^2*x^3) + (b^2*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt
[c + d*x^6])])/(3*a^(5/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 63.3972, size = 100, normalized size = 0.87

$$-\frac{\sqrt{c+dx^6}}{9acx^9}+\frac{\sqrt{c+dx^6}\,(2ad+3bc)}{9a^2c^2x^3}+\frac{b^2\,\mathrm{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{3a^{\frac{5}{2}}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**10/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)/(9*a*c*x**9) + sqrt(c + d*x**6)*(2*a*d + 3*b*c)
/(9*a**2*c**2*x**3) + b**2*atanh(x**3*sqrt(a*d - b*c)/(sqrt(a)*sq
rt(c + d*x**6)))/(3*a**(5/2)*sqrt(a*d - b*c))
```

Mathematica [A] time = 1.4021, size = 149, normalized size = 1.3

$$\frac{\sqrt{c+dx^6}\left(-a^2c+\frac{3b^2cx^{12}\sin^{-1}\left(\frac{\sqrt{x^6\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^6}{a}+1}}\right)}{\sqrt{\frac{bx^6}{a}+1}\sqrt{x^6\left(\frac{b}{a}-\frac{d}{c}\right)}\sqrt{\frac{a\left(c+dx^6\right)}{c\left(a+bx^6\right)}}}+ax^6(2ad+3bc)\right)}{9a^3c^2x^9}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^10*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (Sqrt[c + d*x^6]*(-(a^2*c) + a*(3*b*c + 2*a*d)*x^6 + (3*b^2*c*x^1
2*ArcSin[Sqrt[(b/a - d/c)*x^6]/Sqrt[1 + (b*x^6)/a]])/(Sqrt[(b/a -
 d/c)*x^6]*Sqrt[1 + (b*x^6)/a]*Sqrt[(a*(c + d*x^6))/(c*(a + b*x^6
```

```
))])))/(9*a^3*c^2*x^9)
```

Maple [F] time = 0.099, size = 0, normalized size = 0.

$$\int \frac{1}{x^{10}\left(bx^{6}+a\right)}\frac{1}{\sqrt{dx^{6}+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^10/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(1/x^10/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^{6}+a\right)\sqrt{dx^{6}+c}\,x^{10}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^10),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^10), x)
```

Fricas [A] time = 0.308903, size = 1, normalized size = 0.01

$$\left[\frac{3\,b^{2}c^{2}x^{9}\log\left(\frac{4\left(\left(ab^{2}c^{2}-3\,a^{2}bcd+2\,a^{3}d^{2}\right)x^{9}-\left(a^{2}bc^{2}-a^{3}cd\right)x^{3}\right)\sqrt{dx^{6}+c}+\left(\left(b^{2}c^{2}-8\,abcd+8\,a^{2}d^{2}\right)x^{12}-2\left(3\,abc^{2}-4\,a^{2}cd\right)x^{6}+a^{2}c^{2}\right)\sqrt{-abc+a^{2}d}}{b^{2}x^{12}+2\,abx^{6}+a^{2}}\right)+4\,(\left(\right.}{36\sqrt{-abc+a^{2}d}\,a^{2}c^{2}x^{9}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^10),x, algorithm="fricas")
```

```
[Out] [1/36*(3*b^2*c^2*x^9*log((4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2
)*x^9 - (a^2*b*c^2 - a^3*c*d)*x^3)*sqrt(d*x^6 + c) + ((b^2*c^2 -
8*a*b*c*d + 8*a^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^6 + a^2
*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^12 + 2*a*b*x^6 + a^2)) + 4*((3
*b*c + 2*a*d)*x^6 - a*c)*sqrt(d*x^6 + c)*sqrt(-a*b*c + a^2*d))/(s
qrt(-a*b*c + a^2*d)*a^2*c^2*x^9), 1/18*(3*b^2*c^2*x^9*arctan(1/2*
((b*c - 2*a*d)*x^6 - a*c)/(sqrt(d*x^6 + c)*sqrt(a*b*c - a^2*d)*x^
3)) + 2*((3*b*c + 2*a*d)*x^6 - a*c)*sqrt(d*x^6 + c)*sqrt(a*b*c -
a^2*d))/(sqrt(a*b*c - a^2*d)*a^2*c^2*x^9)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**10/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.2678, size = 277, normalized size = 2.41

$$-\frac{b^{2}\arctan\left(\frac{a\sqrt{d+\frac{c}{x^{6}}}}{\sqrt{abc-a^{2}d}}\right)}{3\sqrt{abc-a^{2}d}a^{2}\mathrm{sign}\left(x\right)}+\frac{\left(3\,b^{2}c^{2}\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^{2}d}}\right)-3\sqrt{abc-a^{2}d}bc\sqrt{d}-2\sqrt{abc-a^{2}d}ad^{\frac{3}{2}}\right)\mathrm{sign}\left(x\right)}{9\sqrt{abc-a^{2}d}a^{2}c^{2}}+\frac{3\,abc^{5}\sqrt{d+\frac{c}{x^{6}}}-a^{2}c^{4}\left(d+\frac{c}{x^{6}}\right)^{\frac{3}{2}}+3\,a^{2}c^{4}\sqrt{d+\frac{c}{x^{6}}}d}{9\,a^{3}c^{6}\mathrm{sign}\left(x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^10),x, algorithm="giac")
```

```
[Out] -1/3*b^2*arctan(a*sqrt(d + c/x^6)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*a^2*sign(x)) + 1/9*(3*b^2*c^2*arctan(a*sqrt(d)/sqrt(a*
b*c - a^2*d)) - 3*sqrt(a*b*c - a^2*d)*b*c*sqrt(d) - 2*sqrt(a*b*c
- a^2*d)*a*d^(3/2))*sign(x)/(sqrt(a*b*c - a^2*d)*a^2*c^2) + 1/9*(
3*a*b*c^5*sqrt(d + c/x^6) - a^2*c^4*(d + c/x^6)^(3/2) + 3*a^2*c^4
*sqrt(d + c/x^6)*d)/(a^3*c^6*sign(x))
```

3.694 $\int \frac{x^4}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$\frac{x^5\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{5}{6};1,\frac{1}{2};\frac{11}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{5a\sqrt{c+dx^6}}$$

```
[Out] (x^5*Sqrt[1 + (d*x^6)/c]*AppellF1[5/6, 1, 1/2, 11/6, -((b*x^6)/a)
, -((d*x^6)/c)])/(5*a*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.192561, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^5\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{5}{6};1,\frac{1}{2};\frac{11}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{5a\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^5*Sqrt[1 + (d*x^6)/c]*AppellF1[5/6, 1, 1/2, 11/6, -((b*x^6)/a)
, -((d*x^6)/c)])/(5*a*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 24.6449, size = 51, normalized size = 0.8

$$\frac{x^5\sqrt{c+dx^6}\,\operatorname{appellf}_1\left(\frac{5}{6},\frac{1}{2},1,\frac{11}{6},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{5ac\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] x**5*sqrt(c + d*x**6)*appellf1(5/6, 1/2, 1, 11/6, -d*x**6/c, -b*x
**6/a)/(5*a*c*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.278063, size = 165, normalized size = 2.58

$$-\frac{11acx^5F_1\left(\frac{5}{6};\frac{1}{2},1;\frac{11}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{5\left(a+bx^6\right)\sqrt{c+dx^6}\left(3x^6\left(2bcF_1\left(\frac{11}{6};\frac{1}{2},2;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{11}{6};\frac{3}{2},1;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-11acF_1\left(\frac{5}{6};\frac{1}{2},1;\frac{11}{6};-\frac{dx^6}{c},\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (-11*a*c*x^5*AppellF1[5/6, 1/2, 1, 11/6, -((d*x^6)/c), -((b*x^6)/
a)])/(5*(a + b*x^6)*Sqrt[c + d*x^6]*(-11*a*c*AppellF1[5/6, 1/2, 1
, 11/6, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[11/6,
 1/2, 2, 17/6, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[11/6, 3
/2, 1, 17/6, -((d*x^6)/c), -((b*x^6)/a)])))
```

Maple [F] time = 0.061, size = 0, normalized size = 0.

$$\int \frac{x^4}{bx^6+a}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^4/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^6+a)\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(a+bx^6)\sqrt{c+dx^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Integral(x**4/((a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^6+a)\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

3.695 $\int \frac{x^3}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$\frac{x^4\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{2}{3};1,\frac{1}{2};\frac{5}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{4a\sqrt{c+dx^6}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^6)/c]*AppellF1[2/3, 1, 1/2, 5/3, -((b*x^6)/a),
 -((d*x^6)/c)])/(4*a*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.235214, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{x^4\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{2}{3};1,\frac{1}{2};\frac{5}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{4a\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^6)/c]*AppellF1[2/3, 1, 1/2, 5/3, -((b*x^6)/a),
 -((d*x^6)/c)])/(4*a*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 27.3414, size = 51, normalized size = 0.8

$$\frac{x^4\sqrt{c+dx^6}\,\operatorname{appellf}_1\left(\frac{2}{3},\frac{1}{2},1,\frac{5}{3},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{4ac\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] x**4*sqrt(c + d*x**6)*appellf1(2/3, 1/2, 1, 5/3, -d*x**6/c, -b*x*
*6/a)/(4*a*c*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.283297, size = 165, normalized size = 2.58

$$-\frac{5acx^4F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{2\left(a+bx^6\right)\sqrt{c+dx^6}\left(3x^6\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (-5*a*c*x^4*AppellF1[2/3, 1/2, 1, 5/3, -((d*x^6)/c), -((b*x^6)/a)
])/(2*(a + b*x^6)*Sqrt[c + d*x^6]*(-10*a*c*AppellF1[2/3, 1/2, 1,
5/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[5/3, 1/2
, 2, 8/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[5/3, 3/2, 1,
 8/3, -((d*x^6)/c), -((b*x^6)/a)])))
```

Maple [F] time = 0.059, size = 0, normalized size = 0.

$$\int \frac{x^3}{bx^6+a}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^3/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^6+a)\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(a+bx^6)\sqrt{c+dx^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Integral(x**3/((a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^6+a)\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^3/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

3.696 $\int \frac{x}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$\frac{x^2\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{1}{3};1,\frac{1}{2};\frac{4}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{2a\sqrt{c+dx^6}}$$

```
[Out] (x^2*Sqrt[1 + (d*x^6)/c]*AppellF1[1/3, 1, 1/2, 4/3, -((b*x^6)/a),
 -((d*x^6)/c)])/(2*a*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.161897, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{x^2\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{1}{3};1,\frac{1}{2};\frac{4}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{2a\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^2*Sqrt[1 + (d*x^6)/c]*AppellF1[1/3, 1, 1/2, 4/3, -((b*x^6)/a),
 -((d*x^6)/c)])/(2*a*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 26.8379, size = 51, normalized size = 0.8

$$\frac{x^2\sqrt{c+dx^6}\,\text{appellf}_1\left(\frac{1}{3},\frac{1}{2},1,\frac{4}{3},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{2ac\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] x**2*sqrt(c + d*x**6)*appellf1(1/3, 1/2, 1, 4/3, -d*x**6/c, -b*x*
*6/a)/(2*a*c*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.288023, size = 163, normalized size = 2.55

$$-\frac{4acx^2F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{(a+bx^6)\sqrt{c+dx^6}\left(3x^6\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (-4*a*c*x^2*AppellF1[1/3, 1/2, 1, 4/3, -((d*x^6)/c), -((b*x^6)/a)
])/((a + b*x^6)*Sqrt[c + d*x^6]*(-8*a*c*AppellF1[1/3, 1/2, 1, 4/3
, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[4/3, 1/2, 2
, 7/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[4/3, 3/2, 1, 7/
3, -((d*x^6)/c), -((b*x^6)/a)])))
```

Maple [F] time = 0.058, size = 0, normalized size = 0.

$$\int \frac{x}{bx^6+a}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^6+a)\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(a+bx^6)\sqrt{c+dx^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] Integral(x/((a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^6+a)\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] integrate(x/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

3.697 $\int \frac{1}{(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=59

$$\frac{x\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{1}{6};1,\frac{1}{2};\frac{7}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{a\sqrt{c+dx^6}}$$

```
[Out] (x*Sqrt[1 + (d*x^6)/c]*AppellF1[1/6, 1, 1/2, 7/6, -((b*x^6)/a), -
((d*x^6)/c)])/(a*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.0876728, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{1}{6};1,\frac{1}{2};\frac{7}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{a\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (x*Sqrt[1 + (d*x^6)/c]*AppellF1[1/6, 1, 1/2, 7/6, -((b*x^6)/a), -
((d*x^6)/c)])/(a*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 21.021, size = 48, normalized size = 0.81

$$\frac{x\sqrt{c+dx^6}\,\text{appellf}_1\left(\frac{1}{6},\frac{1}{2},1,\frac{7}{6},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{ac\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**6)*appellf1(1/6, 1/2, 1, 7/6, -d*x**6/c, -b*x**6/
a)/(a*c*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.285997, size = 161, normalized size = 2.73

$$-\frac{7acxF_1\left(\frac{1}{6};\frac{1}{2},1;\frac{7}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{(a+bx^6)\sqrt{c+dx^6}\left(3x^6\left(2bcF_1\left(\frac{7}{6};\frac{1}{2},2;\frac{13}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{7}{6};\frac{3}{2},1;\frac{13}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-7acF_1\left(\frac{1}{6};\frac{1}{2},1;\frac{7}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] (-7*a*c*x*AppellF1[1/6, 1/2, 1, 7/6, -((d*x^6)/c), -((b*x^6)/a)])
/((a + b*x^6)*Sqrt[c + d*x^6]*(-7*a*c*AppellF1[1/6, 1/2, 1, 7/6,
-((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[7/6, 1/2, 2,
13/6, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[7/6, 3/2, 1, 13/
6, -((d*x^6)/c), -((b*x^6)/a)])))
```

Maple [F] time = 0.06, size = 0, normalized size = 0.

$$\int \frac{1}{b x^{6}+a}\frac{1}{\sqrt{d x^{6}+c}}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^6+a)/(d*x^6+c)^(1/2),x)

[Out] int(1/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b x^{6}+a)\sqrt{d x^{6}+c}}\,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(a+b x^{6})\sqrt{c+d x^{6}}}\,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**6+a)/(d*x**6+c)**(1/2),x)

[Out] Integral(1/((a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b x^{6}+a)\sqrt{d x^{6}+c}}\,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)),x, algorithm="giac")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)), x)
```

3.698 $\int \frac{1}{x^2(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=62

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{1}{6};1,\frac{1}{2};\frac{5}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{ax\sqrt{c+dx^6}}$$

```
[Out] -((Sqrt[1 + (d*x^6)/c]*AppellF1[-1/6, 1, 1/2, 5/6, -((b*x^6)/a),
-((d*x^6)/c)])/(a*x*Sqrt[c + d*x^6]))
```

Rubi [A] time = 0.189551, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{1}{6};1,\frac{1}{2};\frac{5}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{ax\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -((Sqrt[1 + (d*x^6)/c]*AppellF1[-1/6, 1, 1/2, 5/6, -((b*x^6)/a),
-((d*x^6)/c)])/(a*x*Sqrt[c + d*x^6]))
```

Rubi in Sympy [A] time = 25.2079, size = 51, normalized size = 0.82

$$-\frac{\sqrt{c+dx^6}\,\text{appellf}_1\left(-\frac{1}{6},\frac{1}{2},1,\frac{5}{6},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{acx\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)*appellf1(-1/6, 1/2, 1, 5/6, -d*x**6/c, -b*x**6/
a)/(a*c*x*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.721137, size = 344, normalized size = 5.55

$$\frac{\frac{121x^6(bc-2ad)F_1\left(\frac{5}{6};\frac{1}{2},1;\frac{11}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{(a+bx^6)\left(3x^6\left(2bcF_1\left(\frac{11}{6};\frac{1}{2},2;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{11}{6};\frac{3}{2},1;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-11acF_1\left(\frac{5}{6};\frac{1}{2},1;\frac{11}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)}-\frac{170}{(a+bx^6)\left(3x^6\left(2bcF_1\left(\frac{17}{6};\frac{1}{2},2;\frac{23}{6};-\frac{dx^6}{c},-b\right.\right.\right.}}{55x\sqrt{c+dx^6}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] ((-55*(c + d*x^6))/(a*c) + (121*(b*c - 2*a*d)*x^6*AppellF1[5/6, 1
/2, 1, 11/6, -((d*x^6)/c), -((b*x^6)/a)])/((a + b*x^6)*(-11*a*c*A
ppellF1[5/6, 1/2, 1, 11/6, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2
*b*c*AppellF1[11/6, 1/2, 2, 17/6, -((d*x^6)/c), -((b*x^6)/a)] + a
*d*AppellF1[11/6, 3/2, 1, 17/6, -((d*x^6)/c), -((b*x^6)/a)]))) -
(170*b*d*x^12*AppellF1[11/6, 1/2, 1, 17/6, -((d*x^6)/c), -((b*x^6
)/a)])/((a + b*x^6)*(-17*a*c*AppellF1[11/6, 1/2, 1, 17/6, -((d*x^
6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[17/6, 1/2, 2, 23/6,
-((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[17/6, 3/2, 1, 23/6, -(
```

```
(d*x^6)/c), -((b*x^6)/a)]))))/(55*x*Sqrt[c + d*x^6])
```

Maple [F] time = 0.11, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 (bx^6 + a)} \frac{1}{\sqrt{dx^6 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^6+a)/(d*x^6+c)^(1/2),x)

[Out] int(1/x^2/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^6 + a)\sqrt{dx^6 + c}x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^2),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(bx^8 + ax^2)\sqrt{dx^6 + c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^2),x, algorithm="fricas")

[Out] integral(1/((b*x^8 + a*x^2)*sqrt(d*x^6 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 (a + bx^6) \sqrt{c + dx^6}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**6+a)/(d*x**6+c)**(1/2),x)

[Out] Integral(1/(x**2*(a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^6 + a)\sqrt{dx^6 + c}x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^2),x, algorithm="giac")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^2), x)
```

3.699 $\int \frac{1}{x^3(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{\frac{dx^6}{c}+1}\,F_1\left(-\frac{1}{3};1,\frac{1}{2};\frac{2}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{2ax^2\sqrt{c+dx^6}}$$

```
[Out] -(Sqrt[1 + (d*x^6)/c]*AppellF1[-1/3, 1, 1/2, 2/3, -((b*x^6)/a), -
((d*x^6)/c)])/(2*a*x^2*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.287227, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{\sqrt{\frac{dx^6}{c}+1}\,F_1\left(-\frac{1}{3};1,\frac{1}{2};\frac{2}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{2ax^2\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -(Sqrt[1 + (d*x^6)/c]*AppellF1[-1/3, 1, 1/2, 2/3, -((b*x^6)/a), -
((d*x^6)/c)])/(2*a*x^2*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 32.5694, size = 54, normalized size = 0.84

$$-\frac{\sqrt{c+dx^6}\,\operatorname{appellf_1}\left(-\frac{1}{3},\frac{1}{2},1,\frac{2}{3},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{2acx^2\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)*appellf1(-1/3, 1/2, 1, 2/3, -d*x**6/c, -b*x**6/
a)/(2*a*c*x**2*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.718184, size = 345, normalized size = 5.39

$$\frac{\frac{25x^6(2bc-ad)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{(a+bx^6)\left(3x^6\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)}-\frac{16bdx^{12}\cdots}{(a+bx^6)\left(3x^6\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+\cdots\right.\right.}\cdots}{20x^2\sqrt{c+dx^6}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] ((-10*(c + d*x^6))/(a*c) + (25*(2*b*c - a*d)*x^6*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^6)/c), -((b*x^6)/a)])/((a + b*x^6)*(-10*a*c*App
ellF1[2/3, 1/2, 1, 5/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*
c*AppellF1[5/3, 1/2, 2, 8/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*Ap
pellF1[5/3, 3/2, 1, 8/3, -((d*x^6)/c), -((b*x^6)/a)]))) - (16*b*d
*x^12*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^6)/c), -((b*x^6)/a)])/((a
 + b*x^6)*(-16*a*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^6)/c), -((b*
x^6)/a)] + 3*x^6*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^6)/c),
 -((b*x^6)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^6)/c), -(
```

```
(b*x^6)/a)]))))/(20*x^2*Sqrt[c + d*x^6])
```

Maple [F] time = 0.107, size = 0, normalized size = 0.

$$\int \frac{1}{x^3(bx^6+a)}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^6+a)/(d*x^6+c)^(1/2),x)

[Out] int(1/x^3/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^6+a)\sqrt{dx^6+c}\,x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^3),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^3), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^3),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3(a+bx^6)\sqrt{c+dx^6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**6+a)/(d*x**6+c)**(1/2),x)

[Out] Integral(1/(x**3*(a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^6+a)\sqrt{dx^6+c}\,x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^3),x, algorithm="giac")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^3), x)
```

3.700 $\int \frac{1}{x^5(a+bx^6)\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{2}{3};1,\frac{1}{2};\frac{1}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{4ax^4\sqrt{c+dx^6}}$$

```
[Out] -(Sqrt[1 + (d*x^6)/c]*AppellF1[-2/3, 1, 1/2, 1/3, -((b*x^6)/a), -
((d*x^6)/c)])/(4*a*x^4*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.286655, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{2}{3};1,\frac{1}{2};\frac{1}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{4ax^4\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] -(Sqrt[1 + (d*x^6)/c]*AppellF1[-2/3, 1, 1/2, 1/3, -((b*x^6)/a), -
((d*x^6)/c)])/(4*a*x^4*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 32.4172, size = 54, normalized size = 0.84

$$-\frac{\sqrt{c+dx^6}\,\text{appellf}_1\left(-\frac{2}{3},\frac{1}{2},1,\frac{1}{3},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{4acx^4\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(b*x**6+a)/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)*appellf1(-2/3, 1/2, 1, 1/3, -d*x**6/c, -b*x**6/
a)/(4*a*c*x**4*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.693503, size = 344, normalized size = 5.38

$$\frac{\frac{16x^6(ad+4bc)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{(a+bx^6)\left(3x^6\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)}+\frac{7bdx^{12}F}{(a+bx^6)\left(3x^6\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+a\right.\right.}}{16x^4\sqrt{c+dx^6}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^5*(a + b*x^6)*Sqrt[c + d*x^6]),x]
```

```
[Out] ((-4*(c + d*x^6))/(a*c) + (16*(4*b*c + a*d)*x^6*AppellF1[1/3, 1/2
, 1, 4/3, -((d*x^6)/c), -((b*x^6)/a)])/((a + b*x^6)*(-8*a*c*Appel
lF1[1/3, 1/2, 1, 4/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*
AppellF1[4/3, 1/2, 2, 7/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*Appe
llF1[4/3, 3/2, 1, 7/3, -((d*x^6)/c), -((b*x^6)/a)]))) + (7*b*d*x^
12*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^6)/c), -((b*x^6)/a)])/((a +
b*x^6)*(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^6)/c), -((b*x^6
)/a)] + 3*x^6*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^6)/c), -(
(b*x^6)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^6)/c), -((b*
```

```
x^6)/a)])))))/(16*x^4*Sqrt[c + d*x^6])
```

Maple [F] time = 0.115, size = 0, normalized size = 0.

$$\int \frac{1}{x^{5}\left(b x^{6}+a\right)} \frac{1}{\sqrt{d x^{6}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(b*x^6+a)/(d*x^6+c)^(1/2),x)

[Out] int(1/x^5/(b*x^6+a)/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b x^{6}+a)\sqrt{d x^{6}+c}\, x^{5}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^5),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^5), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^5),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{5}\left(a+b x^{6}\right)\sqrt{c+d x^{6}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**6+a)/(d*x**6+c)**(1/2),x)

[Out] Integral(1/(x**5*(a + b*x**6)*sqrt(c + d*x**6)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b x^{6}+a)\sqrt{d x^{6}+c}\, x^{5}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^5),x, algorithm="giac")

[Out] integrate(1/((b*x^6 + a)*sqrt(d*x^6 + c)*x^5), x)
```

3.701 $\int \frac{x^{17}}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=123

$$-\frac{a^2\sqrt{c+dx^6}}{6b^2(a+bx^6)(bc-ad)}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6b^{5/2}(bc-ad)^{3/2}}+\frac{\sqrt{c+dx^6}}{3b^2d}$$

```
[Out] Sqrt[c + d*x^6]/(3*b^2*d) - (a^2*Sqrt[c + d*x^6])/(6*b^2*(b*c - a
*d)*(a + b*x^6)) + (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d
*x^6])/Sqrt[b*c - a*d]])/(6*b^(5/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.421695, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.208$

$$-\frac{a^2\sqrt{c+dx^6}}{6b^2(a+bx^6)(bc-ad)}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6b^{5/2}(bc-ad)^{3/2}}+\frac{\sqrt{c+dx^6}}{3b^2d}$$

Antiderivative was successfully verified.

```
[In]  Int[x^17/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] Sqrt[c + d*x^6]/(3*b^2*d) - (a^2*Sqrt[c + d*x^6])/(6*b^2*(b*c - a
*d)*(a + b*x^6)) + (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d
*x^6])/Sqrt[b*c - a*d]])/(6*b^(5/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 35.273, size = 104, normalized size = 0.85

$$\frac{a^2\sqrt{c+dx^6}}{6b^2(a+bx^6)(ad-bc)}-\frac{a(3ad-4bc)\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{6b^{\frac{5}{2}}(ad-bc)^{\frac{3}{2}}}+\frac{\sqrt{c+dx^6}}{3b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**17/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] a**2*sqrt(c + d*x**6)/(6*b**2*(a + b*x**6)*(a*d - b*c)) - a*(3*a*
d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**6)/sqrt(a*d - b*c))/(6*b**(
5/2)*(a*d - b*c)**(3/2)) + sqrt(c + d*x**6)/(3*b**2*d)
```

Mathematica [A] time = 0.380275, size = 107, normalized size = 0.87

$$\frac{1}{6}\left(\frac{\sqrt{c+dx^6}\left(\frac{a^2}{(a+bx^6)(ad-bc)}+\frac{2}{d}\right)}{b^2}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{b^{5/2}(bc-ad)^{3/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^17/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] ((Sqrt[c + d*x^6]*(2/d + a^2/((-(b*c) + a*d)*(a + b*x^6))))/b^2 +
 (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c -
a*d]])/(b^(5/2)*(b*c - a*d)^(3/2)))/6
```

Maple [F] time = 0.117, size = 0, normalized size = 0.

$$\int \frac{x^{17}}{\left(b x^{6}+a\right)^{2}} \frac{1}{\sqrt{d x^{6}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^17/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^17/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^17/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.234718, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2\left(b^{2} c-a b d\right) x^{6}+2 a b c-3 a^{2} d\right) \sqrt{d x^{6}+c} \sqrt{b^{2} c-a b d}+\left(\left(4 a b^{2} c d-3 a^{2} b d^{2}\right) x^{6}+4 a^{2} b c d-3 a^{3} d^{2}\right) \log \left(\frac{\left(b d x^{6}+2 b c-a d\right)\cdots}{\cdots}\right)}{12\left(\left(b^{4} c d-a b^{3} d^{2}\right) x^{6}+a b^{3} c d-a^{2} b^{2} d^{2}\right) \sqrt{b^{2} c-a b d}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^17/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/12*(2*(2*(b^2*c - a*b*d)*x^6 + 2*a*b*c - 3*a^2*d)*sqrt(d*x^6 +
 c)*sqrt(b^2*c - a*b*d) + ((4*a*b^2*c*d - 3*a^2*b*d^2)*x^6 + 4*a^
2*b*c*d - 3*a^3*d^2)*log(((b*d*x^6 + 2*b*c - a*d)*sqrt(b^2*c - a*
b*d) + 2*sqrt(d*x^6 + c)*(b^2*c - a*b*d))/(b*x^6 + a)))/(((b^4*c*
d - a*b^3*d^2)*x^6 + a*b^3*c*d - a^2*b^2*d^2)*sqrt(b^2*c - a*b*d)
), 1/6*((2*(b^2*c - a*b*d)*x^6 + 2*a*b*c - 3*a^2*d)*sqrt(d*x^6 +
c)*sqrt(-b^2*c + a*b*d) + ((4*a*b^2*c*d - 3*a^2*b*d^2)*x^6 + 4*a^
2*b*c*d - 3*a^3*d^2)*arctan(-(b*c - a*d)/(sqrt(d*x^6 + c)*sqrt(-b
^2*c + a*b*d))))/(((b^4*c*d - a*b^3*d^2)*x^6 + a*b^3*c*d - a^2*b^
2*d^2)*sqrt(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**17/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216553, size = 181, normalized size = 1.47

$$-\frac{\sqrt{d x^{6}+c} a^{2} d}{6\left(b^{3} c-a b^{2} d\right)\left(\left(d x^{6}+c\right) b-b c+a d\right)}-\frac{\left(4 a b c-3 a^{2} d\right) \arctan \left(\frac{\sqrt{d x^{6}+c} b}{\sqrt{-b^{2} c+a b d}}\right)}{6\left(b^{3} c-a b^{2} d\right) \sqrt{-b^{2} c+a b d}}+\frac{\sqrt{d x^{6}+c}}{3 b^{2} d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^17/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] -1/6*sqrt(d*x^6 + c)*a^2*d/((b^3*c - a*b^2*d)*((d*x^6 + c)*b - b*
c + a*d)) - 1/6*(4*a*b*c - 3*a^2*d)*arctan(sqrt(d*x^6 + c)*b/sqrt
(-b^2*c + a*b*d))/((b^3*c - a*b^2*d)*sqrt(-b^2*c + a*b*d)) + 1/3*
sqrt(d*x^6 + c)/(b^2*d)
```

3.702 $\int \frac{x^{11}}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=99

$$\frac{a\sqrt{c+dx^6}}{6b\,(a+bx^6)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6b^{3/2}(bc-ad)^{3/2}}$$

```
[Out] (a*Sqrt[c + d*x^6])/(6*b*(b*c - a*d)*(a + b*x^6)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*b^(3/2)*
(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.233623, antiderivative size = 99, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{a\sqrt{c+dx^6}}{6b\,(a+bx^6)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6b^{3/2}(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (a*Sqrt[c + d*x^6])/(6*b*(b*c - a*d)*(a + b*x^6)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*b^(3/2)*
(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 24.0953, size = 80, normalized size = 0.81

$$-\frac{a\sqrt{c+dx^6}}{6b\,(a+bx^6)\,(ad-bc)}+\frac{\left(\frac{ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{3b^{\frac{3}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -a*sqrt(c + d*x**6)/(6*b*(a + b*x**6)*(a*d - b*c)) + (a*d/2 - b*c
)*atan(sqrt(b)*sqrt(c + d*x**6)/sqrt(a*d - b*c))/(3*b**(3/2)*(a*d
 - b*c)**(3/2))
```

Mathematica [A] time = 0.133604, size = 99, normalized size = 1.

$$\frac{a\sqrt{c+dx^6}}{6b\,(a+bx^6)\,(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6b^{3/2}(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (a*Sqrt[c + d*x^6])/(6*b*(b*c - a*d)*(a + b*x^6)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*b^(3/2)*
(b*c - a*d)^(3/2))
```

Maple [F] time = 0.075, size = 0, normalized size = 0.

$$\int \frac{x^{11}}{\left(b x^6+a\right)^2} \frac{1}{\sqrt{d x^6+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^11/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^11/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.234785, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{dx^6+c}\sqrt{b^2c-abd}a+\left(\left(2b^2c-abd\right)x^6+2abc-a^2d\right)\log\left(\frac{\left(bdx^6+2bc-ad\right)\sqrt{b^2c-abd}-2\sqrt{dx^6+c}\left(b^2c-abd\right)}{bx^6+a}\right)}{12\left(\left(b^3c-ab^2d\right)x^6+ab^2c-a^2bd\right)\sqrt{b^2c-abd}}, \frac{\sqrt{dx^6+c}\sqrt{-b^2}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^11/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/12*(2*sqrt(d*x^6 + c)*sqrt(b^2*c - a*b*d)*a + ((2*b^2*c - a*b*
d)*x^6 + 2*a*b*c - a^2*d)*log(((b*d*x^6 + 2*b*c - a*d)*sqrt(b^2*c
 - a*b*d) - 2*sqrt(d*x^6 + c)*(b^2*c - a*b*d))/(b*x^6 + a)))/(((b
^3*c - a*b^2*d)*x^6 + a*b^2*c - a^2*b*d)*sqrt(b^2*c - a*b*d)), 1/
6*(sqrt(d*x^6 + c)*sqrt(-b^2*c + a*b*d)*a - ((2*b^2*c - a*b*d)*x^
6 + 2*a*b*c - a^2*d)*arctan(-(b*c - a*d)/(sqrt(d*x^6 + c)*sqrt(-b
^2*c + a*b*d))))/(((b^3*c - a*b^2*d)*x^6 + a*b^2*c - a^2*b*d)*sqr
t(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.215473, size = 157, normalized size = 1.59

$$\frac{\frac{\sqrt{dx^6+c}ad^2}{\left(b^2c-abd\right)\left(\left(dx^6+c\right)b-bc+ad\right)}+\frac{\left(2\,bcd-ad^2\right)\arctan\left(\frac{\sqrt{dx^6+c}b}{\sqrt{-b^2c+abd}}\right)}{\left(b^2c-abd\right)\sqrt{-b^2c+abd}}}{6\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] 1/6*(sqrt(d*x^6 + c)*a*d^2/((b^2*c - a*b*d)*((d*x^6 + c)*b - b*c
+ a*d)) + (2*b*c*d - a*d^2)*arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2*c
+ a*b*d))/((b^2*c - a*b*d)*sqrt(-b^2*c + a*b*d)))/d
```

3.703 $\int \frac{x^5}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=87

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6\sqrt{b}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^6}}{6\,(a+bx^6)\,(bc-ad)}$$

```
[Out] -Sqrt[c + d*x^6]/(6*(b*c - a*d)*(a + b*x^6)) + (d*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*Sqrt[b]*(b*c - a*d)^(3/2)
)
```

Rubi [A] time = 0.189977, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6\sqrt{b}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^6}}{6\,(a+bx^6)\,(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] -Sqrt[c + d*x^6]/(6*(b*c - a*d)*(a + b*x^6)) + (d*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*Sqrt[b]*(b*c - a*d)^(3/2)
)
```

Rubi in Sympy [A] time = 20.541, size = 70, normalized size = 0.8

$$\frac{\sqrt{c+dx^6}}{6\,(a+bx^6)\,(ad-bc)}+\frac{d\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{6\sqrt{b}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] sqrt(c + d*x**6)/(6*(a + b*x**6)*(a*d - b*c)) + d*atan(sqrt(b)*sq
rt(c + d*x**6)/sqrt(a*d - b*c))/(6*sqrt(b)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 0.150329, size = 84, normalized size = 0.97

$$\frac{\frac{\sqrt{c+dx^6}}{a+bx^6}-\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{\sqrt{b}\sqrt{bc-ad}}}{6ad-6bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (Sqrt[c + d*x^6]/(a + b*x^6) - (d*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6
])/Sqrt[b*c - a*d]])/(Sqrt[b]*Sqrt[b*c - a*d]))/(-6*b*c + 6*a*d)
```

Maple [F] time = 0.056, size = 0, normalized size = 0.

$$\int \frac{x^5}{(bx^6+a)^2}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^5/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.232526, size = 1, normalized size = 0.01

$$\left[-\frac{\left(bdx^6+ad\right)\log\left(\frac{\left(bdx^6+2\,bc-ad\right)\sqrt{b^2c-abd}-2\,\sqrt{dx^6+c}\left(b^2c-abd\right)}{bx^6+a}\right)+2\,\sqrt{dx^6+c}\sqrt{b^2c-abd}}{12\left(\left(b^2c-abd\right)x^6+abc-a^2d\right)\sqrt{b^2c-abd}},\ \frac{\left(bdx^6+ad\right)\arctan\left(-\frac{bc-ad}{\sqrt{dx^6+c}\sqrt{-b^2c}}\right.}{6\left(\left(b^2c-abd\right)x^6+abc\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [-1/12*((b*d*x^6 + a*d)*log(((b*d*x^6 + 2*b*c - a*d)*sqrt(b^2*c -
 a*b*d) - 2*sqrt(d*x^6 + c)*(b^2*c - a*b*d))/(b*x^6 + a)) + 2*sqr
t(d*x^6 + c)*sqrt(b^2*c - a*b*d))/(((b^2*c - a*b*d)*x^6 + a*b*c -
 a^2*d)*sqrt(b^2*c - a*b*d)), 1/6*((b*d*x^6 + a*d)*arctan(-(b*c -
 a*d)/(sqrt(d*x^6 + c)*sqrt(-b^2*c + a*b*d))) - sqrt(d*x^6 + c)*s
qrt(-b^2*c + a*b*d))/(((b^2*c - a*b*d)*x^6 + a*b*c - a^2*d)*sqrt(
-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21436, size = 124, normalized size = 1.43

$$-\frac{1}{6}\,d\left(\frac{\arctan\left(\frac{\sqrt{dx^6+c}\,b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}\,(bc-ad)}+\frac{\sqrt{dx^6+c}}{\left((dx^6+c)b-bc+ad\right)(bc-ad)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] -1/6*d*(arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2
*c + a*b*d)*(b*c - a*d)) + sqrt(d*x^6 + c)/(((d*x^6 + c)*b - b*c
+ a*d)*(b*c - a*d)))
```

3.704 $\int \frac{1}{x(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=132

$$\frac{\sqrt{b}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6a^2(bc-ad)^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}+\frac{b\sqrt{c+dx^6}}{6a\left(a+bx^6\right)(bc-ad)}$$

```
[Out] (b*Sqrt[c + d*x^6])/(6*a*(b*c - a*d)*(a + b*x^6)) - ArcTanh[Sqrt[
c + d*x^6]/Sqrt[c]]/(3*a^2*Sqrt[c]) + (Sqrt[b]*(2*b*c - 3*a*d)*Ar
cTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*a^2*(b*c - a
*d)^(3/2))
```

Rubi [A] time = 0.387518, antiderivative size = 132, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\sqrt{b}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6a^2(bc-ad)^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}+\frac{b\sqrt{c+dx^6}}{6a\left(a+bx^6\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (b*Sqrt[c + d*x^6])/(6*a*(b*c - a*d)*(a + b*x^6)) - ArcTanh[Sqrt[
c + d*x^6]/Sqrt[c]]/(3*a^2*Sqrt[c]) + (Sqrt[b]*(2*b*c - 3*a*d)*Ar
cTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*a^2*(b*c - a
*d)^(3/2))
```

Rubi in Sympy [A] time = 47.2567, size = 114, normalized size = 0.86

$$-\frac{b\sqrt{c+dx^6}}{6a\left(a+bx^6\right)(ad-bc)}-\frac{\sqrt{b}\left(\frac{3ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{3a^2(ad-bc)^{\frac{3}{2}}}-\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{3a^2\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**6)/(6*a*(a + b*x**6)*(a*d - b*c)) - sqrt(b)*(3*a
*d/2 - b*c)*atan(sqrt(b)*sqrt(c + d*x**6)/sqrt(a*d - b*c))/(3*a**
2*(a*d - b*c)**(3/2)) - atanh(sqrt(c + d*x**6)/sqrt(c))/(3*a**2*s
qrt(c))
```

Mathematica [C] time = 0.446581, size = 396, normalized size = 3.

$$\frac{b\left(\frac{6cdx^6F_1\left(1;\frac{1}{2},1;2;-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{x^6\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}+\frac{5dx^6\left(2ad+b\left(c+3dx^6\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)-3(c+dx \ldots}{a\left(-5bdx^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+2adF_1\left(\ldots\right.\right.}\right.}{18\left(a+bx^6\right)\sqrt{c+dx^6}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (b*((6*c*d*x^6*AppellF1[1, 1/2, 1, 2, -((d*x^6)/c), -((b*x^6)/a)]
)/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^6)/c), -((b*x^6)/a)] + x^
```

```
6*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^6)/c), -((b*x^6)/a)] + a*d
*AppellF1[2, 3/2, 1, 3, -((d*x^6)/c), -((b*x^6)/a)])) + (5*d*x^6*
(2*a*d + b*(c + 3*d*x^6))*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^6))
, -(a/(b*x^6))] - 3*(c + d*x^6)*(2*a*d*AppellF1[5/2, 1/2, 2, 7/2,
 -(c/(d*x^6)), -(a/(b*x^6))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c
/(d*x^6)), -(a/(b*x^6))]))/(a*(-5*b*d*x^6*AppellF1[3/2, 1/2, 1, 5
/2, -(c/(d*x^6)), -(a/(b*x^6))] + 2*a*d*AppellF1[5/2, 1/2, 2, 7/2
, -(c/(d*x^6)), -(a/(b*x^6))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(
c/(d*x^6)), -(a/(b*x^6))]))))/(18*(-(b*c) + a*d)*(a + b*x^6)*Sqrt
[c + d*x^6])
```

Maple [F] time = 0.081, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(bx^{6}+a\right)^{2}}\frac{1}{\sqrt{dx^{6}+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(1/x/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^{6}+a\right)^{2}\sqrt{dx^{6}+c}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x), x)
```

Fricas [A] time = 0.275061, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/12*(2*sqrt(d*x^6 + c)*a*b*sqrt(c) + ((2*b^2*c - 3*a*b*d)*x^6 +
 2*a*b*c - 3*a^2*d)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^6 + 2*
b*c - a*d + 2*sqrt(d*x^6 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b
*x^6 + a)) + 2*((b^2*c - a*b*d)*x^6 + a*b*c - a^2*d)*log(((d*x^6
+ 2*c)*sqrt(c) - 2*sqrt(d*x^6 + c)*c)/x^6))/(((a^2*b^2*c - a^3*b*
d)*x^6 + a^3*b*c - a^4*d)*sqrt(c)), 1/6*(sqrt(d*x^6 + c)*a*b*sqrt
(c) + ((2*b^2*c - 3*a*b*d)*x^6 + 2*a*b*c - 3*a^2*d)*sqrt(c)*sqrt(
-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*
x^6 + c)*b)) + ((b^2*c - a*b*d)*x^6 + a*b*c - a^2*d)*log(((d*x^6
+ 2*c)*sqrt(c) - 2*sqrt(d*x^6 + c)*c)/x^6))/(((a^2*b^2*c - a^3*b*
d)*x^6 + a^3*b*c - a^4*d)*sqrt(c)), 1/12*(2*sqrt(d*x^6 + c)*a*b*s
qrt(-c) + ((2*b^2*c - 3*a*b*d)*x^6 + 2*a*b*c - 3*a^2*d)*sqrt(-c)*
sqrt(b/(b*c - a*d))*log((b*d*x^6 + 2*b*c - a*d + 2*sqrt(d*x^6 + c
)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^6 + a)) + 4*((b^2*c - a*b
*d)*x^6 + a*b*c - a^2*d)*arctan(c/(sqrt(d*x^6 + c)*sqrt(-c))))/((
(a^2*b^2*c - a^3*b*d)*x^6 + a^3*b*c - a^4*d)*sqrt(-c)), 1/6*(sqrt
(d*x^6 + c)*a*b*sqrt(-c) + ((2*b^2*c - 3*a*b*d)*x^6 + 2*a*b*c - 3
*a^2*d)*sqrt(-c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b
/(b*c - a*d))/(sqrt(d*x^6 + c)*b)) + 2*((b^2*c - a*b*d)*x^6 + a*b
```

```
*c - a^2*d)*arctan(c/(sqrt(d*x^6 + c)*sqrt(-c))))/(((a^2*b^2*c -
a^3*b*d)*x^6 + a^3*b*c - a^4*d)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216565, size = 207, normalized size = 1.57

$$-\frac{1}{6}\,d^2\left(\frac{\left(2\,b^2c-3\,abd\right)\,\arctan\left(\frac{\sqrt{dx^6+c}b}{\sqrt{-b^2c+abd}}\right)}{(a^2bcd^2-a^3d^3)\sqrt{-b^2c+abd}}-\frac{\sqrt{dx^6+c}b}{(abcd-a^2d^2)((dx^6+c)b-bc+ad)}-\frac{2\,\arctan\left(\frac{\sqrt{dx^6+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x),x, algorithm="giac")
```

```
[Out] -1/6*d^2*((2*b^2*c - 3*a*b*d)*arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2*
c + a*b*d))/((a^2*b*c*d^2 - a^3*d^3)*sqrt(-b^2*c + a*b*d)) - sqrt
(d*x^6 + c)*b/((a*b*c*d - a^2*d^2)*((d*x^6 + c)*b - b*c + a*d)) -
 2*arctan(sqrt(d*x^6 + c)/sqrt(-c))/(a^2*sqrt(-c)*d^2))
```

3.705 $\int \frac{1}{x^7(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=185

$$-\frac{b^{3/2}(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6a^3(bc-ad)^{3/2}}+\frac{(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{6a^3c^{3/2}}-\frac{b\sqrt{c+dx^6}(2bc-ad)}{6a^2c\,(a+bx^6)\,(bc-ad)}-\frac{\sqrt{c+dx^6}}{6acx^6\,(a+bx^6)}$$

```
[Out] -(b*(2*b*c - a*d)*Sqrt[c + d*x^6])/(6*a^2*c*(b*c - a*d)*(a + b*x^
6)) - Sqrt[c + d*x^6]/(6*a*c*x^6*(a + b*x^6)) + ((4*b*c + a*d)*Ar
cTanh[Sqrt[c + d*x^6]/Sqrt[c]])/(6*a^3*c^(3/2)) - (b^(3/2)*(4*b*c
 - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*
a^3*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.651315, antiderivative size = 185, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{b^{3/2}(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{bc-ad}}\right)}{6a^3(bc-ad)^{3/2}}+\frac{(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{6a^3c^{3/2}}-\frac{b\sqrt{c+dx^6}(2bc-ad)}{6a^2c\,(a+bx^6)\,(bc-ad)}-\frac{\sqrt{c+dx^6}}{6acx^6\,(a+bx^6)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^7*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] -(b*(2*b*c - a*d)*Sqrt[c + d*x^6])/(6*a^2*c*(b*c - a*d)*(a + b*x^
6)) - Sqrt[c + d*x^6]/(6*a*c*x^6*(a + b*x^6)) + ((4*b*c + a*d)*Ar
cTanh[Sqrt[c + d*x^6]/Sqrt[c]])/(6*a^3*c^(3/2)) - (b^(3/2)*(4*b*c
 - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^6])/Sqrt[b*c - a*d]])/(6*
a^3*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 75.6095, size = 158, normalized size = 0.85

$$-\frac{\sqrt{c+dx^6}}{6acx^6\,(a+bx^6)}-\frac{b\sqrt{c+dx^6}\,(ad-2bc)}{6a^2c\,(a+bx^6)\,(ad-bc)}+\frac{b^{\frac{3}{2}}\,(5ad-4bc)\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^6}}{\sqrt{ad-bc}}\right)}{6a^3\,(ad-bc)^{\frac{3}{2}}}+\frac{(ad+4bc)\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^6}}{\sqrt{c}}\right)}{6a^3c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)/(6*a*c*x**6*(a + b*x**6)) - b*sqrt(c + d*x**6)*
(a*d - 2*b*c)/(6*a**2*c*(a + b*x**6)*(a*d - b*c)) + b**(3/2)*(5*a
*d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**6)/sqrt(a*d - b*c))/(6*a**
3*(a*d - b*c)**(3/2)) + (a*d + 4*b*c)*atanh(sqrt(c + d*x**6)/sqrt
(c))/(6*a**3*c**(3/2))
```

Mathematica [C] time = 1.32157, size = 489, normalized size = 2.64

$$\frac{\frac{5bdx^6\left(-a^2d\left(3c+2dx^6\right)+3ab\left(c^2+cdx^6-d^2x^{12}\right)+2b^2cx^6\left(c+3dx^6\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+3\left(c+dx^6\right)\left(a^2d+ab\left(dx^6-c\right)-2b^2cx^6\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^6},-\frac{}{b}\right.\right.}{c(bc-ad)\left(-5bdx^6F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^6},-\frac{a}{bx^6}\right)\right)}}{18a^2x^6\left(a+bx^6\right)\sqrt{c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^7*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] ((6*a*b*d*(-2*b*c + a*d)*x^12*AppellF1[1, 1/2, 1, 2, -((d*x^6)/c)
, -((b*x^6)/a)])/((-(b*c) + a*d)*(-4*a*c*AppellF1[1, 1/2, 1, 2, -
((d*x^6)/c), -((b*x^6)/a)] + x^6*(2*b*c*AppellF1[2, 1/2, 2, 3, -(
(d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^6)/
c), -((b*x^6)/a)]))) + (5*b*d*x^6*(-(a^2*d*(3*c + 2*d*x^6)) + 2*b
^2*c*x^6*(c + 3*d*x^6) + 3*a*b*(c^2 + c*d*x^6 - d^2*x^12))*Appell
F1[3/2, 1/2, 1, 5/2, -(c/(d*x^6)), -(a/(b*x^6))] + 3*(c + d*x^6)*
(a^2*d - 2*b^2*c*x^6 + a*b*(-c + d*x^6))*(2*a*d*AppellF1[5/2, 1/2
, 2, 7/2, -(c/(d*x^6)), -(a/(b*x^6))] + b*c*AppellF1[5/2, 3/2, 1,
 7/2, -(c/(d*x^6)), -(a/(b*x^6))]))/(c*(b*c - a*d)*(-5*b*d*x^6*Ap
pellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^6)), -(a/(b*x^6))] + 2*a*d*Appe
llF1[5/2, 1/2, 2, 7/2, -(c/(d*x^6)), -(a/(b*x^6))] + b*c*AppellF1
[5/2, 3/2, 1, 7/2, -(c/(d*x^6)), -(a/(b*x^6))])))/(18*a^2*x^6*(a
+ b*x^6)*Sqrt[c + d*x^6])
```

Maple [F] time = 0.13, size = 0, normalized size = 0.

$$\int \frac{1}{x^7 (bx^6 + a)^2} \frac{1}{\sqrt{dx^6 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(1/x^7/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^6 + a)^2 \sqrt{dx^6 + c}\, x^7}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^7),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^7), x)
```

Fricas [A] time = 0.351976, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^7),x, algorithm="fricas")
```

```
[Out] [1/12*(((4*b^3*c^2 - 5*a*b^2*c*d)*x^12 + (4*a*b^2*c^2 - 5*a^2*b*c
*d)*x^6)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^6 + 2*b*c - a*d -
 2*sqrt(d*x^6 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^6 + a))
- 2*((2*a*b^2*c - a^2*b*d)*x^6 + a^2*b*c - a^3*d)*sqrt(d*x^6 + c)
*sqrt(c) + ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^12 + (4*a*b^2
*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^6)*log(((d*x^6 + 2*c)*sqrt(c) + 2
*sqrt(d*x^6 + c)*c)/x^6))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^12 + (a^4
*b*c^2 - a^5*c*d)*x^6)*sqrt(c)), -1/12*(2*((4*b^3*c^2 - 5*a*b^2*c
*d)*x^12 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^6)*sqrt(c)*sqrt(-b/(b*c
- a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^6 + c)
*b)) + 2*((2*a*b^2*c - a^2*b*d)*x^6 + a^2*b*c - a^3*d)*sqrt(d*x^6
 + c)*sqrt(c) - ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^12 + (4*
```

```
a*b^2*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^6)*log(((d*x^6 + 2*c)*sqrt(c
) + 2*sqrt(d*x^6 + c)*c)/x^6))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^12 +
 (a^4*b*c^2 - a^5*c*d)*x^6)*sqrt(c)), 1/12*(((4*b^3*c^2 - 5*a*b^2
*c*d)*x^12 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^6)*sqrt(-c)*sqrt(b/(b*
c - a*d))*log((b*d*x^6 + 2*b*c - a*d - 2*sqrt(d*x^6 + c)*(b*c - a
*d)*sqrt(b/(b*c - a*d)))/(b*x^6 + a)) - 2*((2*a*b^2*c - a^2*b*d)*
x^6 + a^2*b*c - a^3*d)*sqrt(d*x^6 + c)*sqrt(-c) - 2*((4*b^3*c^2 -
 3*a*b^2*c*d - a^2*b*d^2)*x^12 + (4*a*b^2*c^2 - 3*a^2*b*c*d - a^3
*d^2)*x^6)*arctan(c/(sqrt(d*x^6 + c)*sqrt(-c))))/(((a^3*b^2*c^2 -
 a^4*b*c*d)*x^12 + (a^4*b*c^2 - a^5*c*d)*x^6)*sqrt(-c)), -1/6*(((
4*b^3*c^2 - 5*a*b^2*c*d)*x^12 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^6)*
sqrt(-c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c -
a*d))/(sqrt(d*x^6 + c)*b)) + ((2*a*b^2*c - a^2*b*d)*x^6 + a^2*b*c
 - a^3*d)*sqrt(d*x^6 + c)*sqrt(-c) + ((4*b^3*c^2 - 3*a*b^2*c*d -
a^2*b*d^2)*x^12 + (4*a*b^2*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^6)*arct
an(c/(sqrt(d*x^6 + c)*sqrt(-c))))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^1
2 + (a^4*b*c^2 - a^5*c*d)*x^6)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.232553, size = 362, normalized size = 1.96

$$\frac{1}{6}d^3\left(\frac{\left(4\,b^3c-5\,ab^2d\right)\arctan\left(\frac{\sqrt{dx^6+c}b}{\sqrt{-b^2c+abd}}\right)}{(a^3bcd^3-a^4d^4)\sqrt{-b^2c+abd}}-\frac{2\left(dx^6+c\right)^{\frac{3}{2}}b^2c-2\sqrt{dx^6+c}b^2c^2-\left(dx^6+c\right)^{\frac{3}{2}}abd+2\sqrt{dx^6+c}abcd-\sqrt{dx^6}}{(a^2bc^2d^2-a^3cd^3)\left((dx^6+c)^2b-2\,(dx^6+c)bc+bc^2+(dx^6+c)ad-aca\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^7),x, algorithm="giac")
```

```
[Out] 1/6*d^3*((4*b^3*c - 5*a*b^2*d)*arctan(sqrt(d*x^6 + c)*b/sqrt(-b^2
*c + a*b*d))/((a^3*b*c*d^3 - a^4*d^4)*sqrt(-b^2*c + a*b*d)) - (2*
(d*x^6 + c)^(3/2)*b^2*c - 2*sqrt(d*x^6 + c)*b^2*c^2 - (d*x^6 + c)
^(3/2)*a*b*d + 2*sqrt(d*x^6 + c)*a*b*c*d - sqrt(d*x^6 + c)*a^2*d^
2)/((a^2*b*c^2*d^2 - a^3*c*d^3)*((d*x^6 + c)^2*b - 2*(d*x^6 + c)*
b*c + b*c^2 + (d*x^6 + c)*a*d - a*c*d)) - (4*b*c + a*d)*arctan(sq
rt(d*x^6 + c)/sqrt(-c))/(a^3*sqrt(-c)*c*d^3))
```

3.706 $\int \frac{x^{14}}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=141

$$-\frac{\sqrt{a}(3bc-2ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6b^2(bc-ad)^{3/2}}+\frac{ax^3\sqrt{c+dx^6}}{6b\,(a+bx^6)\,(bc-ad)}+\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{3b^2\sqrt{d}}$$

```
[Out] (a*x^3*Sqrt[c + d*x^6])/(6*b*(b*c - a*d)*(a + b*x^6)) - (Sqrt[a]*
(3*b*c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*
x^6])])/(6*b^2*(b*c - a*d)^(3/2)) + ArcTanh[(Sqrt[d]*x^3)/Sqrt[c
+ d*x^6]]/(3*b^2*Sqrt[d])
```

Rubi [A] time = 0.441343, antiderivative size = 141, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{\sqrt{a}(3bc-2ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6b^2(bc-ad)^{3/2}}+\frac{ax^3\sqrt{c+dx^6}}{6b\,(a+bx^6)\,(bc-ad)}+\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{3b^2\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^14/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (a*x^3*Sqrt[c + d*x^6])/(6*b*(b*c - a*d)*(a + b*x^6)) - (Sqrt[a]*
(3*b*c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*
x^6])])/(6*b^2*(b*c - a*d)^(3/2)) + ArcTanh[(Sqrt[d]*x^3)/Sqrt[c
+ d*x^6]]/(3*b^2*Sqrt[d])
```

Rubi in Sympy [A] time = 49.5873, size = 122, normalized size = 0.87

$$-\frac{\sqrt{a}\,(2ad-3bc)\,\text{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6b^2\,(ad-bc)^{\frac{3}{2}}}-\frac{ax^3\sqrt{c+dx^6}}{6b\,(a+bx^6)\,(ad-bc)}+\frac{\text{atanh}\left(\frac{\sqrt{d}x^3}{\sqrt{c+dx^6}}\right)}{3b^2\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**14/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(a)*(2*a*d - 3*b*c)*atanh(x**3*sqrt(a*d - b*c)/(sqrt(a)*sqrt
(c + d*x**6)))/(6*b**2*(a*d - b*c)**(3/2)) - a*x**3*sqrt(c + d*x*
*6)/(6*b*(a + b*x**6)*(a*d - b*c)) + atanh(sqrt(d)*x**3/sqrt(c +
d*x**6))/(3*b**2*sqrt(d))
```

Mathematica [A] time = 0.360359, size = 135, normalized size = 0.96

$$\frac{\frac{abx^3\sqrt{c+dx^6}}{(a+bx^6)(bc-ad)}+\frac{\sqrt{a}(2ad-3bc)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{(bc-ad)^{3/2}}+\frac{2\log\left(\sqrt{d}\sqrt{c+dx^6}+dx^3\right)}{\sqrt{d}}}{6b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^14/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] ((a*b*x^3*Sqrt[c + d*x^6])/((b*c - a*d)*(a + b*x^6)) + (Sqrt[a]*(
-3*b*c + 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*
x^6])])/(b*c - a*d)^(3/2) + (2*Log[d*x^3 + Sqrt[d]*Sqrt[c + d*x^6
```

```
]])/Sqrt[d])/(6*b^2)
```

Maple [F] time = 0.075, size = 0, normalized size = 0.

$$\int \frac{x^{14}}{(bx^6+a)^2} \frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^14/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^14/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{14}}{(bx^6+a)^2\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^14/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^14/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

Fricas [A] time = 0.595846, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^14/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [1/24*(4*sqrt(d*x^6 + c)*a*b*sqrt(d)*x^3 + ((3*b^2*c - 2*a*b*d)*x
^6 + 3*a*b*c - 2*a^2*d)*sqrt(d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^
2 - 8*a*b*c*d + 8*a^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^6 +
 a^2*c^2 - 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^9 - (a*b*c^2 -
a^2*c*d)*x^3)*sqrt(d*x^6 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^12 + 2
*a*b*x^6 + a^2)) + 4*((b^2*c - a*b*d)*x^6 + a*b*c - a^2*d)*log(-2
*sqrt(d*x^6 + c)*d*x^3 - (2*d*x^6 + c)*sqrt(d)))/(((b^4*c - a*b^3
*d)*x^6 + a*b^3*c - a^2*b^2*d)*sqrt(d)), 1/24*(4*sqrt(d*x^6 + c)*
a*b*sqrt(-d)*x^3 + ((3*b^2*c - 2*a*b*d)*x^6 + 3*a*b*c - 2*a^2*d)*
sqrt(-d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d
^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^6 + a^2*c^2 - 4*((b^2*c^2
- 3*a*b*c*d + 2*a^2*d^2)*x^9 - (a*b*c^2 - a^2*c*d)*x^3)*sqrt(d*x^
6 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^12 + 2*a*b*x^6 + a^2)) + 8*((
b^2*c - a*b*d)*x^6 + a*b*c - a^2*d)*arctan(sqrt(-d)*x^3/sqrt(d*x^
6 + c)))/(((b^4*c - a*b^3*d)*x^6 + a*b^3*c - a^2*b^2*d)*sqrt(-d))
, 1/12*(2*sqrt(d*x^6 + c)*a*b*sqrt(d)*x^3 - ((3*b^2*c - 2*a*b*d)*
x^6 + 3*a*b*c - 2*a^2*d)*sqrt(d)*sqrt(a/(b*c - a*d))*arctan(1/2*(
(b*c - 2*a*d)*x^6 - a*c)/(sqrt(d*x^6 + c)*(b*c - a*d)*x^3*sqrt(a/
(b*c - a*d)))) + 2*((b^2*c - a*b*d)*x^6 + a*b*c - a^2*d)*log(-2*s
qrt(d*x^6 + c)*d*x^3 - (2*d*x^6 + c)*sqrt(d)))/(((b^4*c - a*b^3*d
)*x^6 + a*b^3*c - a^2*b^2*d)*sqrt(d)), 1/12*(2*sqrt(d*x^6 + c)*a*
b*sqrt(-d)*x^3 - ((3*b^2*c - 2*a*b*d)*x^6 + 3*a*b*c - 2*a^2*d)*sq
rt(-d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^6 - a*c)/(
sqrt(d*x^6 + c)*(b*c - a*d)*x^3*sqrt(a/(b*c - a*d)))) + 4*((b^2*c
 - a*b*d)*x^6 + a*b*c - a^2*d)*arctan(sqrt(-d)*x^3/sqrt(d*x^6 + c
)))/(((b^4*c - a*b^3*d)*x^6 + a*b^3*c - a^2*b^2*d)*sqrt(-d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**14/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.253873, size = 482, normalized size = 3.42

$$\frac{1}{6}\,c^{2}\left(\frac{\left(3\,abc-2\,a^{2}d\right)\,\arctan\left(\frac{a\sqrt{d+\frac{c}{x^{6}}}}{\sqrt{abc-a^{2}d}}\right)}{\left(b^{3}c^{3}\mathrm{sign}\left(x\right)-ab^{2}c^{2}d\mathrm{sign}\left(x\right)\right)\sqrt{abc-a^{2}d}}+\frac{a\sqrt{d+\frac{c}{x^{6}}}}{\left(b^{2}c^{2}\mathrm{sign}\left(x\right)-abcd\mathrm{sign}\left(x\right)\right)\left(bc+a\left(d+\frac{c}{x^{6}}\right)-ad\right)}-\frac{2\,\arctan\left(\frac{\sqrt{d+\frac{c}{x^{6}}}}{\sqrt{-d}}\right)}{b^{2}c^{2}\sqrt{-d}\mathrm{sign}\left(x\right)}\right.$$

$$-\frac{\left(3\,abc\sqrt{-d}\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^{2}d}}\right)-2\,a^{2}\sqrt{-d}d\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^{2}d}}\right)-2\,\sqrt{abc-a^{2}d}bc\arctan\left(\frac{\sqrt{d}}{\sqrt{-d}}\right)+2\,\sqrt{abc-a^{2}d}ad\arctan\left(\right.\right.}{6\left(\sqrt{abc-a^{2}d}b^{3}c\sqrt{-d}-\sqrt{abc-a^{2}d}ab^{2}\sqrt{-d}d\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^14/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] 1/6*c^2*((3*a*b*c - 2*a^2*d)*arctan(a*sqrt(d + c/x^6)/sqrt(a*b*c
- a^2*d))/((b^3*c^3*sign(x) - a*b^2*c^2*d*sign(x))*sqrt(a*b*c - a
^2*d)) + a*sqrt(d + c/x^6)/((b^2*c^2*sign(x) - a*b*c*d*sign(x))*(
b*c + a*(d + c/x^6) - a*d)) - 2*arctan(sqrt(d + c/x^6)/sqrt(-d))/
(b^2*c^2*sqrt(-d)*sign(x))) - 1/6*(3*a*b*c*sqrt(-d)*arctan(a*sqrt
(d)/sqrt(a*b*c - a^2*d)) - 2*a^2*sqrt(-d)*d*arctan(a*sqrt(d)/sqrt
(a*b*c - a^2*d)) - 2*sqrt(a*b*c - a^2*d)*b*c*arctan(sqrt(d)/sqrt(
-d)) + 2*sqrt(a*b*c - a^2*d)*a*d*arctan(sqrt(d)/sqrt(-d)) + sqrt(
a*b*c - a^2*d)*a*sqrt(-d)*sqrt(d))*sign(x)/(sqrt(a*b*c - a^2*d)*b
^3*c*sqrt(-d) - sqrt(a*b*c - a^2*d)*a*b^2*sqrt(-d)*d)
```

3.707 $\int \frac{x^8}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=93

$$\frac{c\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6\sqrt{a}(bc-ad)^{3/2}}-\frac{x^3\sqrt{c+dx^6}}{6\,(a+bx^6)\,(bc-ad)}$$

```
[Out] -(x^3*Sqrt[c + d*x^6])/(6*(b*c - a*d)*(a + b*x^6)) + (c*ArcTan[(S
qrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/(6*Sqrt[a]*(b*c -
 a*d)^(3/2))
```

Rubi [A] time = 0.257695, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{c\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6\sqrt{a}(bc-ad)^{3/2}}-\frac{x^3\sqrt{c+dx^6}}{6\,(a+bx^6)\,(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] -(x^3*Sqrt[c + d*x^6])/(6*(b*c - a*d)*(a + b*x^6)) + (c*ArcTan[(S
qrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/(6*Sqrt[a]*(b*c -
 a*d)^(3/2))
```

Rubi in Sympy [A] time = 29.5023, size = 76, normalized size = 0.82

$$\frac{x^3\sqrt{c+dx^6}}{6\,(a+bx^6)\,(ad-bc)}-\frac{c\,\text{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6\sqrt{a}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] x**3*sqrt(c + d*x**6)/(6*(a + b*x**6)*(a*d - b*c)) - c*atanh(x**3
*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**6)))/(6*sqrt(a)*(a*d - b*
c)**(3/2))
```

Mathematica [A] time = 0.174096, size = 90, normalized size = 0.97

$$\frac{\frac{x^3\sqrt{c+dx^6}}{a+bx^6}-\frac{c\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{\sqrt{a}\sqrt{bc-ad}}}{6ad-6bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] ((x^3*Sqrt[c + d*x^6])/(a + b*x^6) - (c*ArcTan[(Sqrt[b*c - a*d]*x
^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/(Sqrt[a]*Sqrt[b*c - a*d]))/(-6*b*
c + 6*a*d)
```

Maple [F] time = 0.074, size = 0, normalized size = 0.

$$\int \frac{x^8}{(bx^6+a)^2}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^8/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x^8/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^8}{(bx^6+a)^2\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^8/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

Fricas [A] time = 0.321661, size = 1, normalized size = 0.01

$$\left[-\frac{4\sqrt{dx^6+c}\sqrt{-abc+a^2d}x^3+\left(bcx^6+ac\right)\log\left(-\frac{4\left(\left(ab^2c^2-3a^2bcd+2a^3d^2\right)x^9-\left(a^2bc^2-a^3cd\right)x^3\right)\sqrt{dx^6+c}-\left(\left(b^2c^2-8abcd+8a^2d^2\right)x^{12}-2\,(3}{b^2x^{12}+2abx^6+a^2}\right.}{24\left((b^2c-abd)x^6+abc-a^2d\right)\sqrt{-abc+a^2d}}\right.$$

$$\left.-\frac{2\sqrt{dx^6+c}\sqrt{abc-a^2d}x^3-\left(bcx^6+ac\right)\arctan\left(\frac{(bc-2ad)x^6-ac}{2\sqrt{dx^6+c}\sqrt{abc-a^2d}x^3}\right)}{12\left((b^2c-abd)x^6+abc-a^2d\right)\sqrt{abc-a^2d}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] [-1/24*(4*sqrt(d*x^6 + c)*sqrt(-a*b*c + a^2*d)*x^3 + (b*c*x^6 + a
*c)*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^9 - (a^2*b*c
^2 - a^3*c*d)*x^3)*sqrt(d*x^6 + c) - ((b^2*c^2 - 8*a*b*c*d + 8*a^
2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^6 + a^2*c^2)*sqrt(-a*b*
c + a^2*d))/(b^2*x^12 + 2*a*b*x^6 + a^2)))/(((b^2*c - a*b*d)*x^6
+ a*b*c - a^2*d)*sqrt(-a*b*c + a^2*d)), -1/12*(2*sqrt(d*x^6 + c)*
sqrt(a*b*c - a^2*d)*x^3 - (b*c*x^6 + a*c)*arctan(1/2*((b*c - 2*a*
d)*x^6 - a*c)/(sqrt(d*x^6 + c)*sqrt(a*b*c - a^2*d)*x^3)))/(((b^2*
c - a*b*d)*x^6 + a*b*c - a^2*d)*sqrt(a*b*c - a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**8/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.277513, size = 248, normalized size = 2.67

$$-\frac{1}{6}\,c\left(\frac{\arctan\left(\frac{a\sqrt{d+\frac{c}{x^6}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}(bc\mathrm{sign}\,(x)-ad\mathrm{sign}\,(x))}+\frac{\sqrt{d+\frac{c}{x^6}}}{(bc\mathrm{sign}\,(x)-ad\mathrm{sign}\,(x))\left(bc+a\left(d+\frac{c}{x^6}\right)-ad\right)}\right)+\frac{\left(bc\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^2d}}\right)+\sqrt{abc-a^2d}\sqrt{d}\right)\mathrm{sign}\,(x)}{6\left(\sqrt{abc-a^2d}b^2c-\sqrt{abc-a^2d}abd\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^8/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] -1/6*c*(arctan(a*sqrt(d + c/x^6)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*c
 - a^2*d)*(b*c*sign(x) - a*d*sign(x))) + sqrt(d + c/x^6)/((b*c*si
gn(x) - a*d*sign(x))*(b*c + a*(d + c/x^6) - a*d))) + 1/6*(b*c*arc
tan(a*sqrt(d)/sqrt(a*b*c - a^2*d)) + sqrt(a*b*c - a^2*d)*sqrt(d))
*sign(x)/(sqrt(a*b*c - a^2*d)*b^2*c - sqrt(a*b*c - a^2*d)*a*b*d)
```

3.708 $\int \frac{x^2}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=104

$$\frac{(bc-2ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{3/2}(bc-ad)^{3/2}}+\frac{bx^3\sqrt{c+dx^6}}{6a\,(a+bx^6)\,(bc-ad)}$$

```
[Out] (b*x^3*Sqrt[c + d*x^6])/(6*a*(b*c - a*d)*(a + b*x^6)) + ((b*c - 2
*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/(6
*a^(3/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.250367, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{(bc-2ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{3/2}(bc-ad)^{3/2}}+\frac{bx^3\sqrt{c+dx^6}}{6a\,(a+bx^6)\,(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (b*x^3*Sqrt[c + d*x^6])/(6*a*(b*c - a*d)*(a + b*x^6)) + ((b*c - 2
*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/(6
*a^(3/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 28.2295, size = 87, normalized size = 0.84

$$-\frac{bx^3\sqrt{c+dx^6}}{6a\,(a+bx^6)\,(ad-bc)}+\frac{(2ad-bc)\,\operatorname{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{\frac{3}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -b*x**3*sqrt(c + d*x**6)/(6*a*(a + b*x**6)*(a*d - b*c)) + (2*a*d
- b*c)*atanh(x**3*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**6)))/(6*
a**(3/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 0.176354, size = 104, normalized size = 1.

$$\frac{\frac{\sqrt{a}bx^3\sqrt{c+dx^6}}{(a+bx^6)(bc-ad)}+\frac{(bc-2ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{(bc-ad)^{3/2}}}{6a^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] ((Sqrt[a]*b*x^3*Sqrt[c + d*x^6])/((b*c - a*d)*(a + b*x^6)) + ((b*
c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])
])/(b*c - a*d)^(3/2))/(6*a^(3/2))
```

Maple [F] time = 0.064, size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^6+a)^2} \frac{1}{\sqrt{dx^6+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)

[Out] int(x^2/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^6+a)^2 \sqrt{dx^6+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")

[Out] integrate(x^2/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

Fricas [A] time = 0.34691, size = 1, normalized size = 0.01

$$\left[\frac{4\sqrt{dx^6+c}\sqrt{-abc+a^2d}\,bx^3 + \left(\left(b^2c-2\,abd\right)x^6 + abc - 2\,a^2d\right)\log\left(\frac{4\left(\left(ab^2c^2-3\,a^2bcd+2\,a^3d^2\right)x^9-\left(a^2bc^2-a^3cd\right)x^3\right)\sqrt{dx^6+c}+\left(\left(b^2c^2-8\right.\right.}{b^2x^{12}+2\,abx^6}\right.}{24\left(\left(ab^2c-a^2bd\right)x^6+a^2bc-a^3d\right)\sqrt{-abc+a^2d}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")

[Out] [1/24*(4*sqrt(d*x^6 + c)*sqrt(-a*b*c + a^2*d)*b*x^3 + ((b^2*c - 2
*a*b*d)*x^6 + a*b*c - 2*a^2*d)*log((4*((a*b^2*c^2 - 3*a^2*b*c*d +
 2*a^3*d^2)*x^9 - (a^2*b*c^2 - a^3*c*d)*x^3)*sqrt(d*x^6 + c) + ((
b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d)
*x^6 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^12 + 2*a*b*x^6 + a^2
)))/(((a*b^2*c - a^2*b*d)*x^6 + a^2*b*c - a^3*d)*sqrt(-a*b*c + a^
2*d)), 1/12*(2*sqrt(d*x^6 + c)*sqrt(a*b*c - a^2*d)*b*x^3 + ((b^2*
c - 2*a*b*d)*x^6 + a*b*c - 2*a^2*d)*arctan(1/2*((b*c - 2*a*d)*x^6
 - a*c)/(sqrt(d*x^6 + c)*sqrt(a*b*c - a^2*d)*x^3)))/(((a*b^2*c -
a^2*b*d)*x^6 + a^2*b*c - a^3*d)*sqrt(a*b*c - a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.237975, size = 320, normalized size = 3.08

$$-\frac{1}{6}\,d^{\frac{3}{2}}\left(\frac{(bc-2\,ad)\arctan\left(\frac{\left(\sqrt{d}x^3-\sqrt{dx^6+c}\right)^2b-bc+2\,ad}{2\,\sqrt{abcd-a^2d^2}}\right)}{(abcd-a^2d^2)^{\frac{3}{2}}}+\frac{2\left(\left(\sqrt{d}x^3-\sqrt{dx^6+c}\right)^2bc-2\left(\sqrt{d}x^3-\sqrt{dx^6+c}\right.\right.}{\left(\left(\sqrt{d}x^3-\sqrt{dx^6+c}\right)^4b-2\left(\sqrt{d}x^3-\sqrt{dx^6+c}\right)^2bc+4\left(\sqrt{d}x^3-\sqrt{d}\right.\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] -1/6*d^(3/2)*((b*c - 2*a*d)*arctan(1/2*((sqrt(d)*x^3 - sqrt(d*x^6
 + c))^2*b - b*c + 2*a*d)/sqrt(a*b*c*d - a^2*d^2))/(a*b*c*d - a^2
*d^2)^(3/2) + 2*((sqrt(d)*x^3 - sqrt(d*x^6 + c))^2*b*c - 2*(sqrt(
d)*x^3 - sqrt(d*x^6 + c))^2*a*d - b*c^2)/(((sqrt(d)*x^3 - sqrt(d*
x^6 + c))^4*b - 2*(sqrt(d)*x^3 - sqrt(d*x^6 + c))^2*b*c + 4*(sqrt
(d)*x^3 - sqrt(d*x^6 + c))^2*a*d + b*c^2)*(a*b*c*d - a^2*d^2)))
```

3.709 $\int \frac{1}{x^4(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=149

$$-\frac{b(3bc-4ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{5/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^6}(3bc-2ad)}{6a^2cx^3(bc-ad)}+\frac{b\sqrt{c+dx^6}}{6ax^3\left(a+bx^6\right)(bc-ad)}$$

```
[Out] -((3*b*c - 2*a*d)*Sqrt[c + d*x^6])/(6*a^2*c*(b*c - a*d)*x^3) + (b
*Sqrt[c + d*x^6])/(6*a*(b*c - a*d)*x^3*(a + b*x^6)) - (b*(3*b*c -
 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/
(6*a^(5/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.531394, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{b(3bc-4ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{5/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^6}(3bc-2ad)}{6a^2cx^3(bc-ad)}+\frac{b\sqrt{c+dx^6}}{6ax^3\left(a+bx^6\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] -((3*b*c - 2*a*d)*Sqrt[c + d*x^6])/(6*a^2*c*(b*c - a*d)*x^3) + (b
*Sqrt[c + d*x^6])/(6*a*(b*c - a*d)*x^3*(a + b*x^6)) - (b*(3*b*c -
 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqrt[a]*Sqrt[c + d*x^6])])/
(6*a^(5/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 67.4239, size = 129, normalized size = 0.87

$$-\frac{b\sqrt{c+dx^6}}{6ax^3\left(a+bx^6\right)(ad-bc)}-\frac{\sqrt{c+dx^6}\,(2ad-3bc)}{6a^2cx^3\,(ad-bc)}-\frac{b\,(4ad-3bc)\,\mathrm{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{\frac{5}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**6)/(6*a*x**3*(a + b*x**6)*(a*d - b*c)) - sqrt(c
+ d*x**6)*(2*a*d - 3*b*c)/(6*a**2*c*x**3*(a*d - b*c)) - b*(4*a*d
- 3*b*c)*atanh(x**3*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**6)))/(
6*a**(5/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 2.18053, size = 172, normalized size = 1.15

$$\frac{1}{6}\sqrt{c+dx^6}\left(\frac{bx^9(4ad-3bc)\sin^{-1}\left(\frac{\sqrt{x^6\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^6}{a}+1}}\right)}{a^4c^2\sqrt{\frac{bx^6}{a}+1}\left(\frac{x^6(bc-ad)}{ac}\right)^{3/2}\sqrt{\frac{a(c+dx^6)}{c(a+bx^6)}}}+\frac{\frac{b^2x^6}{(a+bx^6)(ad-bc)}-\frac{2}{c}}{a^2x^3}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^4*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (Sqrt[c + d*x^6]*((-2/c + (b^2*x^6)/((-(b*c) + a*d)*(a + b*x^6)))
/(a^2*x^3) + (b*(-3*b*c + 4*a*d)*x^9*ArcSin[Sqrt[(b/a - d/c)*x^6]
/Sqrt[1 + (b*x^6)/a]])/(a^4*c^2*(((b*c - a*d)*x^6)/(a*c))^(3/2)*S
qrt[1 + (b*x^6)/a]*Sqrt[(a*(c + d*x^6))/(c*(a + b*x^6))])))/6
```

Maple [F] time = 0.103, size = 0, normalized size = 0.

$$\int \frac{1}{x^4\left(bx^6+a\right)^2}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(1/x^4/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^6+a\right)^2\sqrt{dx^6+c}\,x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^4), x)
```

Fricas [A] time = 0.380787, size = 1, normalized size = 0.01

$$\left[-\frac{4\left(\left(3\,b^2c-2\,abd\right)x^6+2\,abc-2\,a^2d\right)\sqrt{dx^6+c}\sqrt{-abc+a^2d}-\left(\left(3\,b^3c^2-4\,ab^2cd\right)x^9+\left(3\,ab^2c^2-4\,a^2bcd\right)x^3\right)\log\left(-\frac{4\,((a}{}\right.}{24\left(\left(a^2b^2c^2-a^3bcd\right)x^9+\left(a^3bc^2-a^4cd\right)\right.}\right.$$

$$-\frac{2\left(\left(3\,b^2c-2\,abd\right)x^6+2\,abc-2\,a^2d\right)\sqrt{dx^6+c}\sqrt{abc-a^2d}+\left(\left(3\,b^3c^2-4\,ab^2cd\right)x^9+\left(3\,ab^2c^2-4\,a^2bcd\right)x^3\right)\arctan\left(\frac{(b}{2\sqrt{dx}}\right.}{12\left(\left(a^2b^2c^2-a^3bcd\right)x^9+\left(a^3bc^2-a^4cd\right)x^3\right)\sqrt{abc-a^2d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/24*(4*((3*b^2*c - 2*a*b*d)*x^6 + 2*a*b*c - 2*a^2*d)*sqrt(d*x^
6 + c)*sqrt(-a*b*c + a^2*d) - ((3*b^3*c^2 - 4*a*b^2*c*d)*x^9 + (3
*a*b^2*c^2 - 4*a^2*b*c*d)*x^3)*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d
+ 2*a^3*d^2)*x^9 - (a^2*b*c^2 - a^3*c*d)*x^3)*sqrt(d*x^6 + c) - (
(b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^12 - 2*(3*a*b*c^2 - 4*a^2*c*d
)*x^6 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^12 + 2*a*b*x^6 + a^
2)))/(((a^2*b^2*c^2 - a^3*b*c*d)*x^9 + (a^3*b*c^2 - a^4*c*d)*x^3)
*sqrt(-a*b*c + a^2*d)), -1/12*(2*((3*b^2*c - 2*a*b*d)*x^6 + 2*a*b
*c - 2*a^2*d)*sqrt(d*x^6 + c)*sqrt(a*b*c - a^2*d) + ((3*b^3*c^2 -
 4*a*b^2*c*d)*x^9 + (3*a*b^2*c^2 - 4*a^2*b*c*d)*x^3)*arctan(1/2*(
(b*c - 2*a*d)*x^6 - a*c)/(sqrt(d*x^6 + c)*sqrt(a*b*c - a^2*d)*x^3
)))/(((a^2*b^2*c^2 - a^3*b*c*d)*x^9 + (a^3*b*c^2 - a^4*c*d)*x^3)*
sqrt(a*b*c - a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.310227, size = 386, normalized size = 2.59

$$-\frac{b^2c\sqrt{d+\frac{c}{x^6}}}{6\,(a^2bc\mathrm{sign}\,(x)-a^3d\mathrm{sign}\,(x))\left(bc+a\left(d+\frac{c}{x^6}\right)-ad\right)}-\frac{\left(3\,b^2c^2\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^2d}}\right)-4\,abcd\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^2d}}\right)-3\,\sqrt{abc-a^2d}bc\sqrt{d}+2\,\sqrt{abc-a^2d}ad^{\frac{3}{2}}\right)\mathrm{sign}\,(x)}{6\left(\sqrt{abc-a^2d}a^2bc^2-\sqrt{abc-a^2d}a^3cd\right)}+\frac{\left(3\,b^2c-4\,abd\right)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^6}}}{\sqrt{abc-a^2d}}\right)}{6\,(a^2bc\mathrm{sign}\,(x)-a^3d\mathrm{sign}\,(x))\sqrt{abc-a^2d}}-\frac{\sqrt{d+\frac{c}{x^6}}}{3\,a^2c\mathrm{sign}\,(x)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^4),x, algorithm="giac")
```

```
[Out] -1/6*b^2*c*sqrt(d + c/x^6)/((a^2*b*c*sign(x) - a^3*d*sign(x))*(b*
c + a*(d + c/x^6) - a*d)) - 1/6*(3*b^2*c^2*arctan(a*sqrt(d)/sqrt(
a*b*c - a^2*d)) - 4*a*b*c*d*arctan(a*sqrt(d)/sqrt(a*b*c - a^2*d))
 - 3*sqrt(a*b*c - a^2*d)*b*c*sqrt(d) + 2*sqrt(a*b*c - a^2*d)*a*d^
(3/2))*sign(x)/(sqrt(a*b*c - a^2*d)*a^2*b*c^2 - sqrt(a*b*c - a^2*
d)*a^3*c*d) + 1/6*(3*b^2*c - 4*a*b*d)*arctan(a*sqrt(d + c/x^6)/sq
rt(a*b*c - a^2*d))/((a^2*b*c*sign(x) - a^3*d*sign(x))*sqrt(a*b*c
- a^2*d)) - 1/3*sqrt(d + c/x^6)/(a^2*c*sign(x))
```

3.710 $\int \frac{1}{x^{10}(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=208

$$\frac{b^2(5bc-6ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{7/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^6}(5bc-2ad)}{18a^2cx^9(bc-ad)}+\frac{\sqrt{c+dx^6}\left(-4a^2d^2-8abcd+15b^2c^2\right)}{18a^3c^2x^3(bc-ad)}+\frac{b\sqrt{c+dx^6}}{6ax^9\left(a+bx^6\right)(bc-ad)}$$

```
[Out] -((5*b*c - 2*a*d)*Sqrt[c + d*x^6])/(18*a^2*c*(b*c - a*d)*x^9) + (
(15*b^2*c^2 - 8*a*b*c*d - 4*a^2*d^2)*Sqrt[c + d*x^6])/(18*a^3*c^2
*(b*c - a*d)*x^3) + (b*Sqrt[c + d*x^6])/(6*a*(b*c - a*d)*x^9*(a +
 b*x^6)) + (b^2*(5*b*c - 6*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqr
t[a]*Sqrt[c + d*x^6])])/(6*a^(7/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.865718, antiderivative size = 208, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{b^2(5bc-6ad)\tan^{-1}\left(\frac{x^3\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{7/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^6}(5bc-2ad)}{18a^2cx^9(bc-ad)}+\frac{\sqrt{c+dx^6}\left(-4a^2d^2-8abcd+15b^2c^2\right)}{18a^3c^2x^3(bc-ad)}+\frac{b\sqrt{c+dx^6}}{6ax^9\left(a+bx^6\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^10*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] -((5*b*c - 2*a*d)*Sqrt[c + d*x^6])/(18*a^2*c*(b*c - a*d)*x^9) + (
(15*b^2*c^2 - 8*a*b*c*d - 4*a^2*d^2)*Sqrt[c + d*x^6])/(18*a^3*c^2
*(b*c - a*d)*x^3) + (b*Sqrt[c + d*x^6])/(6*a*(b*c - a*d)*x^9*(a +
 b*x^6)) + (b^2*(5*b*c - 6*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^3)/(Sqr
t[a]*Sqrt[c + d*x^6])])/(6*a^(7/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 136.273, size = 184, normalized size = 0.88

$$-\frac{b\sqrt{c+dx^6}}{6ax^9\left(a+bx^6\right)(ad-bc)}-\frac{\sqrt{c+dx^6}\,(2ad-5bc)}{18a^2cx^9\,(ad-bc)}+\frac{\sqrt{c+dx^6}\left(4a^2d^2+8abcd-15b^2c^2\right)}{18a^3c^2x^3\,(ad-bc)}+\frac{b^2\,(6ad-5bc)\operatorname{atanh}\left(\frac{x^3\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^6}}\right)}{6a^{\frac{7}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**10/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**6)/(6*a*x**9*(a + b*x**6)*(a*d - b*c)) - sqrt(c
+ d*x**6)*(2*a*d - 5*b*c)/(18*a**2*c*x**9*(a*d - b*c)) + sqrt(c +
 d*x**6)*(4*a**2*d**2 + 8*a*b*c*d - 15*b**2*c**2)/(18*a**3*c**2*x
**3*(a*d - b*c)) + b**2*(6*a*d - 5*b*c)*atanh(x**3*sqrt(a*d - b*c
)/(sqrt(a)*sqrt(c + d*x**6)))/(6*a**(7/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 1.93734, size = 195, normalized size = 0.94

$$\frac{\sqrt{c+dx^6}\left(-\frac{2a^2}{c}+\frac{3ab^3x^{12}}{(a+bx^6)(bc-ad)}+\frac{3b^2x^{18}(5bc-6ad)\sin^{-1}\left(\frac{\sqrt{x^6\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^6}{a}+1}}\right)}{ac^2\sqrt{\frac{bx^6}{a}+1}\left(\frac{x^6(bc-ad)}{ac}\right)^{3/2}\sqrt{\frac{a(c+dx^6)}{c(a+bx^6)}}}+\frac{4ax^6(ad+3bc)}{c^2}\right)}{18a^4x^9}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^10*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (Sqrt[c + d*x^6]*((-2*a^2)/c + (4*a*(3*b*c + a*d)*x^6)/c^2 + (3*a
*b^3*x^12)/((b*c - a*d)*(a + b*x^6)) + (3*b^2*(5*b*c - 6*a*d)*x^1
8*ArcSin[Sqrt[(b/a - d/c)*x^6]/Sqrt[1 + (b*x^6)/a]])/(a*c^2*(((b*
c - a*d)*x^6)/(a*c))^(3/2)*Sqrt[1 + (b*x^6)/a]*Sqrt[(a*(c + d*x^6
))/(c*(a + b*x^6))])))/(18*a^4*x^9)
```

Maple [F] time = 0.116, size = 0, normalized size = 0.

$$\int \frac{1}{x^{10}\left(bx^6+a\right)^2}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^10/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(1/x^10/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^6+a\right)^2\sqrt{dx^6+c}\,x^{10}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^10),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^10), x)
```

Fricas [A] time = 0.562031, size = 1, normalized size = 0.

$$\left[\frac{4\left(\left(15\,b^3c^2-8\,ab^2cd-4\,a^2bd^2\right)x^{12}+2\left(5\,ab^2c^2-3\,a^2bcd-2\,a^3d^2\right)x^6-2\,a^2bc^2+2\,a^3cd\right)\sqrt{dx^6+c}\sqrt{-abc+a^2d}+3\left(\left(5\,b\right.\right.}{72\left(\left(a^3b^2c^3-\right.\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^10),x, algorithm="fricas")
```

```
[Out] [1/72*(4*((15*b^3*c^2 - 8*a*b^2*c*d - 4*a^2*b*d^2)*x^12 + 2*(5*a*
b^2*c^2 - 3*a^2*b*c*d - 2*a^3*d^2)*x^6 - 2*a^2*b*c^2 + 2*a^3*c*d)
*sqrt(d*x^6 + c)*sqrt(-a*b*c + a^2*d) + 3*((5*b^4*c^3 - 6*a*b^3*c
^2*d)*x^15 + (5*a*b^3*c^3 - 6*a^2*b^2*c^2*d)*x^9)*log((4*((a*b^2*
c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^9 - (a^2*b*c^2 - a^3*c*d)*x^3)*s
```

```
qrt(d*x^6 + c) + ((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^12 - 2*(3*a
*b*c^2 - 4*a^2*c*d)*x^6 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^1
2 + 2*a*b*x^6 + a^2)))/(((a^3*b^2*c^3 - a^4*b*c^2*d)*x^15 + (a^4*
b*c^3 - a^5*c^2*d)*x^9)*sqrt(-a*b*c + a^2*d)), 1/36*(2*((15*b^3*c
^2 - 8*a*b^2*c*d - 4*a^2*b*d^2)*x^12 + 2*(5*a*b^2*c^2 - 3*a^2*b*c
*d - 2*a^3*d^2)*x^6 - 2*a^2*b*c^2 + 2*a^3*c*d)*sqrt(d*x^6 + c)*sq
rt(a*b*c - a^2*d) + 3*((5*b^4*c^3 - 6*a*b^3*c^2*d)*x^15 + (5*a*b^
3*c^3 - 6*a^2*b^2*c^2*d)*x^9)*arctan(1/2*((b*c - 2*a*d)*x^6 - a*c
)/(sqrt(d*x^6 + c)*sqrt(a*b*c - a^2*d)*x^3)))/(((a^3*b^2*c^3 - a^
4*b*c^2*d)*x^15 + (a^4*b*c^3 - a^5*c^2*d)*x^9)*sqrt(a*b*c - a^2*d
))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**10/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.307738, size = 494, normalized size = 2.38

$$\frac{b^3c\sqrt{d+\frac{c}{x^6}}}{6\left(a^3bc\,\mathrm{sign}(x)-a^4d\,\mathrm{sign}(x)\right)\left(bc+a\left(d+\frac{c}{x^6}\right)-ad\right)}+\frac{\left(15\,b^3c^3\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^2d}}\right)-18\,ab^2c^2d\arctan\left(\frac{a\sqrt{d}}{\sqrt{abc-a^2d}}\right)-15\,\sqrt{abc-a^2d}b^2c^2\sqrt{d}+8\,\sqrt{abc-a^2d}abcd^{\frac{3}{2}}+4\,\sqrt{abc-a^2d}\ldots}{18\left(\sqrt{abc-a^2d}a^3bc^3-\sqrt{abc-a^2d}a^4c^2d\right)}-\frac{\left(5\,b^3c-6\,ab^2d\right)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^6}}}{\sqrt{abc-a^2d}}\right)}{6\left(a^3bc\,\mathrm{sign}(x)-a^4d\,\mathrm{sign}(x)\right)\sqrt{abc-a^2d}}+\frac{6\,a^3bc^5\sqrt{d+\frac{c}{x^6}}-a^4c^4\left(d+\frac{c}{x^6}\right)^{\frac{3}{2}}+3\,a^4c^4\sqrt{d+\frac{c}{x^6}}d}{9\,a^6c^6\,\mathrm{sign}(x)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^10),x, algorithm="giac")
```

```
[Out] 1/6*b^3*c*sqrt(d + c/x^6)/((a^3*b*c*sign(x) - a^4*d*sign(x))*(b*c
 + a*(d + c/x^6) - a*d)) + 1/18*(15*b^3*c^3*arctan(a*sqrt(d)/sqrt
(a*b*c - a^2*d)) - 18*a*b^2*c^2*d*arctan(a*sqrt(d)/sqrt(a*b*c - a
^2*d)) - 15*sqrt(a*b*c - a^2*d)*b^2*c^2*sqrt(d) + 8*sqrt(a*b*c -
a^2*d)*a*b*c*d^(3/2) + 4*sqrt(a*b*c - a^2*d)*a^2*d^(5/2))*sign(x)
/(sqrt(a*b*c - a^2*d)*a^3*b*c^3 - sqrt(a*b*c - a^2*d)*a^4*c^2*d)
- 1/6*(5*b^3*c - 6*a*b^2*d)*arctan(a*sqrt(d + c/x^6)/sqrt(a*b*c -
 a^2*d))/((a^3*b*c*sign(x) - a^4*d*sign(x))*sqrt(a*b*c - a^2*d))
+ 1/9*(6*a^3*b*c^5*sqrt(d + c/x^6) - a^4*c^4*(d + c/x^6)^(3/2) +
3*a^4*c^4*sqrt(d + c/x^6)*d)/(a^6*c^6*sign(x))
```

3.711 $\int \frac{x^4}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$\frac{x^5\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{5}{6};2,\frac{1}{2};\frac{11}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{5a^2\sqrt{c+dx^6}}$$

```
[Out] (x^5*Sqrt[1 + (d*x^6)/c]*AppellF1[5/6, 2, 1/2, 11/6, -((b*x^6)/a)
, -((d*x^6)/c)])/(5*a^2*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.200847, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$

$$\frac{x^5\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{5}{6};2,\frac{1}{2};\frac{11}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{5a^2\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^5*Sqrt[1 + (d*x^6)/c]*AppellF1[5/6, 2, 1/2, 11/6, -((b*x^6)/a)
, -((d*x^6)/c)])/(5*a^2*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 23.2677, size = 53, normalized size = 0.83

$$\frac{x^5\sqrt{c+dx^6}\,\text{appellf}_1\left(\frac{5}{6},\frac{1}{2},2,\frac{11}{6},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{5a^2c\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] x**5*sqrt(c + d*x**6)*appellf1(5/6, 1/2, 2, 11/6, -d*x**6/c, -b*x
**6/a)/(5*a**2*c*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.520959, size = 342, normalized size = 5.34

$$\frac{x^5\left(-\frac{170bcdx^6F_1\left(\frac{11}{6};\frac{1}{2},1;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{3x^6\left(2bcF_1\left(\frac{17}{6};\frac{1}{2},2;\frac{23}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{17}{6};\frac{3}{2},1;\frac{23}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-17acF_1\left(\frac{11}{6};\frac{1}{2},1;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}+\frac{121c(bc-6ad)}{3x^6\left(2bcF_1\left(\frac{11}{6};\frac{1}{2},2;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1(\right.}\right.}{330\left(a+bx^6\right)\sqrt{c+dx^6}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^5*((-55*b*(c + d*x^6))/a + (121*c*(b*c - 6*a*d)*AppellF1[5/6,
1/2, 1, 11/6, -((d*x^6)/c), -((b*x^6)/a)])/(-11*a*c*AppellF1[5/6,
 1/2, 1, 11/6, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF
1[11/6, 1/2, 2, 17/6, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[
11/6, 3/2, 1, 17/6, -((d*x^6)/c), -((b*x^6)/a)])) - (170*b*c*d*x^
6*AppellF1[11/6, 1/2, 1, 17/6, -((d*x^6)/c), -((b*x^6)/a)])/(-17*
a*c*AppellF1[11/6, 1/2, 1, 17/6, -((d*x^6)/c), -((b*x^6)/a)] + 3*
x^6*(2*b*c*AppellF1[17/6, 1/2, 2, 23/6, -((d*x^6)/c), -((b*x^6)/a
```

```
)] + a*d*AppellF1[17/6, 3/2, 1, 23/6, -((d*x^6)/c), -((b*x^6)/a)]
))))/(330*(-(b*c) + a*d)*(a + b*x^6)*Sqrt[c + d*x^6])
```

Maple [F] time = 0.064, size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^6+a)^2} \frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)

[Out] int(x^4/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^6+a)^2\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")

[Out] integrate(x^4/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{(b^2x^{12}+2\,abx^6+a^2)\sqrt{dx^6+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")

[Out] integral(x^4/((b^2*x^12 + 2*a*b*x^6 + a^2)*sqrt(d*x^6 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^6+a)^2\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

3.712 $\int \frac{x^3}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$\frac{x^4\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{2}{3};2,\frac{1}{2};\frac{5}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{4a^2\sqrt{c+dx^6}}$$

```
[Out] (x^4*Sqrt[1 + (d*x^6)/c]*AppellF1[2/3, 2, 1/2, 5/3, -((b*x^6)/a),
 -((d*x^6)/c)])/(4*a^2*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.246309, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{x^4\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{2}{3};2,\frac{1}{2};\frac{5}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{4a^2\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^4*Sqrt[1 + (d*x^6)/c]*AppellF1[2/3, 2, 1/2, 5/3, -((b*x^6)/a),
 -((d*x^6)/c)])/(4*a^2*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 26.2414, size = 53, normalized size = 0.83

$$\frac{x^4\sqrt{c+dx^6}\,\text{appellf}_1\left(\frac{2}{3},\frac{1}{2},2,\frac{5}{3},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{4a^2c\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] x**4*sqrt(c + d*x**6)*appellf1(2/3, 1/2, 2, 5/3, -d*x**6/c, -b*x*
*6/a)/(4*a**2*c*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.529893, size = 342, normalized size = 5.34

$$\frac{x^4\left(-\frac{8bcdx^6F_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{3x^6\left(2bcF_1\left(\frac{8}{3};\frac{1}{2},2;\frac{11}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{8}{3};\frac{3}{2},1;\frac{11}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-16acF_1\left(\frac{5}{3};\frac{1}{2},1;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}+\frac{25c(bc-3ad)F_1\left(\frac{2}{3}\cdots\right.}{3x^6\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1\cdots\right.\right.}\right.}{30\left(a+bx^6\right)\sqrt{c+dx^6}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^3/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^4*((-5*b*(c + d*x^6))/a + (25*c*(b*c - 3*a*d)*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^6)/c), -((b*x^6)/a)])/(-10*a*c*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[5/
3, 1/2, 2, 8/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[5/3, 3
/2, 1, 8/3, -((d*x^6)/c), -((b*x^6)/a)])) - (8*b*c*d*x^6*AppellF1
[5/3, 1/2, 1, 8/3, -((d*x^6)/c), -((b*x^6)/a)])/(-16*a*c*AppellF1
[5/3, 1/2, 1, 8/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*App
ellF1[8/3, 1/2, 2, 11/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*Appell
```

```
F1[8/3, 3/2, 1, 11/3, -((d*x^6)/c), -((b*x^6)/a)]))))/(30*(-(b*c)
 + a*d)*(a + b*x^6)*Sqrt[c + d*x^6])
```

Maple [F] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^6+a)^2} \frac{1}{\sqrt{dx^6+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)

[Out] int(x^3/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^6+a)^2\sqrt{dx^6+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")

[Out] integrate(x^3/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^6+a)^2\sqrt{dx^6+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")

[Out] integrate(x^3/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

3.713 $\int \frac{x}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$\frac{x^2\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{1}{3};2,\frac{1}{2};\frac{4}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{2a^2\sqrt{c+dx^6}}$$

```
[Out] (x^2*Sqrt[1 + (d*x^6)/c]*AppellF1[1/3, 2, 1/2, 4/3, -((b*x^6)/a),
 -((d*x^6)/c)])/(2*a^2*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.162972, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{x^2\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{1}{3};2,\frac{1}{2};\frac{4}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{2a^2\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^2*Sqrt[1 + (d*x^6)/c]*AppellF1[1/3, 2, 1/2, 4/3, -((b*x^6)/a),
 -((d*x^6)/c)])/(2*a^2*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 26.1844, size = 53, normalized size = 0.83

$$\frac{x^2\sqrt{c+dx^6}\,\text{appellf}_1\left(\frac{1}{3},\frac{1}{2},2,\frac{4}{3},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{2a^2c\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] x**2*sqrt(c + d*x**6)*appellf1(1/3, 1/2, 2, 4/3, -d*x**6/c, -b*x*
*6/a)/(2*a**2*c*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.555039, size = 343, normalized size = 5.36

$$\frac{x^2\left(\frac{7bcdx^6F_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{3x^6\left(2bcF_1\left(\frac{7}{3};\frac{1}{2},2;\frac{10}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{7}{3};\frac{3}{2},1;\frac{10}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-14acF_1\left(\frac{4}{3};\frac{1}{2},1;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}+\frac{32c(2bc-3ad)F_1\left(\frac{1}{3};\frac{1}{2}\right.}{3x^6\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3}\right.\right.}}{24\left(a+bx^6\right)\sqrt{c+dx^6}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (x^2*((-4*b*(c + d*x^6))/a + (32*c*(2*b*c - 3*a*d)*AppellF1[1/3,
1/2, 1, 4/3, -((d*x^6)/c), -((b*x^6)/a)])/(-8*a*c*AppellF1[1/3, 1
/2, 1, 4/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[4
/3, 1/2, 2, 7/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[4/3,
3/2, 1, 7/3, -((d*x^6)/c), -((b*x^6)/a)])) + (7*b*c*d*x^6*AppellF
1[4/3, 1/2, 1, 7/3, -((d*x^6)/c), -((b*x^6)/a)])/(-14*a*c*AppellF
1[4/3, 1/2, 1, 7/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*Ap
pellF1[7/3, 1/2, 2, 10/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*Appel
```

```
1F1[7/3, 3/2, 1, 10/3, -((d*x^6)/c), -((b*x^6)/a)]))))/(24*(-(b*c
) + a*d)*(a + b*x^6)*Sqrt[c + d*x^6])
```

Maple [F] time = 0.062, size = 0, normalized size = 0.

$$\int \frac{x}{(bx^6+a)^2}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

```
[Out] int(x/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^6+a)^2\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^6+a)^2\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")

[Out] integrate(x/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

3.714 $\int \frac{1}{(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=59

$$\frac{x\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{1}{6};2,\frac{1}{2};\frac{7}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{a^2\sqrt{c+dx^6}}$$

```
[Out] (x*Sqrt[1 + (d*x^6)/c]*AppellF1[1/6, 2, 1/2, 7/6, -((b*x^6)/a), -
((d*x^6)/c)])/(a^2*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.0867836, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{\frac{dx^6}{c}+1}F_1\left(\frac{1}{6};2,\frac{1}{2};\frac{7}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{a^2\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In] Int[1/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (x*Sqrt[1 + (d*x^6)/c]*AppellF1[1/6, 2, 1/2, 7/6, -((b*x^6)/a), -
((d*x^6)/c)])/(a^2*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 20.421, size = 49, normalized size = 0.83

$$\frac{x\sqrt{c+dx^6}\,\operatorname{appellf}_1\left(\frac{1}{6},\frac{1}{2},2,\frac{7}{6},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{a^2c\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**6)*appellf1(1/6, 1/2, 2, 7/6, -d*x**6/c, -b*x**6/
a)/(a**2*c*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 0.765885, size = 341, normalized size = 5.78

$$\frac{x\left(\frac{26bcdx^6F_1\left(\frac{7}{6};\frac{1}{2},1;\frac{13}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{3x^6\left(2bcF_1\left(\frac{13}{6};\frac{1}{2},2;\frac{19}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{13}{6};\frac{3}{2},1;\frac{19}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-13acF_1\left(\frac{7}{6};\frac{1}{2},1;\frac{13}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}+\frac{49c(5bc-6ad)F_1\left(\frac{1}{6}\right.}{3x^6\left(2bcF_1\left(\frac{7}{6};\frac{1}{2},2;\frac{13}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{7}{6};\frac{3}{2},1\right.\right.}\right.}{42\left(a+bx^6\right)\sqrt{c+dx^6}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/((a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] (x*((-7*b*(c + d*x^6))/a + (49*c*(5*b*c - 6*a*d)*AppellF1[1/6, 1/
2, 1, 7/6, -((d*x^6)/c), -((b*x^6)/a)])/(-7*a*c*AppellF1[1/6, 1/2
, 1, 7/6, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[7/6
, 1/2, 2, 13/6, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[7/6, 3
/2, 1, 13/6, -((d*x^6)/c), -((b*x^6)/a)])) + (26*b*c*d*x^6*Appell
F1[7/6, 1/2, 1, 13/6, -((d*x^6)/c), -((b*x^6)/a)])/(-13*a*c*Appel
lF1[7/6, 1/2, 1, 13/6, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c
*AppellF1[13/6, 1/2, 2, 19/6, -((d*x^6)/c), -((b*x^6)/a)] + a*d*A
```

```
ppellF1[13/6, 3/2, 1, 19/6, -((d*x^6)/c), -((b*x^6)/a)]))))/(42*(
-(b*c) + a*d)*(a + b*x^6)*Sqrt[c + d*x^6])
```

Maple [F] time = 0.062, size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^6+a\right)^2}\frac{1}{\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)

[Out] int(1/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^6+a\right)^2\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^6+a\right)^2\sqrt{dx^6+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)),x, algorithm="giac")

[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)), x)
```

3.715 $\int \frac{1}{x^2(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=62

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{1}{6};2,\frac{1}{2};\frac{5}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{a^2x\sqrt{c+dx^6}}$$

```
[Out] -((Sqrt[1 + (d*x^6)/c]*AppellF1[-1/6, 2, 1/2, 5/6, -((b*x^6)/a),
-((d*x^6)/c)])/(a^2*x*Sqrt[c + d*x^6]))
```

Rubi [A] time = 0.192979, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{1}{6};2,\frac{1}{2};\frac{5}{6};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{a^2x\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] -((Sqrt[1 + (d*x^6)/c]*AppellF1[-1/6, 2, 1/2, 5/6, -((b*x^6)/a),
-((d*x^6)/c)])/(a^2*x*Sqrt[c + d*x^6]))
```

Rubi in Sympy [A] time = 24.2535, size = 53, normalized size = 0.85

$$-\frac{\sqrt{c+dx^6}\,\text{appellf}_1\left(-\frac{1}{6},\frac{1}{2},2,\frac{5}{6},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{a^2cx\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)*appellf1(-1/6, 1/2, 2, 5/6, -d*x**6/c, -b*x**6/
a)/(a**2*c*x*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 1.32019, size = 399, normalized size = 6.44

$$\frac{-\frac{121ax^6\left(12a^2d^2-24abcd+7b^2c^2\right)F_1\left(\frac{5}{6};\frac{1}{2},1;\frac{11}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{3x^6\left(2bcF_1\left(\frac{11}{6};\frac{1}{2},2;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{11}{6};\frac{3}{2},1;\frac{17}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-11acF_1\left(\frac{5}{6};\frac{1}{2},1;\frac{11}{6};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}+\frac{55\left(c+dx^6\right)\left(-6a^2d+6ab\left(c-dx^6\right)+7b^2cx^6\right)}{c}+\frac{\ldots}{3x^6\ldots}}{330a^2x\left(a+bx^6\right)\sqrt{c+dx^6}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] ((55*(c + d*x^6)*(-6*a^2*d + 7*b^2*c*x^6 + 6*a*b*(c - d*x^6)))/c
- (121*a*(7*b^2*c^2 - 24*a*b*c*d + 12*a^2*d^2)*x^6*AppellF1[5/6,
1/2, 1, 11/6, -((d*x^6)/c), -((b*x^6)/a)])/(-11*a*c*AppellF1[5/6,
 1/2, 1, 11/6, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF
1[11/6, 1/2, 2, 17/6, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[
11/6, 3/2, 1, 17/6, -((d*x^6)/c), -((b*x^6)/a)])) + (170*a*b*d*(7
*b*c - 6*a*d)*x^12*AppellF1[11/6, 1/2, 1, 17/6, -((d*x^6)/c), -((
b*x^6)/a)])/(-17*a*c*AppellF1[11/6, 1/2, 1, 17/6, -((d*x^6)/c), -
((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[17/6, 1/2, 2, 23/6, -((d*x^6
```

```
)/c), -((b*x^6)/a)] + a*d*AppellF1[17/6, 3/2, 1, 23/6, -((d*x^6)/
c), -((b*x^6)/a)])))/(330*a^2*(-(b*c) + a*d)*x*(a + b*x^6)*Sqrt[c
 + d*x^6])
```

Maple [F] time = 0.121, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2}\left(b x^{6}+a\right)^{2}}\frac{1}{\sqrt{d x^{6}+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)

[Out] int(1/x^2/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{6}+a\right)^{2}\sqrt{d x^{6}+c}\,x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^2),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\left(b^{2} x^{14}+2\,a b x^{8}+a^{2} x^{2}\right)\sqrt{d x^{6}+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^2),x, algorithm="fricas")

[Out] integral(1/((b^2*x^14 + 2*a*b*x^8 + a^2*x^2)*sqrt(d*x^6 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{6}+a\right)^{2}\sqrt{d x^{6}+c}\,x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^2), x)
```

3.716 $\int \frac{1}{x^3(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{1}{3};2,\frac{1}{2};\frac{2}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{2a^2x^2\sqrt{c+dx^6}}$$

```
[Out] -(Sqrt[1 + (d*x^6)/c]*AppellF1[-1/3, 2, 1/2, 2/3, -((b*x^6)/a), -
((d*x^6)/c)])/(2*a^2*x^2*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.290156, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{1}{3};2,\frac{1}{2};\frac{2}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{2a^2x^2\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] -(Sqrt[1 + (d*x^6)/c]*AppellF1[-1/3, 2, 1/2, 2/3, -((b*x^6)/a), -
((d*x^6)/c)])/(2*a^2*x^2*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 31.8091, size = 56, normalized size = 0.88

$$-\frac{\sqrt{c+dx^6}\,\text{appellf}_1\left(-\frac{1}{3},\frac{1}{2},2,\frac{2}{3},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{2a^2cx^2\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)*appellf1(-1/3, 1/2, 2, 2/3, -d*x**6/c, -b*x**6/
a)/(2*a**2*c*x**2*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 1.25501, size = 399, normalized size = 6.23

$$-\frac{\frac{25ax^6(3a^2d^2-15abcd+8b^2c^2)F_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{3x^6\left(2bcF_1\left(\frac{5}{3};\frac{1}{2},2;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{5}{3};\frac{3}{2},1;\frac{8}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-10acF_1\left(\frac{2}{3};\frac{1}{2},1;\frac{5}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}+\frac{10(c+dx^6)(-3a^2d+3ab(c-dx^6)+4b^2cx^6)}{c}+\frac{\quad}{3x^6(2bc}}{60a^2x^2(a+bx^6)\sqrt{c+dx^6}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] ((10*(c + d*x^6)*(-3*a^2*d + 4*b^2*c*x^6 + 3*a*b*(c - d*x^6)))/c
- (25*a*(8*b^2*c^2 - 15*a*b*c*d + 3*a^2*d^2)*x^6*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^6)/c), -((b*x^6)/a)])/(-10*a*c*AppellF1[2/3, 1/
2, 1, 5/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[5/
3, 1/2, 2, 8/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[5/3, 3
/2, 1, 8/3, -((d*x^6)/c), -((b*x^6)/a)])) + (16*a*b*d*(4*b*c - 3*
a*d)*x^12*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^6)/c), -((b*x^6)/a)])
/(-16*a*c*AppellF1[5/3, 1/2, 1, 8/3, -((d*x^6)/c), -((b*x^6)/a)]
+ 3*x^6*(2*b*c*AppellF1[8/3, 1/2, 2, 11/3, -((d*x^6)/c), -((b*x^6
```

```
)/a)] + a*d*AppellF1[8/3, 3/2, 1, 11/3, -((d*x^6)/c), -((b*x^6)/a
)]))))/(60*a^2*(-(b*c) + a*d)*x^2*(a + b*x^6)*Sqrt[c + d*x^6])
```

Maple [F] time = 0.112, size = 0, normalized size = 0.

$$\int \frac{1}{x^3 (bx^6 + a)^2} \frac{1}{\sqrt{dx^6 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)

[Out] int(1/x^3/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^6 + a)^2 \sqrt{dx^6 + c} x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^3),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^3), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^3),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^6 + a)^2 \sqrt{dx^6 + c} x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^3),x, algorithm="giac")

[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^3), x)
```

3.717 $\int \frac{1}{x^5(a+bx^6)^2\sqrt{c+dx^6}}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{2}{3};2,\frac{1}{2};\frac{1}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{4a^2x^4\sqrt{c+dx^6}}$$

```
[Out] -(Sqrt[1 + (d*x^6)/c]*AppellF1[-2/3, 2, 1/2, 1/3, -((b*x^6)/a), -
((d*x^6)/c)])/(4*a^2*x^4*Sqrt[c + d*x^6])
```

Rubi [A] time = 0.281496, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{\sqrt{\frac{dx^6}{c}+1}F_1\left(-\frac{2}{3};2,\frac{1}{2};\frac{1}{3};-\frac{bx^6}{a},-\frac{dx^6}{c}\right)}{4a^2x^4\sqrt{c+dx^6}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^5*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] -(Sqrt[1 + (d*x^6)/c]*AppellF1[-2/3, 2, 1/2, 1/3, -((b*x^6)/a), -
((d*x^6)/c)])/(4*a^2*x^4*Sqrt[c + d*x^6])
```

Rubi in Sympy [A] time = 31.3719, size = 56, normalized size = 0.88

$$-\frac{\sqrt{c+dx^6}\,\operatorname{appellf}_1\left(-\frac{2}{3},\frac{1}{2},2,\frac{1}{3},-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{4a^2cx^4\sqrt{1+\frac{dx^6}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**5/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**6)*appellf1(-2/3, 1/2, 2, 1/3, -d*x**6/c, -b*x**6/
a)/(4*a**2*c*x**4*sqrt(1 + d*x**6/c))
```

Mathematica [B] time = 1.19247, size = 399, normalized size = 6.23

$$\frac{\frac{16ax^6(3a^2d^2+21abcd-20b^2c^2)F_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}{3x^6\left(2bcF_1\left(\frac{4}{3};\frac{1}{2},2;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)+adF_1\left(\frac{4}{3};\frac{3}{2},1;\frac{7}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)\right)-8acF_1\left(\frac{1}{3};\frac{1}{2},1;\frac{4}{3};-\frac{dx^6}{c},-\frac{bx^6}{a}\right)}+\frac{4(c+dx^6)(-3a^2d+3ab(c-dx^6)+5b^2cx^6)}{c}+\frac{\cdots}{3x^6\left(2bcF_1\left(\cdots\right.\right.}}{48a^2x^4(a+bx^6)\sqrt{c+dx^6}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/(x^5*(a + b*x^6)^2*Sqrt[c + d*x^6]),x]
```

```
[Out] ((4*(c + d*x^6)*(-3*a^2*d + 5*b^2*c*x^6 + 3*a*b*(c - d*x^6)))/c +
 (16*a*(-20*b^2*c^2 + 21*a*b*c*d + 3*a^2*d^2)*x^6*AppellF1[1/3, 1
/2, 1, 4/3, -((d*x^6)/c), -((b*x^6)/a)])/(-8*a*c*AppellF1[1/3, 1/
2, 1, 4/3, -((d*x^6)/c), -((b*x^6)/a)] + 3*x^6*(2*b*c*AppellF1[4/
3, 1/2, 2, 7/3, -((d*x^6)/c), -((b*x^6)/a)] + a*d*AppellF1[4/3, 3
/2, 1, 7/3, -((d*x^6)/c), -((b*x^6)/a)])) + (7*a*b*d*(-5*b*c + 3*
a*d)*x^12*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^6)/c), -((b*x^6)/a)])
/(-14*a*c*AppellF1[4/3, 1/2, 1, 7/3, -((d*x^6)/c), -((b*x^6)/a)]
+ 3*x^6*(2*b*c*AppellF1[7/3, 1/2, 2, 10/3, -((d*x^6)/c), -((b*x^6
```

```
)/a)] + a*d*AppellF1[7/3, 3/2, 1, 10/3, -((d*x^6)/c), -((b*x^6)/a
)]))/(48*a^2*(-(b*c) + a*d)*x^4*(a + b*x^6)*Sqrt[c + d*x^6])
```

Maple [F] time = 0.117, size = 0, normalized size = 0.

$$\int \frac{1}{x^{5} \left(b x^{6}+a\right)^{2}} \frac{1}{\sqrt{d x^{6}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)

[Out] int(1/x^5/(b*x^6+a)^2/(d*x^6+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{6}+a\right)^{2} \sqrt{d x^{6}+c}\, x^{5}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^5),x, algorithm="maxima")

[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^5), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^5),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**6+a)**2/(d*x**6+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{6}+a\right)^{2} \sqrt{d x^{6}+c}\, x^{5}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^5),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^6 + a)^2*sqrt(d*x^6 + c)*x^5), x)
```

3.718 $\int \frac{x^{23}}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=104

$$-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4b^{5/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^8}(ad+bc)}{4b^2d^2}+\frac{\left(c+dx^8\right)^{3/2}}{12bd^2}$$

```
[Out] -((b*c + a*d)*Sqrt[c + d*x^8])/(4*b^2*d^2) + (c + d*x^8)^(3/2)/(1
2*b*d^2) - (a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]
])/(4*b^(5/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.289497, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4b^{5/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^8}(ad+bc)}{4b^2d^2}+\frac{\left(c+dx^8\right)^{3/2}}{12bd^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^23/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -((b*c + a*d)*Sqrt[c + d*x^8])/(4*b^2*d^2) + (c + d*x^8)^(3/2)/(1
2*b*d^2) - (a^2*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]
])/(4*b^(5/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 31.6813, size = 88, normalized size = 0.85

$$\frac{a^2\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{4b^{\frac{5}{2}}\sqrt{ad-bc}}+\frac{\left(c+dx^8\right)^{\frac{3}{2}}}{12bd^2}-\frac{\sqrt{c+dx^8}\,(ad+bc)}{4b^2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**23/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] a**2*atan(sqrt(b)*sqrt(c + d*x**8)/sqrt(a*d - b*c))/(4*b**(5/2)*s
qrt(a*d - b*c)) + (c + d*x**8)**(3/2)/(12*b*d**2) - sqrt(c + d*x*
*8)*(a*d + b*c)/(4*b**2*d**2)
```

Mathematica [A] time = 0.272246, size = 91, normalized size = 0.88

$$\frac{\sqrt{c+dx^8}\left(-3ad-2bc+bdx^8\right)}{12b^2d^2}-\frac{a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4b^{5/2}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^23/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (Sqrt[c + d*x^8]*(-2*b*c - 3*a*d + b*d*x^8))/(12*b^2*d^2) - (a^2*
ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(4*b^(5/2)*Sq
rt[b*c - a*d])
```

Maple [F] time = 0.105, size = 0, normalized size = 0.

$$\int \frac{x^{23}}{bx^8+a}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^23/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^23/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^23/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.225562, size = 1, normalized size = 0.01

$$\left[\frac{3\,a^2d^2\log\left(\frac{\left(bdx^8+2\,bc-ad\right)\sqrt{b^2c-abd}-2\,\sqrt{dx^8+c}\left(b^2c-abd\right)}{bx^8+a}\right)+2\,\left(bdx^8-2\,bc-3\,ad\right)\sqrt{dx^8+c}\sqrt{b^2c-abd}}{24\,\sqrt{b^2c-abd}b^2d^2},\; -\frac{3\,a^2d^2\arctan\left(-\frac{bc-ad}{\sqrt{dx^8+c}\sqrt{-b^2c+abd}}\right)-\left(bdx^8-2\,bc-3\,ad\right)\sqrt{dx^8+c}\sqrt{-b^2c+abd}}{12\,\sqrt{-b^2c+abd}b^2d^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^23/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] [1/24*(3*a^2*d^2*log(((b*d*x^8 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d)
 - 2*sqrt(d*x^8 + c)*(b^2*c - a*b*d))/(b*x^8 + a)) + 2*(b*d*x^8 -
 2*b*c - 3*a*d)*sqrt(d*x^8 + c)*sqrt(b^2*c - a*b*d))/(sqrt(b^2*c
- a*b*d)*b^2*d^2), -1/12*(3*a^2*d^2*arctan(-(b*c - a*d)/(sqrt(d*x
^8 + c)*sqrt(-b^2*c + a*b*d))) - (b*d*x^8 - 2*b*c - 3*a*d)*sqrt(d
*x^8 + c)*sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b^2*d^2)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**23/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21367, size = 143, normalized size = 1.38

$$\frac{a^{2}\arctan\left(\frac{\sqrt{dx^{8}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{4\sqrt{-b^{2}c+abd}b^{2}}+\frac{\left(dx^{8}+c\right)^{\frac{3}{2}}b^{2}d^{4}-3\sqrt{dx^{8}+c}b^{2}cd^{4}-3\sqrt{dx^{8}+c}abd^{5}}{12\,b^{3}d^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^23/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] 1/4*a^2*arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2
*c + a*b*d)*b^2) + 1/12*((d*x^8 + c)^(3/2)*b^2*d^4 - 3*sqrt(d*x^8
 + c)*b^2*c*d^4 - 3*sqrt(d*x^8 + c)*a*b*d^5)/(b^3*d^6)
```

3.719 $\int \frac{x^{15}}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=74

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^8}}{4bd}$$

```
[Out] Sqrt[c + d*x^8]/(4*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sq
rt[b*c - a*d]])/(4*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.191704, antiderivative size = 74, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^8}}{4bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^15/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] Sqrt[c + d*x^8]/(4*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sq
rt[b*c - a*d]])/(4*b^(3/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 20.4693, size = 60, normalized size = 0.81

$$-\frac{a\,\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{4b^{\frac{3}{2}}\sqrt{ad-bc}}+\frac{\sqrt{c+dx^8}}{4bd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**15/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -a*atan(sqrt(b)*sqrt(c + d*x**8)/sqrt(a*d - b*c))/(4*b**(3/2)*sqr
t(a*d - b*c)) + sqrt(c + d*x**8)/(4*b*d)
```

Mathematica [A] time = 0.0904714, size = 74, normalized size = 1.

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4b^{3/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^8}}{4bd}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^15/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] Sqrt[c + d*x^8]/(4*b*d) + (a*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sq
rt[b*c - a*d]])/(4*b^(3/2)*Sqrt[b*c - a*d])
```

Maple [F] time = 0.082, size = 0, normalized size = 0.

$$\int \frac{x^{15}}{bx^8+a}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^15/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^15/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.226362, size = 1, normalized size = 0.01

$$\left[\frac{ad\log\left(\frac{(bdx^8+2\,bc-ad)\sqrt{b^2c-abd}+2\,\sqrt{dx^8+c}(b^2c-abd)}{bx^8+a}\right)+2\,\sqrt{dx^8+c}\sqrt{b^2c-abd}}{8\,\sqrt{b^2c-abd}bd}, \frac{ad\arctan\left(-\frac{bc-ad}{\sqrt{dx^8+c}\sqrt{-b^2c+abd}}\right)+\sqrt{dx^8+c}\sqrt{-\right.}{4\,\sqrt{-b^2c+abd}bd}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] [1/8*(a*d*log(((b*d*x^8 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) + 2*sq
rt(d*x^8 + c)*(b^2*c - a*b*d))/(b*x^8 + a)) + 2*sqrt(d*x^8 + c)*s
qrt(b^2*c - a*b*d))/(sqrt(b^2*c - a*b*d)*b*d), 1/4*(a*d*arctan(-(
b*c - a*d)/(sqrt(d*x^8 + c)*sqrt(-b^2*c + a*b*d))) + sqrt(d*x^8 +
 c)*sqrt(-b^2*c + a*b*d))/(sqrt(-b^2*c + a*b*d)*b*d)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**15/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.214707, size = 86, normalized size = 1.16

$$-\frac{\frac{ad\arctan\left(\frac{\sqrt{dx^8+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}b}-\frac{\sqrt{dx^8+c}}{b}}{4\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] -1/4*(a*d*arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*b) - sqrt(d*x^8 + c)/b)/d
```

3.720 $\int \frac{x^7}{(a+bx^8)\sqrt{c+dx^8}} \, dx$

Optimal. Leaf size=51

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4\sqrt{b}\sqrt{bc-ad}}$$

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]]/(4*Sqrt[b]*Sq
rt[b*c - a*d])
```

Rubi [A] time = 0.135698, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4\sqrt{b}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]]/(4*Sqrt[b]*Sq
rt[b*c - a*d])
```

Rubi in Sympy [A] time = 16.0112, size = 42, normalized size = 0.82

$$\frac{\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{4\sqrt{b}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] atan(sqrt(b)*sqrt(c + d*x**8)/sqrt(a*d - b*c))/(4*sqrt(b)*sqrt(a*
d - b*c))
```

Mathematica [A] time = 0.042007, size = 51, normalized size = 1.

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4\sqrt{b}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]]/(4*Sqrt[b]*Sq
rt[b*c - a*d])
```

Maple [F] time = 0.052, size = 0, normalized size = 0.

$$\int \frac{x^7}{bx^8+a} \frac{1}{\sqrt{dx^8+c}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^7/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.224657, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(\frac{(bdx^8+2\,bc-ad)\,\sqrt{b^2c-abd}-2\,\sqrt{dx^8+c}(b^2c-abd)}{bx^8+a}\right)}{8\,\sqrt{b^2c-abd}}, -\frac{\arctan\left(-\frac{bc-ad}{\sqrt{dx^8+c}\sqrt{-b^2c+abd}}\right)}{4\,\sqrt{-b^2c+abd}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] [1/8*log(((b*d*x^8 + 2*b*c - a*d)*sqrt(b^2*c - a*b*d) - 2*sqrt(d*
x^8 + c)*(b^2*c - a*b*d))/(b*x^8 + a))/sqrt(b^2*c - a*b*d), -1/4*
arctan(-(b*c - a*d)/(sqrt(d*x^8 + c)*sqrt(-b^2*c + a*b*d)))/sqrt(
-b^2*c + a*b*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7}{(a+bx^8)\,\sqrt{c+dx^8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Integral(x**7/((a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [A] time = 0.211107, size = 54, normalized size = 1.06

$$\frac{\arctan\left(\frac{\sqrt{dx^8+c}b}{\sqrt{-b^2c+abd}}\right)}{4\,\sqrt{-b^2c+abd}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] 1/4*arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2*c + a*b*d))/sqrt(-b^2*c +
a*b*d)
```

3.721 $\int \frac{1}{x(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=85

$$\frac{\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4a\sqrt{bc-ad}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{4a\sqrt{c}}$$

```
[Out] -ArcTanh[Sqrt[c + d*x^8]/Sqrt[c]]/(4*a*Sqrt[c]) + (Sqrt[b]*ArcTan
h[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(4*a*Sqrt[b*c - a*d
])
```

Rubi [A] time = 0.211865, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{\sqrt{b}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4a\sqrt{bc-ad}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{4a\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -ArcTanh[Sqrt[c + d*x^8]/Sqrt[c]]/(4*a*Sqrt[c]) + (Sqrt[b]*ArcTan
h[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(4*a*Sqrt[b*c - a*d
])
```

Rubi in Sympy [A] time = 23.2274, size = 71, normalized size = 0.84

$$-\frac{\sqrt{b}\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{4a\sqrt{ad-bc}}-\frac{\mathrm{atanh}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{4a\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(b)*atan(sqrt(b)*sqrt(c + d*x**8)/sqrt(a*d - b*c))/(4*a*sqrt
(a*d - b*c)) - atanh(sqrt(c + d*x**8)/sqrt(c))/(4*a*sqrt(c))
```

Mathematica [C] time = 0.322559, size = 162, normalized size = 1.91

$$\frac{5bdx^8F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)}{12\left(a+bx^8\right)\sqrt{c+dx^8}\left(-5bdx^8F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/(x*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (5*b*d*x^8*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^8)), -(a/(b*x^8))]
)/(12*(a + b*x^8)*Sqrt[c + d*x^8]*(-5*b*d*x^8*AppellF1[3/2, 1/2,
1, 5/2, -(c/(d*x^8)), -(a/(b*x^8))] + 2*a*d*AppellF1[5/2, 1/2, 2,
 7/2, -(c/(d*x^8)), -(a/(b*x^8))] + b*c*AppellF1[5/2, 3/2, 1, 7/2
, -(c/(d*x^8)), -(a/(b*x^8))]))
```

Maple [F] time = 0.076, size = 0, normalized size = 0.

$$\int \frac{1}{x\,(bx^8+a)}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8+a)\sqrt{dx^8+c}\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x), x)
```

Fricas [A] time = 0.242064, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{c}\sqrt{\frac{b}{bc-ad}}\log\left(\frac{bdx^8+2\,bc-ad+2\,\sqrt{dx^8+c}(bc-ad)\sqrt{\frac{b}{bc-ad}}}{bx^8+a}\right)+\log\left(\frac{(dx^8+2\,c)\,\sqrt{c}-2\,\sqrt{dx^8+c}c}{x^8}\right)}{8\,a\sqrt{c}},\ \frac{2\,\sqrt{c}\sqrt{-\frac{b}{bc-ad}}\arctan\left(-\frac{(bc-ad)\sqrt{-\frac{b}{bc-ad}}}{\sqrt{dx^8+c}b}\right.}{8\,a\sqrt{c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/8*(sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^8 + 2*b*c - a*d + 2*
sqrt(d*x^8 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^8 + a)) + l
og(((d*x^8 + 2*c)*sqrt(c) - 2*sqrt(d*x^8 + c)*c)/x^8))/(a*sqrt(c)
), 1/8*(2*sqrt(c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-
b/(b*c - a*d))/(sqrt(d*x^8 + c)*b)) + log(((d*x^8 + 2*c)*sqrt(c)
- 2*sqrt(d*x^8 + c)*c)/x^8))/(a*sqrt(c)), 1/8*(sqrt(-c)*sqrt(b/(b
*c - a*d))*log((b*d*x^8 + 2*b*c - a*d + 2*sqrt(d*x^8 + c)*(b*c -
a*d)*sqrt(b/(b*c - a*d)))/(b*x^8 + a)) + 2*arctan(c/(sqrt(d*x^8 +
 c)*sqrt(-c))))/(a*sqrt(-c)), 1/4*(sqrt(-c)*sqrt(-b/(b*c - a*d))*
arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^8 + c)*b)) + a
rctan(c/(sqrt(d*x^8 + c)*sqrt(-c))))/(a*sqrt(-c))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\,(a+bx^8)\,\sqrt{c+dx^8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Integral(1/(x*(a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [A] time = 0.213331, size = 107, normalized size = 1.26

$$-\frac{1}{4}\,d\left(\frac{b\arctan\left(\frac{\sqrt{dx^8+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}ad}-\frac{\arctan\left(\frac{\sqrt{dx^8+c}}{\sqrt{-c}}\right)}{a\sqrt{-c}d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x),x, algorithm="giac")
```

```
[Out] -1/4*d*(b*arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b
^2*c + a*b*d)*a*d) - arctan(sqrt(d*x^8 + c)/sqrt(-c))/(a*sqrt(-c)
*d))
```

3.722 $\int \frac{1}{x^9(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=117

$$-\frac{b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4a^2\sqrt{bc-ad}}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{8a^2c^{3/2}}-\frac{\sqrt{c+dx^8}}{8acx^8}$$

```
[Out] -Sqrt[c + d*x^8]/(8*a*c*x^8) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d*
x^8]/Sqrt[c]])/(8*a^2*c^(3/2)) - (b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^8])/Sqrt[b*c - a*d]])/(4*a^2*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.354749, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$-\frac{b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{4a^2\sqrt{bc-ad}}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{8a^2c^{3/2}}-\frac{\sqrt{c+dx^8}}{8acx^8}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^9*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -Sqrt[c + d*x^8]/(8*a*c*x^8) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d*
x^8]/Sqrt[c]])/(8*a^2*c^(3/2)) - (b^(3/2)*ArcTanh[(Sqrt[b]*Sqrt[c
 + d*x^8])/Sqrt[b*c - a*d]])/(4*a^2*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 46.3184, size = 100, normalized size = 0.85

$$-\frac{\sqrt{c+dx^8}}{8acx^8}+\frac{b^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{4a^2\sqrt{ad-bc}}+\frac{\left(\frac{ad}{2}+bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{4a^2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**9/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**8)/(8*a*c*x**8) + b**(3/2)*atan(sqrt(b)*sqrt(c + d
*x**8)/sqrt(a*d - b*c))/(4*a**2*sqrt(a*d - b*c)) + (a*d/2 + b*c)*
atanh(sqrt(c + d*x**8)/sqrt(c))/(4*a**2*c**(3/2))
```

Mathematica [C] time = 0.790837, size = 410, normalized size = 3.5

$$\frac{\frac{5bdx^8\left(a\left(3c+2dx^8\right)+bx^8\left(c+3dx^8\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)-3\left(a+bx^8\right)\left(c+dx^8\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)\right)}{ac\left(-5bdx^8F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)\right)}+\frac{\cdots}{x^8\left(2bcF_1\left(\cdots\right.\right.}}{24x^8\left(a+bx^8\right)\sqrt{c+dx^8}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^9*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ((6*b*d*x^16*AppellF1[1, 1/2, 1, 2, -((d*x^8)/c), -((b*x^8)/a)])/
(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^8)/c), -((b*x^8)/a)] + x^8*
(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^8)/c), -((b*x^8)/a)] + a*d*A
ppellF1[2, 3/2, 1, 3, -((d*x^8)/c), -((b*x^8)/a)])) + (5*b*d*x^8*
(a*(3*c + 2*d*x^8) + b*x^8*(c + 3*d*x^8))*AppellF1[3/2, 1/2, 1, 5
/2, -(c/(d*x^8)), -(a/(b*x^8))] - 3*(a + b*x^8)*(c + d*x^8)*(2*a*
```

```
d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^8)), -(a/(b*x^8))] + b*c*Ap
pellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^8)), -(a/(b*x^8))]))/(a*c*(-5*b
*d*x^8*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^8)), -(a/(b*x^8))] + 2
*a*d*AppellF1[5/2, 1/2, 2, 7/2, -(c/(d*x^8)), -(a/(b*x^8))] + b*c
*AppellF1[5/2, 3/2, 1, 7/2, -(c/(d*x^8)), -(a/(b*x^8))])))/(24*x^
8*(a + b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.122, size = 0, normalized size = 0.

$$\int \frac{1}{x^{9}\left(b x^{8}+a\right)} \frac{1}{\sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^9/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^9/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{8}+a\right)\sqrt{d x^{8}+c}\, x^{9}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^9),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^9), x)
```

Fricas [A] time = 0.255531, size = 1, normalized size = 0.01

$$\left[\frac{2\, b c^{\frac{3}{2}} x^{8} \sqrt{\frac{b}{b c-a d}} \log\left(\frac{b d x^{8}+2\, b c-a d-2\, \sqrt{d x^{8}+c}(b c-a d)\sqrt{\frac{b}{b c-a d}}}{b x^{8}+a}\right)+(2\, b c+a d) x^{8} \log\left(\frac{(d x^{8}+2\, c)\sqrt{c}+2\, \sqrt{d x^{8}+c} c}{x^{8}}\right)-2\, \sqrt{d x^{8}+c}\, a \sqrt{c}}{16\, a^{2} c^{\frac{3}{2}} x^{8}}, -\frac{4\, b c^{\frac{3}{2}} x^{8} \sqrt{-\frac{b}{b c-a d}} \arctan\left(-\frac{(b c-a d)\sqrt{-\frac{b}{b c-a d}}}{\sqrt{d x^{8}+c} b}\right)-(2\, b c+a d) x^{8} \log\left(\frac{(d x^{8}+2\, c)\sqrt{c}+2\, \sqrt{d x^{8}+c} c}{x^{8}}\right)+2\, \sqrt{d x^{8}+c}\, a \sqrt{c}}{16\, a^{2} c^{\frac{3}{2}} x^{8}}, \frac{b\sqrt{-c} c x^{8}\sqrt{\frac{b}{b c-\cdots}}\cdots}{\cdots}, -\frac{2\, b \sqrt{-c} c x^{8} \sqrt{-\frac{b}{b c-a d}} \arctan\left(-\frac{(b c-a d)\sqrt{-\frac{b}{b c-a d}}}{\sqrt{d x^{8}+c} b}\right)+(2\, b c+a d) x^{8} \arctan\left(\frac{c}{\sqrt{d x^{8}+c}\sqrt{-c}}\right)+\sqrt{d x^{8}+c}\, a \sqrt{-c}}{8\, a^{2} \sqrt{-c} c x^{8}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^9),x, algorithm="fricas")
```

```
[Out] [1/16*(2*b*c^(3/2)*x^8*sqrt(b/(b*c - a*d))*log((b*d*x^8 + 2*b*c -
 a*d - 2*sqrt(d*x^8 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^8
+ a)) + (2*b*c + a*d)*x^8*log(((d*x^8 + 2*c)*sqrt(c) + 2*sqrt(d*x
^8 + c)*c)/x^8) - 2*sqrt(d*x^8 + c)*a*sqrt(c))/(a^2*c^(3/2)*x^8),
 -1/16*(4*b*c^(3/2)*x^8*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*
sqrt(-b/(b*c - a*d))/(sqrt(d*x^8 + c)*b)) - (2*b*c + a*d)*x^8*log
(((d*x^8 + 2*c)*sqrt(c) + 2*sqrt(d*x^8 + c)*c)/x^8) + 2*sqrt(d*x^
8 + c)*a*sqrt(c))/(a^2*c^(3/2)*x^8), 1/8*(b*sqrt(-c)*c*x^8*sqrt(b
```

```
/(b*c - a*d))*log((b*d*x^8 + 2*b*c - a*d - 2*sqrt(d*x^8 + c)*(b*c
 - a*d)*sqrt(b/(b*c - a*d)))/(b*x^8 + a)) - (2*b*c + a*d)*x^8*arc
tan(c/(sqrt(d*x^8 + c)*sqrt(-c))) - sqrt(d*x^8 + c)*a*sqrt(-c))/(
a^2*sqrt(-c)*c*x^8), -1/8*(2*b*sqrt(-c)*c*x^8*sqrt(-b/(b*c - a*d)
)*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^8 + c)*b)) +
 (2*b*c + a*d)*x^8*arctan(c/(sqrt(d*x^8 + c)*sqrt(-c))) + sqrt(d*
x^8 + c)*a*sqrt(-c))/(a^2*sqrt(-c)*c*x^8)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**9/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.218919, size = 159, normalized size = 1.36

$$\frac{1}{8}\,d^2\left(\frac{2\,b^2\arctan\left(\frac{\sqrt{dx^8+c}\,b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}\,a^2d^2}-\frac{(2\,bc+ad)\arctan\left(\frac{\sqrt{dx^8+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,cd^2}-\frac{\sqrt{dx^8+c}}{acd^2x^8}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^9),x, algorithm="giac")
```

```
[Out] 1/8*d^2*(2*b^2*arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2*c + a*b*d))/(sq
rt(-b^2*c + a*b*d)*a^2*d^2) - (2*b*c + a*d)*arctan(sqrt(d*x^8 + c
)/sqrt(-c))/(a^2*sqrt(-c)*c*d^2) - sqrt(d*x^8 + c)/(a*c*d^2*x^8))
```

3.723 $\int \frac{x^{19}}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=123

$$\frac{a^{3/2}\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4b^2\sqrt{bc-ad}}-\frac{(2ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{8b^2d^{3/2}}+\frac{x^4\sqrt{c+dx^8}}{8bd}$$

```
[Out] (x^4*Sqrt[c + d*x^8])/(8*b*d) + (a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*
x^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/(4*b^2*Sqrt[b*c - a*d]) - ((b*c
+ 2*a*d)*ArcTanh[(Sqrt[d]*x^4)/Sqrt[c + d*x^8]])/(8*b^2*d^(3/2))
```

Rubi [A] time = 0.417163, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$\frac{a^{3/2}\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4b^2\sqrt{bc-ad}}-\frac{(2ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{8b^2d^{3/2}}+\frac{x^4\sqrt{c+dx^8}}{8bd}$$

Antiderivative was successfully verified.

```
[In]  Int[x^19/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^4*Sqrt[c + d*x^8])/(8*b*d) + (a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*
x^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/(4*b^2*Sqrt[b*c - a*d]) - ((b*c
+ 2*a*d)*ArcTanh[(Sqrt[d]*x^4)/Sqrt[c + d*x^8]])/(8*b^2*d^(3/2))
```

Rubi in Sympy [A] time = 49.626, size = 107, normalized size = 0.87

$$\frac{a^{\frac{3}{2}}\operatorname{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4b^2\sqrt{ad-bc}}+\frac{x^4\sqrt{c+dx^8}}{8bd}-\frac{(2ad+bc)\operatorname{atanh}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{8b^2d^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**19/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] a**(3/2)*atanh(x**4*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**8)))/(
4*b**2*sqrt(a*d - b*c)) + x**4*sqrt(c + d*x**8)/(8*b*d) - (2*a*d
+ b*c)*atanh(sqrt(d)*x**4/sqrt(c + d*x**8))/(8*b**2*d**(3/2))
```

Mathematica [A] time = 0.220045, size = 118, normalized size = 0.96

$$\frac{\frac{2a^{3/2}\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{\sqrt{bc-ad}}-\frac{(2ad+bc)\log\left(\sqrt{d}\sqrt{c+dx^8}+dx^4\right)}{d^{3/2}}+\frac{bx^4\sqrt{c+dx^8}}{d}}{8b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^19/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ((b*x^4*Sqrt[c + d*x^8])/d + (2*a^(3/2)*ArcTan[(Sqrt[b*c - a*d]*x
^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/Sqrt[b*c - a*d] - ((b*c + 2*a*d)*
Log[d*x^4 + Sqrt[d]*Sqrt[c + d*x^8]])/d^(3/2))/(8*b^2)
```

Maple [F] time = 0.117, size = 0, normalized size = 0.

$$\int \frac{x^{19}}{bx^8 + a} \frac{1}{\sqrt{dx^8 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^19/(b*x^8+a)/(d*x^8+c)^(1/2),x)

[Out] int(x^19/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^19/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.346774, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^19/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] [1/16*(2*sqrt(d*x^8 + c)*b*sqrt(d)*x^4 + a*d^(3/2)*sqrt(-a/(b*c -
 a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^16 - 2*(3*a*b*c^2
 - 4*a^2*c*d)*x^8 + a^2*c^2 + 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2
)*x^12 - (a*b*c^2 - a^2*c*d)*x^4)*sqrt(d*x^8 + c)*sqrt(-a/(b*c -
a*d)))/(b^2*x^16 + 2*a*b*x^8 + a^2)) + (b*c + 2*a*d)*log(2*sqrt(d
*x^8 + c)*d*x^4 - (2*d*x^8 + c)*sqrt(d)))/(b^2*d^(3/2)), 1/16*(2*
sqrt(d*x^8 + c)*b*sqrt(-d)*x^4 + a*sqrt(-d)*d*sqrt(-a/(b*c - a*d)
)*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*
a^2*c*d)*x^8 + a^2*c^2 + 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^1
2 - (a*b*c^2 - a^2*c*d)*x^4)*sqrt(d*x^8 + c)*sqrt(-a/(b*c - a*d))
)/(b^2*x^16 + 2*a*b*x^8 + a^2)) - 2*(b*c + 2*a*d)*arctan(sqrt(-d)
*x^4/sqrt(d*x^8 + c)))/(b^2*sqrt(-d)*d), 1/16*(2*sqrt(d*x^8 + c)*
b*sqrt(d)*x^4 + 2*a*d^(3/2)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c
- 2*a*d)*x^8 - a*c)/(sqrt(d*x^8 + c)*(b*c - a*d)*x^4*sqrt(a/(b*c
- a*d)))) + (b*c + 2*a*d)*log(2*sqrt(d*x^8 + c)*d*x^4 - (2*d*x^8
+ c)*sqrt(d)))/(b^2*d^(3/2)), 1/8*(sqrt(d*x^8 + c)*b*sqrt(-d)*x^4
 + a*sqrt(-d)*d*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^8
 - a*c)/(sqrt(d*x^8 + c)*(b*c - a*d)*x^4*sqrt(a/(b*c - a*d)))) -
(b*c + 2*a*d)*arctan(sqrt(-d)*x^4/sqrt(d*x^8 + c)))/(b^2*sqrt(-d)
*d)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**19/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.308071, size = 140, normalized size = 1.14

$$\frac{\sqrt{dx^8+cx^4}}{8\,bd}-\frac{a^2\arctan\left(\frac{a\sqrt{d+\frac{c}{x^8}}}{\sqrt{abc-a^2d}}\right)}{4\,\sqrt{abc-a^2d}b^2}+\frac{(bc+2\,ad)\arctan\left(\frac{\sqrt{d+\frac{c}{x^8}}}{\sqrt{-d}}\right)}{8\,b^2\sqrt{-d}d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^19/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] 1/8*sqrt(d*x^8 + c)*x^4/(b*d) - 1/4*a^2*arctan(a*sqrt(d + c/x^8)/
sqrt(a*b*c - a^2*d))/(sqrt(a*b*c - a^2*d)*b^2) + 1/8*(b*c + 2*a*d
)*arctan(sqrt(d + c/x^8)/sqrt(-d))/(b^2*sqrt(-d)*d)
```

3.724 $\int \frac{x^{11}}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=91

$$\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{4b\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4b\sqrt{bc-ad}}$$

```
[Out] -(Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])]
)/(4*b*Sqrt[b*c - a*d]) + ArcTanh[(Sqrt[d]*x^4)/Sqrt[c + d*x^8]]/
(4*b*Sqrt[d])
```

Rubi [A] time = 0.254034, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{4b\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4b\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -(Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])]
)/(4*b*Sqrt[b*c - a*d]) + ArcTanh[(Sqrt[d]*x^4)/Sqrt[c + d*x^8]]/
(4*b*Sqrt[d])
```

Rubi in Sympy [A] time = 32.7051, size = 76, normalized size = 0.84

$$-\frac{\sqrt{a}\operatorname{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4b\sqrt{ad-bc}}+\frac{\operatorname{atanh}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{4b\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(a)*atanh(x**4*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**8)))/(
4*b*sqrt(a*d - b*c)) + atanh(sqrt(d)*x**4/sqrt(c + d*x**8))/(4*b*
sqrt(d))
```

Mathematica [A] time = 0.0761412, size = 90, normalized size = 0.99

$$\frac{\frac{\log\left(\sqrt{d}\sqrt{c+dx^8}+dx^4\right)}{\sqrt{d}}-\frac{\sqrt{a}\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{\sqrt{bc-ad}}}{4b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (-((Sqrt[a]*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8]
)])/Sqrt[b*c - a*d]) + Log[d*x^4 + Sqrt[d]*Sqrt[c + d*x^8]]/Sqrt[
d])/(4*b)
```

Maple [F] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{x^{11}}{bx^8 + a} \frac{1}{\sqrt{dx^8 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^11/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.312895, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{d}\sqrt{-\frac{a}{bc-ad}}\log\left(\frac{(b^2c^2-8\,abcd+8\,a^2d^2)x^{16}-2\,(3\,abc^2-4\,a^2cd)x^8+a^2c^2-4\left((b^2c^2-3\,abcd+2\,a^2d^2)x^{12}-(abc^2-a^2cd)x^4\right)\sqrt{dx^8+c}\sqrt{-\frac{a}{bc-ad}}}{b^2x^{16}+2\,abx^8+a^2}\right)+2\,\mathrm{lo}}{16\,b\sqrt{d}}\right.$$

$$-\frac{\sqrt{d}\sqrt{\frac{a}{bc-ad}}\arctan\left(\frac{(bc-2\,ad)x^8-ac}{2\,\sqrt{dx^8+c}(bc-ad)x^4\sqrt{\frac{a}{bc-ad}}}\right)-\log\left(-2\,\sqrt{dx^8+c}dx^4-\left(2\,dx^8+c\right)\sqrt{d}\right)}{8\,b\sqrt{d}},$$

$$\left.-\frac{\sqrt{-d}\sqrt{\frac{a}{bc-ad}}\arctan\left(\frac{(bc-2\,ad)x^8-ac}{2\,\sqrt{dx^8+c}(bc-ad)x^4\sqrt{\frac{a}{bc-ad}}}\right)-2\,\arctan\left(\frac{\sqrt{-d}x^4}{\sqrt{dx^8+c}}\right)}{8\,b\sqrt{-d}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] [1/16*(sqrt(d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8
*a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^8 + a^2*c^2 - 4*((b^
2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^12 - (a*b*c^2 - a^2*c*d)*x^4)*sq
rt(d*x^8 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^16 + 2*a*b*x^8 + a^2))
 + 2*log(-2*sqrt(d*x^8 + c)*d*x^4 - (2*d*x^8 + c)*sqrt(d)))/(b*sq
rt(d)), 1/16*(sqrt(-d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b
*c*d + 8*a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^8 + a^2*c^2
- 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^12 - (a*b*c^2 - a^2*c*d)
*x^4)*sqrt(d*x^8 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^16 + 2*a*b*x^8
 + a^2)) + 4*arctan(sqrt(-d)*x^4/sqrt(d*x^8 + c)))/(b*sqrt(-d)),
-1/8*(sqrt(d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^8 -
 a*c)/(sqrt(d*x^8 + c)*(b*c - a*d)*x^4*sqrt(a/(b*c - a*d)))) - lo
g(-2*sqrt(d*x^8 + c)*d*x^4 - (2*d*x^8 + c)*sqrt(d)))/(b*sqrt(d)),
 -1/8*(sqrt(-d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^8
 - a*c)/(sqrt(d*x^8 + c)*(b*c - a*d)*x^4*sqrt(a/(b*c - a*d)))) -
2*arctan(sqrt(-d)*x^4/sqrt(d*x^8 + c)))/(b*sqrt(-d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.23311, size = 107, normalized size = 1.18

$$\frac{1}{4}\,c\left(\frac{a\arctan\left(\frac{a\sqrt{d+\frac{c}{x^8}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}bc}-\frac{\arctan\left(\frac{\sqrt{d+\frac{c}{x^8}}}{\sqrt{-d}}\right)}{bc\sqrt{-d}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] 1/4*c*(a*arctan(a*sqrt(d + c/x^8)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*b*c) - arctan(sqrt(d + c/x^8)/sqrt(-d))/(b*c*sqrt(-d))
)
```

3.725 $\int \frac{x^3}{(a+bx^8)\sqrt{c+dx^8}} \, dx$

Optimal. Leaf size=54

$$\frac{\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4\sqrt{a}\sqrt{bc-ad}}$$

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])]/(4*Sqrt[a
]*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.13969, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4\sqrt{a}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])]/(4*Sqrt[a
]*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 19.228, size = 46, normalized size = 0.85

$$\frac{\operatorname{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4\sqrt{a}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] atanh(x**4*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**8)))/(4*sqrt(a)
*sqrt(a*d - b*c))
```

Mathematica [A] time = 0.0408359, size = 54, normalized size = 1.

$$\frac{\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4\sqrt{a}\sqrt{bc-ad}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])]/(4*Sqrt[a
]*Sqrt[b*c - a*d])
```

Maple [F] time = 0.062, size = 0, normalized size = 0.

$$\int \frac{x^3}{bx^8+a} \frac{1}{\sqrt{dx^8+c}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^3/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.270894, size = 1, normalized size = 0.02

$$\left[\frac{\log\left(\frac{4\left(\left(ab^2c^2-3a^2bcd+2a^3d^2\right)x^{12}-\left(a^2bc^2-a^3cd\right)x^4\right)\sqrt{dx^8+c}+\left(\left(b^2c^2-8abcd+8a^2d^2\right)x^{16}-2\left(3abc^2-4a^2cd\right)x^8+a^2c^2\right)\sqrt{-abc+a^2d}}{b^2x^{16}+2abx^8+a^2}\right)}{16\sqrt{-abc+a^2d}}, \frac{\arctan\left(\frac{(b\cdots}{2\sqrt{d\cdots}}\right)}{8\sqrt{a\cdots}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] [1/16*log((4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^12 - (a^2*b
*c^2 - a^3*c*d)*x^4)*sqrt(d*x^8 + c) + ((b^2*c^2 - 8*a*b*c*d + 8*
a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^8 + a^2*c^2)*sqrt(-a*
b*c + a^2*d))/(b^2*x^16 + 2*a*b*x^8 + a^2))/sqrt(-a*b*c + a^2*d),
 1/8*arctan(1/2*((b*c - 2*a*d)*x^8 - a*c)/(sqrt(d*x^8 + c)*sqrt(a
*b*c - a^2*d)*x^4))/sqrt(a*b*c - a^2*d)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\left(a+bx^8\right)\sqrt{c+dx^8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Integral(x**3/((a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [A] time = 0.22934, size = 97, normalized size = 1.8

$$-\frac{\sqrt{d}\arctan\left(\frac{\left(\sqrt{d}x^4-\sqrt{dx^8+c}\right)^2b-bc+2ad}{2\sqrt{abcd-a^2d^2}}\right)}{4\sqrt{abcd-a^2d^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] -1/4*sqrt(d)*arctan(1/2*((sqrt(d)*x^4 - sqrt(d*x^8 + c))^2*b - b*
c + 2*a*d)/sqrt(a*b*c*d - a^2*d^2))/sqrt(a*b*c*d - a^2*d^2)
```

3.726 $\int \frac{1}{x^5(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=80

$$-\frac{b\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4a^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^8}}{4acx^4}$$

```
[Out] -Sqrt[c + d*x^8]/(4*a*c*x^4) - (b*ArcTan[(Sqrt[b*c - a*d]*x^4)/(S
qrt[a]*Sqrt[c + d*x^8])])/(4*a^(3/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.248567, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{b\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4a^{3/2}\sqrt{bc-ad}}-\frac{\sqrt{c+dx^8}}{4acx^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -Sqrt[c + d*x^8]/(4*a*c*x^4) - (b*ArcTan[(Sqrt[b*c - a*d]*x^4)/(S
qrt[a]*Sqrt[c + d*x^8])])/(4*a^(3/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 34.1354, size = 68, normalized size = 0.85

$$-\frac{\sqrt{c+dx^8}}{4acx^4}-\frac{b\,\mathrm{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4a^{\frac{3}{2}}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**8)/(4*a*c*x**4) - b*atanh(x**4*sqrt(a*d - b*c)/(sq
rt(a)*sqrt(c + d*x**8)))/(4*a**(3/2)*sqrt(a*d - b*c))
```

Mathematica [A] time = 1.33288, size = 129, normalized size = 1.61

$$\frac{\sqrt{c+dx^8}\left(-\frac{bx^8\sin^{-1}\left(\frac{\sqrt{x^8\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^8}{a}+1}}\right)}{\sqrt{\frac{bx^8}{a}+1}\sqrt{x^8\left(\frac{b}{a}-\frac{d}{c}\right)}\sqrt{\frac{a\left(c+dx^8\right)}{c\left(a+bx^8\right)}}}-a\right)}{4a^2cx^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^5*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (Sqrt[c + d*x^8]*(-a - (b*x^8*ArcSin[Sqrt[(b/a - d/c)*x^8]/Sqrt[1
 + (b*x^8)/a]])/(Sqrt[(b/a - d/c)*x^8]*Sqrt[1 + (b*x^8)/a]*Sqrt[(
a*(c + d*x^8))/(c*(a + b*x^8))])))/(4*a^2*c*x^4)
```

Maple [F] time = 0.093, size = 0, normalized size = 0.

$$\int \frac{1}{x^{5} \left(b x^{8}+a\right)} \frac{1}{\sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^5/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{8}+a\right) \sqrt{d x^{8}+c}\, x^{5}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^5),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^5), x)
```

Fricas [A] time = 0.297959, size = 1, normalized size = 0.01

$$\left[\frac{b c x^{4} \log\left(-\frac{4 \left(\left(a b^{2} c^{2}-3 a^{2} b c d+2 a^{3} d^{2}\right) x^{12}-\left(a^{2} b c^{2}-a^{3} c d\right) x^{4}\right) \sqrt{d x^{8}+c}-\left(\left(b^{2} c^{2}-8 a b c d+8 a^{2} d^{2}\right) x^{16}-2 \left(3 a b c^{2}-4 a^{2} c d\right) x^{8}+a^{2} c^{2}\right) \sqrt{-a b c+a^{2} d}}{b^{2} x^{16}+2 a b x^{8}+a^{2}}\right) - 4 \sqrt{\cdots}}{16 \sqrt{-a b c+a^{2} d}\, a c x^{4}}, -\frac{b c x^{4} \arctan\left(\frac{(b c-2 a d) x^{8}-a c}{2 \sqrt{d x^{8}+c} \sqrt{a b c-a^{2} d}\, x^{4}}\right) + 2 \sqrt{d x^{8}+c} \sqrt{a b c-a^{2} d}}{8 \sqrt{a b c-a^{2} d}\, a c x^{4}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^5),x, algorithm="fricas")
```

```
[Out] [1/16*(b*c*x^4*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^1
2 - (a^2*b*c^2 - a^3*c*d)*x^4)*sqrt(d*x^8 + c) - ((b^2*c^2 - 8*a*
b*c*d + 8*a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^8 + a^2*c^2
)*sqrt(-a*b*c + a^2*d))/(b^2*x^16 + 2*a*b*x^8 + a^2)) - 4*sqrt(d*
x^8 + c)*sqrt(-a*b*c + a^2*d))/(sqrt(-a*b*c + a^2*d)*a*c*x^4), -1
/8*(b*c*x^4*arctan(1/2*((b*c - 2*a*d)*x^8 - a*c)/(sqrt(d*x^8 + c)
*sqrt(a*b*c - a^2*d)*x^4)) + 2*sqrt(d*x^8 + c)*sqrt(a*b*c - a^2*d
))/(sqrt(a*b*c - a^2*d)*a*c*x^4)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.228714, size = 86, normalized size = 1.08

$$\frac{\frac{bc\arctan\left(\frac{a\sqrt{d+\frac{c}{x^8}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}a}-\frac{\sqrt{d+\frac{c}{x^8}}}{a}}{4c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^5),x, algorithm="giac")
```

```
[Out] 1/4*(b*c*arctan(a*sqrt(d + c/x^8)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*a) - sqrt(d + c/x^8)/a)/c
```

3.727 $\int \frac{1}{x^{13}(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=115

$$\frac{b^2\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4a^{5/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^8}(2ad+3bc)}{12a^2c^2x^4}-\frac{\sqrt{c+dx^8}}{12acx^{12}}$$

```
[Out] -Sqrt[c + d*x^8]/(12*a*c*x^12) + ((3*b*c + 2*a*d)*Sqrt[c + d*x^8]
)/(12*a^2*c^2*x^4) + (b^2*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*S
qrt[c + d*x^8])])/(4*a^(5/2)*Sqrt[b*c - a*d])
```

Rubi [A] time = 0.470028, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{b^2\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4a^{5/2}\sqrt{bc-ad}}+\frac{\sqrt{c+dx^8}(2ad+3bc)}{12a^2c^2x^4}-\frac{\sqrt{c+dx^8}}{12acx^{12}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^13*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -Sqrt[c + d*x^8]/(12*a*c*x^12) + ((3*b*c + 2*a*d)*Sqrt[c + d*x^8]
)/(12*a^2*c^2*x^4) + (b^2*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*S
qrt[c + d*x^8])])/(4*a^(5/2)*Sqrt[b*c - a*d])
```

Rubi in Sympy [A] time = 68.671, size = 100, normalized size = 0.87

$$-\frac{\sqrt{c+dx^8}}{12acx^{12}}+\frac{\sqrt{c+dx^8}\,(2ad+3bc)}{12a^2c^2x^4}+\frac{b^2\,\mathrm{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{4a^{\frac{5}{2}}\sqrt{ad-bc}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**13/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**8)/(12*a*c*x**12) + sqrt(c + d*x**8)*(2*a*d + 3*b*
c)/(12*a**2*c**2*x**4) + b**2*atanh(x**4*sqrt(a*d - b*c)/(sqrt(a)
*sqrt(c + d*x**8)))/(4*a**(5/2)*sqrt(a*d - b*c))
```

Mathematica [A] time = 1.29961, size = 149, normalized size = 1.3

$$\frac{\sqrt{c+dx^8}\left(-a^2c+\frac{3b^2cx^{16}\sin^{-1}\left(\frac{\sqrt{x^8\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^8}{a}+1}}\right)}{\sqrt{\frac{bx^8}{a}+1}\sqrt{x^8\left(\frac{b}{a}-\frac{d}{c}\right)}\sqrt{\frac{a\left(c+dx^8\right)}{c\left(a+bx^8\right)}}}+ax^8(2ad+3bc)\right)}{12a^3c^2x^{12}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^13*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (Sqrt[c + d*x^8]*(-(a^2*c) + a*(3*b*c + 2*a*d)*x^8 + (3*b^2*c*x^1
6*ArcSin[Sqrt[(b/a - d/c)*x^8]/Sqrt[1 + (b*x^8)/a]])/(Sqrt[(b/a -
 d/c)*x^8]*Sqrt[1 + (b*x^8)/a]*Sqrt[(a*(c + d*x^8))/(c*(a + b*x^8
```

```
))])))/(12*a^3*c^2*x^12)
```

Maple [F] time = 0.103, size = 0, normalized size = 0.

$$\int \frac{1}{x^{13}\left(bx^{8}+a\right)}\frac{1}{\sqrt{dx^{8}+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^13/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^13/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^{8}+a\right)\sqrt{dx^{8}+c}\,x^{13}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^13),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^13), x)
```

Fricas [A] time = 0.320611, size = 1, normalized size = 0.01

$$\left[\frac{3\,b^{2}c^{2}x^{12}\log\left(\frac{4\left(\left(ab^{2}c^{2}-3\,a^{2}bcd+2\,a^{3}d^{2}\right)x^{12}-\left(a^{2}bc^{2}-a^{3}cd\right)x^{4}\right)\sqrt{dx^{8}+c}+\left(\left(b^{2}c^{2}-8\,abcd+8\,a^{2}d^{2}\right)x^{16}-2\left(3\,abc^{2}-4\,a^{2}cd\right)x^{8}+a^{2}c^{2}\right)\sqrt{-abc+a^{2}d}}{b^{2}x^{16}+2\,abx^{8}+a^{2}}\right)+4}{48\sqrt{-abc+a^{2}d}\,a^{2}c^{2}x^{12}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^13),x, algorithm="fricas")
```

```
[Out] [1/48*(3*b^2*c^2*x^12*log((4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^
2)*x^12 - (a^2*b*c^2 - a^3*c*d)*x^4)*sqrt(d*x^8 + c) + ((b^2*c^2
- 8*a*b*c*d + 8*a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^8 + a
^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^16 + 2*a*b*x^8 + a^2)) + 4*(
(3*b*c + 2*a*d)*x^8 - a*c)*sqrt(d*x^8 + c)*sqrt(-a*b*c + a^2*d))/
(sqrt(-a*b*c + a^2*d)*a^2*c^2*x^12), 1/24*(3*b^2*c^2*x^12*arctan(
1/2*((b*c - 2*a*d)*x^8 - a*c)/(sqrt(d*x^8 + c)*sqrt(a*b*c - a^2*d
)*x^4)) + 2*((3*b*c + 2*a*d)*x^8 - a*c)*sqrt(d*x^8 + c)*sqrt(a*b*
c - a^2*d))/(sqrt(a*b*c - a^2*d)*a^2*c^2*x^12)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**13/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.228, size = 144, normalized size = 1.25

$$-\frac{b^{2} \arctan\left(\frac{a\sqrt{d+\frac{c}{x^{8}}}}{\sqrt{abc-a^{2}d}}\right)}{4\sqrt{abc-a^{2}d}a^{2}}+\frac{3\,abc^{5}\sqrt{d+\frac{c}{x^{8}}}-a^{2}c^{4}\left(d+\frac{c}{x^{8}}\right)^{\frac{3}{2}}+3\,a^{2}c^{4}\sqrt{d+\frac{c}{x^{8}}}d}{12\,a^{3}c^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^13),x, algorithm="giac")
```

```
[Out] -1/4*b^2*arctan(a*sqrt(d + c/x^8)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*
c - a^2*d)*a^2) + 1/12*(3*a*b*c^5*sqrt(d + c/x^8) - a^2*c^4*(d +
c/x^8)^(3/2) + 3*a^2*c^4*sqrt(d + c/x^8)*d)/(a^3*c^6)
```

3.728 $\int \frac{x^9}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=887

$$-\frac{\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8b\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8b\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{a\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^8+c}}-\frac{a\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^8+c}}+\frac{\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b\sqrt[4]{c}\sqrt[4]{d}\sqrt{dx^8+c}}-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}$$

```
[Out] -ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt[c + d*x
^8]]/(8*b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) - ArcTan[(Sqrt
[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]]/(8*b*Sqrt[
(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]) + ((Sqrt[c] + Sqrt[d]*x^4)*Sqrt[
(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4
)*x^2)/c^(1/4)], 1/2])/(4*b*c^(1/4)*d^(1/4)*Sqrt[c + d*x^8]) + (a
*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt
[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*b
*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqrt[c + d*x^8])
- (a*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] +
Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/
(8*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*Sqrt[c + d*x^
8]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^
4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[
b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt
[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*b*c^(1/4)*(Sqrt[
b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8]) - ((Sqrt[
b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c +
d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + S
qrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan
[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*b*c^(1/4)*(Sqrt[b]*Sqrt[c] + S
qrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi [A] time = 2.19942, antiderivative size = 887, normalized size of antiderivative = 1., number of

steps used = 8, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8b\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8b\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{a\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^8+c}}-\frac{a\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^8+c}}+\frac{\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4b\sqrt[4]{c}\sqrt[4]{d}\sqrt{dx^8+c}}-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^9/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt[c + d*x
^8]]/(8*b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) - ArcTan[(Sqrt
[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]]/(8*b*Sqrt[
(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]) + ((Sqrt[c] + Sqrt[d]*x^4)*Sqrt[
(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4
)*x^2)/c^(1/4)], 1/2])/(4*b*c^(1/4)*d^(1/4)*Sqrt[c + d*x^8]) + (a
*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt
[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*b
*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqrt[c + d*x^8])
- (a*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] +
Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/
(8*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*Sqrt[c + d*x^
8]) - ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^
4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[
b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt
[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*b*c^(1/4)*(Sqrt[
b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8]) - ((Sqrt[
b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c +
d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + S
qrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan
[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*b*c^(1/4)*(Sqrt[b]*Sqrt[c] + S
qrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**9/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.274741, size = 165, normalized size = 0.19

$$-\frac{9acx^{10}F_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{10\left(a+bx^8\right)\sqrt{c+dx^8}\left(2x^8\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{9}{4};\frac{3}{2},1;\frac{13}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-9acF_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^8}{c},-b\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^9/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (-9*a*c*x^10*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a
)])/(10*(a + b*x^8)*Sqrt[c + d*x^8]*(-9*a*c*AppellF1[5/4, 1/2, 1,
 9/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[9/4, 1/
2, 2, 13/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[9/4, 3/2,
1, 13/4, -((d*x^8)/c), -((b*x^8)/a)])))
```

Maple [F] time = 0.073, size = 0, normalized size = 0.

$$\int \frac{x^9}{bx^8+a}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^9/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^9/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^9}{(bx^8+a)\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^9/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^9}{(a+bx^8)\sqrt{c+dx^8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Integral(x**9/((a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^9}{(bx^8 + a)\sqrt{dx^8 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^9/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

3.729 $\int \frac{x}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=786

$$\frac{\tan^{-1}\left(\frac{x^2\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^8}}\right)}{8a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{\tan^{-1}\left(\frac{x^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^8}}\right)}{8a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$-\frac{\sqrt[4]{d}\left(\sqrt{c}+\sqrt{d}x^4\right)\sqrt{\frac{c+dx^8}{\left(\sqrt{c}+\sqrt{d}x^4\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt[4]{c}\sqrt{c+dx^8}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)}$$
$$+\frac{\sqrt[4]{d}\left(\sqrt{c}+\sqrt{d}x^4\right)\sqrt{\frac{c+dx^8}{\left(\sqrt{c}+\sqrt{d}x^4\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt[4]{c}\sqrt{c+dx^8}\left(\sqrt{-a}\sqrt{b}\sqrt{c}+a\sqrt{d}\right)}$$
$$+\frac{\left(\sqrt{c}+\sqrt{d}x^4\right)\sqrt{\frac{c+dx^8}{\left(\sqrt{c}+\sqrt{d}x^4\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^8}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}$$
$$+\frac{\left(\sqrt{c}+\sqrt{d}x^4\right)\sqrt{\frac{c+dx^8}{\left(\sqrt{c}+\sqrt{d}x^4\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^8}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}$$

```
[Out] ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt[c + d*x^
8]]/(8*a*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) + ArcTan[(Sqrt[
(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]]/(8*a*Sqrt[(
b*c - a*d)/(Sqrt[-a]*Sqrt[b])]) - (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4
)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[
(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c
] - a*Sqrt[d])*Sqrt[c + d*x^8]) + (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4
)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[
(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c
] + a*Sqrt[d])*Sqrt[c + d*x^8]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sq
rt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d
]*x^4)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*S
qrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)]
, 1/2])/(16*a*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4
)*Sqrt[c + d*x^8]) + ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[
c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Ell
ipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b
]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*a*
c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x
^8])
```

Rubi [A] time = 1.32898, antiderivative size = 786, normalized size of antiderivative = 1., number of

steps used = 6, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{\tan^{-1}\left(\frac{x^2\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}}{\sqrt{c+dx^8}}\right)}{8a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{\tan^{-1}\left(\frac{x^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}{\sqrt{c+dx^8}}\right)}{8a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$-\frac{\sqrt[4]{d}\left(\sqrt{c}+\sqrt{d}x^4\right)\sqrt{\frac{c+dx^8}{\left(\sqrt{c}+\sqrt{d}x^4\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt[4]{c}\sqrt{c+dx^8}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)}$$
$$+\frac{\sqrt[4]{d}\left(\sqrt{c}+\sqrt{d}x^4\right)\sqrt{\frac{c+dx^8}{\left(\sqrt{c}+\sqrt{d}x^4\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt[4]{c}\sqrt{c+dx^8}\left(\sqrt{-a}\sqrt{b}\sqrt{c}+a\sqrt{d}\right)}$$
$$+\frac{\left(\sqrt{c}+\sqrt{d}x^4\right)\sqrt{\frac{c+dx^8}{\left(\sqrt{c}+\sqrt{d}x^4\right)^2}}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^8}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)}$$
$$+\frac{\left(\sqrt{c}+\sqrt{d}x^4\right)\sqrt{\frac{c+dx^8}{\left(\sqrt{c}+\sqrt{d}x^4\right)^2}}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}\sqrt[4]{d}\sqrt{c+dx^8}\left(\sqrt{-a}\sqrt{d}+\sqrt{b}\sqrt{c}\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt[c + d*x^
8]]/(8*a*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]) + ArcTan[(Sqrt[
(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]]/(8*a*Sqrt[(
b*c - a*d)/(Sqrt[-a]*Sqrt[b])]) - (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4
)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[
(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c
] - a*Sqrt[d])*Sqrt[c + d*x^8]) + (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4
)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[
(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c
] + a*Sqrt[d])*Sqrt[c + d*x^8]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sq
rt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d
]*x^4)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*S
qrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)]
, 1/2])/(16*a*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4
)*Sqrt[c + d*x^8]) + ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[
c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Ell
ipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b
]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*a*
c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x
^8])
```

Rubi in Sympy [A] time = 142.019, size = 690, normalized size = 0.88

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] d**(1/4)*sqrt((c + d*x**8)/(sqrt(c) + sqrt(d)*x**4)**2)*(sqrt(c)
+ sqrt(d)*x**4)*elliptic_f(2*atan(d**(1/4)*x**2/c**(1/4)), 1/2)/(
8*c**(1/4)*sqrt(c + d*x**8)*(a*sqrt(d) + sqrt(b)*sqrt(c)*sqrt(-a)
)) + d**(1/4)*sqrt((c + d*x**8)/(sqrt(c) + sqrt(d)*x**4)**2)*(sqr
t(c) + sqrt(d)*x**4)*elliptic_f(2*atan(d**(1/4)*x**2/c**(1/4)), 1
/2)/(8*c**(1/4)*sqrt(c + d*x**8)*(a*sqrt(d) - sqrt(b)*sqrt(c)*sqr
```

```
t(-a))) + atan(x**2*sqrt(sqrt(-a)*(a*d - b*c)/(a*sqrt(b)))/sqrt(c
 + d*x**8))/(8*a*sqrt(sqrt(-a)*(a*d - b*c)/(a*sqrt(b)))) + atan(x
**2*sqrt(sqrt(-a)*(-a*d + b*c)/(a*sqrt(b)))/sqrt(c + d*x**8))/(8*
a*sqrt(sqrt(-a)*(-a*d + b*c)/(a*sqrt(b)))) + sqrt((c + d*x**8)/(s
qrt(c) + sqrt(d)*x**4)**2)*(sqrt(c) + sqrt(d)*x**4)*(sqrt(b)*sqrt
(c) - sqrt(d)*sqrt(-a))*elliptic_pi((sqrt(b)*sqrt(c) + sqrt(d)*sq
rt(-a))**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-a)), 2*atan(d**(1/4)*
x**2/c**(1/4)), 1/2)/(16*a*c**(1/4)*d**(1/4)*sqrt(c + d*x**8)*(sq
rt(b)*sqrt(c) + sqrt(d)*sqrt(-a))) + sqrt((c + d*x**8)/(sqrt(c) +
 sqrt(d)*x**4)**2)*(sqrt(c) + sqrt(d)*x**4)*(sqrt(b)*sqrt(c) + sq
rt(d)*sqrt(-a))*elliptic_pi(-(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a))
**2/(4*sqrt(b)*sqrt(c)*sqrt(d)*sqrt(-a)), 2*atan(d**(1/4)*x**2/c*
*(1/4)), 1/2)/(16*a*c**(1/4)*d**(1/4)*sqrt(c + d*x**8)*(sqrt(b)*s
qrt(c) - sqrt(d)*sqrt(-a)))
```

Mathematica [C] time = 0.270581, size = 165, normalized size = 0.21

$$-\frac{5acx^2F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{2\left(a+bx^8\right)\sqrt{c+dx^8}\left(2x^8\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (-5*a*c*x^2*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^8)/c), -((b*x^8)/a)
])/(2*(a + b*x^8)*Sqrt[c + d*x^8]*(-5*a*c*AppellF1[1/4, 1/2, 1, 5
/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[5/4, 1/2,
 2, 9/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[5/4, 3/2, 1,
9/4, -((d*x^8)/c), -((b*x^8)/a)])))
```

Maple [F] time = 0.058, size = 0, normalized size = 0.

$$\int \frac{x}{bx^8+a}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(bx^8+a\right)\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\left(bx^8+a\right)\sqrt{dx^8+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] integral(x/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(a+bx^8)\sqrt{c+dx^8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Integral(x/((a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^8+a)\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] integrate(x/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

3.730 $\int \frac{1}{x^7(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=915

result too large to display

```
[Out] -Sqrt[c + d*x^8]/(6*a*c*x^6) - (b*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a
 - d))/Sqrt[b]]*x^2)/Sqrt[c + d*x^8]])/(8*a^2*Sqrt[-((b*c - a*d)/
(Sqrt[-a]*Sqrt[b]))]) - (b*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqr
t[b])]*x^2)/Sqrt[c + d*x^8]])/(8*a^2*Sqrt[(b*c - a*d)/(Sqrt[-a]*S
qrt[b])]) + (b*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(
Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4
)], 1/2])/(8*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqr
t[c + d*x^8]) - (b*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^
8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^
(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])
*Sqrt[c + d*x^8]) - (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*
x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/
c^(1/4)], 1/2])/(12*a*c^(5/4)*Sqrt[c + d*x^8]) - (b*(Sqrt[b]*Sqrt
[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/
(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a
]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1
/4)*x^2)/c^(1/4)], 1/2])/(16*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[
-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8]) - (b*(Sqrt[b]*Sqrt[c] - Sqr
t[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c]
+ Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])
^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c
^(1/4)], 1/2])/(16*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d
])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi [A] time = 2.19853, antiderivative size = 915, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$-\frac{b\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8a^2\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{b\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8a^2\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{d^{3/4}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{12ac^{5/4}\sqrt{dx^8+c}}+\frac{b\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt{dx^8+c}}-\frac{b\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt{dx^8+c}}-\frac{b\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}-\frac{b\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}-\frac{\sqrt{dx^8+c}}{6acx^6}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/(x^7*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -Sqrt[c + d*x^8]/(6*a*c*x^6) - (b*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a
 - d))/Sqrt[b]]*x^2)/Sqrt[c + d*x^8]])/(8*a^2*Sqrt[-((b*c - a*d)/
(Sqrt[-a]*Sqrt[b]))]) - (b*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqr
t[b])]*x^2)/Sqrt[c + d*x^8]])/(8*a^2*Sqrt[(b*c - a*d)/(Sqrt[-a]*S
qrt[b])]) + (b*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(
Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4
)], 1/2])/(8*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*Sqr
t[c + d*x^8]) - (b*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^
8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^
(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])
*Sqrt[c + d*x^8]) - (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*
x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/
c^(1/4)], 1/2])/(12*a*c^(5/4)*Sqrt[c + d*x^8]) - (b*(Sqrt[b]*Sqrt
[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/
(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a
]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1
/4)*x^2)/c^(1/4)], 1/2])/(16*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[
-a]*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8]) - (b*(Sqrt[b]*Sqrt[c] - Sqr
t[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c]
+ Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])
^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c
^(1/4)], 1/2])/(16*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d
])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.482024, size = 344, normalized size = 0.38

$$\frac{\frac{25x^8(ad+3bc)F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{(a+bx^8)\left(2x^8\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)}+\frac{9bdx^{16}F_1}{(a+bx^8)\left(2x^8\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+a\right.\right.}}{30x^6\sqrt{c+dx^8}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^7*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ((-5*(c + d*x^8))/(a*c) + (25*(3*b*c + a*d)*x^8*AppellF1[1/4, 1/2
, 1, 5/4, -((d*x^8)/c), -((b*x^8)/a)])/((a + b*x^8)*(-5*a*c*Appel
lF1[1/4, 1/2, 1, 5/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*
AppellF1[5/4, 1/2, 2, 9/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*Appe
llF1[5/4, 3/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a)]))) + (9*b*d*x^
16*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a)])/((a +
b*x^8)*(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)
/a)] + 2*x^8*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^8)/c), -((
b*x^8)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^8)/c), -((b*x
^8)/a)]))))/(30*x^6*Sqrt[c + d*x^8])
```

Maple [F] time = 0.109, size = 0, normalized size = 0.

$$\int \frac{1}{x^7\left(bx^8+a\right)}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^7/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8+a)\sqrt{dx^8+c}\,x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^7),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^7), x)
```

Fricas [F(-1)]   time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^7),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)]   time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8+a)\sqrt{dx^8+c}\,x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^7),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^7), x)
```

3.731 $\int \frac{x^{13}}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=1053

result too large to display

```
[Out] (x^2*Sqrt[c + d*x^8])/(2*b*Sqrt[d]*(Sqrt[c] + Sqrt[d]*x^4)) - (a*
Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d
)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt[c + d*x^8]])/(8*b*(b*c - a*d)) -
 (a*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)
/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]])/(8*b*(b*c - a*d)) - (
c^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[
d]*x^4)^2]*EllipticE[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(2*b*
d^(3/4)*Sqrt[c + d*x^8]) + (c^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[
(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4
)*x^2)/c^(1/4)], 1/2])/(4*b*d^(3/4)*Sqrt[c + d*x^8]) + (a*d^(1/4)
*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)
^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*b^(3/2)*c
^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^8]) + (a
*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt
[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*b
^(3/2)*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^
8]) + (a*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*
x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt
[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqr
t[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*b^(3/2)*c^(1/4)
*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
- (a*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)
*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[c]
*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sq
rt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*b^(3/2)*c^(1/4
)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi [A] time = 2.48834, antiderivative size = 1053, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$

$$\frac{\sqrt{dx^8+c}\,x^2}{2b\sqrt{d}\left(\sqrt{d}x^4+\sqrt{c}\right)}-\frac{a\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8b(bc-ad)}-\frac{a\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8b(bc-ad)}$$
$$-\frac{\sqrt[4]{c}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2bd^{3/4}\sqrt{dx^8+c}}$$
$$+\frac{a\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^8+c}}$$
$$+\frac{a\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^8+c}}$$
$$+\frac{\sqrt[4]{c}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4bd^{3/4}\sqrt{dx^8+c}}$$
$$+\frac{a\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b^{3/2}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}$$
$$-\frac{a\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b^{3/2}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^8+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^13/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^2*Sqrt[c + d*x^8])/(2*b*Sqrt[d]*(Sqrt[c] + Sqrt[d]*x^4)) - (a*
Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d
)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt[c + d*x^8]])/(8*b*(b*c - a*d)) -
 (a*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)
/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]])/(8*b*(b*c - a*d)) - (
c^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[
d]*x^4)^2]*EllipticE[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(2*b*
d^(3/4)*Sqrt[c + d*x^8]) + (c^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[
(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4
)*x^2)/c^(1/4)], 1/2])/(4*b*d^(3/4)*Sqrt[c + d*x^8]) + (a*d^(1/4)
*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)
^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*b^(3/2)*c
^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^8]) + (a
*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt
[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*b
^(3/2)*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^
8]) + (a*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*
x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt
[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqr
t[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*b^(3/2)*c^(1/4)
*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
- (a*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)
*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[c]
*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sq
rt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*b^(3/2)*c^(1/4
)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**13/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.273289, size = 165, normalized size = 0.16

$$-\frac{11acx^{14}F_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{14\left(a+bx^8\right)\sqrt{c+dx^8}\left(2x^8\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{11}{4};\frac{3}{2},1;\frac{15}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-11acF_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^8}{c}\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^13/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (-11*a*c*x^14*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)
/a)])/(14*(a + b*x^8)*Sqrt[c + d*x^8]*(-11*a*c*AppellF1[7/4, 1/2,
 1, 11/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[11/
4, 1/2, 2, 15/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[11/4,
 3/2, 1, 15/4, -((d*x^8)/c), -((b*x^8)/a)])))
```

Maple [F] time = 0.071, size = 0, normalized size = 0.

$$\int \frac{x^{13}}{bx^8+a}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^13/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^13/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{13}}{(bx^8 + a)\sqrt{dx^8 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^13/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**13/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{13}}{(bx^8 + a)\sqrt{dx^8 + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^13/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

3.732 $\int \frac{x^5}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=812

$$\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8(bc-ad)}+\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8(bc-ad)}-\frac{\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^8+c}}-\frac{\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^8+c}}-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16\sqrt{b}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16\sqrt{b}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^8+c}}$$

```
[Out] (Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*
d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt[c + d*x^8]])/(8*(b*c - a*d)) +
(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(S
qrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]])/(8*(b*c - a*d)) - (d^(1/
4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^
4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*Sqrt[b]
*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^8]) -
(d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt
[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*S
qrt[b]*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^
8]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^
4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b
]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[
d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*Sqrt[b]*c^(1/4)*(
Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8]) +
((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqr
t[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[c]*(Sq
rt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d
]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*Sqrt[b]*c^(1/4)*(S
qrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi [A] time = 1.43874, antiderivative size = 812, normalized size of antiderivative = 1., number of

steps used = 6, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8(bc-ad)}+\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8(bc-ad)}-\frac{\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^8+c}}-\frac{\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^8+c}}-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16\sqrt{b}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16\sqrt{b}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^8+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^5/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*
d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt[c + d*x^8]])/(8*(b*c - a*d)) +
(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(S
qrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]])/(8*(b*c - a*d)) - (d^(1/
4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^
4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*Sqrt[b]
*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^8]) -
(d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt
[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*S
qrt[b]*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^
8]) - ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^
4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b
]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[
d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*Sqrt[b]*c^(1/4)*(
Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8]) +
((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqr
t[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[c]*(Sq
rt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d
]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(16*Sqrt[b]*c^(1/4)*(S
qrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 143.284, size = 721, normalized size = 0.89

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -atan(x**2*sqrt((a*d - b*c)/(sqrt(b)*sqrt(-a)))/sqrt(c + d*x**8))
/(8*sqrt(b)*sqrt(-a)*sqrt((a*d - b*c)/(sqrt(b)*sqrt(-a)))) + atan
(x**2*sqrt((-a*d + b*c)/(sqrt(b)*sqrt(-a)))/sqrt(c + d*x**8))/(8*
sqrt(b)*sqrt(-a)*sqrt((-a*d + b*c)/(sqrt(b)*sqrt(-a)))) - d**(1/4
)*sqrt((c + d*x**8)/(sqrt(c) + sqrt(d)*x**4)**2)*(sqrt(c) + sqrt(
d)*x**4)*elliptic_f(2*atan(d**(1/4)*x**2/c**(1/4)), 1/2)/(8*sqrt(
b)*c**(1/4)*sqrt(c + d*x**8)*(sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))
) - d**(1/4)*sqrt((c + d*x**8)/(sqrt(c) + sqrt(d)*x**4)**2)*(sqrt
```

```
(c) + sqrt(d)*x**4)*elliptic_f(2*atan(d**(1/4)*x**2/c**(1/4)), 1/
2)/(8*sqrt(b)*c**(1/4)*sqrt(c + d*x**8)*(sqrt(b)*sqrt(c) - sqrt(d
)*sqrt(-a))) + sqrt((c + d*x**8)/(sqrt(c) + sqrt(d)*x**4)**2)*(sq
rt(c) + sqrt(d)*x**4)*(sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))*ellipt
ic_pi(-sqrt(c)*(sqrt(b) - sqrt(d)*sqrt(-a)/sqrt(c))**2/(4*sqrt(b)
*sqrt(d)*sqrt(-a)), 2*atan(d**(1/4)*x**2/c**(1/4)), 1/2)/(16*sqrt
(b)*c**(1/4)*d**(1/4)*sqrt(c + d*x**8)*(a*sqrt(d) + sqrt(b)*sqrt(
c)*sqrt(-a))) + sqrt((c + d*x**8)/(sqrt(c) + sqrt(d)*x**4)**2)*(s
qrt(c) + sqrt(d)*x**4)*(sqrt(b)*sqrt(c) - sqrt(d)*sqrt(-a))*ellip
tic_pi((sqrt(b)*sqrt(c) + sqrt(d)*sqrt(-a))**2/(4*sqrt(b)*sqrt(c)
*sqrt(d)*sqrt(-a)), 2*atan(d**(1/4)*x**2/c**(1/4)), 1/2)/(16*sqrt
(b)*c**(1/4)*d**(1/4)*sqrt(c + d*x**8)*(a*sqrt(d) - sqrt(b)*sqrt(
c)*sqrt(-a)))
```

Mathematica [C] time = 0.276226, size = 165, normalized size = 0.2

$$-\frac{7acx^6F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{6\left(a+bx^8\right)\sqrt{c+dx^8}\left(2x^8\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^5/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (-7*a*c*x^6*AppellF1[3/4, 1/2, 1, 7/4, -((d*x^8)/c), -((b*x^8)/a)
])/(6*(a + b*x^8)*Sqrt[c + d*x^8]*(-7*a*c*AppellF1[3/4, 1/2, 1, 7
/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[7/4, 1/2,
 2, 11/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[7/4, 3/2, 1,
 11/4, -((d*x^8)/c), -((b*x^8)/a)])))
```

Maple [F] time = 0.061, size = 0, normalized size = 0.

$$\int \frac{x^5}{bx^8+a}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^5/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\left(bx^8+a\right)\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^5/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{(a+bx^8)\sqrt{c+dx^8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Integral(x**5/((a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{(bx^8+a)\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^5/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

3.733 $\int \frac{1}{x^3(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=1088

result too large to display

```
[Out] -Sqrt[c + d*x^8]/(2*a*c*x^2) + (Sqrt[d]*x^2*Sqrt[c + d*x^8])/(2*a
*c*(Sqrt[c] + Sqrt[d]*x^4)) - (b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqr
t[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt
[c + d*x^8]])/(8*a*(b*c - a*d)) - (b*Sqrt[(b*c - a*d)/(Sqrt[-a]*S
qrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c
 + d*x^8]])/(8*a*(b*c - a*d)) - (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*
Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticE[2*ArcTan[(d
^(1/4)*x^2)/c^(1/4)], 1/2])/(2*a*c^(3/4)*Sqrt[c + d*x^8]) + (d^(1
/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x
^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(4*a*c^(3
/4)*Sqrt[c + d*x^8]) + (Sqrt[b]*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*S
qrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^
(1/4)*x^2)/c^(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-
a]*Sqrt[d])*Sqrt[c + d*x^8]) + (Sqrt[b]*d^(1/4)*(Sqrt[c] + Sqrt[d
]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*Ar
cTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[b]*Sqrt[c]
+ Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^8]) + (Sqrt[b]*(Sqrt[b]*Sqrt[c]
- Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqr
t[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqr
t[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x
^2)/c^(1/4)], 1/2])/(16*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*S
qrt[d])*d^(1/4)*Sqrt[c + d*x^8]) - (Sqrt[b]*(Sqrt[b]*Sqrt[c] + Sq
rt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c]
 + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt
[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*
x^2)/c^(1/4)], 1/2])/(16*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*
Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi [A] time = 3.02527, antiderivative size = 1088, normalized size of antiderivative = 1., number

of steps used = 12, number of rules used = 8, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$

$$\frac{\sqrt{d}\sqrt{dx^8+c}\,x^2}{2ac\left(\sqrt{d}x^4+\sqrt{c}\right)}-\frac{b\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8a(bc-ad)}-\frac{b\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{8a(bc-ad)}$$

$$-\frac{\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{2ac^{3/4}\sqrt{dx^8+c}}$$

$$+\frac{\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{4ac^{3/4}\sqrt{dx^8+c}}$$

$$+\frac{\sqrt{b}\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt{dx^8+c}}$$

$$+\frac{\sqrt{b}\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt{dx^8+c}}$$

$$+\frac{\sqrt{b}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}\sqrt{dx^8+c}}$$

$$-\frac{\sqrt{b}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}\sqrt{dx^8+c}}$$

$$-\frac{\sqrt{dx^8+c}}{2acx^2}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/(x^3*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -Sqrt[c + d*x^8]/(2*a*c*x^2) + (Sqrt[d]*x^2*Sqrt[c + d*x^8])/(2*a
*c*(Sqrt[c] + Sqrt[d]*x^4)) - (b*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqr
t[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt
[c + d*x^8]])/(8*a*(b*c - a*d)) - (b*Sqrt[(b*c - a*d)/(Sqrt[-a]*S
qrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c
 + d*x^8]])/(8*a*(b*c - a*d)) - (d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*
Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticE[2*ArcTan[(d
^(1/4)*x^2)/c^(1/4)], 1/2])/(2*a*c^(3/4)*Sqrt[c + d*x^8]) + (d^(1
/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x
^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(4*a*c^(3
/4)*Sqrt[c + d*x^8]) + (Sqrt[b]*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*S
qrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^
(1/4)*x^2)/c^(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-
a]*Sqrt[d])*Sqrt[c + d*x^8]) + (Sqrt[b]*d^(1/4)*(Sqrt[c] + Sqrt[d
]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*Ar
cTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*a*c^(1/4)*(Sqrt[b]*Sqrt[c]
+ Sqrt[-a]*Sqrt[d])*Sqrt[c + d*x^8]) + (Sqrt[b]*(Sqrt[b]*Sqrt[c]
- Sqrt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqr
t[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqr
t[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x
^2)/c^(1/4)], 1/2])/(16*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*S
qrt[d])*d^(1/4)*Sqrt[c + d*x^8]) - (Sqrt[b]*(Sqrt[b]*Sqrt[c] + Sq
rt[-a]*Sqrt[d])*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c]
 + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt
[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*
x^2)/c^(1/4)], 1/2])/(16*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*
Sqrt[d])*d^(1/4)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.478021, size = 344, normalized size = 0.32

$$\frac{\frac{49x^8(bc-ad)F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{(a+bx^8)\left(2x^8\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)}-\frac{33bdx}{(a+bx^8)\left(2x^8\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right.\right.}}{42x^2\sqrt{c+dx^8}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ((-21*(c + d*x^8))/(a*c) + (49*(b*c - a*d)*x^8*AppellF1[3/4, 1/2,
 1, 7/4, -((d*x^8)/c), -((b*x^8)/a)])/((a + b*x^8)*(-7*a*c*Appell
F1[3/4, 1/2, 1, 7/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*A
ppellF1[7/4, 1/2, 2, 11/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*Appe
llF1[7/4, 3/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)/a)]))) - (33*b*d*
x^16*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)/a)])/((a
 + b*x^8)*(-11*a*c*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^8)/c), -((b
*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[11/4, 1/2, 2, 15/4, -((d*x^8)/c
), -((b*x^8)/a)] + a*d*AppellF1[11/4, 3/2, 1, 15/4, -((d*x^8)/c),
 -((b*x^8)/a)]))))/(42*x^2*Sqrt[c + d*x^8])
```

Maple [F] time = 0.106, size = 0, normalized size = 0.

$$\int \frac{1}{x^3\left(bx^8+a\right)}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^3/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8+a)\sqrt{dx^8+c}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^3), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^3),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8 + a)\sqrt{dx^8 + c}x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^3), x)
```

3.734 $\int \frac{x^4}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=64

$$\frac{x^5\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{5}{8};1,\frac{1}{2};\frac{13}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{5a\sqrt{c+dx^8}}$$

```
[Out] (x^5*Sqrt[1 + (d*x^8)/c]*AppellF1[5/8, 1, 1/2, 13/8, -((b*x^8)/a)
, -((d*x^8)/c)])/(5*a*Sqrt[c + d*x^8])
```

Rubi [A] time = 0.202458, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^5\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{5}{8};1,\frac{1}{2};\frac{13}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{5a\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^5*Sqrt[1 + (d*x^8)/c]*AppellF1[5/8, 1, 1/2, 13/8, -((b*x^8)/a)
, -((d*x^8)/c)])/(5*a*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 25.9705, size = 51, normalized size = 0.8

$$\frac{x^5\sqrt{c+dx^8}\,\text{appellf}_1\left(\frac{5}{8},\frac{1}{2},1,\frac{13}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{5ac\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] x**5*sqrt(c + d*x**8)*appellf1(5/8, 1/2, 1, 13/8, -d*x**8/c, -b*x
**8/a)/(5*a*c*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 0.273877, size = 165, normalized size = 2.58

$$-\frac{13acx^5F_1\left(\frac{5}{8};\frac{1}{2},1;\frac{13}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{5\left(a+bx^8\right)\sqrt{c+dx^8}\left(4x^8\left(2bcF_1\left(\frac{13}{8};\frac{1}{2},2;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{13}{8};\frac{3}{2},1;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-13acF_1\left(\frac{5}{8};\frac{1}{2},1;\frac{13}{8};-\frac{dx^8}{c},\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (-13*a*c*x^5*AppellF1[5/8, 1/2, 1, 13/8, -((d*x^8)/c), -((b*x^8)/
a)])/(5*(a + b*x^8)*Sqrt[c + d*x^8]*(-13*a*c*AppellF1[5/8, 1/2, 1
, 13/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1[13/8,
 1/2, 2, 21/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[13/8, 3
/2, 1, 21/8, -((d*x^8)/c), -((b*x^8)/a)])))
```

Maple [F] time = 0.059, size = 0, normalized size = 0.

$$\int \frac{x^4}{bx^8+a}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^4/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^8+a)\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(a+bx^8)\sqrt{c+dx^8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Integral(x**4/((a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^8+a)\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^4/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

3.735 $\int \frac{x^2}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=64

$$\frac{x^3\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{3}{8};1,\frac{1}{2};\frac{11}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{3a\sqrt{c+dx^8}}$$

```
[Out] (x^3*Sqrt[1 + (d*x^8)/c]*AppellF1[3/8, 1, 1/2, 11/8, -((b*x^8)/a)
, -((d*x^8)/c)])/(3*a*Sqrt[c + d*x^8])
```

Rubi [A] time = 0.200659, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^3\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{3}{8};1,\frac{1}{2};\frac{11}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{3a\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^3*Sqrt[1 + (d*x^8)/c]*AppellF1[3/8, 1, 1/2, 11/8, -((b*x^8)/a)
, -((d*x^8)/c)])/(3*a*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 26.4714, size = 51, normalized size = 0.8

$$\frac{x^3\sqrt{c+dx^8}\,\text{appellf}_1\left(\frac{3}{8},\frac{1}{2},1,\frac{11}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{3ac\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] x**3*sqrt(c + d*x**8)*appellf1(3/8, 1/2, 1, 11/8, -d*x**8/c, -b*x
**8/a)/(3*a*c*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 0.282308, size = 165, normalized size = 2.58

$$-\frac{11acx^3F_1\left(\frac{3}{8};\frac{1}{2},1;\frac{11}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{3\left(a+bx^8\right)\sqrt{c+dx^8}\left(4x^8\left(2bcF_1\left(\frac{11}{8};\frac{1}{2},2;\frac{19}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{11}{8};\frac{3}{2},1;\frac{19}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-11acF_1\left(\frac{3}{8};\frac{1}{2},1;\frac{11}{8};-\frac{dx^8}{c},\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^2/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (-11*a*c*x^3*AppellF1[3/8, 1/2, 1, 11/8, -((d*x^8)/c), -((b*x^8)/
a)])/(3*(a + b*x^8)*Sqrt[c + d*x^8]*(-11*a*c*AppellF1[3/8, 1/2, 1
, 11/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1[11/8,
 1/2, 2, 19/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[11/8, 3
/2, 1, 19/8, -((d*x^8)/c), -((b*x^8)/a)])))
```

Maple [F] time = 0.061, size = 0, normalized size = 0.

$$\int \frac{x^2}{bx^8 + a} \frac{1}{\sqrt{dx^8 + c}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^2/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^8 + a)\sqrt{dx^8 + c}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^2/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a + bx^8)\sqrt{c + dx^8}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Integral(x**2/((a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^8 + a)\sqrt{dx^8 + c}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^2/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

3.736 $\int \frac{1}{(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=59

$$\frac{x\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{1}{8};1,\frac{1}{2};\frac{9}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{a\sqrt{c+dx^8}}$$

```
[Out] (x*Sqrt[1 + (d*x^8)/c]*AppellF1[1/8, 1, 1/2, 9/8, -((b*x^8)/a), -
((d*x^8)/c)])/(a*Sqrt[c + d*x^8])
```

Rubi [A] time = 0.0923407, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{1}{8};1,\frac{1}{2};\frac{9}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{a\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (x*Sqrt[1 + (d*x^8)/c]*AppellF1[1/8, 1, 1/2, 9/8, -((b*x^8)/a), -
((d*x^8)/c)])/(a*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 21.9986, size = 48, normalized size = 0.81

$$\frac{x\sqrt{c+dx^8}\,\mathrm{appellf}_1\left(\frac{1}{8},\frac{1}{2},1,\frac{9}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{ac\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**8)*appellf1(1/8, 1/2, 1, 9/8, -d*x**8/c, -b*x**8/
a)/(a*c*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 0.272379, size = 161, normalized size = 2.73

$$-\frac{9acxF_1\left(\frac{1}{8};\frac{1}{2},1;\frac{9}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{(a+bx^8)\sqrt{c+dx^8}\left(4x^8\left(2bcF_1\left(\frac{9}{8};\frac{1}{2},2;\frac{17}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{9}{8};\frac{3}{2},1;\frac{17}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-9acF_1\left(\frac{1}{8};\frac{1}{2},1;\frac{9}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] (-9*a*c*x*AppellF1[1/8, 1/2, 1, 9/8, -((d*x^8)/c), -((b*x^8)/a)])
/((a + b*x^8)*Sqrt[c + d*x^8]*(-9*a*c*AppellF1[1/8, 1/2, 1, 9/8,
-((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1[9/8, 1/2, 2,
17/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[9/8, 3/2, 1, 17/
8, -((d*x^8)/c), -((b*x^8)/a)])))
```

Maple [F] time = 0.059, size = 0, normalized size = 0.

$$\int \frac{1}{bx^8 + a} \frac{1}{\sqrt{dx^8 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^8+a)/(d*x^8+c)^(1/2),x)

[Out] int(1/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8 + a)\sqrt{dx^8 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(a + bx^8)\sqrt{c + dx^8}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**8+a)/(d*x**8+c)**(1/2),x)

[Out] Integral(1/((a + b*x**8)*sqrt(c + d*x**8)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8 + a)\sqrt{dx^8 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)),x, algorithm="giac")

[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)), x)
```

3.737 $\int \frac{1}{x^2(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=62

$$-\frac{\sqrt{\frac{dx^8}{c}+1}F_1\left(-\frac{1}{8};1,\frac{1}{2};\frac{7}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{ax\sqrt{c+dx^8}}$$

```
[Out] -((Sqrt[1 + (d*x^8)/c]*AppellF1[-1/8, 1, 1/2, 7/8, -((b*x^8)/a),
-((d*x^8)/c)])/(a*x*Sqrt[c + d*x^8]))
```

Rubi [A] time = 0.200259, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$

$$-\frac{\sqrt{\frac{dx^8}{c}+1}F_1\left(-\frac{1}{8};1,\frac{1}{2};\frac{7}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{ax\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -((Sqrt[1 + (d*x^8)/c]*AppellF1[-1/8, 1, 1/2, 7/8, -((b*x^8)/a),
-((d*x^8)/c)])/(a*x*Sqrt[c + d*x^8]))
```

Rubi in Sympy [A] time = 25.8299, size = 51, normalized size = 0.82

$$-\frac{\sqrt{c+dx^8}\operatorname{appellf}_1\left(-\frac{1}{8},\frac{1}{2},1,\frac{7}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{acx\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**8)*appellf1(-1/8, 1/2, 1, 7/8, -d*x**8/c, -b*x**8/
a)/(a*c*x*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 0.965607, size = 344, normalized size = 5.55

$$\frac{\frac{75x^8(bc-3ad)F_1\left(\frac{7}{8};\frac{1}{2},1;\frac{15}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{(a+bx^8)\left(4x^8\left(2bcF_1\left(\frac{15}{8};\frac{1}{2},2;\frac{23}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{15}{8};\frac{3}{2},1;\frac{23}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-15acF_1\left(\frac{7}{8};\frac{1}{2},1;\frac{15}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)} - \frac{161 \ldots}{(a+bx^8)\left(4x^8\left(2bcF_1\left(\frac{23}{8};\frac{1}{2},2;\frac{31}{8};-\frac{dx^8}{c},- \ldots\right.\right.\right.}}{35x\sqrt{c+dx^8}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ((-35*(c + d*x^8))/(a*c) + (75*(b*c - 3*a*d)*x^8*AppellF1[7/8, 1/
2, 1, 15/8, -((d*x^8)/c), -((b*x^8)/a)])/((a + b*x^8)*(-15*a*c*Ap
pellF1[7/8, 1/2, 1, 15/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*
b*c*AppellF1[15/8, 1/2, 2, 23/8, -((d*x^8)/c), -((b*x^8)/a)] + a*
d*AppellF1[15/8, 3/2, 1, 23/8, -((d*x^8)/c), -((b*x^8)/a)]))) - (
161*b*d*x^16*AppellF1[15/8, 1/2, 1, 23/8, -((d*x^8)/c), -((b*x^8)
/a)])/((a + b*x^8)*(-23*a*c*AppellF1[15/8, 1/2, 1, 23/8, -((d*x^8
)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1[23/8, 1/2, 2, 31/8, -
((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[23/8, 3/2, 1, 31/8, -((
```

```
d*x^8)/c), -((b*x^8)/a)])))/(35*x*Sqrt[c + d*x^8])
```

Maple [F] time = 0.11, size = 0, normalized size = 0.

$$\int \frac{1}{x^2\left(bx^8+a\right)}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^2/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)\sqrt{dx^8+c}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\left(bx^{10}+ax^2\right)\sqrt{dx^8+c}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/((b*x^10 + a*x^2)*sqrt(d*x^8 + c)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)\sqrt{dx^8+c}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^2),x, algorithm="giac")

[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^2), x)
```

3.738 $\int \frac{1}{x^4(a+bx^8)\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{\frac{dx^8}{c}+1}F_1\left(-\frac{3}{8};1,\frac{1}{2};\frac{5}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{3ax^3\sqrt{c+dx^8}}$$

```
[Out] -(Sqrt[1 + (d*x^8)/c]*AppellF1[-3/8, 1, 1/2, 5/8, -((b*x^8)/a), -
((d*x^8)/c)])/(3*a*x^3*Sqrt[c + d*x^8])
```

Rubi [A] time = 0.199635, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^8}{c}+1}F_1\left(-\frac{3}{8};1,\frac{1}{2};\frac{5}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{3ax^3\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] -(Sqrt[1 + (d*x^8)/c]*AppellF1[-3/8, 1, 1/2, 5/8, -((b*x^8)/a), -
((d*x^8)/c)])/(3*a*x^3*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 26.6591, size = 54, normalized size = 0.84

$$-\frac{\sqrt{c+dx^8}\,\operatorname{appellf_1}\left(-\frac{3}{8},\frac{1}{2},1,\frac{5}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{3acx^3\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**8+a)/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**8)*appellf1(-3/8, 1/2, 1, 5/8, -d*x**8/c, -b*x**8/
a)/(3*a*c*x**3*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 0.698097, size = 345, normalized size = 5.39

$$\frac{\frac{169x^8(3bc-ad)F_1\left(\frac{5}{8};\frac{1}{2},1;\frac{13}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{(a+bx^8)\left(4x^8\left(2bcF_1\left(\frac{13}{8};\frac{1}{2},2;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{13}{8};\frac{3}{2},1;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-13acF_1\left(\frac{5}{8};\frac{1}{2},1;\frac{13}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)}-\frac{105}{(a+bx^8)\left(4x^8\left(2bcF_1\left(\frac{21}{8};\frac{1}{2},2;\frac{29}{8};-\frac{dx^8}{c},-\right.\right.\right.}}{195x^3\sqrt{c+dx^8}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(a + b*x^8)*Sqrt[c + d*x^8]),x]
```

```
[Out] ((-65*(c + d*x^8))/(a*c) + (169*(3*b*c - a*d)*x^8*AppellF1[5/8, 1
/2, 1, 13/8, -((d*x^8)/c), -((b*x^8)/a)])/((a + b*x^8)*(-13*a*c*A
ppellF1[5/8, 1/2, 1, 13/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2
*b*c*AppellF1[13/8, 1/2, 2, 21/8, -((d*x^8)/c), -((b*x^8)/a)] + a
*d*AppellF1[13/8, 3/2, 1, 21/8, -((d*x^8)/c), -((b*x^8)/a)]))) -
(105*b*d*x^16*AppellF1[13/8, 1/2, 1, 21/8, -((d*x^8)/c), -((b*x^8
)/a)])/((a + b*x^8)*(-21*a*c*AppellF1[13/8, 1/2, 1, 21/8, -((d*x^
8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1[21/8, 1/2, 2, 29/8,
-((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[21/8, 3/2, 1, 29/8, -(
```

```
(d*x^8)/c), -((b*x^8)/a)]))))/(195*x^3*Sqrt[c + d*x^8])
```

Maple [F] time = 0.108, size = 0, normalized size = 0.

$$\int \frac{1}{x^4\left(bx^8+a\right)}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^8+a)/(d*x^8+c)^(1/2),x)

[Out] int(1/x^4/(b*x^8+a)/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)\sqrt{dx^8+c}\,x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^4),x, algorithm="maxima")

[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^4), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^4),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**8+a)/(d*x**8+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)\sqrt{dx^8+c}\,x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^4),x, algorithm="giac")

[Out] integrate(1/((b*x^8 + a)*sqrt(d*x^8 + c)*x^4), x)
```

3.739 $\int \frac{x^{23}}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=123

$$-\frac{a^2\sqrt{c+dx^8}}{8b^2\,(a+bx^8)\,(bc-ad)}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8b^{5/2}(bc-ad)^{3/2}}+\frac{\sqrt{c+dx^8}}{4b^2d}$$

```
[Out] Sqrt[c + d*x^8]/(4*b^2*d) - (a^2*Sqrt[c + d*x^8])/(8*b^2*(b*c - a
*d)*(a + b*x^8)) + (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d
*x^8])/Sqrt[b*c - a*d]])/(8*b^(5/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.430144, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$-\frac{a^2\sqrt{c+dx^8}}{8b^2\,(a+bx^8)\,(bc-ad)}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8b^{5/2}(bc-ad)^{3/2}}+\frac{\sqrt{c+dx^8}}{4b^2d}$$

Antiderivative was successfully verified.

```
[In]  Int[x^23/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] Sqrt[c + d*x^8]/(4*b^2*d) - (a^2*Sqrt[c + d*x^8])/(8*b^2*(b*c - a
*d)*(a + b*x^8)) + (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d
*x^8])/Sqrt[b*c - a*d]])/(8*b^(5/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 36.5668, size = 104, normalized size = 0.85

$$\frac{a^2\sqrt{c+dx^8}}{8b^2\,(a+bx^8)\,(ad-bc)}-\frac{a\,(3ad-4bc)\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{8b^{\frac{5}{2}}\,(ad-bc)^{\frac{3}{2}}}+\frac{\sqrt{c+dx^8}}{4b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**23/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] a**2*sqrt(c + d*x**8)/(8*b**2*(a + b*x**8)*(a*d - b*c)) - a*(3*a*
d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**8)/sqrt(a*d - b*c))/(8*b**(
5/2)*(a*d - b*c)**(3/2)) + sqrt(c + d*x**8)/(4*b**2*d)
```

Mathematica [A] time = 0.393592, size = 107, normalized size = 0.87

$$\frac{1}{8}\left(\frac{\sqrt{c+dx^8}\left(\frac{a^2}{(a+bx^8)(ad-bc)}+\frac{2}{d}\right)}{b^2}+\frac{a(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{b^{5/2}(bc-ad)^{3/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^23/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((Sqrt[c + d*x^8]*(2/d + a^2/((-(b*c) + a*d)*(a + b*x^8))))/b^2 +
 (a*(4*b*c - 3*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c -
a*d]])/(b^(5/2)*(b*c - a*d)^(3/2)))/8
```

Maple [F] time = 0.109, size = 0, normalized size = 0.

$$\int \frac{x^{23}}{(bx^8+a)^2} \frac{1}{\sqrt{dx^8+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^23/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)

[Out] int(x^23/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^23/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240787, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2\left(b^2c-abd\right)x^8+2\,abc-3\,a^2d\right)\sqrt{dx^8+c}\sqrt{b^2c-abd}+\left(\left(4\,ab^2cd-3\,a^2bd^2\right)x^8+4\,a^2bcd-3\,a^3d^2\right)\log\left(\frac{(bdx^8+2\,bc-ad)\cdots}{\cdots}\right)}{16\left((b^4cd-ab^3d^2)x^8+ab^3cd-a^2b^2d^2\right)\sqrt{b^2c-abd}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^23/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] [1/16*(2*(2*(b^2*c - a*b*d)*x^8 + 2*a*b*c - 3*a^2*d)*sqrt(d*x^8 +
 c)*sqrt(b^2*c - a*b*d) + ((4*a*b^2*c*d - 3*a^2*b*d^2)*x^8 + 4*a^
2*b*c*d - 3*a^3*d^2)*log(((b*d*x^8 + 2*b*c - a*d)*sqrt(b^2*c - a*
b*d) + 2*sqrt(d*x^8 + c)*(b^2*c - a*b*d))/(b*x^8 + a)))/(((b^4*c*
d - a*b^3*d^2)*x^8 + a*b^3*c*d - a^2*b^2*d^2)*sqrt(b^2*c - a*b*d)
), 1/8*((2*(b^2*c - a*b*d)*x^8 + 2*a*b*c - 3*a^2*d)*sqrt(d*x^8 +
c)*sqrt(-b^2*c + a*b*d) + ((4*a*b^2*c*d - 3*a^2*b*d^2)*x^8 + 4*a^
2*b*c*d - 3*a^3*d^2)*arctan(-(b*c - a*d)/(sqrt(d*x^8 + c)*sqrt(-b
^2*c + a*b*d))))/(((b^4*c*d - a*b^3*d^2)*x^8 + a*b^3*c*d - a^2*b^
2*d^2)*sqrt(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**23/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.217098, size = 181, normalized size = 1.47

$$-\frac{\sqrt{dx^8+c}a^2d}{8\,(b^3c-ab^2d)((dx^8+c)b-bc+ad)}-\frac{\left(4\,abc-3\,a^2d\right)\arctan\left(\frac{\sqrt{dx^8+c}b}{\sqrt{-b^2c+abd}}\right)}{8\,(b^3c-ab^2d)\sqrt{-b^2c+abd}}+\frac{\sqrt{dx^8+c}}{4\,b^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^23/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] -1/8*sqrt(d*x^8 + c)*a^2*d/((b^3*c - a*b^2*d)*((d*x^8 + c)*b - b*
c + a*d)) - 1/8*(4*a*b*c - 3*a^2*d)*arctan(sqrt(d*x^8 + c)*b/sqrt
(-b^2*c + a*b*d))/((b^3*c - a*b^2*d)*sqrt(-b^2*c + a*b*d)) + 1/4*
sqrt(d*x^8 + c)/(b^2*d)
```

3.740 $\int \frac{x^{15}}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=99

$$\frac{a\sqrt{c+dx^8}}{8b(a+bx^8)(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8b^{3/2}(bc-ad)^{3/2}}$$

```
[Out] (a*Sqrt[c + d*x^8])/(8*b*(b*c - a*d)*(a + b*x^8)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*b^(3/2)*
(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.256272, antiderivative size = 99, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{a\sqrt{c+dx^8}}{8b(a+bx^8)(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8b^{3/2}(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^15/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (a*Sqrt[c + d*x^8])/(8*b*(b*c - a*d)*(a + b*x^8)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*b^(3/2)*
(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 25.5303, size = 80, normalized size = 0.81

$$-\frac{a\sqrt{c+dx^8}}{8b(a+bx^8)(ad-bc)}+\frac{\left(\frac{ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{4b^{\frac{3}{2}}(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**15/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -a*sqrt(c + d*x**8)/(8*b*(a + b*x**8)*(a*d - b*c)) + (a*d/2 - b*c
)*atan(sqrt(b)*sqrt(c + d*x**8)/sqrt(a*d - b*c))/(4*b**(3/2)*(a*d
 - b*c)**(3/2))
```

Mathematica [A] time = 0.122729, size = 99, normalized size = 1.

$$\frac{a\sqrt{c+dx^8}}{8b(a+bx^8)(bc-ad)}-\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8b^{3/2}(bc-ad)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^15/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (a*Sqrt[c + d*x^8])/(8*b*(b*c - a*d)*(a + b*x^8)) - ((2*b*c - a*d
)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*b^(3/2)*
(b*c - a*d)^(3/2))
```

Maple [F] time = 0.072, size = 0, normalized size = 0.

$$\int \frac{x^{15}}{(bx^8+a)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^15/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^15/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^15/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231824, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{dx^8+c}\sqrt{b^2c-abd}a+\left(\left(2\,b^2c-abd\right)x^8+2\,abc-a^2d\right)\log\left(\frac{(bdx^8+2\,bc-ad)\sqrt{b^2c-abd}-2\,\sqrt{dx^8+c}(b^2c-abd)}{bx^8+a}\right)}{16\,((b^3c-ab^2d)x^8+ab^2c-a^2bd)\sqrt{b^2c-abd}},\ \frac{\sqrt{dx^8+c}\sqrt{-b^2}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^15/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] [1/16*(2*sqrt(d*x^8 + c)*sqrt(b^2*c - a*b*d)*a + ((2*b^2*c - a*b*
d)*x^8 + 2*a*b*c - a^2*d)*log(((b*d*x^8 + 2*b*c - a*d)*sqrt(b^2*c
 - a*b*d) - 2*sqrt(d*x^8 + c)*(b^2*c - a*b*d))/(b*x^8 + a)))/(((b
^3*c - a*b^2*d)*x^8 + a*b^2*c - a^2*b*d)*sqrt(b^2*c - a*b*d)), 1/
8*(sqrt(d*x^8 + c)*sqrt(-b^2*c + a*b*d)*a - ((2*b^2*c - a*b*d)*x^
8 + 2*a*b*c - a^2*d)*arctan(-(b*c - a*d)/(sqrt(d*x^8 + c)*sqrt(-b
^2*c + a*b*d))))/(((b^3*c - a*b^2*d)*x^8 + a*b^2*c - a^2*b*d)*sqr
t(-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**15/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216935, size = 157, normalized size = 1.59

$$\frac{\frac{\sqrt{dx^8+c}ad^2}{(b^2c-abd)((dx^8+c)b-bc+ad)}+\frac{(2\,bcd-ad^2)\arctan\left(\frac{\sqrt{dx^8+c}b}{\sqrt{-b^2c+abd}}\right)}{(b^2c-abd)\sqrt{-b^2c+abd}}}{8\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^15/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] 1/8*(sqrt(d*x^8 + c)*a*d^2/((b^2*c - a*b*d)*((d*x^8 + c)*b - b*c
+ a*d)) + (2*b*c*d - a*d^2)*arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2*c
+ a*b*d))/((b^2*c - a*b*d)*sqrt(-b^2*c + a*b*d)))/d
```

3.741 $\int \frac{x^7}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=87

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8\sqrt{b}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^8}}{8\,(a+bx^8)\,(bc-ad)}$$

```
[Out] -Sqrt[c + d*x^8]/(8*(b*c - a*d)*(a + b*x^8)) + (d*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*Sqrt[b]*(b*c - a*d)^(3/2)
)
```

Rubi [A] time = 0.208327, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8\sqrt{b}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^8}}{8\,(a+bx^8)\,(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -Sqrt[c + d*x^8]/(8*(b*c - a*d)*(a + b*x^8)) + (d*ArcTanh[(Sqrt[b
]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*Sqrt[b]*(b*c - a*d)^(3/2)
)
```

Rubi in Sympy [A] time = 21.1248, size = 70, normalized size = 0.8

$$\frac{\sqrt{c+dx^8}}{8\,(a+bx^8)\,(ad-bc)}+\frac{d\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{8\sqrt{b}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] sqrt(c + d*x**8)/(8*(a + b*x**8)*(a*d - b*c)) + d*atan(sqrt(b)*sq
rt(c + d*x**8)/sqrt(a*d - b*c))/(8*sqrt(b)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 0.142937, size = 84, normalized size = 0.97

$$\frac{\frac{\sqrt{c+dx^8}}{a+bx^8}-\frac{d\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{\sqrt{b}\sqrt{bc-ad}}}{8ad-8bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (Sqrt[c + d*x^8]/(a + b*x^8) - (d*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8
])/Sqrt[b*c - a*d]])/(Sqrt[b]*Sqrt[b*c - a*d]))/(-8*b*c + 8*a*d)
```

Maple [F] time = 0.057, size = 0, normalized size = 0.

$$\int \frac{x^7}{(bx^8+a)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^7/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231832, size = 1, normalized size = 0.01

$$\left[-\frac{\left(bdx^8+ad\right)\log\left(\frac{\left(bdx^8+2\,bc-ad\right)\sqrt{b^2c-abd}-2\,\sqrt{dx^8+c}\left(b^2c-abd\right)}{bx^8+a}\right)+2\,\sqrt{dx^8+c}\sqrt{b^2c-abd}}{16\left(\left(b^2c-abd\right)x^8+abc-a^2d\right)\sqrt{b^2c-abd}},\ \frac{\left(bdx^8+ad\right)\arctan\left(-\frac{bc-ad}{\sqrt{dx^8+c}\sqrt{-b^2c}}\right.}{8\left(\left(b^2c-abd\right)x^8+abc\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] [-1/16*((b*d*x^8 + a*d)*log(((b*d*x^8 + 2*b*c - a*d)*sqrt(b^2*c -
 a*b*d) - 2*sqrt(d*x^8 + c)*(b^2*c - a*b*d))/(b*x^8 + a)) + 2*sqr
t(d*x^8 + c)*sqrt(b^2*c - a*b*d))/(((b^2*c - a*b*d)*x^8 + a*b*c -
 a^2*d)*sqrt(b^2*c - a*b*d)), 1/8*((b*d*x^8 + a*d)*arctan(-(b*c -
 a*d)/(sqrt(d*x^8 + c)*sqrt(-b^2*c + a*b*d))) - sqrt(d*x^8 + c)*s
qrt(-b^2*c + a*b*d))/(((b^2*c - a*b*d)*x^8 + a*b*c - a^2*d)*sqrt(
-b^2*c + a*b*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.213325, size = 124, normalized size = 1.43

$$-\frac{1}{8}\,d\left(\frac{\arctan\left(\frac{\sqrt{dx^8+c}b}{\sqrt{-b^2c+abd}}\right)}{\sqrt{-b^2c+abd}(bc-ad)}+\frac{\sqrt{dx^8+c}}{\left((dx^8+c)b-bc+ad\right)(bc-ad)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] -1/8*d*(arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2*c + a*b*d))/(sqrt(-b^2
*c + a*b*d)*(b*c - a*d)) + sqrt(d*x^8 + c)/(((d*x^8 + c)*b - b*c
+ a*d)*(b*c - a*d)))
```

3.742 $\int \frac{1}{x(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=132

$$\frac{\sqrt{b}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8a^2(bc-ad)^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{4a^2\sqrt{c}}+\frac{b\sqrt{c+dx^8}}{8a\left(a+bx^8\right)(bc-ad)}$$

```
[Out] (b*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(a + b*x^8)) - ArcTanh[Sqrt[
c + d*x^8]/Sqrt[c]]/(4*a^2*Sqrt[c]) + (Sqrt[b]*(2*b*c - 3*a*d)*Ar
cTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*a^2*(b*c - a
*d)^(3/2))
```

Rubi [A] time = 0.415622, antiderivative size = 132, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{\sqrt{b}(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8a^2(bc-ad)^{3/2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{4a^2\sqrt{c}}+\frac{b\sqrt{c+dx^8}}{8a\left(a+bx^8\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (b*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(a + b*x^8)) - ArcTanh[Sqrt[
c + d*x^8]/Sqrt[c]]/(4*a^2*Sqrt[c]) + (Sqrt[b]*(2*b*c - 3*a*d)*Ar
cTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*a^2*(b*c - a
*d)^(3/2))
```

Rubi in Sympy [A] time = 48.6231, size = 114, normalized size = 0.86

$$-\frac{b\sqrt{c+dx^8}}{8a\left(a+bx^8\right)(ad-bc)}-\frac{\sqrt{b}\left(\frac{3ad}{2}-bc\right)\operatorname{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{4a^2\left(ad-bc\right)^{\frac{3}{2}}}-\frac{\operatorname{atanh}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{4a^2\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**8)/(8*a*(a + b*x**8)*(a*d - b*c)) - sqrt(b)*(3*a
*d/2 - b*c)*atan(sqrt(b)*sqrt(c + d*x**8)/sqrt(a*d - b*c))/(4*a**
2*(a*d - b*c)**(3/2)) - atanh(sqrt(c + d*x**8)/sqrt(c))/(4*a**2*s
qrt(c))
```

Mathematica [C] time = 0.447378, size = 396, normalized size = 3.

$$\frac{b\left(\frac{6cdx^8F_1\left(1;\frac{1}{2},1;2;-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{x^8\left(2bcF_1\left(2;\frac{1}{2},2;3;-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(2;\frac{3}{2},1;3;-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-4acF_1\left(1;\frac{1}{2},1;2;-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{5dx^8\left(2ad+b\left(c+3dx^8\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)-3(c+dx}{a\left(-5bdx^8F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+2adF_1\left(\right.\right.}\right.}{24\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (b*((6*c*d*x^8*AppellF1[1, 1/2, 1, 2, -((d*x^8)/c), -((b*x^8)/a)]
)/(-4*a*c*AppellF1[1, 1/2, 1, 2, -((d*x^8)/c), -((b*x^8)/a)] + x^
```

```
8*(2*b*c*AppellF1[2, 1/2, 2, 3, -((d*x^8)/c), -((b*x^8)/a)] + a*d
*AppellF1[2, 3/2, 1, 3, -((d*x^8)/c), -((b*x^8)/a)])) + (5*d*x^8*
(2*a*d + b*(c + 3*d*x^8))*AppellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^8))
, -(a/(b*x^8))] - 3*(c + d*x^8)*(2*a*d*AppellF1[5/2, 1/2, 2, 7/2,
 -(c/(d*x^8)), -(a/(b*x^8))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(c
/(d*x^8)), -(a/(b*x^8))]))/(a*(-5*b*d*x^8*AppellF1[3/2, 1/2, 1, 5
/2, -(c/(d*x^8)), -(a/(b*x^8))] + 2*a*d*AppellF1[5/2, 1/2, 2, 7/2
, -(c/(d*x^8)), -(a/(b*x^8))] + b*c*AppellF1[5/2, 3/2, 1, 7/2, -(
c/(d*x^8)), -(a/(b*x^8))]))))/(24*(-(b*c) + a*d)*(a + b*x^8)*Sqrt
[c + d*x^8])
```

Maple [F] time = 0.082, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(bx^8+a\right)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)^2\sqrt{dx^8+c}\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x), x)
```

Fricas [A] time = 0.269766, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x),x, algorithm="fricas")
```

```
[Out] [1/16*(2*sqrt(d*x^8 + c)*a*b*sqrt(c) + ((2*b^2*c - 3*a*b*d)*x^8 +
 2*a*b*c - 3*a^2*d)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^8 + 2*
b*c - a*d + 2*sqrt(d*x^8 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b
*x^8 + a)) + 2*((b^2*c - a*b*d)*x^8 + a*b*c - a^2*d)*log(((d*x^8
+ 2*c)*sqrt(c) - 2*sqrt(d*x^8 + c)*c)/x^8))/(((a^2*b^2*c - a^3*b*
d)*x^8 + a^3*b*c - a^4*d)*sqrt(c)), 1/8*(sqrt(d*x^8 + c)*a*b*sqrt
(c) + ((2*b^2*c - 3*a*b*d)*x^8 + 2*a*b*c - 3*a^2*d)*sqrt(c)*sqrt(
-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*
x^8 + c)*b)) + ((b^2*c - a*b*d)*x^8 + a*b*c - a^2*d)*log(((d*x^8
+ 2*c)*sqrt(c) - 2*sqrt(d*x^8 + c)*c)/x^8))/(((a^2*b^2*c - a^3*b*
d)*x^8 + a^3*b*c - a^4*d)*sqrt(c)), 1/16*(2*sqrt(d*x^8 + c)*a*b*s
qrt(-c) + ((2*b^2*c - 3*a*b*d)*x^8 + 2*a*b*c - 3*a^2*d)*sqrt(-c)*
sqrt(b/(b*c - a*d))*log((b*d*x^8 + 2*b*c - a*d + 2*sqrt(d*x^8 + c
)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^8 + a)) + 4*((b^2*c - a*b
*d)*x^8 + a*b*c - a^2*d)*arctan(c/(sqrt(d*x^8 + c)*sqrt(-c))))/((
(a^2*b^2*c - a^3*b*d)*x^8 + a^3*b*c - a^4*d)*sqrt(-c)), 1/8*(sqrt
(d*x^8 + c)*a*b*sqrt(-c) + ((2*b^2*c - 3*a*b*d)*x^8 + 2*a*b*c - 3
*a^2*d)*sqrt(-c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b
/(b*c - a*d))/(sqrt(d*x^8 + c)*b)) + 2*((b^2*c - a*b*d)*x^8 + a*b
```

```
*c - a^2*d)*arctan(c/(sqrt(d*x^8 + c)*sqrt(-c))))/(((a^2*b^2*c -
a^3*b*d)*x^8 + a^3*b*c - a^4*d)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.215435, size = 207, normalized size = 1.57

$$-\frac{1}{8}\,d^2\left(\frac{\left(2\,b^2c-3\,abd\right)\arctan\left(\frac{\sqrt{dx^8+c}b}{\sqrt{-b^2c+abd}}\right)}{(a^2bcd^2-a^3d^3)\sqrt{-b^2c+abd}}-\frac{\sqrt{dx^8+c}b}{(abcd-a^2d^2)((dx^8+c)b-bc+ad)}-\frac{2\arctan\left(\frac{\sqrt{dx^8+c}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}d^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x),x, algorithm="giac")
```

```
[Out] -1/8*d^2*((2*b^2*c - 3*a*b*d)*arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2*
c + a*b*d))/((a^2*b*c*d^2 - a^3*d^3)*sqrt(-b^2*c + a*b*d)) - sqrt
(d*x^8 + c)*b/((a*b*c*d - a^2*d^2)*((d*x^8 + c)*b - b*c + a*d)) -
 2*arctan(sqrt(d*x^8 + c)/sqrt(-c))/(a^2*sqrt(-c)*d^2))
```

3.743 $\int \frac{1}{x^9(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=185

$$-\frac{b^{3/2}(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8a^3(bc-ad)^{3/2}}+\frac{(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{8a^3c^{3/2}}-\frac{b\sqrt{c+dx^8}(2bc-ad)}{8a^2c\,(a+bx^8)\,(bc-ad)}-\frac{\sqrt{c+dx^8}}{8acx^8\,(a+bx^8)}$$

```
[Out] -(b*(2*b*c - a*d)*Sqrt[c + d*x^8])/(8*a^2*c*(b*c - a*d)*(a + b*x^
8)) - Sqrt[c + d*x^8]/(8*a*c*x^8*(a + b*x^8)) + ((4*b*c + a*d)*Ar
cTanh[Sqrt[c + d*x^8]/Sqrt[c]])/(8*a^3*c^(3/2)) - (b^(3/2)*(4*b*c
 - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*
a^3*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.720181, antiderivative size = 185, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{b^{3/2}(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{bc-ad}}\right)}{8a^3(bc-ad)^{3/2}}+\frac{(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{8a^3c^{3/2}}-\frac{b\sqrt{c+dx^8}(2bc-ad)}{8a^2c\,(a+bx^8)\,(bc-ad)}-\frac{\sqrt{c+dx^8}}{8acx^8\,(a+bx^8)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^9*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -(b*(2*b*c - a*d)*Sqrt[c + d*x^8])/(8*a^2*c*(b*c - a*d)*(a + b*x^
8)) - Sqrt[c + d*x^8]/(8*a*c*x^8*(a + b*x^8)) + ((4*b*c + a*d)*Ar
cTanh[Sqrt[c + d*x^8]/Sqrt[c]])/(8*a^3*c^(3/2)) - (b^(3/2)*(4*b*c
 - 5*a*d)*ArcTanh[(Sqrt[b]*Sqrt[c + d*x^8])/Sqrt[b*c - a*d]])/(8*
a^3*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 77.0361, size = 158, normalized size = 0.85

$$-\frac{\sqrt{c+dx^8}}{8acx^8\,(a+bx^8)}-\frac{b\sqrt{c+dx^8}\,(ad-2bc)}{8a^2c\,(a+bx^8)\,(ad-bc)}+\frac{b^{\frac{3}{2}}\,(5ad-4bc)\,\mathrm{atan}\left(\frac{\sqrt{b}\sqrt{c+dx^8}}{\sqrt{ad-bc}}\right)}{8a^3\,(ad-bc)^{\frac{3}{2}}}+\frac{(ad+4bc)\,\mathrm{atanh}\left(\frac{\sqrt{c+dx^8}}{\sqrt{c}}\right)}{8a^3c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**9/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**8)/(8*a*c*x**8*(a + b*x**8)) - b*sqrt(c + d*x**8)*
(a*d - 2*b*c)/(8*a**2*c*(a + b*x**8)*(a*d - b*c)) + b**(3/2)*(5*a
*d - 4*b*c)*atan(sqrt(b)*sqrt(c + d*x**8)/sqrt(a*d - b*c))/(8*a**
3*(a*d - b*c)**(3/2)) + (a*d + 4*b*c)*atanh(sqrt(c + d*x**8)/sqrt
(c))/(8*a**3*c**(3/2))
```

Mathematica [C] time = 1.2651, size = 489, normalized size = 2.64

$$\frac{\frac{5bdx^8\left(-a^2d\left(3c+2dx^8\right)+3ab\left(c^2+cdx^8-d^2x^{16}\right)+2b^2cx^8\left(c+3dx^8\right)\right)F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+3\left(c+dx^8\right)\left(a^2d+ab\left(dx^8-c\right)-2b^2cx^8\right)\left(2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^8},-\frac{}{b}\right.\right.}{c(bc-ad)\left(-5bdx^8F_1\left(\frac{3}{2};\frac{1}{2},1;\frac{5}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+2adF_1\left(\frac{5}{2};\frac{1}{2},2;\frac{7}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)+bcF_1\left(\frac{5}{2};\frac{3}{2},1;\frac{7}{2};-\frac{c}{dx^8},-\frac{a}{bx^8}\right)\right)}}{24a^2x^8\left(a+bx^8\right)\sqrt{c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^9*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((6*a*b*d*(-2*b*c + a*d)*x^16*AppellF1[1, 1/2, 1, 2, -((d*x^8)/c)
, -((b*x^8)/a)])/((-(b*c) + a*d)*(-4*a*c*AppellF1[1, 1/2, 1, 2, -
((d*x^8)/c), -((b*x^8)/a)] + x^8*(2*b*c*AppellF1[2, 1/2, 2, 3, -(
(d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[2, 3/2, 1, 3, -((d*x^8)/
c), -((b*x^8)/a)]))) + (5*b*d*x^8*(-(a^2*d*(3*c + 2*d*x^8)) + 2*b
^2*c*x^8*(c + 3*d*x^8) + 3*a*b*(c^2 + c*d*x^8 - d^2*x^16))*Appell
F1[3/2, 1/2, 1, 5/2, -(c/(d*x^8)), -(a/(b*x^8))] + 3*(c + d*x^8)*
(a^2*d - 2*b^2*c*x^8 + a*b*(-c + d*x^8))*(2*a*d*AppellF1[5/2, 1/2
, 2, 7/2, -(c/(d*x^8)), -(a/(b*x^8))] + b*c*AppellF1[5/2, 3/2, 1,
 7/2, -(c/(d*x^8)), -(a/(b*x^8))]))/(c*(b*c - a*d)*(-5*b*d*x^8*Ap
pellF1[3/2, 1/2, 1, 5/2, -(c/(d*x^8)), -(a/(b*x^8))] + 2*a*d*Appe
llF1[5/2, 1/2, 2, 7/2, -(c/(d*x^8)), -(a/(b*x^8))] + b*c*AppellF1
[5/2, 3/2, 1, 7/2, -(c/(d*x^8)), -(a/(b*x^8))])))/(24*a^2*x^8*(a
+ b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.134, size = 0, normalized size = 0.

$$\int \frac{1}{x^{9} \left(b x^{8}+a \right)^{2}} \frac{1}{\sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^9/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^9/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{{\left(b x^{8} + a\right)}^{2} \sqrt{d x^{8} + c} x^{9}}\,{d x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^9),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^9), x)
```

Fricas [A] time = 0.34291, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^9),x, algorithm="fricas")
```

```
[Out] [1/16*(((4*b^3*c^2 - 5*a*b^2*c*d)*x^16 + (4*a*b^2*c^2 - 5*a^2*b*c
*d)*x^8)*sqrt(c)*sqrt(b/(b*c - a*d))*log((b*d*x^8 + 2*b*c - a*d -
 2*sqrt(d*x^8 + c)*(b*c - a*d)*sqrt(b/(b*c - a*d)))/(b*x^8 + a))
- 2*((2*a*b^2*c - a^2*b*d)*x^8 + a^2*b*c - a^3*d)*sqrt(d*x^8 + c)
*sqrt(c) + ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^16 + (4*a*b^2
*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^8)*log(((d*x^8 + 2*c)*sqrt(c) + 2
*sqrt(d*x^8 + c)*c)/x^8))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^16 + (a^4
*b*c^2 - a^5*c*d)*x^8)*sqrt(c)), -1/16*(2*((4*b^3*c^2 - 5*a*b^2*c
*d)*x^16 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^8)*sqrt(c)*sqrt(-b/(b*c
- a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c - a*d))/(sqrt(d*x^8 + c)
*b)) + 2*((2*a*b^2*c - a^2*b*d)*x^8 + a^2*b*c - a^3*d)*sqrt(d*x^8
 + c)*sqrt(c) - ((4*b^3*c^2 - 3*a*b^2*c*d - a^2*b*d^2)*x^16 + (4*
```

```
a*b^2*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^8)*log(((d*x^8 + 2*c)*sqrt(c
) + 2*sqrt(d*x^8 + c)*c)/x^8))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^16 +
 (a^4*b*c^2 - a^5*c*d)*x^8)*sqrt(c)), 1/16*(((4*b^3*c^2 - 5*a*b^2
*c*d)*x^16 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^8)*sqrt(-c)*sqrt(b/(b*
c - a*d))*log((b*d*x^8 + 2*b*c - a*d - 2*sqrt(d*x^8 + c)*(b*c - a
*d)*sqrt(b/(b*c - a*d)))/(b*x^8 + a)) - 2*((2*a*b^2*c - a^2*b*d)*
x^8 + a^2*b*c - a^3*d)*sqrt(d*x^8 + c)*sqrt(-c) - 2*((4*b^3*c^2 -
 3*a*b^2*c*d - a^2*b*d^2)*x^16 + (4*a*b^2*c^2 - 3*a^2*b*c*d - a^3
*d^2)*x^8)*arctan(c/(sqrt(d*x^8 + c)*sqrt(-c))))/(((a^3*b^2*c^2 -
 a^4*b*c*d)*x^16 + (a^4*b*c^2 - a^5*c*d)*x^8)*sqrt(-c)), -1/8*(((
4*b^3*c^2 - 5*a*b^2*c*d)*x^16 + (4*a*b^2*c^2 - 5*a^2*b*c*d)*x^8)*
sqrt(-c)*sqrt(-b/(b*c - a*d))*arctan(-(b*c - a*d)*sqrt(-b/(b*c -
a*d))/(sqrt(d*x^8 + c)*b)) + ((2*a*b^2*c - a^2*b*d)*x^8 + a^2*b*c
 - a^3*d)*sqrt(d*x^8 + c)*sqrt(-c) + ((4*b^3*c^2 - 3*a*b^2*c*d -
a^2*b*d^2)*x^16 + (4*a*b^2*c^2 - 3*a^2*b*c*d - a^3*d^2)*x^8)*arct
an(c/(sqrt(d*x^8 + c)*sqrt(-c))))/(((a^3*b^2*c^2 - a^4*b*c*d)*x^1
6 + (a^4*b*c^2 - a^5*c*d)*x^8)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**9/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.21914, size = 362, normalized size = 1.96

$$\frac{1}{8}\,d^{3}\left(\frac{\left(4\,b^{3}c-5\,ab^{2}d\right)\,\arctan\left(\frac{\sqrt{dx^{8}+c}b}{\sqrt{-b^{2}c+abd}}\right)}{\left(a^{3}bcd^{3}-a^{4}d^{4}\right)\sqrt{-b^{2}c+abd}}-\frac{2\,\left(dx^{8}+c\right)^{\frac{3}{2}}b^{2}c-2\,\sqrt{dx^{8}+c}b^{2}c^{2}-\left(dx^{8}+c\right)^{\frac{3}{2}}abd+2\,\sqrt{dx^{8}+c}abcd-\sqrt{dx^{8}}}{\left(a^{2}bc^{2}d^{2}-a^{3}cd^{3}\right)\left(\left(dx^{8}+c\right)^{2}b-2\,\left(dx^{8}+c\right)bc+bc^{2}+\left(dx^{8}+c\right)ad-aca\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^9),x, algorithm="giac")
```

```
[Out] 1/8*d^3*((4*b^3*c - 5*a*b^2*d)*arctan(sqrt(d*x^8 + c)*b/sqrt(-b^2
*c + a*b*d))/((a^3*b*c*d^3 - a^4*d^4)*sqrt(-b^2*c + a*b*d)) - (2*
(d*x^8 + c)^(3/2)*b^2*c - 2*sqrt(d*x^8 + c)*b^2*c^2 - (d*x^8 + c)
^(3/2)*a*b*d + 2*sqrt(d*x^8 + c)*a*b*c*d - sqrt(d*x^8 + c)*a^2*d^
2)/((a^2*b*c^2*d^2 - a^3*c*d^3)*((d*x^8 + c)^2*b - 2*(d*x^8 + c)*
b*c + b*c^2 + (d*x^8 + c)*a*d - a*c*d)) - (4*b*c + a*d)*arctan(sq
rt(d*x^8 + c)/sqrt(-c))/(a^3*sqrt(-c)*c*d^3))
```

3.744 $\int \frac{x^{19}}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=141

$$-\frac{\sqrt{a}(3bc-2ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8b^2(bc-ad)^{3/2}}+\frac{ax^4\sqrt{c+dx^8}}{8b\,(a+bx^8)\,(bc-ad)}+\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{4b^2\sqrt{d}}$$

```
[Out] (a*x^4*Sqrt[c + d*x^8])/(8*b*(b*c - a*d)*(a + b*x^8)) - (Sqrt[a]*
(3*b*c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*
x^8])])/(8*b^2*(b*c - a*d)^(3/2)) + ArcTanh[(Sqrt[d]*x^4)/Sqrt[c
+ d*x^8]]/(4*b^2*Sqrt[d])
```

Rubi [A] time = 0.472375, antiderivative size = 141, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{\sqrt{a}(3bc-2ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8b^2(bc-ad)^{3/2}}+\frac{ax^4\sqrt{c+dx^8}}{8b\,(a+bx^8)\,(bc-ad)}+\frac{\tanh^{-1}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{4b^2\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^19/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (a*x^4*Sqrt[c + d*x^8])/(8*b*(b*c - a*d)*(a + b*x^8)) - (Sqrt[a]*
(3*b*c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*
x^8])])/(8*b^2*(b*c - a*d)^(3/2)) + ArcTanh[(Sqrt[d]*x^4)/Sqrt[c
+ d*x^8]]/(4*b^2*Sqrt[d])
```

Rubi in Sympy [A] time = 50.4692, size = 122, normalized size = 0.87

$$-\frac{\sqrt{a}\,(2ad-3bc)\,\text{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8b^2\,(ad-bc)^{\frac{3}{2}}}-\frac{ax^4\sqrt{c+dx^8}}{8b\,(a+bx^8)\,(ad-bc)}+\frac{\text{atanh}\left(\frac{\sqrt{d}x^4}{\sqrt{c+dx^8}}\right)}{4b^2\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**19/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(a)*(2*a*d - 3*b*c)*atanh(x**4*sqrt(a*d - b*c)/(sqrt(a)*sqrt
(c + d*x**8)))/(8*b**2*(a*d - b*c)**(3/2)) - a*x**4*sqrt(c + d*x*
*8)/(8*b*(a + b*x**8)*(a*d - b*c)) + atanh(sqrt(d)*x**4/sqrt(c +
d*x**8))/(4*b**2*sqrt(d))
```

Mathematica [A] time = 0.340359, size = 135, normalized size = 0.96

$$\frac{\frac{abx^4\sqrt{c+dx^8}}{(a+bx^8)(bc-ad)}+\frac{\sqrt{a}(2ad-3bc)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{(bc-ad)^{3/2}}+\frac{2\log\left(\sqrt{d}\sqrt{c+dx^8}+dx^4\right)}{\sqrt{d}}}{8b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^19/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((a*b*x^4*Sqrt[c + d*x^8])/((b*c - a*d)*(a + b*x^8)) + (Sqrt[a]*(
-3*b*c + 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*
x^8])])/(b*c - a*d)^(3/2) + (2*Log[d*x^4 + Sqrt[d]*Sqrt[c + d*x^8
```

```
]])/Sqrt[d])/(8*b^2)
```

Maple [F] time = 0.079, size = 0, normalized size = 0.

$$\int \frac{x^{19}}{(bx^8+a)^2} \frac{1}{\sqrt{dx^8+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^19/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)

[Out] int(x^19/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{19}}{(bx^8+a)^2\sqrt{dx^8+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^19/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] integrate(x^19/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [A] time = 0.59376, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^19/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] [1/32*(4*sqrt(d*x^8 + c)*a*b*sqrt(d)*x^4 + ((3*b^2*c - 2*a*b*d)*x
^8 + 3*a*b*c - 2*a^2*d)*sqrt(d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^
2 - 8*a*b*c*d + 8*a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^8 +
 a^2*c^2 - 4*((b^2*c^2 - 3*a*b*c*d + 2*a^2*d^2)*x^12 - (a*b*c^2 -
 a^2*c*d)*x^4)*sqrt(d*x^8 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^16 +
2*a*b*x^8 + a^2)) + 4*((b^2*c - a*b*d)*x^8 + a*b*c - a^2*d)*log(-
2*sqrt(d*x^8 + c)*d*x^4 - (2*d*x^8 + c)*sqrt(d)))/(((b^4*c - a*b^
3*d)*x^8 + a*b^3*c - a^2*b^2*d)*sqrt(d)), 1/32*(4*sqrt(d*x^8 + c)
*a*b*sqrt(-d)*x^4 + ((3*b^2*c - 2*a*b*d)*x^8 + 3*a*b*c - 2*a^2*d)
*sqrt(-d)*sqrt(-a/(b*c - a*d))*log(((b^2*c^2 - 8*a*b*c*d + 8*a^2*
d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^8 + a^2*c^2 - 4*((b^2*c^2
 - 3*a*b*c*d + 2*a^2*d^2)*x^12 - (a*b*c^2 - a^2*c*d)*x^4)*sqrt(d*
x^8 + c)*sqrt(-a/(b*c - a*d)))/(b^2*x^16 + 2*a*b*x^8 + a^2)) + 8*
((b^2*c - a*b*d)*x^8 + a*b*c - a^2*d)*arctan(sqrt(-d)*x^4/sqrt(d*
x^8 + c)))/(((b^4*c - a*b^3*d)*x^8 + a*b^3*c - a^2*b^2*d)*sqrt(-d
)), 1/16*(2*sqrt(d*x^8 + c)*a*b*sqrt(d)*x^4 - ((3*b^2*c - 2*a*b*d
)*x^8 + 3*a*b*c - 2*a^2*d)*sqrt(d)*sqrt(a/(b*c - a*d))*arctan(1/2
*((b*c - 2*a*d)*x^8 - a*c)/(sqrt(d*x^8 + c)*(b*c - a*d)*x^4*sqrt(
a/(b*c - a*d)))) + 2*((b^2*c - a*b*d)*x^8 + a*b*c - a^2*d)*log(-2
*sqrt(d*x^8 + c)*d*x^4 - (2*d*x^8 + c)*sqrt(d)))/(((b^4*c - a*b^3
*d)*x^8 + a*b^3*c - a^2*b^2*d)*sqrt(d)), 1/16*(2*sqrt(d*x^8 + c)*
a*b*sqrt(-d)*x^4 - ((3*b^2*c - 2*a*b*d)*x^8 + 3*a*b*c - 2*a^2*d)*
sqrt(-d)*sqrt(a/(b*c - a*d))*arctan(1/2*((b*c - 2*a*d)*x^8 - a*c)
/(sqrt(d*x^8 + c)*(b*c - a*d)*x^4*sqrt(a/(b*c - a*d)))) + 4*((b^2
*c - a*b*d)*x^8 + a*b*c - a^2*d)*arctan(sqrt(-d)*x^4/sqrt(d*x^8 +
 c)))/(((b^4*c - a*b^3*d)*x^8 + a*b^3*c - a^2*b^2*d)*sqrt(-d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**19/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.238978, size = 205, normalized size = 1.45

$$\frac{1}{8}\,c^2\left(\frac{\left(3\,abc-2\,a^2d\right)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^8}}}{\sqrt{abc-a^2d}}\right)}{\left(b^3c^3-ab^2c^2d\right)\sqrt{abc-a^2d}}+\frac{a\sqrt{d+\frac{c}{x^8}}}{\left(b^2c^2-abcd\right)\left(bc+a\left(d+\frac{c}{x^8}\right)-ad\right)}-\frac{2\,\arctan\left(\frac{\sqrt{d+\frac{c}{x^8}}}{\sqrt{-d}}\right)}{b^2c^2\sqrt{-d}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^19/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] 1/8*c^2*((3*a*b*c - 2*a^2*d)*arctan(a*sqrt(d + c/x^8)/sqrt(a*b*c
- a^2*d))/((b^3*c^3 - a*b^2*c^2*d)*sqrt(a*b*c - a^2*d)) + a*sqrt(
d + c/x^8)/((b^2*c^2 - a*b*c*d)*(b*c + a*(d + c/x^8) - a*d)) - 2*
arctan(sqrt(d + c/x^8)/sqrt(-d))/(b^2*c^2*sqrt(-d)))
```

3.745 $\int \frac{x^{11}}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=93

$$\frac{c\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8\sqrt{a}(bc-ad)^{3/2}}-\frac{x^4\sqrt{c+dx^8}}{8\left(a+bx^8\right)(bc-ad)}$$

```
[Out] -(x^4*Sqrt[c + d*x^8])/(8*(b*c - a*d)*(a + b*x^8)) + (c*ArcTan[(S
qrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/(8*Sqrt[a]*(b*c -
 a*d)^(3/2))
```

Rubi [A] time = 0.273649, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208

$$\frac{c\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8\sqrt{a}(bc-ad)^{3/2}}-\frac{x^4\sqrt{c+dx^8}}{8\left(a+bx^8\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -(x^4*Sqrt[c + d*x^8])/(8*(b*c - a*d)*(a + b*x^8)) + (c*ArcTan[(S
qrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/(8*Sqrt[a]*(b*c -
 a*d)^(3/2))
```

Rubi in Sympy [A] time = 30.8303, size = 76, normalized size = 0.82

$$\frac{x^4\sqrt{c+dx^8}}{8\left(a+bx^8\right)(ad-bc)}-\frac{c\,\operatorname{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8\sqrt{a}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] x**4*sqrt(c + d*x**8)/(8*(a + b*x**8)*(a*d - b*c)) - c*atanh(x**4
*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**8)))/(8*sqrt(a)*(a*d - b*
c)**(3/2))
```

Mathematica [A] time = 0.172646, size = 90, normalized size = 0.97

$$\frac{\frac{x^4\sqrt{c+dx^8}}{a+bx^8}-\frac{c\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{\sqrt{a}\sqrt{bc-ad}}}{8ad-8bc}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((x^4*Sqrt[c + d*x^8])/(a + b*x^8) - (c*ArcTan[(Sqrt[b*c - a*d]*x
^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/(Sqrt[a]*Sqrt[b*c - a*d]))/(-8*b*
c + 8*a*d)
```

Maple [F] time = 0.073, size = 0, normalized size = 0.

$$\int \frac{x^{11}}{(bx^8+a)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)

[Out] int(x^11/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{11}}{(bx^8+a)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^11/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] integrate(x^11/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [A] time = 0.328178, size = 1, normalized size = 0.01

$$\left[-\frac{4\sqrt{dx^8+c}\sqrt{-abc+a^2d}\,x^4+\left(bcx^8+ac\right)\log\left(-\frac{4\left((ab^2c^2-3a^2bcd+2a^3d^2)x^{12}-(a^2bc^2-a^3cd)x^4\right)\sqrt{dx^8+c}-\left((b^2c^2-8abcd+8a^2d^2)x^{16}-2(3\cdots\right.}{b^2x^{16}+2abx^8+a^2}\cdots\right)}{32\left((b^2c-abd)x^8+abc-a^2d\right)\sqrt{-abc+a^2d}},\; -\frac{2\sqrt{dx^8+c}\sqrt{abc-a^2d}\,x^4-\left(bcx^8+ac\right)\arctan\left(\frac{(bc-2ad)x^8-ac}{2\sqrt{dx^8+c}\sqrt{abc-a^2d}\,x^4}\right)}{16\left((b^2c-abd)x^8+abc-a^2d\right)\sqrt{abc-a^2d}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^11/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] [-1/32*(4*sqrt(d*x^8 + c)*sqrt(-a*b*c + a^2*d)*x^4 + (b*c*x^8 + a
*c)*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^12 - (a^2*b*
c^2 - a^3*c*d)*x^4)*sqrt(d*x^8 + c) - ((b^2*c^2 - 8*a*b*c*d + 8*a
^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d)*x^8 + a^2*c^2)*sqrt(-a*b
*c + a^2*d))/(b^2*x^16 + 2*a*b*x^8 + a^2)))/(((b^2*c - a*b*d)*x^8
 + a*b*c - a^2*d)*sqrt(-a*b*c + a^2*d)), -1/16*(2*sqrt(d*x^8 + c)
*sqrt(a*b*c - a^2*d)*x^4 - (b*c*x^8 + a*c)*arctan(1/2*((b*c - 2*a
*d)*x^8 - a*c)/(sqrt(d*x^8 + c)*sqrt(a*b*c - a^2*d)*x^4)))/(((b^2
*c - a*b*d)*x^8 + a*b*c - a^2*d)*sqrt(a*b*c - a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.234679, size = 124, normalized size = 1.33

$$-\frac{1}{8}\,c\left(\frac{\arctan\left(\frac{a\sqrt{d+\frac{c}{x^8}}}{\sqrt{abc-a^2d}}\right)}{\sqrt{abc-a^2d}(bc-ad)}+\frac{\sqrt{d+\frac{c}{x^8}}}{\left(bc+a\left(d+\frac{c}{x^8}\right)-ad\right)(bc-ad)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] -1/8*c*(arctan(a*sqrt(d + c/x^8)/sqrt(a*b*c - a^2*d))/(sqrt(a*b*c
 - a^2*d)*(b*c - a*d)) + sqrt(d + c/x^8)/((b*c + a*(d + c/x^8) -
a*d)*(b*c - a*d)))
```

3.746 $\int \frac{x^3}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=104

$$\frac{(bc-2ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{3/2}(bc-ad)^{3/2}}+\frac{bx^4\sqrt{c+dx^8}}{8a(a+bx^8)(bc-ad)}$$

```
[Out] (b*x^4*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(a + b*x^8)) + ((b*c - 2
*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/(8
*a^(3/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.265667, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{(bc-2ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{3/2}(bc-ad)^{3/2}}+\frac{bx^4\sqrt{c+dx^8}}{8a(a+bx^8)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (b*x^4*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(a + b*x^8)) + ((b*c - 2
*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/(8
*a^(3/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 29.4384, size = 87, normalized size = 0.84

$$-\frac{bx^4\sqrt{c+dx^8}}{8a(a+bx^8)(ad-bc)}+\frac{(2ad-bc)\,\text{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{\frac{3}{2}}(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**3/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -b*x**4*sqrt(c + d*x**8)/(8*a*(a + b*x**8)*(a*d - b*c)) + (2*a*d
- b*c)*atanh(x**4*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**8)))/(8*
a**(3/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 0.173083, size = 104, normalized size = 1.

$$\frac{\frac{\sqrt{a}bx^4\sqrt{c+dx^8}}{(a+bx^8)(bc-ad)}+\frac{(bc-2ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{(bc-ad)^{3/2}}}{8a^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((Sqrt[a]*b*x^4*Sqrt[c + d*x^8])/((b*c - a*d)*(a + b*x^8)) + ((b*
c - 2*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])
])/(b*c - a*d)^(3/2))/(8*a^(3/2))
```

Maple [F] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^8+a)^2} \frac{1}{\sqrt{dx^8+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^3/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^8+a)^2\sqrt{dx^8+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [A] time = 0.357933, size = 1, normalized size = 0.01

$$\left[\frac{4\sqrt{dx^8+c}\sqrt{-abc+a^2d}\,bx^4 + \left(\left(b^2c-2\,abd\right)x^8 + abc - 2\,a^2d\right)\log\left(\frac{4\left(\left(ab^2c^2-3\,a^2bcd+2\,a^3d^2\right)x^{12}-\left(a^2bc^2-a^3cd\right)x^4\right)\sqrt{dx^8+c}+\left(\left(b^2c^2-\cdots\right.\right.}{b^2x^{16}+2\,abx\cdots}\right.}{32\left(\left(ab^2c-a^2bd\right)x^8+a^2bc-a^3d\right)\sqrt{-abc+a^2d}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] [1/32*(4*sqrt(d*x^8 + c)*sqrt(-a*b*c + a^2*d)*b*x^4 + ((b^2*c - 2
*a*b*d)*x^8 + a*b*c - 2*a^2*d)*log((4*((a*b^2*c^2 - 3*a^2*b*c*d +
 2*a^3*d^2)*x^12 - (a^2*b*c^2 - a^3*c*d)*x^4)*sqrt(d*x^8 + c) + (
(b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c*d
)*x^8 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^16 + 2*a*b*x^8 + a^
2)))/(((a*b^2*c - a^2*b*d)*x^8 + a^2*b*c - a^3*d)*sqrt(-a*b*c + a
^2*d)), 1/16*(2*sqrt(d*x^8 + c)*sqrt(a*b*c - a^2*d)*b*x^4 + ((b^2
*c - 2*a*b*d)*x^8 + a*b*c - 2*a^2*d)*arctan(1/2*((b*c - 2*a*d)*x^
8 - a*c)/(sqrt(d*x^8 + c)*sqrt(a*b*c - a^2*d)*x^4)))/(((a*b^2*c -
 a^2*b*d)*x^8 + a^2*b*c - a^3*d)*sqrt(a*b*c - a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.236756, size = 320, normalized size = 3.08

$$-\frac{1}{8}d^{\frac{3}{2}}\left(\frac{(bc-2\,ad)\arctan\left(\frac{\left(\sqrt{d}x^4-\sqrt{dx^8+c}\right)^2b-bc+2\,ad}{2\sqrt{abcd-a^2d^2}}\right)}{(abcd-a^2d^2)^{\frac{3}{2}}}+\frac{2\left(\left(\sqrt{d}x^4-\sqrt{dx^8+c}\right)^2bc-2\left(\sqrt{d}x^4-\sqrt{dx^8+c}\right.\right.}{\left(\left(\sqrt{d}x^4-\sqrt{dx^8+c}\right)^4b-2\left(\sqrt{d}x^4-\sqrt{dx^8+c}\right)^2bc+4\left(\sqrt{d}x^4-\sqrt{d}\right.\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] -1/8*d^(3/2)*((b*c - 2*a*d)*arctan(1/2*((sqrt(d)*x^4 - sqrt(d*x^8
 + c))^2*b - b*c + 2*a*d)/sqrt(a*b*c*d - a^2*d^2))/(a*b*c*d - a^2
*d^2)^(3/2) + 2*((sqrt(d)*x^4 - sqrt(d*x^8 + c))^2*b*c - 2*(sqrt(
d)*x^4 - sqrt(d*x^8 + c))^2*a*d - b*c^2)/(((sqrt(d)*x^4 - sqrt(d*
x^8 + c))^4*b - 2*(sqrt(d)*x^4 - sqrt(d*x^8 + c))^2*b*c + 4*(sqrt
(d)*x^4 - sqrt(d*x^8 + c))^2*a*d + b*c^2)*(a*b*c*d - a^2*d^2)))
```

3.747 $\int \frac{1}{x^5(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=149

$$-\frac{b(3bc-4ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{5/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^8}(3bc-2ad)}{8a^2cx^4(bc-ad)}+\frac{b\sqrt{c+dx^8}}{8ax^4\left(a+bx^8\right)(bc-ad)}$$

```
[Out] -((3*b*c - 2*a*d)*Sqrt[c + d*x^8])/(8*a^2*c*(b*c - a*d)*x^4) + (b
*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*x^4*(a + b*x^8)) - (b*(3*b*c -
 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/
(8*a^(5/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.555401, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{b(3bc-4ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{5/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^8}(3bc-2ad)}{8a^2cx^4(bc-ad)}+\frac{b\sqrt{c+dx^8}}{8ax^4\left(a+bx^8\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^5*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -((3*b*c - 2*a*d)*Sqrt[c + d*x^8])/(8*a^2*c*(b*c - a*d)*x^4) + (b
*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*x^4*(a + b*x^8)) - (b*(3*b*c -
 4*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(Sqrt[a]*Sqrt[c + d*x^8])])/
(8*a^(5/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 69.2035, size = 129, normalized size = 0.87

$$-\frac{b\sqrt{c+dx^8}}{8ax^4\left(a+bx^8\right)(ad-bc)}-\frac{\sqrt{c+dx^8}\,(2ad-3bc)}{8a^2cx^4\,(ad-bc)}-\frac{b\,(4ad-3bc)\,\mathrm{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{\frac{5}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**5/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**8)/(8*a*x**4*(a + b*x**8)*(a*d - b*c)) - sqrt(c
+ d*x**8)*(2*a*d - 3*b*c)/(8*a**2*c*x**4*(a*d - b*c)) - b*(4*a*d
- 3*b*c)*atanh(x**4*sqrt(a*d - b*c)/(sqrt(a)*sqrt(c + d*x**8)))/(
8*a**(5/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 1.96041, size = 172, normalized size = 1.15

$$\frac{1}{8}\sqrt{c+dx^8}\left(\frac{bx^{12}(4ad-3bc)\sin^{-1}\left(\frac{\sqrt{x^8\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^8}{a}+1}}\right)}{a^4c^2\sqrt{\frac{bx^8}{a}+1}\left(\frac{x^8(bc-ad)}{ac}\right)^{3/2}\sqrt{\frac{a(c+dx^8)}{c(a+bx^8)}}}+\frac{\frac{b^2x^8}{(a+bx^8)(ad-bc)}-\frac{2}{c}}{a^2x^4}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^5*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (Sqrt[c + d*x^8]*((-2/c + (b^2*x^8)/((-(b*c) + a*d)*(a + b*x^8)))
/(a^2*x^4) + (b*(-3*b*c + 4*a*d)*x^12*ArcSin[Sqrt[(b/a - d/c)*x^8
]/Sqrt[1 + (b*x^8)/a]])/(a^4*c^2*(((b*c - a*d)*x^8)/(a*c))^(3/2)*
Sqrt[1 + (b*x^8)/a]*Sqrt[(a*(c + d*x^8))/(c*(a + b*x^8))])))/8
```

Maple [F] time = 0.108, size = 0, normalized size = 0.

$$\int \frac{1}{x^5 (bx^8 + a)^2} \frac{1}{\sqrt{dx^8 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^5/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^5/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8 + a)^2 \sqrt{dx^8 + c}x^5}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^5),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^5), x)
```

Fricas [A] time = 0.391966, size = 1, normalized size = 0.01

$$\left[-\frac{4 \left(\left(3 b^2 c - 2 abd\right) x^8 + 2 abc - 2 a^2 d\right) \sqrt{dx^8 + c}\sqrt{-abc + a^2 d} - \left(\left(3 b^3 c^2 - 4 ab^2 cd\right) x^{12} + \left(3 ab^2 c^2 - 4 a^2 bcd\right) x^4\right) \log\left(-\frac{4 (\cdots}{\cdots}\right.}{32 \left((a^2 b^2 c^2 - a^3 bcd)x^{12} + (a^3 bc^2 - a^4 c\cdots\right.}\right.$$

$$-\frac{2 \left(\left(3 b^2 c - 2 abd\right) x^8 + 2 abc - 2 a^2 d\right) \sqrt{dx^8 + c}\sqrt{abc - a^2 d} + \left(\left(3 b^3 c^2 - 4 ab^2 cd\right) x^{12} + \left(3 ab^2 c^2 - 4 a^2 bcd\right) x^4\right) \arctan\left(\frac{(\cdots}{2 \sqrt{d\cdots}}\right.}{16 \left((a^2 b^2 c^2 - a^3 bcd)x^{12} + (a^3 bc^2 - a^4 cd)x^4\right)\sqrt{abc - a^2 d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^5),x, algorithm="fricas")
```

```
[Out] [-1/32*(4*((3*b^2*c - 2*a*b*d)*x^8 + 2*a*b*c - 2*a^2*d)*sqrt(d*x^
8 + c)*sqrt(-a*b*c + a^2*d) - ((3*b^3*c^2 - 4*a*b^2*c*d)*x^12 + (
3*a*b^2*c^2 - 4*a^2*b*c*d)*x^4)*log(-(4*((a*b^2*c^2 - 3*a^2*b*c*d
 + 2*a^3*d^2)*x^12 - (a^2*b*c^2 - a^3*c*d)*x^4)*sqrt(d*x^8 + c) -
 ((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^16 - 2*(3*a*b*c^2 - 4*a^2*c
*d)*x^8 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x^16 + 2*a*b*x^8 +
a^2)))/(((a^2*b^2*c^2 - a^3*b*c*d)*x^12 + (a^3*b*c^2 - a^4*c*d)*x
^4)*sqrt(-a*b*c + a^2*d)), -1/16*(2*((3*b^2*c - 2*a*b*d)*x^8 + 2*
a*b*c - 2*a^2*d)*sqrt(d*x^8 + c)*sqrt(a*b*c - a^2*d) + ((3*b^3*c^
2 - 4*a*b^2*c*d)*x^12 + (3*a*b^2*c^2 - 4*a^2*b*c*d)*x^4)*arctan(1
/2*((b*c - 2*a*d)*x^8 - a*c)/(sqrt(d*x^8 + c)*sqrt(a*b*c - a^2*d)
*x^4)))/(((a^2*b^2*c^2 - a^3*b*c*d)*x^12 + (a^3*b*c^2 - a^4*c*d)*
x^4)*sqrt(a*b*c - a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.234678, size = 181, normalized size = 1.21

$$-\frac{b^{2}c\sqrt{d+\frac{c}{x^{8}}}}{8\left(a^{2}bc-a^{3}d\right)\left(bc+a\left(d+\frac{c}{x^{8}}\right)-ad\right)}+\frac{\left(3\,b^{2}c-4\,abd\right)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^{8}}}}{\sqrt{abc-a^{2}d}}\right)}{8\left(a^{2}bc-a^{3}d\right)\sqrt{abc-a^{2}d}}-\frac{\sqrt{d+\frac{c}{x^{8}}}}{4\,a^{2}c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^5),x, algorithm="giac")
```

```
[Out] -1/8*b^2*c*sqrt(d + c/x^8)/((a^2*b*c - a^3*d)*(b*c + a*(d + c/x^8
) - a*d)) + 1/8*(3*b^2*c - 4*a*b*d)*arctan(a*sqrt(d + c/x^8)/sqrt
(a*b*c - a^2*d))/((a^2*b*c - a^3*d)*sqrt(a*b*c - a^2*d)) - 1/4*sq
rt(d + c/x^8)/(a^2*c)
```

3.748 $\int \frac{1}{x^{13}(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=208

$$\frac{b^2(5bc-6ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{7/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^8}(5bc-2ad)}{24a^2cx^{12}(bc-ad)}+\frac{\sqrt{c+dx^8}\left(-4a^2d^2-8abcd+15b^2c^2\right)}{24a^3c^2x^4(bc-ad)}+\frac{b\sqrt{c+dx^8}}{8ax^{12}\left(a+bx^8\right)(bc-ad)}$$

```
[Out] -((5*b*c - 2*a*d)*Sqrt[c + d*x^8])/(24*a^2*c*(b*c - a*d)*x^12) +
((15*b^2*c^2 - 8*a*b*c*d - 4*a^2*d^2)*Sqrt[c + d*x^8])/(24*a^3*c^
2*(b*c - a*d)*x^4) + (b*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*x^12*(a
 + b*x^8)) + (b^2*(5*b*c - 6*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(S
qrt[a]*Sqrt[c + d*x^8])])/(8*a^(7/2)*(b*c - a*d)^(3/2))
```

Rubi [A] time = 0.915008, antiderivative size = 208, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{b^2(5bc-6ad)\tan^{-1}\left(\frac{x^4\sqrt{bc-ad}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{7/2}(bc-ad)^{3/2}}-\frac{\sqrt{c+dx^8}(5bc-2ad)}{24a^2cx^{12}(bc-ad)}+\frac{\sqrt{c+dx^8}\left(-4a^2d^2-8abcd+15b^2c^2\right)}{24a^3c^2x^4(bc-ad)}+\frac{b\sqrt{c+dx^8}}{8ax^{12}\left(a+bx^8\right)(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^13*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -((5*b*c - 2*a*d)*Sqrt[c + d*x^8])/(24*a^2*c*(b*c - a*d)*x^12) +
((15*b^2*c^2 - 8*a*b*c*d - 4*a^2*d^2)*Sqrt[c + d*x^8])/(24*a^3*c^
2*(b*c - a*d)*x^4) + (b*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*x^12*(a
 + b*x^8)) + (b^2*(5*b*c - 6*a*d)*ArcTan[(Sqrt[b*c - a*d]*x^4)/(S
qrt[a]*Sqrt[c + d*x^8])])/(8*a^(7/2)*(b*c - a*d)^(3/2))
```

Rubi in Sympy [A] time = 138.058, size = 184, normalized size = 0.88

$$-\frac{b\sqrt{c+dx^8}}{8ax^{12}\left(a+bx^8\right)(ad-bc)}-\frac{\sqrt{c+dx^8}\,(2ad-5bc)}{24a^2cx^{12}\,(ad-bc)}+\frac{\sqrt{c+dx^8}\left(4a^2d^2+8abcd-15b^2c^2\right)}{24a^3c^2x^4\,(ad-bc)}+\frac{b^2\,(6ad-5bc)\,\mathrm{atanh}\left(\frac{x^4\sqrt{ad-bc}}{\sqrt{a}\sqrt{c+dx^8}}\right)}{8a^{\frac{7}{2}}\,(ad-bc)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**13/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -b*sqrt(c + d*x**8)/(8*a*x**12*(a + b*x**8)*(a*d - b*c)) - sqrt(c
 + d*x**8)*(2*a*d - 5*b*c)/(24*a**2*c*x**12*(a*d - b*c)) + sqrt(c
 + d*x**8)*(4*a**2*d**2 + 8*a*b*c*d - 15*b**2*c**2)/(24*a**3*c**2
*x**4*(a*d - b*c)) + b**2*(6*a*d - 5*b*c)*atanh(x**4*sqrt(a*d - b
*c)/(sqrt(a)*sqrt(c + d*x**8)))/(8*a**(7/2)*(a*d - b*c)**(3/2))
```

Mathematica [A] time = 1.86108, size = 195, normalized size = 0.94

$$\frac{\sqrt{c+dx^8}\left(-\frac{2a^2}{c}+\frac{3ab^3x^{16}}{(a+bx^8)(bc-ad)}+\frac{3b^2x^{24}(5bc-6ad)\sin^{-1}\left(\frac{\sqrt{x^8\left(\frac{b}{a}-\frac{d}{c}\right)}}{\sqrt{\frac{bx^8}{a}+1}}\right)}{ac^2\sqrt{\frac{bx^8}{a}+1}\left(\frac{x^8(bc-ad)}{ac}\right)^{3/2}\sqrt{\frac{a\left(c+dx^8\right)}{c\left(a+bx^8\right)}}}+\frac{4ax^8(ad+3bc)}{c^2}\right)}{24a^4x^{12}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^13*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (Sqrt[c + d*x^8]*((-2*a^2)/c + (4*a*(3*b*c + a*d)*x^8)/c^2 + (3*a
*b^3*x^16)/((b*c - a*d)*(a + b*x^8)) + (3*b^2*(5*b*c - 6*a*d)*x^2
4*ArcSin[Sqrt[(b/a - d/c)*x^8]/Sqrt[1 + (b*x^8)/a]])/(a*c^2*(((b*
c - a*d)*x^8)/(a*c))^(3/2)*Sqrt[1 + (b*x^8)/a]*Sqrt[(a*(c + d*x^8
))/(c*(a + b*x^8))])))/(24*a^4*x^12)
```

Maple [F] time = 0.12, size = 0, normalized size = 0.

$$\int \frac{1}{x^{13}\left(bx^8+a\right)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^13/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^13/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)^2\sqrt{dx^8+c}\,x^{13}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^13),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^13), x)
```

Fricas [A] time = 0.576477, size = 1, normalized size = 0.

$$\left[\frac{4\left(\left(15\,b^3c^2-8\,ab^2cd-4\,a^2bd^2\right)x^{16}+2\left(5\,ab^2c^2-3\,a^2bcd-2\,a^3d^2\right)x^8-2\,a^2bc^2+2\,a^3cd\right)\sqrt{dx^8+c}\sqrt{-abc+a^2d}+3\left(\left(5\,b\right.\right.}{96\left(\left(a^3b^2c^3-\right.\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^13),x, algorithm="fricas")
```

```
[Out] [1/96*(4*((15*b^3*c^2 - 8*a*b^2*c*d - 4*a^2*b*d^2)*x^16 + 2*(5*a*
b^2*c^2 - 3*a^2*b*c*d - 2*a^3*d^2)*x^8 - 2*a^2*b*c^2 + 2*a^3*c*d)
*sqrt(d*x^8 + c)*sqrt(-a*b*c + a^2*d) + 3*((5*b^4*c^3 - 6*a*b^3*c
^2*d)*x^20 + (5*a*b^3*c^3 - 6*a^2*b^2*c^2*d)*x^12)*log((4*((a*b^2
*c^2 - 3*a^2*b*c*d + 2*a^3*d^2)*x^12 - (a^2*b*c^2 - a^3*c*d)*x^4)
```

```
*sqrt(d*x^8 + c) + ((b^2*c^2 - 8*a*b*c*d + 8*a^2*d^2)*x^16 - 2*(3
*a*b*c^2 - 4*a^2*c*d)*x^8 + a^2*c^2)*sqrt(-a*b*c + a^2*d))/(b^2*x
^16 + 2*a*b*x^8 + a^2)))/(((a^3*b^2*c^3 - a^4*b*c^2*d)*x^20 + (a^
4*b*c^3 - a^5*c^2*d)*x^12)*sqrt(-a*b*c + a^2*d)), 1/48*(2*((15*b^
3*c^2 - 8*a*b^2*c*d - 4*a^2*b*d^2)*x^16 + 2*(5*a*b^2*c^2 - 3*a^2*
b*c*d - 2*a^3*d^2)*x^8 - 2*a^2*b*c^2 + 2*a^3*c*d)*sqrt(d*x^8 + c)
*sqrt(a*b*c - a^2*d) + 3*((5*b^4*c^3 - 6*a*b^3*c^2*d)*x^20 + (5*a
*b^3*c^3 - 6*a^2*b^2*c^2*d)*x^12)*arctan(1/2*((b*c - 2*a*d)*x^8 -
 a*c)/(sqrt(d*x^8 + c)*sqrt(a*b*c - a^2*d)*x^4)))/(((a^3*b^2*c^3
- a^4*b*c^2*d)*x^20 + (a^4*b*c^3 - a^5*c^2*d)*x^12)*sqrt(a*b*c -
a^2*d))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**13/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.23661, size = 244, normalized size = 1.17

$$\frac{b^3c\sqrt{d+\frac{c}{x^8}}}{8\left(a^3bc-a^4d\right)\left(bc+a\left(d+\frac{c}{x^8}\right)-ad\right)}-\frac{\left(5\,b^3c-6\,ab^2d\right)\arctan\left(\frac{a\sqrt{d+\frac{c}{x^8}}}{\sqrt{abc-a^2d}}\right)}{8\left(a^3bc-a^4d\right)\sqrt{abc-a^2d}}+\frac{6\,a^3bc^5\sqrt{d+\frac{c}{x^8}}-a^4c^4\left(d+\frac{c}{x^8}\right)^{\frac{3}{2}}+3\,a^4c^4\sqrt{d+\frac{c}{x^8}}d}{12\,a^6c^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^13),x, algorithm="giac")
```

```
[Out] 1/8*b^3*c*sqrt(d + c/x^8)/((a^3*b*c - a^4*d)*(b*c + a*(d + c/x^8)
 - a*d)) - 1/8*(5*b^3*c - 6*a*b^2*d)*arctan(a*sqrt(d + c/x^8)/sqr
t(a*b*c - a^2*d))/((a^3*b*c - a^4*d)*sqrt(a*b*c - a^2*d)) + 1/12*
(6*a^3*b*c^5*sqrt(d + c/x^8) - a^4*c^4*(d + c/x^8)^(3/2) + 3*a^4*
c^4*sqrt(d + c/x^8)*d)/(a^6*c^6)
```

3.749 $\int \frac{x^9}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=1042

result too large to display

```
[Out] -(x^2*Sqrt[c + d*x^8])/(8*(b*c - a*d)*(a + b*x^8)) + ((b*c + a*d)
*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt[c + d*x
^8]])/(32*a*b*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]
) - ((b*c + a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2
)/Sqrt[c + d*x^8]])/(32*(-a)^(3/2)*b^(3/2)*((b*c - a*d)/(Sqrt[-a]
*Sqrt[b]))^(3/2)) - (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*
x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/
c^(1/4)], 1/2])/(16*b*c^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8]) - (d^(
1/4)*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c
] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/
2])/(32*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a
*d)*Sqrt[c + d*x^8]) + (d^(1/4)*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^
4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan
[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sq
rt[c] + a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) + ((Sqrt[b]*Sqrt[
c] + Sqrt[-a]*Sqrt[d])*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(
c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c
] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*A
rcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a*b*c^(1/4)*(Sqrt[b]*Sqrt
[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8]) + ((
Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c + a*d)*(Sqrt[c] + Sqrt[d
]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sq
rt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*S
qrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a*b*c^(1/4)*(
Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c +
d*x^8])
```

Rubi [A] time = 4.12689, antiderivative size = 1042, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$-\frac{\sqrt{dx^8+c}\,x^2}{8(bc-ad)\left(bx^8+a\right)}+\frac{(bc+ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}\,x^2}{\sqrt{dx^8+c}}\right)}{32ab(bc-ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{(bc+ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x^2}{\sqrt{dx^8+c}}\right)}{32(-a)^{3/2}b^{3/2}\left(\frac{bc-ad}{\sqrt{-a}\sqrt{b}}\right)^{3/2}}$$
$$-\frac{\sqrt[4]{d}(bc+ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32b\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$+\frac{\sqrt[4]{d}(bc+ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32b\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$-\frac{d^{3/4}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b\sqrt[4]{c}(bc-ad)\sqrt{dx^8+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc+ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64ab\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc+ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64ab\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^9/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -(x^2*Sqrt[c + d*x^8])/(8*(b*c - a*d)*(a + b*x^8)) + ((b*c + a*d)
*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt[c + d*x
^8]])/(32*a*b*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]
) - ((b*c + a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2
)/Sqrt[c + d*x^8]])/(32*(-a)^(3/2)*b^(3/2)*((b*c - a*d)/(Sqrt[-a]
*Sqrt[b]))^(3/2)) - (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*
x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/
c^(1/4)], 1/2])/(16*b*c^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8]) - (d^(
1/4)*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c
] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/
2])/(32*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a
*d)*Sqrt[c + d*x^8]) + (d^(1/4)*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^
4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan
[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*b*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sq
rt[c] + a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) + ((Sqrt[b]*Sqrt[
c] + Sqrt[-a]*Sqrt[d])*(b*c + a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(
c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c
] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*A
rcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a*b*c^(1/4)*(Sqrt[b]*Sqrt
[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8]) + ((
Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c + a*d)*(Sqrt[c] + Sqrt[d
]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sq
rt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*S
qrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a*b*c^(1/4)*(
Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c +
d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**9/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.310513, size = 333, normalized size = 0.32

$$\frac{x^2\left(\frac{25ac^2F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{2x^8\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}-\frac{9acdx^8F_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};\right.}{2x^8\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{9}{4};\frac{3}{2},1;\frac{13}{4};\right.\right.}\right.}{40\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^9/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^2*(5*(c + d*x^8) + (25*a*c^2*AppellF1[1/4, 1/2, 1, 5/4, -((d*x
^8)/c), -((b*x^8)/a)])/(-5*a*c*AppellF1[1/4, 1/2, 1, 5/4, -((d*x^
8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[5/4, 1/2, 2, 9/4, -(
(d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[5/4, 3/2, 1, 9/4, -((d*x
^8)/c), -((b*x^8)/a)])) - (9*a*c*d*x^8*AppellF1[5/4, 1/2, 1, 9/4,
 -((d*x^8)/c), -((b*x^8)/a)])/(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4,
-((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[9/4, 1/2, 2,
13/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/
4, -((d*x^8)/c), -((b*x^8)/a)]))))/(40*(-(b*c) + a*d)*(a + b*x^8)
*Sqrt[c + d*x^8])
```

Maple [F] time = 0.074, size = 0, normalized size = 0.

$$\int \frac{x^9}{(bx^8+a)^2} \frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^9/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)

[Out] int(x^9/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^9}{(bx^8+a)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] integrate(x^9/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^9}{(bx^8+a)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")

[Out] integrate(x^9/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

3.750 $\int \frac{x}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=1050

result too large to display

```
[Out] (b*x^2*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(a + b*x^8)) + ((3*b*c -
 5*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt[
c + d*x^8]])/(32*a^2*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqr
t[b]))]) + ((3*b*c - 5*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sq
rt[b])]*x^2)/Sqrt[c + d*x^8]])/(32*a^2*(b*c - a*d)*Sqrt[(b*c - a*
d)/(Sqrt[-a]*Sqrt[b])]) + (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(
c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)
*x^2)/c^(1/4)], 1/2])/(16*a*c^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8])
- (d^(1/4)*(3*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^
8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^
(1/4)], 1/2])/(32*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d]
)*(b*c - a*d)*Sqrt[c + d*x^8]) + (d^(1/4)*(3*b*c - 5*a*d)*(Sqrt[c
] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Elli
pticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a*c^(1/4)*(Sqrt[
-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) + (
(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(3*b*c - 5*a*d)*(Sqrt[c] + S
qrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticP
i[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqr
t[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a^2*c^(
1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqr
t[c + d*x^8]) + ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(3*b*c - 5*
a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*
x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt
[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1
/2])/(64*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)
*(b*c - a*d)*Sqrt[c + d*x^8])
```

Rubi [A] time = 3.17293, antiderivative size = 1050, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$\frac{b\sqrt{dx^8+cx^2}}{8a(bc-ad)(bx^8+a)}+\frac{(3bc-5ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{32a^2(bc-ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}+\frac{(3bc-5ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{32a^2(bc-ad)\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$-\frac{\sqrt[4]{d}(3bc-5ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$+\frac{\sqrt[4]{d}(3bc-5ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$+\frac{d^{3/4}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a\sqrt[4]{c}(bc-ad)\sqrt{dx^8+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(3bc-5ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$
$$+\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(3bc-5ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (b*x^2*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(a + b*x^8)) + ((3*b*c -
 5*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt[
c + d*x^8]])/(32*a^2*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqr
t[b]))]) + ((3*b*c - 5*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sq
rt[b])]*x^2)/Sqrt[c + d*x^8]])/(32*a^2*(b*c - a*d)*Sqrt[(b*c - a*
d)/(Sqrt[-a]*Sqrt[b])]) + (d^(3/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(
c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)
*x^2)/c^(1/4)], 1/2])/(16*a*c^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8])
- (d^(1/4)*(3*b*c - 5*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^
8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^
(1/4)], 1/2])/(32*a*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d]
)*(b*c - a*d)*Sqrt[c + d*x^8]) + (d^(1/4)*(3*b*c - 5*a*d)*(Sqrt[c
] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Elli
pticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a*c^(1/4)*(Sqrt[
-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) + (
(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(3*b*c - 5*a*d)*(Sqrt[c] + S
qrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticP
i[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqr
t[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a^2*c^(
1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqr
t[c + d*x^8]) + ((Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(3*b*c - 5*
a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*
x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt
[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1
/2])/(64*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)
*(b*c - a*d)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.527045, size = 343, normalized size = 0.33

$$\frac{x^2\left(\frac{9bcdx^8F_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{2x^8\left(2bcF_1\left(\frac{9}{4};\frac{1}{2},2;\frac{13}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{9}{4};\frac{3}{2},1;\frac{13}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-9acF_1\left(\frac{5}{4};\frac{1}{2},1;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{25c(3bc-4ad)F_1\left(\frac{1}{4};\frac{1}{2},\ldots\right.}{2x^8\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};\ldots\right.\right.}\ldots\right.}{40\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^2*((-5*b*(c + d*x^8))/a + (25*c*(3*b*c - 4*a*d)*AppellF1[1/4,
1/2, 1, 5/4, -((d*x^8)/c), -((b*x^8)/a)])/(-5*a*c*AppellF1[1/4, 1
/2, 1, 5/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[5
/4, 1/2, 2, 9/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[5/4,
3/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a)])) + (9*b*c*d*x^8*AppellF
1[5/4, 1/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a)])/(-9*a*c*AppellF1
[5/4, 1/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*App
ellF1[9/4, 1/2, 2, 13/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*Appell
F1[9/4, 3/2, 1, 13/4, -((d*x^8)/c), -((b*x^8)/a)]))))/(40*(-(b*c)
 + a*d)*(a + b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.065, size = 0, normalized size = 0.

$$\int \frac{x}{\left(b x^{8}+a\right)^{2}} \frac{1}{\sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)

[Out] int(x/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(b x^{8}+a\right)^{2} \sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] integrate(x/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(b x^{8}+a\right)^{2} \sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")

[Out] integrate(x/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

3.751 $\int \frac{1}{x^7(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=1108

result too large to display

```
[Out] -((7*b*c - 4*a*d)*Sqrt[c + d*x^8])/(24*a^2*c*(b*c - a*d)*x^6) + (
b*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*x^6*(a + b*x^8)) - (b*(7*b*c
- 9*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt
[c + d*x^8]])/(32*a^3*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sq
rt[b]))]) - (b*(7*b*c - 9*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]
*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]])/(32*a^3*(b*c - a*d)*Sqrt[(b*c -
 a*d)/(Sqrt[-a]*Sqrt[b])]) + (b*d^(1/4)*(7*b*c - 9*a*d)*(Sqrt[c]
+ Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Ellipt
icF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[
-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) - (
b*d^(1/4)*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8
)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(
1/4)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d
])*(b*c - a*d)*Sqrt[c + d*x^8]) - (d^(3/4)*(7*b*c - 4*a*d)*(Sqrt[
c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Ell
ipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(48*a^2*c^(5/4)*(b*
c - a*d)*Sqrt[c + d*x^8]) - (b*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d
])*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt
[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqr
t[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x
^2)/c^(1/4)], 1/2])/(64*a^3*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*S
qrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8]) - (b*(Sqrt[b]*Sqrt[c
] - Sqrt[-a]*Sqrt[d])*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqr
t[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt
[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2
*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a^3*c^(1/4)*(Sqrt[b]*Sq
rt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8])
```

Rubi [A] time = 4.58504, antiderivative size = 1108, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.292

$$-\frac{(7bc-9ad)\tan^{-1}\left(\frac{\sqrt{\frac{\sqrt{-a}\left(\frac{bc}{a}-d\right)}{\sqrt{b}}}\,x^2}{\sqrt{dx^8+c}}\right)b}{32a^3(bc-ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}-\frac{(7bc-9ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\,x^2}{\sqrt{dx^8+c}}\right)b}{32a^3(bc-ad)\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}}$$
$$+\frac{\sqrt[4]{d}(7bc-9ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)b}{32a^2\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$-\frac{\sqrt[4]{d}(7bc-9ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)b}{32a^2\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(7bc-9ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\left(-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)b}{64a^3\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$
$$-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(7bc-9ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)b}{64a^3\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$
$$+\frac{\sqrt{dx^8+c}\,b}{8a(bc-ad)x^6\left(bx^8+a\right)}-\frac{d^{3/4}(7bc-4ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{48a^2c^{5/4}(bc-ad)\sqrt{dx^8+c}}$$
$$-\frac{(7bc-4ad)\sqrt{dx^8+c}}{24a^2c(bc-ad)x^6}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/(x^7*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -((7*b*c - 4*a*d)*Sqrt[c + d*x^8])/(24*a^2*c*(b*c - a*d)*x^6) + (
b*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*x^6*(a + b*x^8)) - (b*(7*b*c
- 9*a*d)*ArcTan[(Sqrt[(Sqrt[-a]*((b*c)/a - d))/Sqrt[b]]*x^2)/Sqrt
[c + d*x^8]])/(32*a^3*(b*c - a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sq
rt[b]))]) - (b*(7*b*c - 9*a*d)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]
*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]])/(32*a^3*(b*c - a*d)*Sqrt[(b*c -
 a*d)/(Sqrt[-a]*Sqrt[b])]) + (b*d^(1/4)*(7*b*c - 9*a*d)*(Sqrt[c]
+ Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Ellipt
icF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[
-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) - (
b*d^(1/4)*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8
)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(
1/4)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d
])*(b*c - a*d)*Sqrt[c + d*x^8]) - (d^(3/4)*(7*b*c - 4*a*d)*(Sqrt[
c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Ell
ipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(48*a^2*c^(5/4)*(b*
c - a*d)*Sqrt[c + d*x^8]) - (b*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d
])*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt
[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqr
t[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x
^2)/c^(1/4)], 1/2])/(64*a^3*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*S
qrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8]) - (b*(Sqrt[b]*Sqrt[c
] - Sqrt[-a]*Sqrt[d])*(7*b*c - 9*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqr
t[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt
[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2
*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a^3*c^(1/4)*(Sqrt[b]*Sq
rt[c] + Sqrt[-a]*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**7/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 1.283, size = 399, normalized size = 0.36

$$\frac{\frac{25ax^8\left(4a^2d^2+20abcd-21b^2c^2\right)F_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{2x^8\left(2bcF_1\left(\frac{5}{4};\frac{1}{2},2;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{5}{4};\frac{3}{2},1;\frac{9}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-5acF_1\left(\frac{1}{4};\frac{1}{2},1;\frac{5}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{5\left(c+dx^8\right)\left(-4a^2d+4ab\left(c-dx^8\right)+7b^2cx^8\right)}{c}+\cdots}{120a^2x^6\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^7*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((5*(c + d*x^8)*(-4*a^2*d + 7*b^2*c*x^8 + 4*a*b*(c - d*x^8)))/c +
 (25*a*(-21*b^2*c^2 + 20*a*b*c*d + 4*a^2*d^2)*x^8*AppellF1[1/4, 1
/2, 1, 5/4, -((d*x^8)/c), -((b*x^8)/a)])/(-5*a*c*AppellF1[1/4, 1/
2, 1, 5/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[5/
4, 1/2, 2, 9/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[5/4, 3
/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a)])) + (9*a*b*d*(-7*b*c + 4*
a*d)*x^16*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a)])
/(-9*a*c*AppellF1[5/4, 1/2, 1, 9/4, -((d*x^8)/c), -((b*x^8)/a)] +
 2*x^8*(2*b*c*AppellF1[9/4, 1/2, 2, 13/4, -((d*x^8)/c), -((b*x^8)
/a)] + a*d*AppellF1[9/4, 3/2, 1, 13/4, -((d*x^8)/c), -((b*x^8)/a)
])))/(120*a^2*(-(b*c) + a*d)*x^6*(a + b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.132, size = 0, normalized size = 0.

$$\int \frac{1}{x^{7} \left(b x^{8}+a \right)^{2}} \frac{1}{\sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^7/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^7/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{{\left(b x^{8} + a\right)}^{2} \sqrt{d x^{8} + c} x^{7}}\,{d x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^7),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^7), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^7),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**7/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{{\left(b x^{8} + a\right)}^{2} \sqrt{d x^{8} + c} x^{7}}\,{d x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^7),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^7), x)
```

3.752 $\int \frac{x^{13}}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=1208

result too large to display

```
[Out] (Sqrt[d]*x^2*Sqrt[c + d*x^8])/(8*b*(b*c - a*d)*(Sqrt[c] + Sqrt[d]
*x^4)) - (x^6*Sqrt[c + d*x^8])/(8*(b*c - a*d)*(a + b*x^8)) + (Sqr
t[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*(3*b*c - a*d)*ArcTan[(Sqrt[-
((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt[c + d*x^8]])/(32*b*(b
*c - a*d)^2) + (Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*(3*b*c - a*d
)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^
8]])/(32*b*(b*c - a*d)^2) - (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x
^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticE[2*ArcTa
n[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*b*(b*c - a*d)*Sqrt[c + d*x^8])
 + (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqr
t[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)],
 1/2])/(16*b*(b*c - a*d)*Sqrt[c + d*x^8]) - (d^(1/4)*(3*b*c - a*d
)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4
)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*b^(3/2)
*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c
+ d*x^8]) - (d^(1/4)*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(
c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)
*x^2)/c^(1/4)], 1/2])/(32*b^(3/2)*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt
[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) - ((Sqrt[b]*Sqrt[c] -
Sqrt[-a]*Sqrt[d])*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c +
 d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] +
Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTa
n[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqr
t[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8]) +
((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(3*b*c - a*d)*(Sqrt[c] + Sq
rt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi
[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*
Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*b^(3
/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*(b*c -
 a*d)*Sqrt[c + d*x^8])
```

Rubi [A] time = 4.05687, antiderivative size = 1208, normalized size of antiderivative = 1., number

of steps used = 12, number of rules used = 8, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$

$$
\begin{aligned}
&-\frac{\sqrt{dx^8+c}\,x^6}{8(bc-ad)(bx^8+a)}+\frac{\sqrt{d}\sqrt{dx^8+c}\,x^2}{8b(bc-ad)\left(\sqrt{d}x^4+\sqrt{c}\right)}+\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}(3bc-ad)\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{32b(bc-ad)^2} \\
&+\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}(3bc-ad)\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{32b(bc-ad)^2}-\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8b(bc-ad)\sqrt{dx^8+c}} \\
&-\frac{\sqrt[4]{d}(3bc-ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}} \\
&-\frac{\sqrt[4]{d}(3bc-ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32b^{3/2}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}} \\
&+\frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16b(bc-ad)\sqrt{dx^8+c}} \\
&-\frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(3bc-ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64b^{3/2}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}} \\
&+\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(3bc-ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64b^{3/2}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}
\end{aligned}
$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^13/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (Sqrt[d]*x^2*Sqrt[c + d*x^8])/(8*b*(b*c - a*d)*(Sqrt[c] + Sqrt[d]
*x^4)) - (x^6*Sqrt[c + d*x^8])/(8*(b*c - a*d)*(a + b*x^8)) + (Sqr
t[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*(3*b*c - a*d)*ArcTan[(Sqrt[-
((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt[c + d*x^8]])/(32*b*(b
*c - a*d)^2) + (Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*(3*b*c - a*d
)*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^
8]])/(32*b*(b*c - a*d)^2) - (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x
^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticE[2*ArcTa
n[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*b*(b*c - a*d)*Sqrt[c + d*x^8])
 + (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqr
t[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)],
 1/2])/(16*b*(b*c - a*d)*Sqrt[c + d*x^8]) - (d^(1/4)*(3*b*c - a*d
)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4
)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*b^(3/2)
*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c
+ d*x^8]) - (d^(1/4)*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(
c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)
*x^2)/c^(1/4)], 1/2])/(32*b^(3/2)*c^(1/4)*(Sqrt[b]*Sqrt[c] + Sqrt
[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) - ((Sqrt[b]*Sqrt[c] -
Sqrt[-a]*Sqrt[d])*(3*b*c - a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c +
 d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*Sqrt[c] +
Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d]), 2*ArcTa
n[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*b^(3/2)*c^(1/4)*(Sqrt[-a]*Sqr
t[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8]) +
((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(3*b*c - a*d)*(Sqrt[c] + Sq
rt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi
[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*
Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*b^(3
/2)*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d^(1/4)*(b*c -
 a*d)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**13/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.315823, size = 333, normalized size = 0.28

$$\frac{x^6\left(\frac{49ac^2F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{2x^8\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{11acdx^8F_1\left(\frac{7}{4};\frac{1}{2},1 \ldots\right.}{2x^8\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{11}{4};\frac{3}{2},1; \ldots\right.\right.}\right.}{56\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^13/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^6*(7*(c + d*x^8) + (49*a*c^2*AppellF1[3/4, 1/2, 1, 7/4, -((d*x
^8)/c), -((b*x^8)/a)])/(-7*a*c*AppellF1[3/4, 1/2, 1, 7/4, -((d*x^
8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[7/4, 1/2, 2, 11/4, -
((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[7/4, 3/2, 1, 11/4, -((d
*x^8)/c), -((b*x^8)/a)])) + (11*a*c*d*x^8*AppellF1[7/4, 1/2, 1, 1
1/4, -((d*x^8)/c), -((b*x^8)/a)])/(-11*a*c*AppellF1[7/4, 1/2, 1,
11/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[11/4, 1
/2, 2, 15/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[11/4, 3/2
, 1, 15/4, -((d*x^8)/c), -((b*x^8)/a)]))))/(56*(-(b*c) + a*d)*(a
+ b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.073, size = 0, normalized size = 0.

$$\int \frac{x^{13}}{\left(bx^8+a\right)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^13/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^13/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{13}}{\left(bx^8+a\right)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^13/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^13/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^13/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**13/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{13}}{(bx^8 + a)^2 \sqrt{dx^8 + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^13/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^13/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

3.753 $\int \frac{x^5}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=1218

result too large to display

```
[Out] -(Sqrt[d]*x^2*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(Sqrt[c] + Sqrt[d
]*x^4)) + (b*x^6*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(a + b*x^8)) +
 ((b*c - 3*a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(S
qrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt[c + d*x^8]])/(32
*a*(b*c - a*d)^2) + ((b*c - 3*a*d)*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqr
t[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c +
 d*x^8]])/(32*a*(b*c - a*d)^2) + (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt
[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticE[2*
ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*a*(b*c - a*d)*Sqrt[c + d*
x^8]) - (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)
/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1
/4)], 1/2])/(16*a*(b*c - a*d)*Sqrt[c + d*x^8]) - (d^(1/4)*(b*c -
3*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d
]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a*
Sqrt[b]*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*
Sqrt[c + d*x^8]) - (d^(1/4)*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^4)
*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(
d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a*Sqrt[b]*c^(1/4)*(Sqrt[b]*Sqrt[
c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) - ((Sqrt[b]*S
qrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*
Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*S
qrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d])
, 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a*Sqrt[b]*c^(1/4)*(S
qrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c +
 d*x^8]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - 3*a*d)*(S
qrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]
*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(
4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2
])/(64*a*Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d
^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8])
```

Rubi [A] time = 4.10498, antiderivative size = 1218, normalized size of antiderivative = 1., number

of steps used = 12, number of rules used = 8, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$

$$\frac{b\sqrt{dx^8+cx^6}}{8a(bc-ad)(bx^8+a)} - \frac{\sqrt{d}\sqrt{dx^8+cx^2}}{8a(bc-ad)\left(\sqrt{d}x^4+\sqrt{c}\right)} + \frac{(bc-3ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{32a(bc-ad)^2}$$
$$+ \frac{(bc-3ad)\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{32a(bc-ad)^2} + \frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a(bc-ad)\sqrt{dx^8+c}}$$
$$- \frac{\sqrt[4]{d}(bc-3ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$- \frac{\sqrt[4]{d}(bc-3ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a\sqrt{b}\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$- \frac{\sqrt[4]{c}\sqrt[4]{d}\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a(bc-ad)\sqrt{dx^8+c}}$$
$$- \frac{\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-3ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64a\sqrt{b}\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$
$$+ \frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-3ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64a\sqrt{b}\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[x^5/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -(Sqrt[d]*x^2*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(Sqrt[c] + Sqrt[d
]*x^4)) + (b*x^6*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*(a + b*x^8)) +
 ((b*c - 3*a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*ArcTan[(S
qrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/Sqrt[c + d*x^8]])/(32
*a*(b*c - a*d)^2) + ((b*c - 3*a*d)*Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqr
t[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*x^2)/Sqrt[c +
 d*x^8]])/(32*a*(b*c - a*d)^2) + (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt
[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticE[2*
ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(8*a*(b*c - a*d)*Sqrt[c + d*
x^8]) - (c^(1/4)*d^(1/4)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)
/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1
/4)], 1/2])/(16*a*(b*c - a*d)*Sqrt[c + d*x^8]) - (d^(1/4)*(b*c -
3*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d
]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a*
Sqrt[b]*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - a*d)*
Sqrt[c + d*x^8]) - (d^(1/4)*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^4)
*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(
d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a*Sqrt[b]*c^(1/4)*(Sqrt[b]*Sqrt[
c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8]) - ((Sqrt[b]*S
qrt[c] - Sqrt[-a]*Sqrt[d])*(b*c - 3*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*
Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticPi[(Sqrt[b]*S
qrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b]*Sqrt[c]*Sqrt[d])
, 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a*Sqrt[b]*c^(1/4)*(S
qrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c +
 d*x^8]) + ((Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - 3*a*d)*(S
qrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]
*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*Sqrt[d])/Sqrt[c])^2)/(
4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2
])/(64*a*Sqrt[b]*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] + a*Sqrt[d])*d
^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 0.511804, size = 342, normalized size = 0.28

$$\frac{x^6\left(-\frac{33bcdx^8F_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{2x^8\left(2bcF_1\left(\frac{11}{4};\frac{1}{2},2;\frac{15}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{11}{4};\frac{3}{2},1;\frac{15}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-11acF_1\left(\frac{7}{4};\frac{1}{2},1;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{49c(bc-4ad)F_1}{2x^8\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{7}{4};\cdots\right.\right.}\cdots\right)}{168\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^5/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^6*((-21*b*(c + d*x^8))/a + (49*c*(b*c - 4*a*d)*AppellF1[3/4, 1
/2, 1, 7/4, -((d*x^8)/c), -((b*x^8)/a)])/(-7*a*c*AppellF1[3/4, 1/
2, 1, 7/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[7/
4, 1/2, 2, 11/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[7/4,
3/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)/a)])) - (33*b*c*d*x^8*Appel
lF1[7/4, 1/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)/a)])/(-11*a*c*Appe
llF1[7/4, 1/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*
c*AppellF1[11/4, 1/2, 2, 15/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*
AppellF1[11/4, 3/2, 1, 15/4, -((d*x^8)/c), -((b*x^8)/a)]))))/(168
*(-(b*c) + a*d)*(a + b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.067, size = 0, normalized size = 0.

$$\int \frac{x^5}{\left(bx^8+a\right)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^5/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\left(bx^8+a\right)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^5/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{(bx^8 + a)^2 \sqrt{dx^8 + c}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")
```

```
[Out] integrate(x^5/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

3.754 $\int \frac{1}{x^3(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=1299

result too large to display

```
[Out] -((5*b*c - 4*a*d)*Sqrt[c + d*x^8])/(8*a^2*c*(b*c - a*d)*x^2) + (S
qrt[d]*(5*b*c - 4*a*d)*x^2*Sqrt[c + d*x^8])/(8*a^2*c*(b*c - a*d)*
(Sqrt[c] + Sqrt[d]*x^4)) + (b*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*x
^2*(a + b*x^8)) - (b*(5*b*c - 7*a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]
*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/
Sqrt[c + d*x^8]])/(32*a^2*(b*c - a*d)^2) - (b*(5*b*c - 7*a*d)*Sqr
t[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[
-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]])/(32*a^2*(b*c - a*d)^2) - (d^
(1/4)*(5*b*c - 4*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(S
qrt[c] + Sqrt[d]*x^4)^2]*EllipticE[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)
], 1/2])/(8*a^2*c^(3/4)*(b*c - a*d)*Sqrt[c + d*x^8]) + (Sqrt[b]*d
^(1/4)*(5*b*c - 7*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(
Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4
)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b
*c - a*d)*Sqrt[c + d*x^8]) + (Sqrt[b]*d^(1/4)*(5*b*c - 7*a*d)*(Sq
rt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*
EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a^2*c^(1/4)*
(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8])
 + (d^(1/4)*(5*b*c - 4*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x
^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c
^(1/4)], 1/2])/(16*a^2*c^(3/4)*(b*c - a*d)*Sqrt[c + d*x^8]) + (Sq
rt[b]*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(5*b*c - 7*a*d)*(Sqrt[
c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Ell
ipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b
]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a^
2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a
*d)*Sqrt[c + d*x^8]) - (Sqrt[b]*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[
d])*(5*b*c - 7*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqr
t[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*
Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1
/4)*x^2)/c^(1/4)], 1/2])/(64*a^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c
] + a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8])
```

Rubi [A] time = 5.42838, antiderivative size = 1299, normalized size of antiderivative = 1., number

of steps used = 13, number of rules used = 9, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.375$

$$\frac{\sqrt{d}(5bc-4ad)\sqrt{dx^8+cx^2}}{8a^2c(bc-ad)\left(\sqrt{d}x^4+\sqrt{c}\right)} - \frac{b(5bc-7ad)\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{-\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{32a^2(bc-ad)^2}$$
$$- \frac{b(5bc-7ad)\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{\frac{bc-ad}{\sqrt{-a}\sqrt{b}}}x^2}{\sqrt{dx^8+c}}\right)}{32a^2(bc-ad)^2}$$
$$- \frac{\sqrt[4]{d}(5bc-4ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{8a^2c^{3/4}(bc-ad)\sqrt{dx^8+c}}$$
$$+ \frac{\sqrt{b}\sqrt[4]{d}(5bc-7ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$+ \frac{\sqrt{b}\sqrt[4]{d}(5bc-7ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{32a^2\sqrt[4]{c}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(bc-ad)\sqrt{dx^8+c}}$$
$$+ \frac{\sqrt[4]{d}(5bc-4ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{16a^2c^{3/4}(bc-ad)\sqrt{dx^8+c}}$$
$$+ \frac{\sqrt{b}\left(\sqrt{b}\sqrt{c}-\sqrt{-a}\sqrt{d}\right)(5bc-7ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(\frac{\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{c}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64a^2\sqrt[4]{c}\left(\sqrt{-a}\sqrt{b}\sqrt{c}-a\sqrt{d}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$
$$- \frac{\sqrt{b}\left(\sqrt{b}\sqrt{c}+\sqrt{-a}\sqrt{d}\right)(5bc-7ad)\left(\sqrt{d}x^4+\sqrt{c}\right)\sqrt{\frac{dx^8+c}{\left(\sqrt{d}x^4+\sqrt{c}\right)^2}}\Pi\left(-\frac{\sqrt{c}\left(\sqrt{b}-\frac{\sqrt{-a}\sqrt{d}}{\sqrt{c}}\right)^2}{4\sqrt{-a}\sqrt{b}\sqrt{d}};2\tan^{-1}\left(\frac{\sqrt[4]{d}x^2}{\sqrt[4]{c}}\right)|\frac{1}{2}\right)}{64a^2\sqrt[4]{c}\left(\sqrt{d}a+\sqrt{-a}\sqrt{b}\sqrt{c}\right)\sqrt[4]{d}(bc-ad)\sqrt{dx^8+c}}$$
$$- \frac{(5bc-4ad)\sqrt{dx^8+c}}{8a^2c(bc-ad)x^2} + \frac{b\sqrt{dx^8+c}}{8a(bc-ad)(bx^8+a)x^2}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[1/(x^3*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -((5*b*c - 4*a*d)*Sqrt[c + d*x^8])/(8*a^2*c*(b*c - a*d)*x^2) + (S
qrt[d]*(5*b*c - 4*a*d)*x^2*Sqrt[c + d*x^8])/(8*a^2*c*(b*c - a*d)*
(Sqrt[c] + Sqrt[d]*x^4)) + (b*Sqrt[c + d*x^8])/(8*a*(b*c - a*d)*x
^2*(a + b*x^8)) - (b*(5*b*c - 7*a*d)*Sqrt[-((b*c - a*d)/(Sqrt[-a]
*Sqrt[b]))]*ArcTan[(Sqrt[-((b*c - a*d)/(Sqrt[-a]*Sqrt[b]))]*x^2)/
Sqrt[c + d*x^8]])/(32*a^2*(b*c - a*d)^2) - (b*(5*b*c - 7*a*d)*Sqr
t[(b*c - a*d)/(Sqrt[-a]*Sqrt[b])]*ArcTan[(Sqrt[(b*c - a*d)/(Sqrt[
-a]*Sqrt[b])]*x^2)/Sqrt[c + d*x^8]])/(32*a^2*(b*c - a*d)^2) - (d^
(1/4)*(5*b*c - 4*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(S
qrt[c] + Sqrt[d]*x^4)^2]*EllipticE[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)
], 1/2])/(8*a^2*c^(3/4)*(b*c - a*d)*Sqrt[c + d*x^8]) + (Sqrt[b]*d
^(1/4)*(5*b*c - 7*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(
Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4
)], 1/2])/(32*a^2*c^(1/4)*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(b
*c - a*d)*Sqrt[c + d*x^8]) + (Sqrt[b]*d^(1/4)*(5*b*c - 7*a*d)*(Sq
rt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*
EllipticF[2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(32*a^2*c^(1/4)*
(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])*(b*c - a*d)*Sqrt[c + d*x^8])
 + (d^(1/4)*(5*b*c - 4*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x
^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*EllipticF[2*ArcTan[(d^(1/4)*x^2)/c
^(1/4)], 1/2])/(16*a^2*c^(3/4)*(b*c - a*d)*Sqrt[c + d*x^8]) + (Sq
rt[b]*(Sqrt[b]*Sqrt[c] - Sqrt[-a]*Sqrt[d])*(5*b*c - 7*a*d)*(Sqrt[
c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqrt[c] + Sqrt[d]*x^4)^2]*Ell
ipticPi[(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[d])^2/(4*Sqrt[-a]*Sqrt[b
]*Sqrt[c]*Sqrt[d]), 2*ArcTan[(d^(1/4)*x^2)/c^(1/4)], 1/2])/(64*a^
2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c] - a*Sqrt[d])*d^(1/4)*(b*c - a
```

```
*d)*Sqrt[c + d*x^8]) - (Sqrt[b]*(Sqrt[b]*Sqrt[c] + Sqrt[-a]*Sqrt[
d])*(5*b*c - 7*a*d)*(Sqrt[c] + Sqrt[d]*x^4)*Sqrt[(c + d*x^8)/(Sqr
t[c] + Sqrt[d]*x^4)^2]*EllipticPi[-(Sqrt[c]*(Sqrt[b] - (Sqrt[-a]*
Sqrt[d])/Sqrt[c])^2)/(4*Sqrt[-a]*Sqrt[b]*Sqrt[d]), 2*ArcTan[(d^(1
/4)*x^2)/c^(1/4)], 1/2])/(64*a^2*c^(1/4)*(Sqrt[-a]*Sqrt[b]*Sqrt[c
] + a*Sqrt[d])*d^(1/4)*(b*c - a*d)*Sqrt[c + d*x^8])
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 1.53944, size = 399, normalized size = 0.31

$$\frac{-\frac{49ax^8\left(4a^2d^2-12abcd+5b^2c^2\right)F_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{2x^8\left(2bcF_1\left(\frac{7}{4};\frac{1}{2},2;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{7}{4};\frac{3}{2},1;\frac{11}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-7acF_1\left(\frac{3}{4};\frac{1}{2},1;\frac{7}{4};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{21\left(c+dx^8\right)\left(-4a^2d+4ab\left(c-dx^8\right)+5b^2cx^8\right)}{c}+\frac{\cdots}{2x^8\left(2b\cdots\right.}}{168a^2x^2\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((21*(c + d*x^8)*(-4*a^2*d + 5*b^2*c*x^8 + 4*a*b*(c - d*x^8)))/c
- (49*a*(5*b^2*c^2 - 12*a*b*c*d + 4*a^2*d^2)*x^8*AppellF1[3/4, 1/
2, 1, 7/4, -((d*x^8)/c), -((b*x^8)/a)])/(-7*a*c*AppellF1[3/4, 1/2
, 1, 7/4, -((d*x^8)/c), -((b*x^8)/a)] + 2*x^8*(2*b*c*AppellF1[7/4
, 1/2, 2, 11/4, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[7/4, 3
/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)/a)])) + (33*a*b*d*(5*b*c - 4
*a*d)*x^16*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)/a)
])/(-11*a*c*AppellF1[7/4, 1/2, 1, 11/4, -((d*x^8)/c), -((b*x^8)/a
)] + 2*x^8*(2*b*c*AppellF1[11/4, 1/2, 2, 15/4, -((d*x^8)/c), -((b
*x^8)/a)] + a*d*AppellF1[11/4, 3/2, 1, 15/4, -((d*x^8)/c), -((b*x
^8)/a)])))/(168*a^2*(-(b*c) + a*d)*x^2*(a + b*x^8)*Sqrt[c + d*x^8
])
```

Maple [F] time = 0.124, size = 0, normalized size = 0.

$$\int \frac{1}{x^3\left(bx^8+a\right)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^3/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)^2\sqrt{dx^8+c}\,x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^3), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^3),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^8 + a)^2 \sqrt{dx^8 + c}x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^3), x)
```

3.755 $\int \frac{x^4}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=64

$$\frac{x^5\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{5}{8};2,\frac{1}{2};\frac{13}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{5a^2\sqrt{c+dx^8}}$$

```
[Out] (x^5*Sqrt[1 + (d*x^8)/c]*AppellF1[5/8, 2, 1/2, 13/8, -((b*x^8)/a)
, -((d*x^8)/c)])/(5*a^2*Sqrt[c + d*x^8])
```

Rubi [A] time = 0.211893, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^5\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{5}{8};2,\frac{1}{2};\frac{13}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{5a^2\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^5*Sqrt[1 + (d*x^8)/c]*AppellF1[5/8, 2, 1/2, 13/8, -((b*x^8)/a)
, -((d*x^8)/c)])/(5*a^2*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 24.4298, size = 53, normalized size = 0.83

$$\frac{x^5\sqrt{c+dx^8}\,\text{appellf}_1\left(\frac{5}{8},\frac{1}{2},2,\frac{13}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{5a^2c\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] x**5*sqrt(c + d*x**8)*appellf1(5/8, 1/2, 2, 13/8, -d*x**8/c, -b*x
**8/a)/(5*a**2*c*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 0.69892, size = 343, normalized size = 5.36

$$\frac{x^5\left(-\frac{105bcdx^8F_1\left(\frac{13}{8};\frac{1}{2},1;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{4x^8\left(2bcF_1\left(\frac{21}{8};\frac{1}{2},2;\frac{29}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{21}{8};\frac{3}{2},1;\frac{29}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-21acF_1\left(\frac{13}{8};\frac{1}{2},1;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{169c(3bc-8ad}{4x^8\left(2bcF_1\left(\frac{13}{8};\frac{1}{2},2;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1(}\right.}{520\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^5*((-65*b*(c + d*x^8))/a + (169*c*(3*b*c - 8*a*d)*AppellF1[5/8
, 1/2, 1, 13/8, -((d*x^8)/c), -((b*x^8)/a)])/(-13*a*c*AppellF1[5/
8, 1/2, 1, 13/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*Appel
lF1[13/8, 1/2, 2, 21/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF
1[13/8, 3/2, 1, 21/8, -((d*x^8)/c), -((b*x^8)/a)])) - (105*b*c*d*
x^8*AppellF1[13/8, 1/2, 1, 21/8, -((d*x^8)/c), -((b*x^8)/a)])/(-2
1*a*c*AppellF1[13/8, 1/2, 1, 21/8, -((d*x^8)/c), -((b*x^8)/a)] +
4*x^8*(2*b*c*AppellF1[21/8, 1/2, 2, 29/8, -((d*x^8)/c), -((b*x^8)
```

```
/a)] + a*d*AppellF1[21/8, 3/2, 1, 29/8, -((d*x^8)/c), -((b*x^8)/a
)]))))/(520*(-(b*c) + a*d)*(a + b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^8+a)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)

[Out] int(x^4/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^8+a)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] integrate(x^4/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{(bx^8+a)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")

[Out] integrate(x^4/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

3.756 $\int \frac{x^2}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=64

$$\frac{x^3\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{3}{8};2,\frac{1}{2};\frac{11}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{3a^2\sqrt{c+dx^8}}$$

```
[Out] (x^3*Sqrt[1 + (d*x^8)/c]*AppellF1[3/8, 2, 1/2, 11/8, -((b*x^8)/a)
, -((d*x^8)/c)])/(3*a^2*Sqrt[c + d*x^8])
```

Rubi [A] time = 0.208368, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{x^3\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{3}{8};2,\frac{1}{2};\frac{11}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{3a^2\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^3*Sqrt[1 + (d*x^8)/c]*AppellF1[3/8, 2, 1/2, 11/8, -((b*x^8)/a)
, -((d*x^8)/c)])/(3*a^2*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 24.7165, size = 53, normalized size = 0.83

$$\frac{x^3\sqrt{c+dx^8}\,\text{appellf}_1\left(\frac{3}{8},\frac{1}{2},2,\frac{11}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{3a^2c\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] x**3*sqrt(c + d*x**8)*appellf1(3/8, 1/2, 2, 11/8, -d*x**8/c, -b*x
**8/a)/(3*a**2*c*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 0.768309, size = 343, normalized size = 5.36

$$\frac{x^3\left(\frac{57bcdx^8F_1\left(\frac{11}{8};\frac{1}{2},1;\frac{19}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{4x^8\left(2bcF_1\left(\frac{19}{8};\frac{1}{2},2;\frac{27}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{19}{8};\frac{3}{2},1;\frac{27}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-19acF_1\left(\frac{11}{8};\frac{1}{2},1;\frac{19}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{121c(5bc-8ad)F}{4x^8\left(2bcF_1\left(\frac{11}{8};\frac{1}{2},2;\frac{19}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{11}{8}\right.\right.}\right.}{264\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^2/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x^3*((-33*b*(c + d*x^8))/a + (121*c*(5*b*c - 8*a*d)*AppellF1[3/8
, 1/2, 1, 11/8, -((d*x^8)/c), -((b*x^8)/a)])/(-11*a*c*AppellF1[3/
8, 1/2, 1, 11/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*Appel
lF1[11/8, 1/2, 2, 19/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF
1[11/8, 3/2, 1, 19/8, -((d*x^8)/c), -((b*x^8)/a)])) + (57*b*c*d*x
^8*AppellF1[11/8, 1/2, 1, 19/8, -((d*x^8)/c), -((b*x^8)/a)])/(-19
*a*c*AppellF1[11/8, 1/2, 1, 19/8, -((d*x^8)/c), -((b*x^8)/a)] + 4
*x^8*(2*b*c*AppellF1[19/8, 1/2, 2, 27/8, -((d*x^8)/c), -((b*x^8)/
```

```
a)] + a*d*AppellF1[19/8, 3/2, 1, 27/8, -((d*x^8)/c), -((b*x^8)/a)
]))))/(264*(-(b*c) + a*d)*(a + b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.068, size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^8+a)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(x^2/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^8+a)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^2/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^8+a)^2\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")

[Out] integrate(x^2/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

3.757 $\int \frac{1}{(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=59

$$\frac{x\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{1}{8};2,\frac{1}{2};\frac{9}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{a^2\sqrt{c+dx^8}}$$

```
[Out] (x*Sqrt[1 + (d*x^8)/c]*AppellF1[1/8, 2, 1/2, 9/8, -((b*x^8)/a), -
((d*x^8)/c)])/(a^2*Sqrt[c + d*x^8])
```

Rubi [A] time = 0.0948071, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{x\sqrt{\frac{dx^8}{c}+1}F_1\left(\frac{1}{8};2,\frac{1}{2};\frac{9}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{a^2\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x*Sqrt[1 + (d*x^8)/c]*AppellF1[1/8, 2, 1/2, 9/8, -((b*x^8)/a), -
((d*x^8)/c)])/(a^2*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 20.3269, size = 49, normalized size = 0.83

$$\frac{x\sqrt{c+dx^8}\,\text{appellf}_1\left(\frac{1}{8},\frac{1}{2},2,\frac{9}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{a^2c\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] x*sqrt(c + d*x**8)*appellf1(1/8, 1/2, 2, 9/8, -d*x**8/c, -b*x**8/
a)/(a**2*c*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 0.805289, size = 341, normalized size = 5.78

$$\frac{x\left(\frac{17bcdx^8F_1\left(\frac{9}{8};\frac{1}{2},1;\frac{17}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{4x^8\left(2bcF_1\left(\frac{17}{8};\frac{1}{2},2;\frac{25}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{17}{8};\frac{3}{2},1;\frac{25}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-17acF_1\left(\frac{9}{8};\frac{1}{2},1;\frac{17}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{27c(7bc-8ad)F_1\left(\frac{1}{8}\right.}{4x^8\left(2bcF_1\left(\frac{9}{8};\frac{1}{2},2;\frac{17}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{9}{8};\frac{3}{2},1\right.\right.}\right.}{24\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/((a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] (x*((-3*b*(c + d*x^8))/a + (27*c*(7*b*c - 8*a*d)*AppellF1[1/8, 1/
2, 1, 9/8, -((d*x^8)/c), -((b*x^8)/a)])/(-9*a*c*AppellF1[1/8, 1/2
, 1, 9/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1[9/8
, 1/2, 2, 17/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[9/8, 3
/2, 1, 17/8, -((d*x^8)/c), -((b*x^8)/a)])) + (17*b*c*d*x^8*Appell
F1[9/8, 1/2, 1, 17/8, -((d*x^8)/c), -((b*x^8)/a)])/(-17*a*c*Appel
lF1[9/8, 1/2, 1, 17/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c
*AppellF1[17/8, 1/2, 2, 25/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*A
```

```
ppellF1[17/8, 3/2, 1, 25/8, -((d*x^8)/c), -((b*x^8)/a)]))))/(24*(
-(b*c) + a*d)*(a + b*x^8)*Sqrt[c + d*x^8])
```

Maple [F] time = 0.064, size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{8}+a\right)^{2}} \frac{1}{\sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)

[Out] int(1/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{8}+a\right)^{2} \sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="maxima")

[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{8}+a\right)^{2} \sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)),x, algorithm="giac")

[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)), x)
```

3.758 $\int \frac{1}{x^2(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=62

$$-\frac{\sqrt{\frac{dx^8}{c}+1}F_1\left(-\frac{1}{8};2,\frac{1}{2};\frac{7}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{a^2x\sqrt{c+dx^8}}$$

```
[Out] -((Sqrt[1 + (d*x^8)/c]*AppellF1[-1/8, 2, 1/2, 7/8, -((b*x^8)/a),
-((d*x^8)/c)])/(a^2*x*Sqrt[c + d*x^8]))
```

Rubi [A] time = 0.204087, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^8}{c}+1}F_1\left(-\frac{1}{8};2,\frac{1}{2};\frac{7}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{a^2x\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -((Sqrt[1 + (d*x^8)/c]*AppellF1[-1/8, 2, 1/2, 7/8, -((b*x^8)/a),
-((d*x^8)/c)])/(a^2*x*Sqrt[c + d*x^8]))
```

Rubi in Sympy [A] time = 25.2912, size = 53, normalized size = 0.85

$$-\frac{\sqrt{c+dx^8}\,\operatorname{appellf}_1\left(-\frac{1}{8},\frac{1}{2},2,\frac{7}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{a^2cx\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**8)*appellf1(-1/8, 1/2, 2, 7/8, -d*x**8/c, -b*x**8/
a)/(a**2*c*x*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 1.45121, size = 399, normalized size = 6.44

$$-\frac{\frac{75ax^8\left(24a^2d^2-40abcd+9b^2c^2\right)F_1\left(\frac{7}{8};\frac{1}{2},1;\frac{15}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{4x^8\left(2bcF_1\left(\frac{15}{8};\frac{1}{2},2;\frac{23}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{15}{8};\frac{3}{2},1;\frac{23}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-15acF_1\left(\frac{7}{8};\frac{1}{2},1;\frac{15}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{35\left(c+dx^8\right)\left(-8a^2d+8ab\left(c-dx^8\right)+9b^2cx^8\right)}{c}+\frac{\ldots}{4x^8\ldots}}{280a^2x\left(a+bx^8\right)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((35*(c + d*x^8)*(-8*a^2*d + 9*b^2*c*x^8 + 8*a*b*(c - d*x^8)))/c
- (75*a*(9*b^2*c^2 - 40*a*b*c*d + 24*a^2*d^2)*x^8*AppellF1[7/8, 1
/2, 1, 15/8, -((d*x^8)/c), -((b*x^8)/a)])/(-15*a*c*AppellF1[7/8,
1/2, 1, 15/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1
[15/8, 1/2, 2, 23/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1[1
5/8, 3/2, 1, 23/8, -((d*x^8)/c), -((b*x^8)/a)])) + (161*a*b*d*(9*
b*c - 8*a*d)*x^16*AppellF1[15/8, 1/2, 1, 23/8, -((d*x^8)/c), -((b
*x^8)/a)])/(-23*a*c*AppellF1[15/8, 1/2, 1, 23/8, -((d*x^8)/c), -(
(b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1[23/8, 1/2, 2, 31/8, -((d*x^8)
```

```
/c), -((b*x^8)/a)] + a*d*AppellF1[23/8, 3/2, 1, 31/8, -((d*x^8)/c
), -((b*x^8)/a)])))/(280*a^2*(-(b*c) + a*d)*x*(a + b*x^8)*Sqrt[c
+ d*x^8])
```

Maple [F] time = 0.119, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \left(b x^{8}+a\right)^{2}} \frac{1}{\sqrt{d x^{8}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^2/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{{\left(b x^{8}+a\right)}^{2} \sqrt{d x^{8}+c}\, x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{{\left(b^{2} x^{18}+2\, a b x^{10}+a^{2} x^{2}\right)} \sqrt{d x^{8}+c}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/((b^2*x^18 + 2*a*b*x^10 + a^2*x^2)*sqrt(d*x^8 + c)), x
)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{{\left(b x^{8}+a\right)}^{2} \sqrt{d x^{8}+c}\, x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^2), x)
```

3.759 $\int \frac{1}{x^4(a+bx^8)^2\sqrt{c+dx^8}}\,dx$

Optimal. Leaf size=64

$$-\frac{\sqrt{\frac{dx^8}{c}+1}F_1\left(-\frac{3}{8};2,\frac{1}{2};\frac{5}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{3a^2x^3\sqrt{c+dx^8}}$$

```
[Out] -(Sqrt[1 + (d*x^8)/c]*AppellF1[-3/8, 2, 1/2, 5/8, -((b*x^8)/a), -
((d*x^8)/c)])/(3*a^2*x^3*Sqrt[c + d*x^8])
```

Rubi [A] time = 0.201814, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{\sqrt{\frac{dx^8}{c}+1}F_1\left(-\frac{3}{8};2,\frac{1}{2};\frac{5}{8};-\frac{bx^8}{a},-\frac{dx^8}{c}\right)}{3a^2x^3\sqrt{c+dx^8}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] -(Sqrt[1 + (d*x^8)/c]*AppellF1[-3/8, 2, 1/2, 5/8, -((b*x^8)/a), -
((d*x^8)/c)])/(3*a^2*x^3*Sqrt[c + d*x^8])
```

Rubi in Sympy [A] time = 25.1768, size = 56, normalized size = 0.88

$$-\frac{\sqrt{c+dx^8}\,\text{appellf}_1\left(-\frac{3}{8},\frac{1}{2},2,\frac{5}{8},-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{3a^2cx^3\sqrt{1+\frac{dx^8}{c}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] -sqrt(c + d*x**8)*appellf1(-3/8, 1/2, 2, 5/8, -d*x**8/c, -b*x**8/
a)/(3*a**2*c*x**3*sqrt(1 + d*x**8/c))
```

Mathematica [B] time = 1.52038, size = 399, normalized size = 6.23

$$\frac{-\frac{169ax^8(8a^2d^2-56abcd+33b^2c^2)F_1\left(\frac{5}{8};\frac{1}{2},1;\frac{13}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}{4x^8\left(2bcF_1\left(\frac{13}{8};\frac{1}{2},2;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)+adF_1\left(\frac{13}{8};\frac{3}{2},1;\frac{21}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)\right)-13acF_1\left(\frac{5}{8};\frac{1}{2},1;\frac{13}{8};-\frac{dx^8}{c},-\frac{bx^8}{a}\right)}+\frac{65(c+dx^8)(-8a^2d+8ab(c-dx^8)+11b^2cx^8)}{c}+\frac{\cdots}{4x^{\cdots}}}{1560a^2x^3(a+bx^8)\sqrt{c+dx^8}(ad-bc)}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^4*(a + b*x^8)^2*Sqrt[c + d*x^8]),x]
```

```
[Out] ((65*(c + d*x^8)*(-8*a^2*d + 11*b^2*c*x^8 + 8*a*b*(c - d*x^8)))/c
 - (169*a*(33*b^2*c^2 - 56*a*b*c*d + 8*a^2*d^2)*x^8*AppellF1[5/8,
 1/2, 1, 13/8, -((d*x^8)/c), -((b*x^8)/a)])/(-13*a*c*AppellF1[5/8
, 1/2, 1, 13/8, -((d*x^8)/c), -((b*x^8)/a)] + 4*x^8*(2*b*c*Appell
F1[13/8, 1/2, 2, 21/8, -((d*x^8)/c), -((b*x^8)/a)] + a*d*AppellF1
[13/8, 3/2, 1, 21/8, -((d*x^8)/c), -((b*x^8)/a)])) + (105*a*b*d*(
11*b*c - 8*a*d)*x^16*AppellF1[13/8, 1/2, 1, 21/8, -((d*x^8)/c), -
((b*x^8)/a)])/(-21*a*c*AppellF1[13/8, 1/2, 1, 21/8, -((d*x^8)/c),
 -((b*x^8)/a)] + 4*x^8*(2*b*c*AppellF1[21/8, 1/2, 2, 29/8, -((d*x
```

```
^8)/c), -((b*x^8)/a)] + a*d*AppellF1[21/8, 3/2, 1, 29/8, -((d*x^8
)/c), -((b*x^8)/a)])))/(1560*a^2*(-(b*c) + a*d)*x^3*(a + b*x^8)*S
qrt[c + d*x^8])
```

Maple [F] time = 0.117, size = 0, normalized size = 0.

$$\int \frac{1}{x^4\left(bx^8+a\right)^2}\frac{1}{\sqrt{dx^8+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

```
[Out] int(1/x^4/(b*x^8+a)^2/(d*x^8+c)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)^2\sqrt{dx^8+c}\,x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^4), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^4),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**8+a)**2/(d*x**8+c)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^8+a\right)^2\sqrt{dx^8+c}\,x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^4),x, algorithm="giac")

[Out] integrate(1/((b*x^8 + a)^2*sqrt(d*x^8 + c)*x^4), x)
```

3.760 $\int \left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}x^5\,dx$

Optimal. Leaf size=123

$$-\frac{d^2(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{16c^{5/2}}+\frac{dx^2\sqrt{c+\frac{d}{x^2}}(2bc-ad)}{16c^2}+\frac{x^4\sqrt{c+\frac{d}{x^2}}(2bc-ad)}{8c}+\frac{ax^6\left(c+\frac{d}{x^2}\right)^{3/2}}{6c}$$

```
[Out] (d*(2*b*c - a*d)*Sqrt[c + d/x^2]*x^2)/(16*c^2) + ((2*b*c - a*d)*S
qrt[c + d/x^2]*x^4)/(8*c) + (a*(c + d/x^2)^(3/2)*x^6)/(6*c) - (d^
2*(2*b*c - a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(16*c^(5/2))
```

Rubi [A] time = 0.274661, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{d^2(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{16c^{5/2}}+\frac{dx^2\sqrt{c+\frac{d}{x^2}}(2bc-ad)}{16c^2}+\frac{x^4\sqrt{c+\frac{d}{x^2}}(2bc-ad)}{8c}+\frac{ax^6\left(c+\frac{d}{x^2}\right)^{3/2}}{6c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*Sqrt[c + d/x^2]*x^5,x]
```

```
[Out] (d*(2*b*c - a*d)*Sqrt[c + d/x^2]*x^2)/(16*c^2) + ((2*b*c - a*d)*S
qrt[c + d/x^2]*x^4)/(8*c) + (a*(c + d/x^2)^(3/2)*x^6)/(6*c) - (d^
2*(2*b*c - a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(16*c^(5/2))
```

Rubi in Sympy [A] time = 19.6044, size = 107, normalized size = 0.87

$$\frac{ax^6\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{6c}-\frac{x^4\sqrt{c+\frac{d}{x^2}}\left(\frac{ad}{2}-bc\right)}{4c}-\frac{dx^2\sqrt{c+\frac{d}{x^2}}\,(ad-2bc)}{16c^2}+\frac{d^2\left(\frac{ad}{2}-bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**5*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**6*(c + d/x**2)**(3/2)/(6*c) - x**4*sqrt(c + d/x**2)*(a*d/2 -
 b*c)/(4*c) - d*x**2*sqrt(c + d/x**2)*(a*d - 2*b*c)/(16*c**2) + d
**2*(a*d/2 - b*c)*atanh(sqrt(c + d/x**2)/sqrt(c))/(8*c**(5/2))
```

Mathematica [A] time = 0.155007, size = 123, normalized size = 1.

$$\frac{d^2x\sqrt{c+\frac{d}{x^2}}(ad-2bc)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{16c^{5/2}\sqrt{cx^2+d}}+x\sqrt{c+\frac{d}{x^2}}\left(-\frac{dx(ad-2bc)}{16c^2}+\frac{x^3(ad+6bc)}{24c}+\frac{ax^5}{6}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*Sqrt[c + d/x^2]*x^5,x]
```

```
[Out] Sqrt[c + d/x^2]*x*(-(d*(-2*b*c + a*d)*x)/(16*c^2) + ((6*b*c + a*d
)*x^3)/(24*c) + (a*x^5)/6) + (d^2*(-2*b*c + a*d)*Sqrt[c + d/x^2]*
x*Log[c*x + Sqrt[c]*Sqrt[d + c*x^2]])/(16*c^(5/2)*Sqrt[d + c*x^2]
```

)

Maple [A] time = 0.021, size = 167, normalized size = 1.4

$$\frac{x}{48}\sqrt{\frac{cx^2+d}{x^2}}\left(8\,ax^3\left(cx^2+d\right)^{3/2}c^{7/2}-6\,adx\left(cx^2+d\right)^{3/2}c^{5/2}+12\,bx\left(cx^2+d\right)^{3/2}c^{7/2}+3\,ad^2x\sqrt{cx^2+d}c^{5/2}-6\,bdx\sqrt{cx^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^5*(c+d/x^2)^(1/2),x)
```

```
[Out] 1/48*((c*x^2+d)/x^2)^(1/2)*x*(8*a*x^3*(c*x^2+d)^(3/2)*c^(7/2)-6*a
*d*x*(c*x^2+d)^(3/2)*c^(5/2)+12*b*x*(c*x^2+d)^(3/2)*c^(7/2)+3*a*d
^2*x*(c*x^2+d)^(1/2)*c^(5/2)-6*b*d*x*(c*x^2+d)^(1/2)*c^(7/2)-6*b*
d^2*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*c^3+3*a*d^3*ln(c^(1/2)*x+(c*x^2
+d)^(1/2))*c^2)/(c*x^2+d)^(1/2)/c^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.251476, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(2\,bcd^2-ad^3\right)\sqrt{c}\log\left(-2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)-2\left(8\,ac^3x^6+2\left(6\,bc^3+ac^2d\right)x^4+3\left(2\,bc^2d-acd^2\right)x^2\right)\sqrt{\frac{cx^2+}{x^2}}}{96\,c^3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^5,x, algorithm="fricas")
```

```
[Out] [-1/96*(3*(2*b*c*d^2 - a*d^3)*sqrt(c)*log(-2*c*x^2*sqrt((c*x^2 +
d)/x^2) - (2*c*x^2 + d)*sqrt(c)) - 2*(8*a*c^3*x^6 + 2*(6*b*c^3 +
a*c^2*d)*x^4 + 3*(2*b*c^2*d - a*c*d^2)*x^2)*sqrt((c*x^2 + d)/x^2)
)/c^3, 1/48*(3*(2*b*c*d^2 - a*d^3)*sqrt(-c)*arctan(sqrt(-c)/sqrt(
(c*x^2 + d)/x^2)) + (8*a*c^3*x^6 + 2*(6*b*c^3 + a*c^2*d)*x^4 + 3*
(2*b*c^2*d - a*c*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/c^3]
```

Sympy [A] time = 33.5933, size = 226, normalized size = 1.84

$$\frac{acx^7}{6\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{5a\sqrt{d}x^5}{24\sqrt{\frac{cx^2}{d}+1}}-\frac{ad^{\frac{3}{2}}x^3}{48c\sqrt{\frac{cx^2}{d}+1}}-\frac{ad^{\frac{5}{2}}x}{16c^2\sqrt{\frac{cx^2}{d}+1}}+\frac{ad^3\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{16c^{\frac{5}{2}}}$$
$$+\frac{bcx^5}{4\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{3b\sqrt{d}x^3}{8\sqrt{\frac{cx^2}{d}+1}}+\frac{bd^{\frac{3}{2}}x}{8c\sqrt{\frac{cx^2}{d}+1}}-\frac{bd^2\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{8c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**5*(c+d/x**2)**(1/2),x)
```

```
[Out] a*c*x**7/(6*sqrt(d)*sqrt(c*x**2/d + 1)) + 5*a*sqrt(d)*x**5/(24*sq
rt(c*x**2/d + 1)) - a*d**(3/2)*x**3/(48*c*sqrt(c*x**2/d + 1)) - a
*d**(5/2)*x/(16*c**2*sqrt(c*x**2/d + 1)) + a*d**3*asinh(sqrt(c)*x
/sqrt(d))/(16*c**(5/2)) + b*c*x**5/(4*sqrt(d)*sqrt(c*x**2/d + 1))
 + 3*b*sqrt(d)*x**3/(8*sqrt(c*x**2/d + 1)) + b*d**(3/2)*x/(8*c*sq
rt(c*x**2/d + 1)) - b*d**2*asinh(sqrt(c)*x/sqrt(d))/(8*c**(3/2))
```

GIAC/XCAS [A] time = 0.222024, size = 196, normalized size = 1.59

$$\frac{1}{48}\left(2\left(4\,ax^2\mathrm{sign}\left(x\right)+\frac{6\,bc^4\mathrm{sign}\left(x\right)+ac^3d\mathrm{sign}\left(x\right)}{c^4}\right)x^2+\frac{3\left(2\,bc^3d\mathrm{sign}\left(x\right)-ac^2d^2\mathrm{sign}\left(x\right)\right)}{c^4}\right)\sqrt{cx^2+d}x+\frac{\left(2\,bcd^2\mathrm{sign}\left(x\right)-ad^3\mathrm{sign}\left(x\right)\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+d}\right|\right)}{16\,c^{\frac{5}{2}}}-\frac{\left(2\,bcd^2\ln\left(\sqrt{d}\right)-ad^3\ln\left(\sqrt{d}\right)\right)\mathrm{sign}\left(x\right)}{16\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^5,x, algorithm="giac")
```

```
[Out] 1/48*(2*(4*a*x^2*sign(x) + (6*b*c^4*sign(x) + a*c^3*d*sign(x))/c^
4)*x^2 + 3*(2*b*c^3*d*sign(x) - a*c^2*d^2*sign(x))/c^4)*sqrt(c*x^
2 + d)*x + 1/16*(2*b*c*d^2*sign(x) - a*d^3*sign(x))*ln(abs(-sqrt(
c)*x + sqrt(c*x^2 + d)))/c^(5/2) - 1/16*(2*b*c*d^2*ln(sqrt(d)) -
a*d^3*ln(sqrt(d)))*sign(x)/c^(5/2)
```

3.761 $\int \left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}x^3\,dx$

Optimal. Leaf size=90

$$\frac{d(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{3/2}}+\frac{x^2\sqrt{c+\frac{d}{x^2}}(4bc-ad)}{8c}+\frac{ax^4\left(c+\frac{d}{x^2}\right)^{3/2}}{4c}$$

```
[Out] ((4*b*c - a*d)*Sqrt[c + d/x^2]*x^2)/(8*c) + (a*(c + d/x^2)^(3/2)*
x^4)/(4*c) + (d*(4*b*c - a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(
8*c^(3/2))
```

Rubi [A] time = 0.209742, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{d(4bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{3/2}}+\frac{x^2\sqrt{c+\frac{d}{x^2}}(4bc-ad)}{8c}+\frac{ax^4\left(c+\frac{d}{x^2}\right)^{3/2}}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*Sqrt[c + d/x^2]*x^3,x]
```

```
[Out] ((4*b*c - a*d)*Sqrt[c + d/x^2]*x^2)/(8*c) + (a*(c + d/x^2)^(3/2)*
x^4)/(4*c) + (d*(4*b*c - a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(
8*c^(3/2))
```

Rubi in Sympy [A] time = 14.8482, size = 76, normalized size = 0.84

$$\frac{ax^4\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{4c}-\frac{x^2\sqrt{c+\frac{d}{x^2}}\left(ad-4bc\right)}{8c}-\frac{d\left(ad-4bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**3*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**4*(c + d/x**2)**(3/2)/(4*c) - x**2*sqrt(c + d/x**2)*(a*d - 4
*b*c)/(8*c) - d*(a*d - 4*b*c)*atanh(sqrt(c + d/x**2)/sqrt(c))/(8*
c**(3/2))
```

Mathematica [A] time = 0.0969584, size = 99, normalized size = 1.1

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(\sqrt{c}x\sqrt{cx^2+d}\left(a\left(2cx^2+d\right)+4bc\right)+d(4bc-ad)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)\right)}{8c^{3/2}\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*Sqrt[c + d/x^2]*x^3,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(Sqrt[c]*x*Sqrt[d + c*x^2]*(4*b*c + a*(d + 2*c
*x^2)) + d*(4*b*c - a*d)*Log[c*x + Sqrt[c]*Sqrt[d + c*x^2]]))/(8*
c^(3/2)*Sqrt[d + c*x^2])
```

Maple [A] time = 0.011, size = 125, normalized size = 1.4

$$\frac{x}{8}\sqrt{\frac{cx^2+d}{x^2}}\left(2\,ax\left(cx^2+d\right)^{3/2}c^{3/2}-adx\sqrt{cx^2+d}c^{\frac{3}{2}}+4\,bx\sqrt{cx^2+d}c^{5/2}+4\,bd\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)c^2-ad^2\ln\left(\sqrt{c}x+\sqrt{c}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^3*(c+d/x^2)^(1/2),x)
```

```
[Out] 1/8*((c*x^2+d)/x^2)^(1/2)*x*(2*a*x*(c*x^2+d)^(3/2)*c^(3/2)-a*d*x*
(c*x^2+d)^(1/2)*c^(3/2)+4*b*x*(c*x^2+d)^(1/2)*c^(5/2)+4*b*d*ln(c^
(1/2)*x+(c*x^2+d)^(1/2))*c^2-a*d^2*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*
c)/(c*x^2+d)^(1/2)/c^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.237586, size = 1, normalized size = 0.01

$$\left[-\frac{\left(4\,bcd-ad^2\right)\sqrt{c}\log\left(2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)-2\left(2\,ac^2x^4+\left(4\,bc^2+acd\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{16\,c^2},\right.$$
$$\left.-\frac{\left(4\,bcd-ad^2\right)\sqrt{-c}\arctan\left(\frac{\sqrt{-c}}{\sqrt{\frac{cx^2+d}{x^2}}}\right)-\left(2\,ac^2x^4+\left(4\,bc^2+acd\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{8\,c^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^3,x, algorithm="fricas")
```

```
[Out] [-1/16*((4*b*c*d - a*d^2)*sqrt(c)*log(2*c*x^2*sqrt((c*x^2 + d)/x^
2) - (2*c*x^2 + d)*sqrt(c)) - 2*(2*a*c^2*x^4 + (4*b*c^2 + a*c*d)*
x^2)*sqrt((c*x^2 + d)/x^2))/c^2, -1/8*((4*b*c*d - a*d^2)*sqrt(-c)
*arctan(sqrt(-c)/sqrt((c*x^2 + d)/x^2)) - (2*a*c^2*x^4 + (4*b*c^2
 + a*c*d)*x^2)*sqrt((c*x^2 + d)/x^2))/c^2]
```

Sympy [A] time = 22.2215, size = 144, normalized size = 1.6

$$\frac{acx^5}{4\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{3a\sqrt{d}x^3}{8\sqrt{\frac{cx^2}{d}+1}}+\frac{ad^{\frac{3}{2}}x}{8c\sqrt{\frac{cx^2}{d}+1}}-\frac{ad^2\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{8c^{\frac{3}{2}}}+\frac{b\sqrt{d}x\sqrt{\frac{cx^2}{d}+1}}{2}+\frac{bd\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{2\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**3*(c+d/x**2)**(1/2),x)
```

```
[Out] a*c*x**5/(4*sqrt(d)*sqrt(c*x**2/d + 1)) + 3*a*sqrt(d)*x**3/(8*sqr
t(c*x**2/d + 1)) + a*d**(3/2)*x/(8*c*sqrt(c*x**2/d + 1)) - a*d**2
*asinh(sqrt(c)*x/sqrt(d))/(8*c**(3/2)) + b*sqrt(d)*x*sqrt(c*x**2/
d + 1)/2 + b*d*asinh(sqrt(c)*x/sqrt(d))/(2*sqrt(c))
```

GIAC/XCAS [A] time = 0.222341, size = 144, normalized size = 1.6

$$\frac{1}{8}\left(2\,ax^2\mathrm{sign}\left(x\right)+\frac{4\,bc^2\mathrm{sign}\left(x\right)+acd\mathrm{sign}\left(x\right)}{c^2}\right)\sqrt{cx^2+d}x-\frac{\left(4\,bcd\mathrm{sign}\left(x\right)-ad^2\mathrm{sign}\left(x\right)\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+d}\right|\right)}{8\,c^{\frac{3}{2}}}+\frac{\left(4\,bcd\ln\left(\sqrt{d}\right)-ad^2\ln\left(\sqrt{d}\right)\right)\mathrm{sign}\left(x\right)}{8\,c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^3,x, algorithm="giac")
```

```
[Out] 1/8*(2*a*x^2*sign(x) + (4*b*c^2*sign(x) + a*c*d*sign(x))/c^2)*sqr
t(c*x^2 + d)*x - 1/8*(4*b*c*d*sign(x) - a*d^2*sign(x))*ln(abs(-sq
rt(c)*x + sqrt(c*x^2 + d)))/c^(3/2) + 1/8*(4*b*c*d*ln(sqrt(d)) -
a*d^2*ln(sqrt(d)))*sign(x)/c^(3/2)
```

3.762 $\int \left(a+\frac{b}{x^2}\right) \sqrt{c+\frac{d}{x^2}}x\,dx$

Optimal. Leaf size=84

$$-\frac{\sqrt{c+\frac{d}{x^2}}(ad+2bc)}{2c}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{2\sqrt{c}}+\frac{ax^2\left(c+\frac{d}{x^2}\right)^{3/2}}{2c}$$

```
[Out] -((2*b*c + a*d)*Sqrt[c + d/x^2])/(2*c) + (a*(c + d/x^2)^(3/2)*x^2
)/(2*c) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(2*Sqr
t[c])
```

Rubi [A] time = 0.179291, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{\sqrt{c+\frac{d}{x^2}}(ad+2bc)}{2c}+\frac{(ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{2\sqrt{c}}+\frac{ax^2\left(c+\frac{d}{x^2}\right)^{3/2}}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*Sqrt[c + d/x^2]*x,x]
```

```
[Out] -((2*b*c + a*d)*Sqrt[c + d/x^2])/(2*c) + (a*(c + d/x^2)^(3/2)*x^2
)/(2*c) + ((2*b*c + a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(2*Sqr
t[c])
```

Rubi in Sympy [A] time = 13.9538, size = 68, normalized size = 0.81

$$\frac{ax^2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{2c}-\frac{\sqrt{c+\frac{d}{x^2}}\left(\frac{ad}{2}+bc\right)}{c}+\frac{\left(\frac{ad}{2}+bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**2*(c + d/x**2)**(3/2)/(2*c) - sqrt(c + d/x**2)*(a*d/2 + b*c)
/c + (a*d/2 + b*c)*atanh(sqrt(c + d/x**2)/sqrt(c))/sqrt(c)
```

Mathematica [A] time = 0.11842, size = 72, normalized size = 0.86

$$\frac{1}{2}\sqrt{c+\frac{d}{x^2}}\left(\frac{x(ad+2bc)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{\sqrt{c}\sqrt{cx^2+d}}+ax^2-2b\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*Sqrt[c + d/x^2]*x,x]
```

```
[Out] (Sqrt[c + d/x^2]*(-2*b + a*x^2 + ((2*b*c + a*d)*x*Log[c*x + Sqrt[
c]*Sqrt[d + c*x^2]])/(Sqrt[c]*Sqrt[d + c*x^2])))/2
```

Maple [A] time = 0.019, size = 127, normalized size = 1.5

$$\frac{1}{2d}\sqrt{\frac{cx^2+d}{x^2}}\left(2bc\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)xd+ax^2\sqrt{cx^2+d}\sqrt{c}d+2bc^{3/2}x^2\sqrt{cx^2+d}-2b\left(cx^2+d\right)^{3/2}\sqrt{c}+ad^2\ln\left(\sqrt{c}x+\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x*(c+d/x^2)^(1/2),x)
```

```
[Out] 1/2*((c*x^2+d)/x^2)^(1/2)*(2*b*c*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*x*
d+a*x^2*(c*x^2+d)^(1/2)*c^(1/2)*d+2*b*c^(3/2)*x^2*(c*x^2+d)^(1/2)
-2*b*(c*x^2+d)^(3/2)*c^(1/2)+a*d^2*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*
x)/(c*x^2+d)^(1/2)/c^(1/2)/d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.233111, size = 1, normalized size = 0.01

$$\left[\frac{(2bc+ad)\sqrt{c}\log\left(-2cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2cx^2+d\right)\sqrt{c}\right)+2\left(acx^2-2bc\right)\sqrt{\frac{cx^2+d}{x^2}}}{4c},\right.$$
$$\left.-\frac{(2bc+ad)\sqrt{-c}\arctan\left(\frac{\sqrt{-c}}{\sqrt{\frac{cx^2+d}{x^2}}}\right)-\left(acx^2-2bc\right)\sqrt{\frac{cx^2+d}{x^2}}}{2c}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x,x, algorithm="fricas")
```

```
[Out] [1/4*((2*b*c + a*d)*sqrt(c)*log(-2*c*x^2*sqrt((c*x^2 + d)/x^2) -
(2*c*x^2 + d)*sqrt(c)) + 2*(a*c*x^2 - 2*b*c)*sqrt((c*x^2 + d)/x^2
))/c, -1/2*((2*b*c + a*d)*sqrt(-c)*arctan(sqrt(-c)/sqrt((c*x^2 +
d)/x^2)) - (a*c*x^2 - 2*b*c)*sqrt((c*x^2 + d)/x^2))/c]
```

Sympy [A] time = 11.2965, size = 107, normalized size = 1.27

$$\frac{a\sqrt{d}x\sqrt{\frac{cx^2}{d}+1}}{2}+\frac{ad\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{2\sqrt{c}}+b\sqrt{c}\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)-\frac{bcx}{\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}-\frac{b\sqrt{d}}{x\sqrt{\frac{cx^2}{d}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x*(c+d/x**2)**(1/2),x)
```

```
[Out] a*sqrt(d)*x*sqrt(c*x**2/d + 1)/2 + a*d*asinh(sqrt(c)*x/sqrt(d))/(
2*sqrt(c)) + b*sqrt(c)*asinh(sqrt(c)*x/sqrt(d)) - b*c*x/(sqrt(d)*
sqrt(c*x**2/d + 1)) - b*sqrt(d)/(x*sqrt(c*x**2/d + 1))
```

GIAC/XCAS [A] time = 0.259688, size = 124, normalized size = 1.48

$$\frac{1}{2}\sqrt{cx^2+d}ax\operatorname{sign}(x)+\frac{2b\sqrt{c}d\operatorname{sign}(x)}{\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2-d}-\frac{\left(2bc^{\frac{3}{2}}\operatorname{sign}(x)+a\sqrt{c}d\operatorname{sign}(x)\right)\ln\left(\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2\right)}{4c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x,x, algorithm="giac")
```

```
[Out] 1/2*sqrt(c*x^2 + d)*a*x*sign(x) + 2*b*sqrt(c)*d*sign(x)/((sqrt(c)
*x - sqrt(c*x^2 + d))^2 - d) - 1/4*(2*b*c^(3/2)*sign(x) + a*sqrt(
c)*d*sign(x))*ln((sqrt(c)*x - sqrt(c*x^2 + d))^2)/c
```

3.763 $\int \frac{\left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}}{x}\,dx$

Optimal. Leaf size=59

$$-a\sqrt{c+\frac{d}{x^2}}+a\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{3d}$$

```
[Out] -(a*Sqrt[c + d/x^2]) - (b*(c + d/x^2)^(3/2))/(3*d) + a*Sqrt[c]*Ar
cTanh[Sqrt[c + d/x^2]/Sqrt[c]]
```

Rubi [A] time = 0.148087, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-a\sqrt{c+\frac{d}{x^2}}+a\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{3d}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*Sqrt[c + d/x^2])/x,x]
```

```
[Out] -(a*Sqrt[c + d/x^2]) - (b*(c + d/x^2)^(3/2))/(3*d) + a*Sqrt[c]*Ar
cTanh[Sqrt[c + d/x^2]/Sqrt[c]]
```

Rubi in Sympy [A] time = 12.399, size = 49, normalized size = 0.83

$$a\sqrt{c}\,\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)-a\sqrt{c+\frac{d}{x^2}}-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x,x)
```

```
[Out] a*sqrt(c)*atanh(sqrt(c + d/x**2)/sqrt(c)) - a*sqrt(c + d/x**2) -
b*(c + d/x**2)**(3/2)/(3*d)
```

Mathematica [A] time = 0.129236, size = 82, normalized size = 1.39

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(\frac{3a\sqrt{c}x^3\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{\sqrt{cx^2+d}}-3ax^2-\frac{bcx^2}{d}-b\right)}{3x^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*Sqrt[c + d/x^2])/x,x]
```

```
[Out] (Sqrt[c + d/x^2]*(-b - 3*a*x^2 - (b*c*x^2)/d + (3*a*Sqrt[c]*x^3*L
og[c*x + Sqrt[c]*Sqrt[d + c*x^2]])/Sqrt[d + c*x^2]))/(3*x^2)
```

Maple [B] time = 0.017, size = 101, normalized size = 1.7

$$\frac{1}{3\,dx^{2}}\sqrt{\frac{cx^{2}+d}{x^{2}}}\left(3\,a\sqrt{c}\ln\left(\sqrt{c}x+\sqrt{cx^{2}+d}\right)x^{3}d+3\,acx^{4}\sqrt{cx^{2}+d}-3\,a\left(cx^{2}+d\right)^{3/2}x^{2}-b\left(cx^{2}+d\right)^{\frac{3}{2}}\right)\frac{1}{\sqrt{cx^{2}+d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(1/2)/x,x)
```

```
[Out] 1/3*((c*x^2+d)/x^2)^(1/2)/x^2*(3*a*c^(1/2)*ln(c^(1/2)*x+(c*x^2+d)
^(1/2))*x^3*d+3*a*c*x^4*(c*x^2+d)^(1/2)-3*a*(c*x^2+d)^(3/2)*x^2-b
*(c*x^2+d)^(3/2))/(c*x^2+d)^(1/2)/d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.23323, size = 1, normalized size = 0.02

$$\left[\frac{3\,a\sqrt{c}dx^{2}\log\left(-2\,cx^{2}-2\,\sqrt{c}x^{2}\sqrt{\frac{cx^{2}+d}{x^{2}}}-d\right)-2\,\left((bc+3\,ad)x^{2}+bd\right)\sqrt{\frac{cx^{2}+d}{x^{2}}}}{6\,dx^{2}},\ \frac{3\,a\sqrt{-c}dx^{2}\arctan\left(\frac{c}{\sqrt{-c}\sqrt{\frac{cx^{2}+d}{x^{2}}}}\right)-((bc+3\,a\right.}{3\,dx^{2}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x,x, algorithm="fricas")
```

```
[Out] [1/6*(3*a*sqrt(c)*d*x^2*log(-2*c*x^2 - 2*sqrt(c)*x^2*sqrt((c*x^2
+ d)/x^2) - d) - 2*((b*c + 3*a*d)*x^2 + b*d)*sqrt((c*x^2 + d)/x^2
))/(d*x^2), 1/3*(3*a*sqrt(-c)*d*x^2*arctan(c/(sqrt(-c)*sqrt((c*x^
2 + d)/x^2))) - ((b*c + 3*a*d)*x^2 + b*d)*sqrt((c*x^2 + d)/x^2))/
(d*x^2)]
```

Sympy [A] time = 4.52426, size = 117, normalized size = 1.98

$$ac\left(\begin{cases}-\frac{\operatorname{atan}\left(\frac{\sqrt{c+\frac{d}{x^{2}}}}{\sqrt{-c}}\right)}{\sqrt{-c}} & \text{for}\ -c>0\\ \frac{\operatorname{acoth}\left(\frac{\sqrt{c+\frac{d}{x^{2}}}}{\sqrt{c}}\right)}{\sqrt{c}} & \text{for}\ -c<0\wedge c<c+\frac{d}{x^{2}}\\ \frac{\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^{2}}}}{\sqrt{c}}\right)}{\sqrt{c}} & \text{for}\ c>c+\frac{d}{x^{2}}\wedge -c<0\end{cases}\right)-a\sqrt{c+\frac{d}{x^{2}}}-\frac{b\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x,x)
```

```
[Out] a*c*Piecewise((-atan(sqrt(c + d/x**2)/sqrt(-c))/sqrt(-c), -c > 0)
, (acoth(sqrt(c + d/x**2)/sqrt(c))/sqrt(c), (-c < 0) & (c < c + d
/x**2)), (atanh(sqrt(c + d/x**2)/sqrt(c))/sqrt(c), (-c < 0) & (c
> c + d/x**2))) - a*sqrt(c + d/x**2) - b*(c + d/x**2)**(3/2)/(3*d
)
```

GIAC/XCAS [A] time = 0.326824, size = 220, normalized size = 3.73

$$-\frac{1}{2}\,a\sqrt{c}\ln\left(\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2\right)\operatorname{sign}(x) + \frac{2\left(3\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^4bc^{\frac{3}{2}}\operatorname{sign}(x)+3\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^4a\sqrt{c}d\operatorname{sign}(x)-6\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2a\sqrt{c}d^2\operatorname{sign}(x)+bc^{\frac{3}{2}}d^2\operatorname{sig}}{3\left(\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2-d\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x,x, algorithm="giac")
```

```
[Out] -1/2*a*sqrt(c)*ln((sqrt(c)*x - sqrt(c*x^2 + d))^2)*sign(x) + 2/3*
(3*(sqrt(c)*x - sqrt(c*x^2 + d))^4*b*c^(3/2)*sign(x) + 3*(sqrt(c)
*x - sqrt(c*x^2 + d))^4*a*sqrt(c)*d*sign(x) - 6*(sqrt(c)*x - sqrt
(c*x^2 + d))^2*a*sqrt(c)*d^2*sign(x) + b*c^(3/2)*d^2*sign(x) + 3*
a*sqrt(c)*d^3*sign(x))/((sqrt(c)*x - sqrt(c*x^2 + d))^2 - d)^3
```

3.764 $\int \frac{\left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}}{x^3}\,dx$

Optimal. Leaf size=46

$$\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(bc-ad)}{3d^2}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{5d^2}$$

```
[Out] ((b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^2) - (b*(c + d/x^2)^(5/2))/(
5*d^2)
```

Rubi [A] time = 0.120396, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(bc-ad)}{3d^2}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{5d^2}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b/x^2)*Sqrt[c + d/x^2])/x^3,x]
```

```
[Out] ((b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^2) - (b*(c + d/x^2)^(5/2))/(
5*d^2)
```

Rubi in Sympy [A] time = 12.0012, size = 39, normalized size = 0.85

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5d^2}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(ad-bc)}{3d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**3,x)
```

```
[Out] -b*(c + d/x**2)**(5/2)/(5*d**2) - (c + d/x**2)**(3/2)*(a*d - b*c)
/(3*d**2)
```

Mathematica [A] time = 0.0597789, size = 47, normalized size = 1.02

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)\left(5adx^2-2bcx^2+3bd\right)}{15d^2x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b/x^2)*Sqrt[c + d/x^2])/x^3,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(d + c*x^2)*(3*b*d - 2*b*c*x^2 + 5*a*d*x^2))/(1
5*d^2*x^4)
```

Maple [A] time = 0.01, size = 48, normalized size = 1.

$$-\frac{\left(5\,ad{x}^{2}-2\,bc{x}^{2}+3\,bd\right)\left(c{x}^{2}+d\right)}{15\,{d}^{2}{x}^{4}}\sqrt{\frac{c{x}^{2}+d}{{x}^{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(1/2)/x^3,x)
```

```
[Out] -1/15*((c*x^2+d)/x^2)^(1/2)*(5*a*d*x^2-2*b*c*x^2+3*b*d)*(c*x^2+d)
/d^2/x^4
```

Maxima [A] time = 1.37597, size = 66, normalized size = 1.43

$$-\frac{1}{15}\,b\left(\frac{3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{d^2}-\frac{5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c}{d^2}\right)-\frac{a\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^3,x, algorithm="maxima")
```

```
[Out] -1/15*b*(3*(c + d/x^2)^(5/2)/d^2 - 5*(c + d/x^2)^(3/2)*c/d^2) - 1
/3*a*(c + d/x^2)^(3/2)/d
```

Fricas [A] time = 0.228014, size = 81, normalized size = 1.76

$$\frac{\left(\left(2\,bc^2-5\,acd\right)x^4-3\,bd^2-\left(bcd+5\,ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{15\,d^2x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^3,x, algorithm="fricas")
```

```
[Out] 1/15*((2*b*c^2 - 5*a*c*d)*x^4 - 3*b*d^2 - (b*c*d + 5*a*d^2)*x^2)*
sqrt((c*x^2 + d)/x^2)/(d^2*x^4)
```

Sympy [A] time = 2.76533, size = 58, normalized size = 1.26

$$-\frac{a\left(\begin{cases}\frac{\sqrt{c}}{x^2} & \text{for}\ d=0\\ \frac{2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3d} & \text{otherwise}\end{cases}\right)}{2}-\frac{b\left(-\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}\right)}{d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**3,x)
```

```
[Out] -a*Piecewise((sqrt(c)/x**2, Eq(d, 0)), (2*(c + d/x**2)**(3/2)/(3*
d), True))/2 - b*(-c*(c + d/x**2)**(3/2)/3 + (c + d/x**2)**(5/2)/
5)/d**2
```

GIAC/XCAS [A] time = 0.453602, size = 338, normalized size = 7.35

$$\frac{2\left(15\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^8ac^{\frac{3}{2}}\operatorname{sign}(x)+30\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^6bc^{\frac{5}{2}}\operatorname{sign}(x)-30\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^6ac^{\frac{3}{2}}d\operatorname{sign}(x)+10\left(\sqrt{c}x-\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^3,x, algorithm="giac")
```

```
[Out] 2/15*(15*(sqrt(c)*x - sqrt(c*x^2 + d))^8*a*c^(3/2)*sign(x) + 30*(
sqrt(c)*x - sqrt(c*x^2 + d))^6*b*c^(5/2)*sign(x) - 30*(sqrt(c)*x
- sqrt(c*x^2 + d))^6*a*c^(3/2)*d*sign(x) + 10*(sqrt(c)*x - sqrt(c
*x^2 + d))^4*b*c^(5/2)*d*sign(x) + 20*(sqrt(c)*x - sqrt(c*x^2 + d
))^4*a*c^(3/2)*d^2*sign(x) + 10*(sqrt(c)*x - sqrt(c*x^2 + d))^2*b
*c^(5/2)*d^2*sign(x) - 10*(sqrt(c)*x - sqrt(c*x^2 + d))^2*a*c^(3/
2)*d^3*sign(x) - 2*b*c^(5/2)*d^3*sign(x) + 5*a*c^(3/2)*d^4*sign(x
))/((sqrt(c)*x - sqrt(c*x^2 + d))^2 - d)^5
```

3.765 $\int \frac{\left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}}{x^5}\,dx$

Optimal. Leaf size=74

$$\frac{\left(c+\frac{d}{x^2}\right)^{5/2}(2bc-ad)}{5d^3}-\frac{c\left(c+\frac{d}{x^2}\right)^{3/2}(bc-ad)}{3d^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{7/2}}{7d^3}$$

```
[Out] -(c*(b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^3) + ((2*b*c - a*d)*(c +
d/x^2)^(5/2))/(5*d^3) - (b*(c + d/x^2)^(7/2))/(7*d^3)
```

Rubi [A] time = 0.174686, antiderivative size = 74, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{\left(c+\frac{d}{x^2}\right)^{5/2}(2bc-ad)}{5d^3}-\frac{c\left(c+\frac{d}{x^2}\right)^{3/2}(bc-ad)}{3d^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{7/2}}{7d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*Sqrt[c + d/x^2])/x^5,x]
```

```
[Out] -(c*(b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^3) + ((2*b*c - a*d)*(c +
d/x^2)^(5/2))/(5*d^3) - (b*(c + d/x^2)^(7/2))/(7*d^3)
```

Rubi in Sympy [A] time = 17.1863, size = 63, normalized size = 0.85

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7d^3}+\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(ad-bc)}{3d^3}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(ad-2bc)}{5d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**5,x)
```

```
[Out] -b*(c + d/x**2)**(7/2)/(7*d**3) + c*(c + d/x**2)**(3/2)*(a*d - b*
c)/(3*d**3) - (c + d/x**2)**(5/2)*(a*d - 2*b*c)/(5*d**3)
```

Mathematica [A] time = 0.083019, size = 69, normalized size = 0.93

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)\left(7adx^2\left(3d-2cx^2\right)+b\left(8c^2x^4-12cdx^2+15d^2\right)\right)}{105d^3x^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*Sqrt[c + d/x^2])/x^5,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(d + c*x^2)*(7*a*d*x^2*(3*d - 2*c*x^2) + b*(15*
d^2 - 12*c*d*x^2 + 8*c^2*x^4)))/(105*d^3*x^6)
```

Maple [A] time = 0.009, size = 70, normalized size = 1.

$$\frac{\left(14\,acdx^4-8\,bc^2x^4-21\,ad^2x^2+12\,bcdx^2-15\,bd^2\right)\left(cx^2+d\right)}{105\,d^3x^6}\sqrt{\frac{cx^2+d}{x^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(1/2)/x^5,x)
```

```
[Out] 1/105*((c*x^2+d)/x^2)^(1/2)*(14*a*c*d*x^4-8*b*c^2*x^4-21*a*d^2*x^
2+12*b*c*d*x^2-15*b*d^2)*(c*x^2+d)/d^3/x^6
```

Maxima [A] time = 1.38448, size = 113, normalized size = 1.53

$$-\frac{1}{105}\,b\left(\frac{15\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{d^3}-\frac{42\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c}{d^3}+\frac{35\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c^2}{d^3}\right)-\frac{1}{15}\,a\left(\frac{3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{d^2}-\frac{5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c}{d^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^5,x, algorithm="maxima")
```

```
[Out] -1/105*b*(15*(c + d/x^2)^(7/2)/d^3 - 42*(c + d/x^2)^(5/2)*c/d^3 +
 35*(c + d/x^2)^(3/2)*c^2/d^3) - 1/15*a*(3*(c + d/x^2)^(5/2)/d^2
- 5*(c + d/x^2)^(3/2)*c/d^2)
```

Fricas [A] time = 0.265506, size = 115, normalized size = 1.55

$$-\frac{\left(2\left(4\,bc^3-7\,ac^2d\right)x^6-\left(4\,bc^2d-7\,acd^2\right)x^4+15\,bd^3+3\left(bcd^2+7\,ad^3\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{105\,d^3x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^5,x, algorithm="fricas")
```

```
[Out] -1/105*(2*(4*b*c^3 - 7*a*c^2*d)*x^6 - (4*b*c^2*d - 7*a*c*d^2)*x^4
 + 15*b*d^3 + 3*(b*c*d^2 + 7*a*d^3)*x^2)*sqrt((c*x^2 + d)/x^2)/(d
^3*x^6)
```

Sympy [A] time = 2.98336, size = 78, normalized size = 1.05

$$-\frac{a\left(-\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}\right)}{d^2}-\frac{b\left(\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{2c\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}\right)}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**5,x)
```

```
[Out] -a*(-c*(c + d/x**2)**(3/2)/3 + (c + d/x**2)**(5/2)/5)/d**2 - b*(c
**2*(c + d/x**2)**(3/2)/3 - 2*c*(c + d/x**2)**(5/2)/5 + (c + d/x*
*2)**(7/2)/7)/d**3
```

GIAC/XCAS [A] time = 0.605639, size = 419, normalized size = 5.66

$$4\left(105\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{10}ac^{\frac{5}{2}}\mathrm{sign}\left(x\right)+280\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{8}bc^{\frac{7}{2}}\mathrm{sign}\left(x\right)-175\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{8}ac^{\frac{5}{2}}d\,\mathrm{sign}\left(x\right)+140\left(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^5,x, algorithm="giac")
```

```
[Out] 4/105*(105*(sqrt(c)*x - sqrt(c*x^2 + d))^10*a*c^(5/2)*sign(x) + 2
80*(sqrt(c)*x - sqrt(c*x^2 + d))^8*b*c^(7/2)*sign(x) - 175*(sqrt(
c)*x - sqrt(c*x^2 + d))^8*a*c^(5/2)*d*sign(x) + 140*(sqrt(c)*x -
sqrt(c*x^2 + d))^6*b*c^(7/2)*d*sign(x) + 70*(sqrt(c)*x - sqrt(c*x
^2 + d))^6*a*c^(5/2)*d^2*sign(x) + 84*(sqrt(c)*x - sqrt(c*x^2 + d
))^4*b*c^(7/2)*d^2*sign(x) - 42*(sqrt(c)*x - sqrt(c*x^2 + d))^4*a
*c^(5/2)*d^3*sign(x) - 28*(sqrt(c)*x - sqrt(c*x^2 + d))^2*b*c^(7/
2)*d^3*sign(x) + 49*(sqrt(c)*x - sqrt(c*x^2 + d))^2*a*c^(5/2)*d^4
*sign(x) + 4*b*c^(7/2)*d^4*sign(x) - 7*a*c^(5/2)*d^5*sign(x))/((s
qrt(c)*x - sqrt(c*x^2 + d))^2 - d)^7
```

3.766 $\int \frac{\left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}}{x^7}\,dx$

Optimal. Leaf size=104

$$\frac{c^2\left(c+\frac{d}{x^2}\right)^{3/2}(bc-ad)}{3d^4}+\frac{\left(c+\frac{d}{x^2}\right)^{7/2}(3bc-ad)}{7d^4}-\frac{c\left(c+\frac{d}{x^2}\right)^{5/2}(3bc-2ad)}{5d^4}-\frac{b\left(c+\frac{d}{x^2}\right)^{9/2}}{9d^4}$$

```
[Out] (c^2*(b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^4) - (c*(3*b*c - 2*a*d)*
(c + d/x^2)^(5/2))/(5*d^4) + ((3*b*c - a*d)*(c + d/x^2)^(7/2))/(7
*d^4) - (b*(c + d/x^2)^(9/2))/(9*d^4)
```

Rubi [A] time = 0.234944, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{c^2\left(c+\frac{d}{x^2}\right)^{3/2}(bc-ad)}{3d^4}+\frac{\left(c+\frac{d}{x^2}\right)^{7/2}(3bc-ad)}{7d^4}-\frac{c\left(c+\frac{d}{x^2}\right)^{5/2}(3bc-2ad)}{5d^4}-\frac{b\left(c+\frac{d}{x^2}\right)^{9/2}}{9d^4}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*Sqrt[c + d/x^2])/x^7,x]
```

```
[Out] (c^2*(b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^4) - (c*(3*b*c - 2*a*d)*
(c + d/x^2)^(5/2))/(5*d^4) + ((3*b*c - a*d)*(c + d/x^2)^(7/2))/(7
*d^4) - (b*(c + d/x^2)^(9/2))/(9*d^4)
```

Rubi in Sympy [A] time = 22.8243, size = 92, normalized size = 0.88

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9d^4}-\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(ad-bc)}{3d^4}+\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(2ad-3bc)}{5d^4}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}(ad-3bc)}{7d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**7,x)
```

```
[Out] -b*(c + d/x**2)**(9/2)/(9*d**4) - c**2*(c + d/x**2)**(3/2)*(a*d -
 b*c)/(3*d**4) + c*(c + d/x**2)**(5/2)*(2*a*d - 3*b*c)/(5*d**4) -
 (c + d/x**2)**(7/2)*(a*d - 3*b*c)/(7*d**4)
```

Mathematica [A] time = 0.104687, size = 91, normalized size = 0.88

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)\left(3adx^2\left(8c^2x^4-12cdx^2+15d^2\right)+b\left(-16c^3x^6+24c^2dx^4-30cd^2x^2+35d^3\right)\right)}{315d^4x^8}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*Sqrt[c + d/x^2])/x^7,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(d + c*x^2)*(3*a*d*x^2*(15*d^2 - 12*c*d*x^2 + 8
*c^2*x^4) + b*(35*d^3 - 30*c*d^2*x^2 + 24*c^2*d*x^4 - 16*c^3*x^6)
))/(315*d^4*x^8)
```

Maple [A] time = 0.011, size = 94, normalized size = 0.9

$$-\frac{\left(24\,ac^{2}dx^{6}-16\,bc^{3}x^{6}-36\,acd^{2}x^{4}+24\,bc^{2}dx^{4}+45\,ad^{3}x^{2}-30\,bcd^{2}x^{2}+35\,bd^{3}\right)\left(cx^{2}+d\right)}{315\,d^{4}x^{8}}\sqrt{\frac{cx^{2}+d}{x^{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(1/2)/x^7,x)
```

```
[Out] -1/315*((c*x^2+d)/x^2)^(1/2)*(24*a*c^2*d*x^6-16*b*c^3*x^6-36*a*c*
d^2*x^4+24*b*c^2*d*x^4+45*a*d^3*x^2-30*b*c*d^2*x^2+35*b*d^3)*(c*x
^2+d)/d^4/x^8
```

Maxima [A] time = 1.39348, size = 159, normalized size = 1.53

$$-\frac{1}{315}\,b\left(\frac{35\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}}}{d^{4}}-\frac{135\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}c}{d^{4}}+\frac{189\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}c^{2}}{d^{4}}-\frac{105\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}c^{3}}{d^{4}}\right)$$
$$-\frac{1}{105}\,a\left(\frac{15\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}}{d^{3}}-\frac{42\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}c}{d^{3}}+\frac{35\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}c^{2}}{d^{3}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^7,x, algorithm="maxima")
```

```
[Out] -1/315*b*(35*(c + d/x^2)^(9/2)/d^4 - 135*(c + d/x^2)^(7/2)*c/d^4
+ 189*(c + d/x^2)^(5/2)*c^2/d^4 - 105*(c + d/x^2)^(3/2)*c^3/d^4)
- 1/105*a*(15*(c + d/x^2)^(7/2)/d^3 - 42*(c + d/x^2)^(5/2)*c/d^3
+ 35*(c + d/x^2)^(3/2)*c^2/d^3)
```

Fricas [A] time = 0.330539, size = 147, normalized size = 1.41

$$\frac{\left(8\left(2\,bc^{4}-3\,ac^{3}d\right)x^{8}-4\left(2\,bc^{3}d-3\,ac^{2}d^{2}\right)x^{6}-35\,bd^{4}+3\left(2\,bc^{2}d^{2}-3\,acd^{3}\right)x^{4}-5\left(bcd^{3}+9\,ad^{4}\right)x^{2}\right)\sqrt{\frac{cx^{2}+d}{x^{2}}}}{315\,d^{4}x^{8}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^7,x, algorithm="fricas")
```

```
[Out] 1/315*(8*(2*b*c^4 - 3*a*c^3*d)*x^8 - 4*(2*b*c^3*d - 3*a*c^2*d^2)*
x^6 - 35*b*d^4 + 3*(2*b*c^2*d^2 - 3*a*c*d^3)*x^4 - 5*(b*c*d^3 + 9
*a*d^4)*x^2)*sqrt((c*x^2 + d)/x^2)/(d^4*x^8)
```

Sympy [A] time = 3.75093, size = 112, normalized size = 1.08

$$-\frac{a\left(\frac{c^{2}\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}}{3}-\frac{2c\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}}{5}+\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}}{7}\right)}{d^{3}}-\frac{b\left(-\frac{c^{3}\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}}{3}+\frac{3c^{2}\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}}{5}-\frac{3c\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}}{7}+\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}}}{9}\right)}{d^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**7,x)
```

```
[Out] -a*(c**2*(c + d/x**2)**(3/2)/3 - 2*c*(c + d/x**2)**(5/2)/5 + (c +
 d/x**2)**(7/2)/7)/d**3 - b*(-c**3*(c + d/x**2)**(3/2)/3 + 3*c**2
*(c + d/x**2)**(5/2)/5 - 3*c*(c + d/x**2)**(7/2)/7 + (c + d/x**2)
**(9/2)/9)/d**4
```

GIAC/XCAS [A] time = 0.819908, size = 500, normalized size = 4.81

$$\frac{16\left(210\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{12}ac^{\frac{7}{2}}\mathrm{sign}\left(x\right)+630\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{10}bc^{\frac{9}{2}}\mathrm{sign}\left(x\right)-315\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{10}ac^{\frac{7}{2}}d\mathrm{sign}\left(x\right)+37}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^7,x, algorithm="giac")
```

```
[Out] 16/315*(210*(sqrt(c)*x - sqrt(c*x^2 + d))^12*a*c^(7/2)*sign(x) +
630*(sqrt(c)*x - sqrt(c*x^2 + d))^10*b*c^(9/2)*sign(x) - 315*(sqr
t(c)*x - sqrt(c*x^2 + d))^10*a*c^(7/2)*d*sign(x) + 378*(sqrt(c)*x
 - sqrt(c*x^2 + d))^8*b*c^(9/2)*d*sign(x) + 63*(sqrt(c)*x - sqrt(
c*x^2 + d))^8*a*c^(7/2)*d^2*sign(x) + 168*(sqrt(c)*x - sqrt(c*x^2
 + d))^6*b*c^(9/2)*d^2*sign(x) - 42*(sqrt(c)*x - sqrt(c*x^2 + d))
^6*a*c^(7/2)*d^3*sign(x) - 72*(sqrt(c)*x - sqrt(c*x^2 + d))^4*b*c
^(9/2)*d^3*sign(x) + 108*(sqrt(c)*x - sqrt(c*x^2 + d))^4*a*c^(7/2
)*d^4*sign(x) + 18*(sqrt(c)*x - sqrt(c*x^2 + d))^2*b*c^(9/2)*d^4*
sign(x) - 27*(sqrt(c)*x - sqrt(c*x^2 + d))^2*a*c^(7/2)*d^5*sign(x
) - 2*b*c^(9/2)*d^5*sign(x) + 3*a*c^(7/2)*d^6*sign(x))/((sqrt(c)*
x - sqrt(c*x^2 + d))^2 - d)^9
```

3.767 $\int \frac{\left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}}{x^9}\,dx$

Optimal. Leaf size=134

$$-\frac{c^3\left(c+\frac{d}{x^2}\right)^{3/2}(bc-ad)}{3d^5}+\frac{c^2\left(c+\frac{d}{x^2}\right)^{5/2}(4bc-3ad)}{5d^5}+\frac{\left(c+\frac{d}{x^2}\right)^{9/2}(4bc-ad)}{9d^5}-\frac{3c\left(c+\frac{d}{x^2}\right)^{7/2}(2bc-ad)}{7d^5}-\frac{b\left(c+\frac{d}{x^2}\right)^{11/2}}{11d^5}$$

```
[Out] -(c^3*(b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^5) + (c^2*(4*b*c - 3*a*
d)*(c + d/x^2)^(5/2))/(5*d^5) - (3*c*(2*b*c - a*d)*(c + d/x^2)^(7
/2))/(7*d^5) + ((4*b*c - a*d)*(c + d/x^2)^(9/2))/(9*d^5) - (b*(c
+ d/x^2)^(11/2))/(11*d^5)
```

Rubi [A] time = 0.284083, antiderivative size = 134, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{c^3\left(c+\frac{d}{x^2}\right)^{3/2}(bc-ad)}{3d^5}+\frac{c^2\left(c+\frac{d}{x^2}\right)^{5/2}(4bc-3ad)}{5d^5}+\frac{\left(c+\frac{d}{x^2}\right)^{9/2}(4bc-ad)}{9d^5}-\frac{3c\left(c+\frac{d}{x^2}\right)^{7/2}(2bc-ad)}{7d^5}-\frac{b\left(c+\frac{d}{x^2}\right)^{11/2}}{11d^5}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b/x^2)*Sqrt[c + d/x^2])/x^9,x]
```

```
[Out] -(c^3*(b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^5) + (c^2*(4*b*c - 3*a*
d)*(c + d/x^2)^(5/2))/(5*d^5) - (3*c*(2*b*c - a*d)*(c + d/x^2)^(7
/2))/(7*d^5) + ((4*b*c - a*d)*(c + d/x^2)^(9/2))/(9*d^5) - (b*(c
+ d/x^2)^(11/2))/(11*d^5)
```

Rubi in Sympy [A] time = 28.5536, size = 121, normalized size = 0.9

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}}{11d^5}+\frac{c^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(ad-bc)}{3d^5}-\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(3ad-4bc)}{5d^5}+\frac{3c\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}(ad-2bc)}{7d^5}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}(ad-4bc)}{9d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**9,x)
```

```
[Out] -b*(c + d/x**2)**(11/2)/(11*d**5) + c**3*(c + d/x**2)**(3/2)*(a*d
 - b*c)/(3*d**5) - c**2*(c + d/x**2)**(5/2)*(3*a*d - 4*b*c)/(5*d*
*5) + 3*c*(c + d/x**2)**(7/2)*(a*d - 2*b*c)/(7*d**5) - (c + d/x**
2)**(9/2)*(a*d - 4*b*c)/(9*d**5)
```

Mathematica [A] time = 0.124379, size = 113, normalized size = 0.84

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)\left(11adx^2\left(-16c^3x^6+24c^2dx^4-30cd^2x^2+35d^3\right)+b\left(128c^4x^8-192c^3dx^6+240c^2d^2x^4-280cd^3x^2+31\right.\right.}{3465d^5x^{10}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[((a + b/x^2)*Sqrt[c + d/x^2])/x^9,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(d + c*x^2)*(11*a*d*x^2*(35*d^3 - 30*c*d^2*x^2
+ 24*c^2*d*x^4 - 16*c^3*x^6) + b*(315*d^4 - 280*c*d^3*x^2 + 240*c
^2*d^2*x^4 - 192*c^3*d*x^6 + 128*c^4*x^8)))/(3465*d^5*x^10)
```

Maple [A]   time = 0.011, size = 118, normalized size = 0.9

$$\frac{\left(176\,ac^3dx^8-128\,bc^4x^8-264\,ac^2d^2x^6+192\,bc^3dx^6+330\,acd^3x^4-240\,bc^2d^2x^4-385\,ad^4x^2+280\,bcd^3x^2-315\,bd^4\right)\left(cx\right.}{3465\,d^5x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((a+b/x^2)*(c+d/x^2)^(1/2)/x^9,x)
```

```
[Out] 1/3465*((c*x^2+d)/x^2)^(1/2)*(176*a*c^3*d*x^8-128*b*c^4*x^8-264*a
*c^2*d^2*x^6+192*b*c^3*d*x^6+330*a*c*d^3*x^4-240*b*c^2*d^2*x^4-38
5*a*d^4*x^2+280*b*c*d^3*x^2-315*b*d^4)*(c*x^2+d)/d^5/x^10
```

Maxima [A]   time = 1.38267, size = 205, normalized size = 1.53

$$-\frac{1}{3465}\,b\left(\frac{315\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}}{d^5}-\frac{1540\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}c}{d^5}+\frac{2970\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}c^2}{d^5}-\frac{2772\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c^3}{d^5}+\frac{1155\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c^4}{d^5}\right)$$
$$-\frac{1}{315}\,a\left(\frac{35\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{d^4}-\frac{135\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}c}{d^4}+\frac{189\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c^2}{d^4}-\frac{105\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c^3}{d^4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*sqrt(c + d/x^2)/x^9,x, algorithm="maxima")
```

```
[Out] -1/3465*b*(315*(c + d/x^2)^(11/2)/d^5 - 1540*(c + d/x^2)^(9/2)*c/
d^5 + 2970*(c + d/x^2)^(7/2)*c^2/d^5 - 2772*(c + d/x^2)^(5/2)*c^3
/d^5 + 1155*(c + d/x^2)^(3/2)*c^4/d^5) - 1/315*a*(35*(c + d/x^2)^
(9/2)/d^4 - 135*(c + d/x^2)^(7/2)*c/d^4 + 189*(c + d/x^2)^(5/2)*c
^2/d^4 - 105*(c + d/x^2)^(3/2)*c^3/d^4)
```

Fricas [A]   time = 0.487867, size = 180, normalized size = 1.34

$$-\frac{\left(16\left(8\,bc^5-11\,ac^4d\right)x^{10}-8\left(8\,bc^4d-11\,ac^3d^2\right)x^8+6\left(8\,bc^3d^2-11\,ac^2d^3\right)x^6+315\,bd^5-5\left(8\,bc^2d^3-11\,acd^4\right)x^4+35\left(b\right.\right.}{3465\,d^5x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*sqrt(c + d/x^2)/x^9,x, algorithm="fricas")
```

```
[Out] -1/3465*(16*(8*b*c^5 - 11*a*c^4*d)*x^10 - 8*(8*b*c^4*d - 11*a*c^3
*d^2)*x^8 + 6*(8*b*c^3*d^2 - 11*a*c^2*d^3)*x^6 + 315*b*d^5 - 5*(8
*b*c^2*d^3 - 11*a*c*d^4)*x^4 + 35*(b*c*d^4 + 11*a*d^5)*x^2)*sqrt(
(c*x^2 + d)/x^2)/(d^5*x^10)
```

Sympy [A] time = 5.07913, size = 146, normalized size = 1.09

$$-\frac{a\left(-\frac{c^{3}\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}}{3}+\frac{3c^{2}\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}}{5}-\frac{3c\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}}{7}+\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}}}{9}\right)}{d^{4}}-\frac{b\left(\frac{c^{4}\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}}{3}-\frac{4c^{3}\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}}{5}+\frac{6c^{2}\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}}{7}-\frac{4c\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}}}{9}+\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{11}{2}}}{11}\right)}{d^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**9,x)
```

```
[Out] -a*(-c**3*(c + d/x**2)**(3/2)/3 + 3*c**2*(c + d/x**2)**(5/2)/5 -
3*c*(c + d/x**2)**(7/2)/7 + (c + d/x**2)**(9/2)/9)/d**4 - b*(c**4
*(c + d/x**2)**(3/2)/3 - 4*c**3*(c + d/x**2)**(5/2)/5 + 6*c**2*(c
 + d/x**2)**(7/2)/7 - 4*c*(c + d/x**2)**(9/2)/9 + (c + d/x**2)**(
11/2)/11)/d**5
```

GIAC/XCAS [A] time = 1.23267, size = 581, normalized size = 4.34

$$\frac{32\left(3465\left(\sqrt{c}x-\sqrt{cx^{2}+d}\right)^{14}ac^{\frac{9}{2}}\operatorname{sign}(x)+11088\left(\sqrt{c}x-\sqrt{cx^{2}+d}\right)^{12}bc^{\frac{11}{2}}\operatorname{sign}(x)-4851\left(\sqrt{c}x-\sqrt{cx^{2}+d}\right)^{12}ac^{\frac{9}{2}}d\operatorname{sign}(x\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^9,x, algorithm="giac")
```

```
[Out] 32/3465*(3465*(sqrt(c)*x - sqrt(c*x^2 + d))^14*a*c^(9/2)*sign(x)
+ 11088*(sqrt(c)*x - sqrt(c*x^2 + d))^12*b*c^(11/2)*sign(x) - 485
1*(sqrt(c)*x - sqrt(c*x^2 + d))^12*a*c^(9/2)*d*sign(x) + 7392*(sq
rt(c)*x - sqrt(c*x^2 + d))^10*b*c^(11/2)*d*sign(x) + 231*(sqrt(c)
*x - sqrt(c*x^2 + d))^10*a*c^(9/2)*d^2*sign(x) + 2640*(sqrt(c)*x
- sqrt(c*x^2 + d))^8*b*c^(11/2)*d^2*sign(x) - 165*(sqrt(c)*x - sq
rt(c*x^2 + d))^8*a*c^(9/2)*d^3*sign(x) - 1320*(sqrt(c)*x - sqrt(c
*x^2 + d))^6*b*c^(11/2)*d^3*sign(x) + 1815*(sqrt(c)*x - sqrt(c*x^
2 + d))^6*a*c^(9/2)*d^4*sign(x) + 440*(sqrt(c)*x - sqrt(c*x^2 + d
))^4*b*c^(11/2)*d^4*sign(x) - 605*(sqrt(c)*x - sqrt(c*x^2 + d))^4
*a*c^(9/2)*d^5*sign(x) - 88*(sqrt(c)*x - sqrt(c*x^2 + d))^2*b*c^(
11/2)*d^5*sign(x) + 121*(sqrt(c)*x - sqrt(c*x^2 + d))^2*a*c^(9/2)
*d^6*sign(x) + 8*b*c^(11/2)*d^6*sign(x) - 11*a*c^(9/2)*d^7*sign(x
))/((sqrt(c)*x - sqrt(c*x^2 + d))^2 - d)^11
```

3.768 $\int \left(a+\frac{b}{x^2}\right) \sqrt{c+\frac{d}{x^2}} x^{10}\,dx$

Optimal. Leaf size=150

$$-\frac{16d^3x^3\left(c+\frac{d}{x^2}\right)^{3/2}(11bc-8ad)}{3465c^5}+\frac{8d^2x^5\left(c+\frac{d}{x^2}\right)^{3/2}(11bc-8ad)}{1155c^4}-\frac{2dx^7\left(c+\frac{d}{x^2}\right)^{3/2}(11bc-8ad)}{231c^3}+\frac{x^9\left(c+\frac{d}{x^2}\right)^{3/2}(11bc-8ad)}{99c^2}+\frac{ax^{11}\left(c+\frac{d}{x^2}\right)^{3/2}}{11c}$$

```
[Out] (-16*d^3*(11*b*c - 8*a*d)*(c + d/x^2)^(3/2)*x^3)/(3465*c^5) + (8*
d^2*(11*b*c - 8*a*d)*(c + d/x^2)^(3/2)*x^5)/(1155*c^4) - (2*d*(11
*b*c - 8*a*d)*(c + d/x^2)^(3/2)*x^7)/(231*c^3) + ((11*b*c - 8*a*d
)*(c + d/x^2)^(3/2)*x^9)/(99*c^2) + (a*(c + d/x^2)^(3/2)*x^11)/(1
1*c)
```

Rubi [A] time = 0.256791, antiderivative size = 150, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{16d^3x^3\left(c+\frac{d}{x^2}\right)^{3/2}(11bc-8ad)}{3465c^5}+\frac{8d^2x^5\left(c+\frac{d}{x^2}\right)^{3/2}(11bc-8ad)}{1155c^4}-\frac{2dx^7\left(c+\frac{d}{x^2}\right)^{3/2}(11bc-8ad)}{231c^3}+\frac{x^9\left(c+\frac{d}{x^2}\right)^{3/2}(11bc-8ad)}{99c^2}+\frac{ax^{11}\left(c+\frac{d}{x^2}\right)^{3/2}}{11c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*Sqrt[c + d/x^2]*x^10,x]
```

```
[Out] (-16*d^3*(11*b*c - 8*a*d)*(c + d/x^2)^(3/2)*x^3)/(3465*c^5) + (8*
d^2*(11*b*c - 8*a*d)*(c + d/x^2)^(3/2)*x^5)/(1155*c^4) - (2*d*(11
*b*c - 8*a*d)*(c + d/x^2)^(3/2)*x^7)/(231*c^3) + ((11*b*c - 8*a*d
)*(c + d/x^2)^(3/2)*x^9)/(99*c^2) + (a*(c + d/x^2)^(3/2)*x^11)/(1
1*c)
```

Rubi in Sympy [A] time = 18.0129, size = 146, normalized size = 0.97

$$\frac{ax^{11}\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{11c}-\frac{x^9\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(8ad-11bc)}{99c^2}+\frac{2dx^7\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(8ad-11bc)}{231c^3}-\frac{8d^2x^5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(8ad-11bc)}{1155c^4}+\frac{16d^3x^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(8ad-11bc)}{3465c^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**10*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**11*(c + d/x**2)**(3/2)/(11*c) - x**9*(c + d/x**2)**(3/2)*(8*
a*d - 11*b*c)/(99*c**2) + 2*d*x**7*(c + d/x**2)**(3/2)*(8*a*d - 1
1*b*c)/(231*c**3) - 8*d**2*x**5*(c + d/x**2)**(3/2)*(8*a*d - 11*b
*c)/(1155*c**4) + 16*d**3*x**3*(c + d/x**2)**(3/2)*(8*a*d - 11*b*
c)/(3465*c**5)
```

Mathematica [A] time = 0.0987397, size = 108, normalized size = 0.72

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)\left(a\left(315c^4x^8-280c^3dx^6+240c^2d^2x^4-192cd^3x^2+128d^4\right)+11bc\left(35c^3x^6-30c^2dx^4+24cd^2x^2-16d^3\right.\right.}{3465c^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*Sqrt[c + d/x^2]*x^10,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(d + c*x^2)*(11*b*c*(-16*d^3 + 24*c*d^2*x^2 -
30*c^2*d*x^4 + 35*c^3*x^6) + a*(128*d^4 - 192*c*d^3*x^2 + 240*c^2
*d^2*x^4 - 280*c^3*d*x^6 + 315*c^4*x^8)))/(3465*c^5)
```

Maple [A] time = 0.011, size = 113, normalized size = 0.8

$$\frac{x\left(315\,ax^{8}c^{4}-280\,ac^{3}dx^{6}+385\,bc^{4}x^{6}+240\,ac^{2}d^{2}x^{4}-330\,bc^{3}dx^{4}-192\,acd^{3}x^{2}+264\,bc^{2}d^{2}x^{2}+128\,ad^{4}-176\,bcd^{3}\right)\left(cx^{2}\right.}{3465\,c^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^10*(c+d/x^2)^(1/2),x)
```

```
[Out] 1/3465*((c*x^2+d)/x^2)^(1/2)*x*(315*a*c^4*x^8-280*a*c^3*d*x^6+385
*b*c^4*x^6+240*a*c^2*d^2*x^4-330*b*c^3*d*x^4-192*a*c*d^3*x^2+264*
b*c^2*d^2*x^2+128*a*d^4-176*b*c*d^3)*(c*x^2+d)/c^5
```

Maxima [A] time = 1.37017, size = 213, normalized size = 1.42

$$\frac{\left(35\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}}x^{9}-135\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}dx^{7}+189\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}d^{2}x^{5}-105\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}d^{3}x^{3}\right)b}{315\,c^{4}}+\frac{\left(315\left(c+\frac{d}{x^{2}}\right)^{\frac{11}{2}}x^{11}-1540\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}}dx^{9}+2970\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}d^{2}x^{7}-2772\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}d^{3}x^{5}+1155\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}d^{4}x^{3}\right)a}{3465\,c^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^10,x, algorithm="maxima")
```

```
[Out] 1/315*(35*(c + d/x^2)^(9/2)*x^9 - 135*(c + d/x^2)^(7/2)*d*x^7 + 1
89*(c + d/x^2)^(5/2)*d^2*x^5 - 105*(c + d/x^2)^(3/2)*d^3*x^3)*b/c
^4 + 1/3465*(315*(c + d/x^2)^(11/2)*x^11 - 1540*(c + d/x^2)^(9/2)
*d*x^9 + 2970*(c + d/x^2)^(7/2)*d^2*x^7 - 2772*(c + d/x^2)^(5/2)*
d^3*x^5 + 1155*(c + d/x^2)^(3/2)*d^4*x^3)*a/c^5
```

Fricas [A] time = 0.230501, size = 177, normalized size = 1.18

$$\frac{\left(315\,ac^{5}x^{11}+35\left(11\,bc^{5}+ac^{4}d\right)x^{9}+5\left(11\,bc^{4}d-8\,ac^{3}d^{2}\right)x^{7}-6\left(11\,bc^{3}d^{2}-8\,ac^{2}d^{3}\right)x^{5}+8\left(11\,bc^{2}d^{3}-8\,acd^{4}\right)x^{3}-16\left(11\right.}{3465\,c^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^10,x, algorithm="fricas")
```

```
[Out] 1/3465*(315*a*c^5*x^11 + 35*(11*b*c^5 + a*c^4*d)*x^9 + 5*(11*b*c^
4*d - 8*a*c^3*d^2)*x^7 - 6*(11*b*c^3*d^2 - 8*a*c^2*d^3)*x^5 + 8*(
11*b*c^2*d^3 - 8*a*c*d^4)*x^3 - 16*(11*b*c*d^4 - 8*a*d^5)*x)*sqrt
((c*x^2 + d)/x^2)/c^5
```

Sympy [A] time = 15.5781, size = 1386, normalized size = 9.24

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**10*(c+d/x**2)**(1/2),x)
```

```
[Out] 315*a*c**9*d**(33/2)*x**18*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x*
*8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d
**19*x**2 + 3465*c**5*d**20) + 1295*a*c**8*d**(35/2)*x**16*sqrt(c
*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 2079
0*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 19
90*a*c**7*d**(37/2)*x**14*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**
8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d*
*19*x**2 + 3465*c**5*d**20) + 1358*a*c**6*d**(39/2)*x**12*sqrt(c*
x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790
*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 343
*a*c**5*d**(41/2)*x**10*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8
+ 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**1
9*x**2 + 3465*c**5*d**20) + 35*a*c**4*d**(43/2)*x**8*sqrt(c*x**2/
d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7
*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 280*a*c*
*3*d**(45/2)*x**6*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 1386
0*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2
 + 3465*c**5*d**20) + 560*a*c**2*d**(47/2)*x**4*sqrt(c*x**2/d + 1
)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**1
8*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 448*a*c*d**(4
9/2)*x**2*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d
**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*
c**5*d**20) + 128*a*d**(51/2)*sqrt(c*x**2/d + 1)/(3465*c**9*d**16
*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**
6*d**19*x**2 + 3465*c**5*d**20) + 35*b*c**7*d**(19/2)*x**14*sqrt(
c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**
5*d**11*x**2 + 315*c**4*d**12) + 110*b*c**6*d**(21/2)*x**12*sqrt(
c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**
5*d**11*x**2 + 315*c**4*d**12) + 114*b*c**5*d**(23/2)*x**10*sqrt(
c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**
5*d**11*x**2 + 315*c**4*d**12) + 40*b*c**4*d**(25/2)*x**8*sqrt(c*
x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*
d**11*x**2 + 315*c**4*d**12) - 5*b*c**3*d**(27/2)*x**6*sqrt(c*x**
2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**
11*x**2 + 315*c**4*d**12) - 30*b*c**2*d**(29/2)*x**4*sqrt(c*x**2/
d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11
*x**2 + 315*c**4*d**12) - 40*b*c*d**(31/2)*x**2*sqrt(c*x**2/d + 1
)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2
 + 315*c**4*d**12) - 16*b*d**(33/2)*sqrt(c*x**2/d + 1)/(315*c**7*
d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*
d**12)
```

GIAC/XCAS [A] time = 0.230706, size = 217, normalized size = 1.45

$$\frac{\frac{11\left(35\left(cx^2+d\right)^{\frac{9}{2}}-135\left(cx^2+d\right)^{\frac{7}{2}}d+189\left(cx^2+d\right)^{\frac{5}{2}}d^2-105\left(cx^2+d\right)^{\frac{3}{2}}d^3\right)b\,\mathrm{sign}(x)}{c^3}+\frac{\left(315\left(cx^2+d\right)^{\frac{11}{2}}-1540\left(cx^2+d\right)^{\frac{9}{2}}d+2970\left(cx^2+d\right)^{\frac{7}{2}}d^2-2772\left(cx^2+d\right)^{\frac{5}{2}}d^3+\right.}{c^4}}{3465\,c}$$

$$+\frac{16\left(11\,bcd^{\frac{9}{2}}-8\,ad^{\frac{11}{2}}\right)\mathrm{sign}\left(x\right)}{3465\,c^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^10,x, algorithm="giac")
```

```
[Out] 1/3465*(11*(35*(c*x^2 + d)^(9/2) - 135*(c*x^2 + d)^(7/2)*d + 189*
(c*x^2 + d)^(5/2)*d^2 - 105*(c*x^2 + d)^(3/2)*d^3)*b*sign(x)/c^3
+ (315*(c*x^2 + d)^(11/2) - 1540*(c*x^2 + d)^(9/2)*d + 2970*(c*x^
2 + d)^(7/2)*d^2 - 2772*(c*x^2 + d)^(5/2)*d^3 + 1155*(c*x^2 + d)^
(3/2)*d^4)*a*sign(x)/c^4)/c + 16/3465*(11*b*c*d^(9/2) - 8*a*d^(11
/2))*sign(x)/c^5
```

3.769 $\int \left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}x^8\,dx$

Optimal. Leaf size=117

$$\frac{8d^2x^3\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-2ad)}{315c^4}-\frac{4dx^5\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-2ad)}{105c^3}+\frac{x^7\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-2ad)}{21c^2}+\frac{ax^9\left(c+\frac{d}{x^2}\right)^{3/2}}{9c}$$

```
[Out] (8*d^2*(3*b*c - 2*a*d)*(c + d/x^2)^(3/2)*x^3)/(315*c^4) - (4*d*(3
*b*c - 2*a*d)*(c + d/x^2)^(3/2)*x^5)/(105*c^3) + ((3*b*c - 2*a*d)
*(c + d/x^2)^(3/2)*x^7)/(21*c^2) + (a*(c + d/x^2)^(3/2)*x^9)/(9*c
)
```

Rubi [A] time = 0.219225, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{8d^2x^3\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-2ad)}{315c^4}-\frac{4dx^5\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-2ad)}{105c^3}+\frac{x^7\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-2ad)}{21c^2}+\frac{ax^9\left(c+\frac{d}{x^2}\right)^{3/2}}{9c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*Sqrt[c + d/x^2]*x^8,x]
```

```
[Out] (8*d^2*(3*b*c - 2*a*d)*(c + d/x^2)^(3/2)*x^3)/(315*c^4) - (4*d*(3
*b*c - 2*a*d)*(c + d/x^2)^(3/2)*x^5)/(105*c^3) + ((3*b*c - 2*a*d)
*(c + d/x^2)^(3/2)*x^7)/(21*c^2) + (a*(c + d/x^2)^(3/2)*x^9)/(9*c
)
```

Rubi in Sympy [A] time = 13.7508, size = 112, normalized size = 0.96

$$\frac{ax^9\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{9c}-\frac{x^7\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(2ad-3bc)}{21c^2}+\frac{4dx^5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(2ad-3bc)}{105c^3}-\frac{8d^2x^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(2ad-3bc)}{315c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**8*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**9*(c + d/x**2)**(3/2)/(9*c) - x**7*(c + d/x**2)**(3/2)*(2*a*
d - 3*b*c)/(21*c**2) + 4*d*x**5*(c + d/x**2)**(3/2)*(2*a*d - 3*b*
c)/(105*c**3) - 8*d**2*x**3*(c + d/x**2)**(3/2)*(2*a*d - 3*b*c)/(
315*c**4)
```

Mathematica [A] time = 0.083713, size = 86, normalized size = 0.74

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)\left(a\left(35c^3x^6-30c^2dx^4+24cd^2x^2-16d^3\right)+3bc\left(15c^2x^4-12cdx^2+8d^2\right)\right)}{315c^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*Sqrt[c + d/x^2]*x^8,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(d + c*x^2)*(3*b*c*(8*d^2 - 12*c*d*x^2 + 15*c^
2*x^4) + a*(-16*d^3 + 24*c*d^2*x^2 - 30*c^2*d*x^4 + 35*c^3*x^6)))
/(315*c^4)
```

Maple [A] time = 0.011, size = 89, normalized size = 0.8

$$\frac{x\left(35\,a x^{6} c^{3}-30\,a c^{2} d x^{4}+45\,b c^{3} x^{4}+24\,a c d^{2} x^{2}-36\,b c^{2} d x^{2}-16\,a d^{3}+24\,b c d^{2}\right)\left(c x^{2}+d\right)}{315\,c^{4}}\sqrt{\frac{c x^{2}+d}{x^{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^8*(c+d/x^2)^(1/2),x)
```

```
[Out] 1/315*((c*x^2+d)/x^2)^(1/2)*x*(35*a*c^3*x^6-30*a*c^2*d*x^4+45*b*c
^3*x^4+24*a*c*d^2*x^2-36*b*c^2*d*x^2-16*a*d^3+24*b*c*d^2)*(c*x^2+
d)/c^4
```

Maxima [A] time = 1.39025, size = 167, normalized size = 1.43

$$\frac{\left(15\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}} x^{7}-42\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}} d x^{5}+35\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}} d^{2} x^{3}\right) b}{105\,c^{3}}+\frac{\left(35\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}} x^{9}-135\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}} d x^{7}+189\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}} d^{2} x^{5}-105\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}} d^{3} x^{3}\right) a}{315\,c^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^8,x, algorithm="maxima")
```

```
[Out] 1/105*(15*(c + d/x^2)^(7/2)*x^7 - 42*(c + d/x^2)^(5/2)*d*x^5 + 35
*(c + d/x^2)^(3/2)*d^2*x^3)*b/c^3 + 1/315*(35*(c + d/x^2)^(9/2)*x
^9 - 135*(c + d/x^2)^(7/2)*d*x^7 + 189*(c + d/x^2)^(5/2)*d^2*x^5
- 105*(c + d/x^2)^(3/2)*d^3*x^3)*a/c^4
```

Fricas [A] time = 0.233194, size = 144, normalized size = 1.23

$$\frac{\left(35\,a c^{4} x^{9}+5\left(9\,b c^{4}+a c^{3} d\right) x^{7}+3\left(3\,b c^{3} d-2\,a c^{2} d^{2}\right) x^{5}-4\left(3\,b c^{2} d^{2}-2\,a c d^{3}\right) x^{3}+8\left(3\,b c d^{3}-2\,a d^{4}\right) x\right)\sqrt{\frac{c x^{2}+d}{x^{2}}}}{315\,c^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^8,x, algorithm="fricas")
```

```
[Out] 1/315*(35*a*c^4*x^9 + 5*(9*b*c^4 + a*c^3*d)*x^7 + 3*(3*b*c^3*d -
2*a*c^2*d^2)*x^5 - 4*(3*b*c^2*d^2 - 2*a*c*d^3)*x^3 + 8*(3*b*c*d^3
 - 2*a*d^4)*x)*sqrt((c*x^2 + d)/x^2)/c^4
```

Sympy [A] time = 10.2474, size = 910, normalized size = 7.78

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**8*(c+d/x**2)**(1/2),x)
```

```
[Out] 35*a*c**7*d**(19/2)*x**14*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6
+ 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 1
```

```
10*a*c**6*d**(21/2)*x**12*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6
+ 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 1
14*a*c**5*d**(23/2)*x**10*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6
+ 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 4
0*a*c**4*d**(25/2)*x**8*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 +
945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) - 5*a
*c**3*d**(27/2)*x**6*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945
*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) - 30*a*c
**2*d**(29/2)*x**4*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c
**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) - 40*a*c*d
**(31/2)*x**2*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d
**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) - 16*a*d**(33/2
)*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 +
945*c**5*d**11*x**2 + 315*c**4*d**12) + 15*b*c**5*d**(9/2)*x**10*
sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105
*c**3*d**6) + 33*b*c**4*d**(11/2)*x**8*sqrt(c*x**2/d + 1)/(105*c*
*5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 17*b*c**3*d*
*(13/2)*x**6*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d*
*5*x**2 + 105*c**3*d**6) + 3*b*c**2*d**(15/2)*x**4*sqrt(c*x**2/d
+ 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) +
12*b*c*d**(17/2)*x**2*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 21
0*c**4*d**5*x**2 + 105*c**3*d**6) + 8*b*d**(19/2)*sqrt(c*x**2/d +
 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6)
```

GIAC/XCAS [A] time = 0.214761, size = 180, normalized size = 1.54

$$\frac{\frac{3\left(15\left(cx^2+d\right)^{\frac{7}{2}}-42\left(cx^2+d\right)^{\frac{5}{2}}d+35\left(cx^2+d\right)^{\frac{3}{2}}d^2\right)b\operatorname{sign}(x)}{c^2}+\frac{\left(35\left(cx^2+d\right)^{\frac{9}{2}}-135\left(cx^2+d\right)^{\frac{7}{2}}d+189\left(cx^2+d\right)^{\frac{5}{2}}d^2-105\left(cx^2+d\right)^{\frac{3}{2}}d^3\right)a\operatorname{sign}(x)}{c^3}}{315\,c}$$

$$-\frac{8\left(3\,bcd^{\frac{7}{2}}-2\,ad^{\frac{9}{2}}\right)\operatorname{sign}(x)}{315\,c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^8,x, algorithm="giac")
```

```
[Out] 1/315*(3*(15*(c*x^2 + d)^(7/2) - 42*(c*x^2 + d)^(5/2)*d + 35*(c*x
^2 + d)^(3/2)*d^2)*b*sign(x)/c^2 + (35*(c*x^2 + d)^(9/2) - 135*(c
*x^2 + d)^(7/2)*d + 189*(c*x^2 + d)^(5/2)*d^2 - 105*(c*x^2 + d)^(
3/2)*d^3)*a*sign(x)/c^3)/c - 8/315*(3*b*c*d^(7/2) - 2*a*d^(9/2))*
sign(x)/c^4
```

3.770 $\int \left(a+\frac{b}{x^2}\right) \sqrt{c+\frac{d}{x^2}} x^6 \, dx$

Optimal. Leaf size=84

$$-\frac{2dx^3\left(c+\frac{d}{x^2}\right)^{3/2}(7bc-4ad)}{105c^3}+\frac{x^5\left(c+\frac{d}{x^2}\right)^{3/2}(7bc-4ad)}{35c^2}+\frac{ax^7\left(c+\frac{d}{x^2}\right)^{3/2}}{7c}$$

```
[Out] (-2*d*(7*b*c - 4*a*d)*(c + d/x^2)^(3/2)*x^3)/(105*c^3) + ((7*b*c
- 4*a*d)*(c + d/x^2)^(3/2)*x^5)/(35*c^2) + (a*(c + d/x^2)^(3/2)*x
^7)/(7*c)
```

Rubi [A] time = 0.15216, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$-\frac{2dx^3\left(c+\frac{d}{x^2}\right)^{3/2}(7bc-4ad)}{105c^3}+\frac{x^5\left(c+\frac{d}{x^2}\right)^{3/2}(7bc-4ad)}{35c^2}+\frac{ax^7\left(c+\frac{d}{x^2}\right)^{3/2}}{7c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*Sqrt[c + d/x^2]*x^6,x]
```

```
[Out] (-2*d*(7*b*c - 4*a*d)*(c + d/x^2)^(3/2)*x^3)/(105*c^3) + ((7*b*c
- 4*a*d)*(c + d/x^2)^(3/2)*x^5)/(35*c^2) + (a*(c + d/x^2)^(3/2)*x
^7)/(7*c)
```

Rubi in Sympy [A] time = 10.4773, size = 78, normalized size = 0.93

$$\frac{ax^7\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{7c}-\frac{x^5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(4ad-7bc)}{35c^2}+\frac{2dx^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(4ad-7bc)}{105c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**6*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**7*(c + d/x**2)**(3/2)/(7*c) - x**5*(c + d/x**2)**(3/2)*(4*a*
d - 7*b*c)/(35*c**2) + 2*d*x**3*(c + d/x**2)**(3/2)*(4*a*d - 7*b*
c)/(105*c**3)
```

Mathematica [A] time = 0.0673299, size = 64, normalized size = 0.76

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)\left(a\left(15c^2x^4-12cdx^2+8d^2\right)+7bc\left(3cx^2-2d\right)\right)}{105c^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*Sqrt[c + d/x^2]*x^6,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(d + c*x^2)*(7*b*c*(-2*d + 3*c*x^2) + a*(8*d^2
 - 12*c*d*x^2 + 15*c^2*x^4)))/(105*c^3)
```

Maple [A] time = 0.01, size = 65, normalized size = 0.8

$$\frac{x\left(15\,ax^4c^2-12\,acdx^2+21\,bc^2x^2+8\,ad^2-14\,bcd\right)\left(cx^2+d\right)}{105\,c^3}\sqrt{\frac{cx^2+d}{x^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^6*(c+d/x^2)^(1/2),x)
```

```
[Out] 1/105*((c*x^2+d)/x^2)^(1/2)*x*(15*a*c^2*x^4-12*a*c*d*x^2+21*b*c^2
*x^2+8*a*d^2-14*b*c*d)*(c*x^2+d)/c^3
```

Maxima [A] time = 1.49333, size = 122, normalized size = 1.45

$$\frac{\left(3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}x^5-5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}dx^3\right)b}{15\,c^2}+\frac{\left(15\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}x^7-42\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}dx^5+35\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}d^2x^3\right)a}{105\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^6,x, algorithm="maxima")
```

```
[Out] 1/15*(3*(c + d/x^2)^(5/2)*x^5 - 5*(c + d/x^2)^(3/2)*d*x^3)*b/c^2
+ 1/105*(15*(c + d/x^2)^(7/2)*x^7 - 42*(c + d/x^2)^(5/2)*d*x^5 +
35*(c + d/x^2)^(3/2)*d^2*x^3)*a/c^3
```

Fricas [A] time = 0.219388, size = 111, normalized size = 1.32

$$\frac{\left(15\,ac^3x^7+3\left(7\,bc^3+ac^2d\right)x^5+\left(7\,bc^2d-4\,acd^2\right)x^3-2\left(7\,bcd^2-4\,ad^3\right)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{105\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^6,x, algorithm="fricas")
```

```
[Out] 1/105*(15*a*c^3*x^7 + 3*(7*b*c^3 + a*c^2*d)*x^5 + (7*b*c^2*d - 4*
a*c*d^2)*x^3 - 2*(7*b*c*d^2 - 4*a*d^3)*x)*sqrt((c*x^2 + d)/x^2)/c
^3
```

Sympy [A] time = 6.48918, size = 422, normalized size = 5.02

$$\frac{15ac^5d^{\frac{9}{2}}x^{10}\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{33ac^4d^{\frac{11}{2}}x^8\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{17ac^3d^{\frac{13}{2}}x^6\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{3ac^2d^{\frac{15}{2}}x^4\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{12acd^{\frac{17}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{8ad^{\frac{19}{2}}\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{b\sqrt{d}x^4\sqrt{\frac{cx^2}{d}+1}}{5}+\frac{bd^{\frac{3}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{15c}-\frac{2bd^{\frac{5}{2}}\sqrt{\frac{cx^2}{d}+1}}{15c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**6*(c+d/x**2)**(1/2),x)
```

```
[Out] 15*a*c**5*d**(9/2)*x**10*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 +
 210*c**4*d**5*x**2 + 105*c**3*d**6) + 33*a*c**4*d**(11/2)*x**8*s
qrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*
c**3*d**6) + 17*a*c**3*d**(13/2)*x**6*sqrt(c*x**2/d + 1)/(105*c**
5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 3*a*c**2*d**(
15/2)*x**4*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5
*x**2 + 105*c**3*d**6) + 12*a*c*d**(17/2)*x**2*sqrt(c*x**2/d + 1)
/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 8*a*
d**(19/2)*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*
x**2 + 105*c**3*d**6) + b*sqrt(d)*x**4*sqrt(c*x**2/d + 1)/5 + b*d
**(3/2)*x**2*sqrt(c*x**2/d + 1)/(15*c) - 2*b*d**(5/2)*sqrt(c*x**2
/d + 1)/(15*c**2)
```

GIAC/XCAS [A] time = 0.214467, size = 142, normalized size = 1.69

$$\frac{\frac{7\left(3\left(cx^2+d\right)^{\frac{5}{2}}-5\left(cx^2+d\right)^{\frac{3}{2}}d\right)b\mathrm{sign}(x)}{c}+\frac{\left(15\left(cx^2+d\right)^{\frac{7}{2}}-42\left(cx^2+d\right)^{\frac{5}{2}}d+35\left(cx^2+d\right)^{\frac{3}{2}}d^2\right)a\mathrm{sign}(x)}{c^2}}{105\,c}+\frac{2\left(7\,bcd^{\frac{5}{2}}-4\,ad^{\frac{7}{2}}\right)\mathrm{sign}\left(x\right)}{105\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^6,x, algorithm="giac")
```

```
[Out] 1/105*(7*(3*(c*x^2 + d)^(5/2) - 5*(c*x^2 + d)^(3/2)*d)*b*sign(x)/
c + (15*(c*x^2 + d)^(7/2) - 42*(c*x^2 + d)^(5/2)*d + 35*(c*x^2 +
d)^(3/2)*d^2)*a*sign(x)/c^2)/c + 2/105*(7*b*c*d^(5/2) - 4*a*d^(7/
2))*sign(x)/c^3
```

3.771 $\int \left(a+\frac{b}{x^2}\right) \sqrt{c+\frac{d}{x^2}} x^4 \, dx$

Optimal. Leaf size=53

$$\frac{x^3 \left(c+\frac{d}{x^2}\right)^{3/2} (5bc-2ad)}{15c^2}+\frac{ax^5 \left(c+\frac{d}{x^2}\right)^{3/2}}{5c}$$

```
[Out] ((5*b*c - 2*a*d)*(c + d/x^2)^(3/2)*x^3)/(15*c^2) + (a*(c + d/x^2)
^(3/2)*x^5)/(5*c)
```

Rubi [A] time = 0.106376, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{x^3 \left(c+\frac{d}{x^2}\right)^{3/2} (5bc-2ad)}{15c^2}+\frac{ax^5 \left(c+\frac{d}{x^2}\right)^{3/2}}{5c}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b/x^2)*Sqrt[c + d/x^2]*x^4,x]
```

```
[Out] ((5*b*c - 2*a*d)*(c + d/x^2)^(3/2)*x^3)/(15*c^2) + (a*(c + d/x^2)
^(3/2)*x^5)/(5*c)
```

Rubi in Sympy [A] time = 7.53265, size = 46, normalized size = 0.87

$$\frac{ax^5 \left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{5c}-\frac{x^3 \left(c+\frac{d}{x^2}\right)^{\frac{3}{2}} (2ad-5bc)}{15c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)*x**4*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**5*(c + d/x**2)**(3/2)/(5*c) - x**3*(c + d/x**2)**(3/2)*(2*a*
d - 5*b*c)/(15*c**2)
```

Mathematica [A] time = 0.0496418, size = 42, normalized size = 0.79

$$\frac{x\sqrt{c+\frac{d}{x^2}} \left(cx^2+d\right) \left(3acx^2-2ad+5bc\right)}{15c^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b/x^2)*Sqrt[c + d/x^2]*x^4,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(d + c*x^2)*(5*b*c - 2*a*d + 3*a*c*x^2))/(15*c
^2)
```

Maple [A] time = 0.007, size = 43, normalized size = 0.8

$$\frac{x \left(3\,ax^2c-2\,ad+5\,bc\right) \left(cx^2+d\right)}{15\,c^2}\sqrt{\frac{cx^2+d}{x^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^4*(c+d/x^2)^(1/2),x)
```

```
[Out] 1/15*((c*x^2+d)/x^2)^(1/2)*x*(3*a*c*x^2-2*a*d+5*b*c)*(c*x^2+d)/c^
2
```

Maxima [A] time = 1.4506, size = 74, normalized size = 1.4

$$\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}x^3}{3\,c}+\frac{\left(3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}x^5-5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}dx^3\right)a}{15\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^4,x, algorithm="maxima")
```

```
[Out] 1/3*b*(c + d/x^2)^(3/2)*x^3/c + 1/15*(3*(c + d/x^2)^(5/2)*x^5 - 5
*(c + d/x^2)^(3/2)*d*x^3)*a/c^2
```

Fricas [A] time = 0.216349, size = 77, normalized size = 1.45

$$\frac{\left(3\,ac^2x^5+\left(5\,bc^2+acd\right)x^3+\left(5\,bcd-2\,ad^2\right)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{15\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^4,x, algorithm="fricas")
```

```
[Out] 1/15*(3*a*c^2*x^5 + (5*b*c^2 + a*c*d)*x^3 + (5*b*c*d - 2*a*d^2)*x
)*sqrt((c*x^2 + d)/x^2)/c^2
```

Sympy [A] time = 4.11268, size = 119, normalized size = 2.25

$$\frac{a\sqrt{d}x^4\sqrt{\frac{cx^2}{d}+1}}{5}+\frac{ad^{\frac{3}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{15c}-\frac{2ad^{\frac{5}{2}}\sqrt{\frac{cx^2}{d}+1}}{15c^2}+\frac{b\sqrt{d}x^2\sqrt{\frac{cx^2}{d}+1}}{3}+\frac{bd^{\frac{3}{2}}\sqrt{\frac{cx^2}{d}+1}}{3c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**4*(c+d/x**2)**(1/2),x)
```

```
[Out] a*sqrt(d)*x**4*sqrt(c*x**2/d + 1)/5 + a*d**(3/2)*x**2*sqrt(c*x**2
/d + 1)/(15*c) - 2*a*d**(5/2)*sqrt(c*x**2/d + 1)/(15*c**2) + b*sq
rt(d)*x**2*sqrt(c*x**2/d + 1)/3 + b*d**(3/2)*sqrt(c*x**2/d + 1)/(
3*c)
```

GIAC/XCAS [A] time = 0.216044, size = 99, normalized size = 1.87

$$\frac{5\left(cx^2+d\right)^{\frac{3}{2}}b\mathrm{sign}\left(x\right)+\frac{\left(3\left(cx^2+d\right)^{\frac{5}{2}}-5\left(cx^2+d\right)^{\frac{3}{2}}d\right)a\mathrm{sign}(x)}{c}}{15\,c}-\frac{\left(5\,bcd^{\frac{3}{2}}-2\,ad^{\frac{5}{2}}\right)\mathrm{sign}\left(x\right)}{15\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^4,x, algorithm="giac")
```

```
[Out] 1/15*(5*(c*x^2 + d)^(3/2)*b*sign(x) + (3*(c*x^2 + d)^(5/2) - 5*(c
*x^2 + d)^(3/2)*d)*a*sign(x)/c)/c - 1/15*(5*b*c*d^(3/2) - 2*a*d^(
5/2))*sign(x)/c^2
```

3.772 $\int \left(a+\frac{b}{x^2}\right) \sqrt{c+\frac{d}{x^2}} x^2 \, dx$

Optimal. Leaf size=66

$$\frac{ax^3\left(c+\frac{d}{x^2}\right)^{3/2}}{3c}+bx\sqrt{c+\frac{d}{x^2}}-b\sqrt{d}\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)$$

```
[Out] b*Sqrt[c + d/x^2]*x + (a*(c + d/x^2)^(3/2)*x^3)/(3*c) - b*Sqrt[d]
*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)]
```

Rubi [A] time = 0.121181, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{ax^3\left(c+\frac{d}{x^2}\right)^{3/2}}{3c}+bx\sqrt{c+\frac{d}{x^2}}-b\sqrt{d}\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*Sqrt[c + d/x^2]*x^2,x]
```

```
[Out] b*Sqrt[c + d/x^2]*x + (a*(c + d/x^2)^(3/2)*x^3)/(3*c) - b*Sqrt[d]
*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)]
```

Rubi in Sympy [A] time = 10.8027, size = 56, normalized size = 0.85

$$\frac{ax^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3c}-b\sqrt{d}\,\operatorname{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)+bx\sqrt{c+\frac{d}{x^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**2*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**3*(c + d/x**2)**(3/2)/(3*c) - b*sqrt(d)*atanh(sqrt(d)/(x*sqr
t(c + d/x**2))) + b*x*sqrt(c + d/x**2)
```

Mathematica [A] time = 0.124374, size = 97, normalized size = 1.47

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(\sqrt{cx^2+d}\left(acx^2+ad+3bc\right)-3bc\sqrt{d}\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)+3bc\sqrt{d}\log(x)\right)}{3c\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*Sqrt[c + d/x^2]*x^2,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(Sqrt[d + c*x^2]*(3*b*c + a*d + a*c*x^2) + 3*b
*c*Sqrt[d]*Log[x] - 3*b*c*Sqrt[d]*Log[d + Sqrt[d]*Sqrt[d + c*x^2]
]))/(3*c*Sqrt[d + c*x^2])
```

Maple [A] time = 0.013, size = 83, normalized size = 1.3

$$-\frac{x}{3c}\sqrt{\frac{cx^2+d}{x^2}}\left(3\sqrt{d}\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)bc-a\left(cx^2+d\right)^{\frac{3}{2}}-3\sqrt{cx^2+d}bc\right)\frac{1}{\sqrt{cx^2+d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((a+b/x^2)*x^2*(c+d/x^2)^(1/2),x)
```

```
[Out] -1/3*((c*x^2+d)/x^2)^(1/2)*x*(3*d^(1/2)*ln(2*(d^(1/2)*(c*x^2+d)^(
1/2)+d)/x)*b*c-a*(c*x^2+d)^(3/2)-3*(c*x^2+d)^(1/2)*b*c)/(c*x^2+d)
^(1/2)/c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*sqrt(c + d/x^2)*x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231912, size = 1, normalized size = 0.02

$$\left[\frac{3\,bc\sqrt{d}\log\left(-\frac{cx^2-2\,\sqrt{d}x\sqrt{\frac{cx^2+d}{x^2}}+2\,d}{x^2}\right)+2\left(acx^3+(3\,bc+ad)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{6\,c},\right.$$
$$\left.-\frac{3\,bc\sqrt{-d}\arctan\left(\frac{d}{\sqrt{-d}x\sqrt{\frac{cx^2+d}{x^2}}}\right)-\left(acx^3+(3\,bc+ad)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{3\,c}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*sqrt(c + d/x^2)*x^2,x, algorithm="fricas")
```

```
[Out] [1/6*(3*b*c*sqrt(d)*log(-(c*x^2 - 2*sqrt(d)*x*sqrt((c*x^2 + d)/x^
2) + 2*d)/x^2) + 2*(a*c*x^3 + (3*b*c + a*d)*x)*sqrt((c*x^2 + d)/x
^2))/c, -1/3*(3*b*c*sqrt(-d)*arctan(d/(sqrt(-d)*x*sqrt((c*x^2 + d
)/x^2))) - (a*c*x^3 + (3*b*c + a*d)*x)*sqrt((c*x^2 + d)/x^2))/c]
```

Sympy [A] time = 4.30527, size = 107, normalized size = 1.62

$$\frac{a\sqrt{d}x^2\sqrt{\frac{cx^2}{d}+1}}{3}+\frac{ad^{\frac{3}{2}}\sqrt{\frac{cx^2}{d}+1}}{3c}+\frac{b\sqrt{c}x}{\sqrt{1+\frac{d}{cx^2}}}-b\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)+\frac{bd}{\sqrt{c}x\sqrt{1+\frac{d}{cx^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a+b/x**2)*x**2*(c+d/x**2)**(1/2),x)
```

```
[Out] a*sqrt(d)*x**2*sqrt(c*x**2/d + 1)/3 + a*d**(3/2)*sqrt(c*x**2/d +
1)/(3*c) + b*sqrt(c)*x/sqrt(1 + d/(c*x**2)) - b*sqrt(d)*asinh(sqr
t(d)/(sqrt(c)*x)) + b*d/(sqrt(c)*x*sqrt(1 + d/(c*x**2)))
```

GIAC/XCAS [A] time = 0.217031, size = 157, normalized size = 2.38

$$\frac{bd\arctan\left(\frac{\sqrt{cx^2+d}}{\sqrt{-d}}\right)\operatorname{sign}(x)}{\sqrt{-d}} - \frac{\left(3\,bcd\arctan\left(\frac{\sqrt{d}}{\sqrt{-d}}\right) + 3\,bc\sqrt{-d}\sqrt{d} + a\sqrt{-d}d^{\frac{3}{2}}\right)\operatorname{sign}(x)}{3\,c\sqrt{-d}} + \frac{\left(cx^2+d\right)^{\frac{3}{2}}ac^2\operatorname{sign}(x) + 3\,\sqrt{cx^2+d}bc^3\operatorname{sign}(x)}{3\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)*x^2,x, algorithm="giac")
```

```
[Out] b*d*arctan(sqrt(c*x^2 + d)/sqrt(-d))*sign(x)/sqrt(-d) - 1/3*(3*b*
c*d*arctan(sqrt(d)/sqrt(-d)) + 3*b*c*sqrt(-d)*sqrt(d) + a*sqrt(-d
)*d^(3/2))*sign(x)/(c*sqrt(-d)) + 1/3*((c*x^2 + d)^(3/2)*a*c^2*si
gn(x) + 3*sqrt(c*x^2 + d)*b*c^3*sign(x))/c^3
```

3.773 $\int \left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}\,dx$

Optimal. Leaf size=85

$$-\frac{\sqrt{c+\frac{d}{x^2}}(2ad+bc)}{2cx}-\frac{(2ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2\sqrt{d}}+\frac{ax\left(c+\frac{d}{x^2}\right)^{3/2}}{c}$$

```
[Out] -((b*c + 2*a*d)*Sqrt[c + d/x^2])/(2*c*x) + (a*(c + d/x^2)^(3/2)*x
)/c - ((b*c + 2*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(2*Sqr
t[d])
```

Rubi [A] time = 0.146613, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$-\frac{\sqrt{c+\frac{d}{x^2}}(2ad+bc)}{2cx}-\frac{(2ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2\sqrt{d}}+\frac{ax\left(c+\frac{d}{x^2}\right)^{3/2}}{c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*Sqrt[c + d/x^2],x]
```

```
[Out] -((b*c + 2*a*d)*Sqrt[c + d/x^2])/(2*c*x) + (a*(c + d/x^2)^(3/2)*x
)/c - ((b*c + 2*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(2*Sqr
t[d])
```

Rubi in Sympy [A] time = 13.4391, size = 71, normalized size = 0.84

$$\frac{ax\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{c}-\frac{(2ad+bc)\operatorname{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2\sqrt{d}}-\frac{\sqrt{c+\frac{d}{x^2}}\,(2ad+bc)}{2cx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(1/2),x)
```

```
[Out] a*x*(c + d/x**2)**(3/2)/c - (2*a*d + b*c)*atanh(sqrt(d)/(x*sqrt(c
 + d/x**2)))/(2*sqrt(d)) - sqrt(c + d/x**2)*(2*a*d + b*c)/(2*c*x)
```

Mathematica [A] time = 0.118758, size = 109, normalized size = 1.28

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(\sqrt{d}\left(2ax^2-b\right)\sqrt{cx^2+d}+x^2\log(x)(2ad+bc)-x^2(2ad+bc)\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)\right)}{2\sqrt{d}x\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*Sqrt[c + d/x^2],x]
```

```
[Out] (Sqrt[c + d/x^2]*(Sqrt[d]*(-b + 2*a*x^2)*Sqrt[d + c*x^2] + (b*c +
 2*a*d)*x^2*Log[x] - (b*c + 2*a*d)*x^2*Log[d + Sqrt[d]*Sqrt[d + c
*x^2]]))/(2*Sqrt[d]*x*Sqrt[d + c*x^2])
```

Maple [A] time = 0.016, size = 142, normalized size = 1.7

$$\frac{1}{2x}\sqrt{\frac{cx^2+d}{x^2}}\left(2\sqrt{cx^2+d}ax^2d^{3/2}+bc\sqrt{cx^2+d}x^2\sqrt{d}-2d^2\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)ax^2-bc\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)x^2d-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(1/2),x)
```

```
[Out] 1/2*((c*x^2+d)/x^2)^(1/2)*(2*(c*x^2+d)^(1/2)*a*x^2*d^(3/2)+b*c*(c
*x^2+d)^(1/2)*x^2*d^(1/2)-2*d^2*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/
x)*a*x^2-b*c*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*x^2*d-b*(c*x^2+d
)^(3/2)*d^(1/2))/x/(c*x^2+d)^(1/2)/d^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.234256, size = 1, normalized size = 0.01

$$\left[\frac{(bc+2ad)\sqrt{d}x\log\left(\frac{2dx\sqrt{\frac{cx^2+d}{x^2}}-(cx^2+2d)\sqrt{d}}{x^2}\right)+2\left(2adx^2-bd\right)\sqrt{\frac{cx^2+d}{x^2}}}{4dx},\ \frac{(bc+2ad)\sqrt{-d}x\arctan\left(\frac{\sqrt{-d}}{x\sqrt{\frac{cx^2+d}{x^2}}}\right)+\left(2adx^2-bd\right.}{2dx}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2),x, algorithm="fricas")
```

```
[Out] [1/4*((b*c + 2*a*d)*sqrt(d)*x*log((2*d*x*sqrt((c*x^2 + d)/x^2) -
(c*x^2 + 2*d)*sqrt(d))/x^2) + 2*(2*a*d*x^2 - b*d)*sqrt((c*x^2 + d
)/x^2))/(d*x), 1/2*((b*c + 2*a*d)*sqrt(-d)*x*arctan(sqrt(-d)/(x*s
qrt((c*x^2 + d)/x^2))) + (2*a*d*x^2 - b*d)*sqrt((c*x^2 + d)/x^2))
/(d*x)]
```

Sympy [A] time = 6.00896, size = 107, normalized size = 1.26

$$\frac{a\sqrt{c}x}{\sqrt{1+\frac{d}{cx^2}}}-a\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)+\frac{ad}{\sqrt{c}x\sqrt{1+\frac{d}{cx^2}}}-\frac{b\sqrt{c}\sqrt{1+\frac{d}{cx^2}}}{2x}-\frac{bc\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{2\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(1/2),x)
```

```
[Out] a*sqrt(c)*x/sqrt(1 + d/(c*x**2)) - a*sqrt(d)*asinh(sqrt(d)/(sqrt(
c)*x)) + a*d/(sqrt(c)*x*sqrt(1 + d/(c*x**2))) - b*sqrt(c)*sqrt(1
```

```
+ d/(c*x**2))/(2*x) - b*c*asinh(sqrt(d)/(sqrt(c)*x))/(2*sqrt(d))
```

GIAC/XCAS [A] time = 0.239893, size = 103, normalized size = 1.21

$$\frac{2\sqrt{cx^2+d}\,ac\,\mathrm{sign}(x)+\frac{\left(bc^2\mathrm{sign}(x)+2\,acd\,\mathrm{sign}(x)\right)\arctan\left(\frac{\sqrt{cx^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\frac{\sqrt{cx^2+d}\,bc\,\mathrm{sign}(x)}{x^2}}{2\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2),x, algorithm="giac")
```

```
[Out] 1/2*(2*sqrt(c*x^2 + d)*a*c*sign(x) + (b*c^2*sign(x) + 2*a*c*d*sig
n(x))*arctan(sqrt(c*x^2 + d)/sqrt(-d))/sqrt(-d) - sqrt(c*x^2 + d)
*b*c*sign(x)/x^2)/c
```

3.774 $\int \frac{\left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}}{x^2}\,dx$

Optimal. Leaf size=91

$$\frac{c(bc-4ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{3/2}}+\frac{\sqrt{c+\frac{d}{x^2}}(bc-4ad)}{8dx}-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{4dx}$$

```
[Out] ((b*c - 4*a*d)*Sqrt[c + d/x^2])/(8*d*x) - (b*(c + d/x^2)^(3/2))/(
4*d*x) + (c*(b*c - 4*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(
8*d^(3/2))
```

Rubi [A] time = 0.159678, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{c(bc-4ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{3/2}}+\frac{\sqrt{c+\frac{d}{x^2}}(bc-4ad)}{8dx}-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{4dx}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*Sqrt[c + d/x^2])/x^2,x]
```

```
[Out] ((b*c - 4*a*d)*Sqrt[c + d/x^2])/(8*d*x) - (b*(c + d/x^2)^(3/2))/(
4*d*x) + (c*(b*c - 4*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(
8*d^(3/2))
```

Rubi in Sympy [A] time = 13.0123, size = 76, normalized size = 0.84

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{4dx}-\frac{c\,(4ad-bc)\,\text{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{\frac{3}{2}}}-\frac{\sqrt{c+\frac{d}{x^2}}\,(4ad-bc)}{8dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**2,x)
```

```
[Out] -b*(c + d/x**2)**(3/2)/(4*d*x) - c*(4*a*d - b*c)*atanh(sqrt(d)/(x
*sqrt(c + d/x**2)))/(8*d**(3/2)) - sqrt(c + d/x**2)*(4*a*d - b*c)
/(8*d*x)
```

Mathematica [A] time = 0.157091, size = 119, normalized size = 1.31

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^4\log(x)(bc-4ad)+\sqrt{d}\sqrt{cx^2+d}\left(4adx^2+bcx^2+2bd\right)+cx^4(4ad-bc)\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)\right)}{8d^{3/2}x^3\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*Sqrt[c + d/x^2])/x^2,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(Sqrt[d]*Sqrt[d + c*x^2]*(2*b*d + b*c*x^2 + 4*a
*d*x^2) + c*(b*c - 4*a*d)*x^4*Log[x] + c*(-(b*c) + 4*a*d)*x^4*Log
[d + Sqrt[d]*Sqrt[d + c*x^2]]))/(8*d^(3/2)*x^3*Sqrt[d + c*x^2])
```

Maple [B] time = 0.018, size = 187, normalized size = 2.1

$$-\frac{1}{8x^3}\sqrt{\frac{cx^2+d}{x^2}}\left(-4ac\sqrt{cx^2+d}x^4d^{5/2}+bc^2\sqrt{cx^2+d}x^4d^{\frac{3}{2}}+4ac\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)x^4d^3+4a\left(cx^2+d\right)^{3/2}x^2d^{5/2}-b$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(1/2)/x^2,x)
```

```
[Out] -1/8*((c*x^2+d)/x^2)^(1/2)/x^3*(-4*a*c*(c*x^2+d)^(1/2)*x^4*d^(5/2
)+b*c^2*(c*x^2+d)^(1/2)*x^4*d^(3/2)+4*a*c*ln(2*(d^(1/2)*(c*x^2+d)
^(1/2)+d)/x)*x^4*d^3+4*a*(c*x^2+d)^(3/2)*x^2*d^(5/2)-b*c*(c*x^2+d
)^(3/2)*x^2*d^(3/2)-b*c^2*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*x^4
*d^2+2*b*(c*x^2+d)^(3/2)*d^(5/2))/(c*x^2+d)^(1/2)/d^(7/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238281, size = 1, normalized size = 0.01

$$\left[-\frac{\left(bc^2-4acd\right)\sqrt{d}x^3\log\left(\frac{2dx\sqrt{\frac{cx^2+d}{x^2}}-\left(cx^2+2d\right)\sqrt{d}}{x^2}\right)+2\left(2bd^2+\left(bcd+4ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{16d^2x^3},\right.$$
$$\left.-\frac{\left(bc^2-4acd\right)\sqrt{-d}x^3\arctan\left(\frac{\sqrt{-d}}{x\sqrt{\frac{cx^2+d}{x^2}}}\right)+\left(2bd^2+\left(bcd+4ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{8d^2x^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^2,x, algorithm="fricas")
```

```
[Out] [-1/16*((b*c^2 - 4*a*c*d)*sqrt(d)*x^3*log((2*d*x*sqrt((c*x^2 + d)
/x^2) - (c*x^2 + 2*d)*sqrt(d))/x^2) + 2*(2*b*d^2 + (b*c*d + 4*a*d
^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(d^2*x^3), -1/8*((b*c^2 - 4*a*c*d
)*sqrt(-d)*x^3*arctan(sqrt(-d)/(x*sqrt((c*x^2 + d)/x^2))) + (2*b*
d^2 + (b*c*d + 4*a*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(d^2*x^3)]
```

Sympy [A] time = 9.85855, size = 144, normalized size = 1.58

$$-\frac{a\sqrt{c}\sqrt{1+\frac{d}{cx^2}}}{2x}-\frac{ac\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{2\sqrt{d}}-\frac{bc^{\frac{3}{2}}}{8dx\sqrt{1+\frac{d}{cx^2}}}-\frac{3b\sqrt{c}}{8x^3\sqrt{1+\frac{d}{cx^2}}}+\frac{bc^2\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{8d^{\frac{3}{2}}}-\frac{bd}{4\sqrt{c}x^5\sqrt{1+\frac{d}{cx^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**2,x)
```

```
[Out] -a*sqrt(c)*sqrt(1 + d/(c*x**2))/(2*x) - a*c*asinh(sqrt(d)/(sqrt(c
)*x))/(2*sqrt(d)) - b*c**(3/2)/(8*d*x*sqrt(1 + d/(c*x**2))) - 3*b
*sqrt(c)/(8*x**3*sqrt(1 + d/(c*x**2))) + b*c**2*asinh(sqrt(d)/(sq
rt(c)*x))/(8*d**(3/2)) - b*d/(4*sqrt(c)*x**5*sqrt(1 + d/(c*x**2))
)
```

GIAC/XCAS [A] time = 0.249531, size = 176, normalized size = 1.93

$$-\frac{\frac{\left(bc^{3}\mathrm{sign}(x)-4\,ac^{2}d\mathrm{sign}(x)\right)\arctan\left(\frac{\sqrt{cx^{2}+d}}{\sqrt{-d}}\right)}{\sqrt{-d}d}+\frac{\left(cx^{2}+d\right)^{\frac{3}{2}}bc^{3}\mathrm{sign}(x)+4\left(cx^{2}+d\right)^{\frac{3}{2}}ac^{2}d\mathrm{sign}(x)+\sqrt{cx^{2}+d}bc^{3}d\mathrm{sign}(x)-4\sqrt{cx^{2}+d}ac^{2}d^{2}\mathrm{sign}(x)}{c^{2}dx^{4}}}{8\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^2,x, algorithm="giac")
```

```
[Out] -1/8*((b*c^3*sign(x) - 4*a*c^2*d*sign(x))*arctan(sqrt(c*x^2 + d)/
sqrt(-d))/(sqrt(-d)*d) + ((c*x^2 + d)^(3/2)*b*c^3*sign(x) + 4*(c*
x^2 + d)^(3/2)*a*c^2*d*sign(x) + sqrt(c*x^2 + d)*b*c^3*d*sign(x)
- 4*sqrt(c*x^2 + d)*a*c^2*d^2*sign(x))/(c^2*d*x^4))/c
```

3.775 $\int \frac{\left(a+\frac{b}{x^2}\right)\sqrt{c+\frac{d}{x^2}}}{x^4}\,dx$

Optimal. Leaf size=123

$$-\frac{c^2(bc-2ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{16d^{5/2}}+\frac{c\sqrt{c+\frac{d}{x^2}}(bc-2ad)}{16d^2x}+\frac{\sqrt{c+\frac{d}{x^2}}(bc-2ad)}{8dx^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{6dx^3}$$

```
[Out] ((b*c - 2*a*d)*Sqrt[c + d/x^2])/(8*d*x^3) - (b*(c + d/x^2)^(3/2))
/(6*d*x^3) + (c*(b*c - 2*a*d)*Sqrt[c + d/x^2])/(16*d^2*x) - (c^2*
(b*c - 2*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(16*d^(5/2))
```

Rubi [A] time = 0.244556, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{c^2(bc-2ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{16d^{5/2}}+\frac{c\sqrt{c+\frac{d}{x^2}}(bc-2ad)}{16d^2x}+\frac{\sqrt{c+\frac{d}{x^2}}(bc-2ad)}{8dx^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{6dx^3}$$

Antiderivative was successfully verified.

```
[In] Int[((a + b/x^2)*Sqrt[c + d/x^2])/x^4,x]
```

```
[Out] ((b*c - 2*a*d)*Sqrt[c + d/x^2])/(8*d*x^3) - (b*(c + d/x^2)^(3/2))
/(6*d*x^3) + (c*(b*c - 2*a*d)*Sqrt[c + d/x^2])/(16*d^2*x) - (c^2*
(b*c - 2*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(16*d^(5/2))
```

Rubi in Sympy [A] time = 18.3273, size = 107, normalized size = 0.87

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{6dx^3}+\frac{c^2\left(2ad-bc\right)\operatorname{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{16d^{\frac{5}{2}}}-\frac{c\sqrt{c+\frac{d}{x^2}}\left(2ad-bc\right)}{16d^2x}-\frac{\sqrt{c+\frac{d}{x^2}}\left(2ad-bc\right)}{8dx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**4,x)
```

```
[Out] -b*(c + d/x**2)**(3/2)/(6*d*x**3) + c**2*(2*a*d - b*c)*atanh(sqrt
(d)/(x*sqrt(c + d/x**2)))/(16*d**(5/2)) - c*sqrt(c + d/x**2)*(2*a
*d - b*c)/(16*d**2*x) - sqrt(c + d/x**2)*(2*a*d - b*c)/(8*d*x**3)
```

Mathematica [A] time = 0.309756, size = 146, normalized size = 1.19

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(\sqrt{d}\sqrt{cx^2+d}\left(6adx^2\left(cx^2+2d\right)+b\left(-3c^2x^4+2cdx^2+8d^2\right)\right)-3c^2x^6\log(x)(bc-2ad)+3c^2x^6(bc-2ad)\log\left(\sqrt{\right.\right.}{48d^{5/2}x^5\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b/x^2)*Sqrt[c + d/x^2])/x^4,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(Sqrt[d]*Sqrt[d + c*x^2]*(6*a*d*x^2*(2*d + c*x^
2) + b*(8*d^2 + 2*c*d*x^2 - 3*c^2*x^4)) - 3*c^2*(b*c - 2*a*d)*x^6
*Log[x] + 3*c^2*(b*c - 2*a*d)*x^6*Log[d + Sqrt[d]*Sqrt[d + c*x^2]
```

```
]))/(48*d^(5/2)*x^5*Sqrt[d + c*x^2])
```

Maple [B] time = 0.021, size = 232, normalized size = 1.9

$$-\frac{1}{48\,x^5}\sqrt{\frac{cx^2+d}{x^2}}\left(6\,ac^2\sqrt{cx^2+d}x^6d^{7/2}-6\,ac\left(cx^2+d\right)^{3/2}x^4d^{7/2}-3\,bc^3\sqrt{cx^2+d}x^6d^{5/2}+12\,a\left(cx^2+d\right)^{3/2}x^2d^{9/2}+3\,bc^2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((a+b/x^2)*(c+d/x^2)^(1/2)/x^4,x)
```

```
[Out] -1/48*((c*x^2+d)/x^2)^(1/2)*(6*a*c^2*(c*x^2+d)^(1/2)*x^6*d^(7/2)-
6*a*c*(c*x^2+d)^(3/2)*x^4*d^(7/2)-3*b*c^3*(c*x^2+d)^(1/2)*x^6*d^(
5/2)+12*a*(c*x^2+d)^(3/2)*x^2*d^(9/2)+3*b*c^2*(c*x^2+d)^(3/2)*x^4
*d^(5/2)-6*b*c*(c*x^2+d)^(3/2)*x^2*d^(7/2)-6*a*c^2*ln(2*(d^(1/2)*
(c*x^2+d)^(1/2)+d)/x)*x^6*d^4+3*b*c^3*ln(2*(d^(1/2)*(c*x^2+d)^(1/
2)+d)/x)*x^6*d^3+8*b*(c*x^2+d)^(3/2)*d^(9/2))/x^5/(c*x^2+d)^(1/2)
/d^(11/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*sqrt(c + d/x^2)/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.256401, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(bc^3-2\,ac^2d\right)\sqrt{d}x^5\log\left(-\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}+\left(cx^2+2\,d\right)\sqrt{d}}{x^2}\right)-2\left(3\left(bc^2d-2\,acd^2\right)x^4-8\,bd^3-2\left(bcd^2+6\,ad^3\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{96\,d^3x^5},\ \frac{3\,(\ldots}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*sqrt(c + d/x^2)/x^4,x, algorithm="fricas")
```

```
[Out] [-1/96*(3*(b*c^3 - 2*a*c^2*d)*sqrt(d)*x^5*log(-(2*d*x*sqrt((c*x^2
 + d)/x^2) + (c*x^2 + 2*d)*sqrt(d))/x^2) - 2*(3*(b*c^2*d - 2*a*c*
d^2)*x^4 - 8*b*d^3 - 2*(b*c*d^2 + 6*a*d^3)*x^2)*sqrt((c*x^2 + d)/
x^2))/(d^3*x^5), 1/48*(3*(b*c^3 - 2*a*c^2*d)*sqrt(-d)*x^5*arctan(
sqrt(-d)/(x*sqrt((c*x^2 + d)/x^2))) + (3*(b*c^2*d - 2*a*c*d^2)*x^
4 - 8*b*d^3 - 2*(b*c*d^2 + 6*a*d^3)*x^2)*sqrt((c*x^2 + d)/x^2))/(
d^3*x^5)]
```

Sympy [A] time = 16.7221, size = 226, normalized size = 1.84

$$-\frac{ac^{\frac{3}{2}}}{8dx\sqrt{1+\frac{d}{cx^2}}}-\frac{3a\sqrt{c}}{8x^3\sqrt{1+\frac{d}{cx^2}}}+\frac{ac^2\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{8d^{\frac{3}{2}}}-\frac{ad}{4\sqrt{c}x^5\sqrt{1+\frac{d}{cx^2}}}+\frac{bc^{\frac{5}{2}}}{16d^2x\sqrt{1+\frac{d}{cx^2}}}$$
$$+\frac{bc^{\frac{3}{2}}}{48dx^3\sqrt{1+\frac{d}{cx^2}}}-\frac{5b\sqrt{c}}{24x^5\sqrt{1+\frac{d}{cx^2}}}-\frac{bc^3\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{16d^{\frac{5}{2}}}-\frac{bd}{6\sqrt{c}x^7\sqrt{1+\frac{d}{cx^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(1/2)/x**4,x)
```

```
[Out] -a*c**(3/2)/(8*d*x*sqrt(1 + d/(c*x**2))) - 3*a*sqrt(c)/(8*x**3*sq
rt(1 + d/(c*x**2))) + a*c**2*asinh(sqrt(d)/(sqrt(c)*x))/(8*d**(3/
2)) - a*d/(4*sqrt(c)*x**5*sqrt(1 + d/(c*x**2))) + b*c**(5/2)/(16*
d**2*x*sqrt(1 + d/(c*x**2))) + b*c**(3/2)/(48*d*x**3*sqrt(1 + d/(
c*x**2))) - 5*b*sqrt(c)/(24*x**5*sqrt(1 + d/(c*x**2))) - b*c**3*a
sinh(sqrt(d)/(sqrt(c)*x))/(16*d**(5/2)) - b*d/(6*sqrt(c)*x**7*sqr
t(1 + d/(c*x**2)))
```

GIAC/XCAS [A] time = 0.257215, size = 207, normalized size = 1.68

$$\frac{\frac{3\left(bc^4\mathrm{sign}(x)-2\,ac^3d\mathrm{sign}(x)\right)\arctan\left(\frac{\sqrt{cx^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}d^2}+\frac{3\left(cx^2+d\right)^{\frac{5}{2}}bc^4\mathrm{sign}(x)-6\left(cx^2+d\right)^{\frac{5}{2}}ac^3d\mathrm{sign}(x)-8\left(cx^2+d\right)^{\frac{3}{2}}bc^4d\mathrm{sign}(x)-3\sqrt{cx^2+d}bc^4d^2\mathrm{sign}(x)+6\sqrt{cx^2+\cdots}}{c^3d^2x^6}}{48\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*sqrt(c + d/x^2)/x^4,x, algorithm="giac")
```

```
[Out] 1/48*(3*(b*c^4*sign(x) - 2*a*c^3*d*sign(x))*arctan(sqrt(c*x^2 + d
)/sqrt(-d))/(sqrt(-d)*d^2) + (3*(c*x^2 + d)^(5/2)*b*c^4*sign(x) -
 6*(c*x^2 + d)^(5/2)*a*c^3*d*sign(x) - 8*(c*x^2 + d)^(3/2)*b*c^4*
d*sign(x) - 3*sqrt(c*x^2 + d)*b*c^4*d^2*sign(x) + 6*sqrt(c*x^2 +
d)*a*c^3*d^3*sign(x))/(c^3*d^2*x^6))/c
```

3.776 $\int \left(a+\frac{b}{x^2}\right) \left(c+\frac{d}{x^2}\right)^{3/2} x^5 \, dx$

Optimal. Leaf size=123

$$\frac{d^2(6bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{16c^{3/2}}+\frac{dx^2\sqrt{c+\frac{d}{x^2}}(6bc-ad)}{16c}+\frac{x^4\left(c+\frac{d}{x^2}\right)^{3/2}(6bc-ad)}{24c}+\frac{ax^6\left(c+\frac{d}{x^2}\right)^{5/2}}{6c}$$

```
[Out] (d*(6*b*c - a*d)*Sqrt[c + d/x^2]*x^2)/(16*c) + ((6*b*c - a*d)*(c
+ d/x^2)^(3/2)*x^4)/(24*c) + (a*(c + d/x^2)^(5/2)*x^6)/(6*c) + (d
^2*(6*b*c - a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(16*c^(3/2))
```

Rubi [A] time = 0.264568, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{d^2(6bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{16c^{3/2}}+\frac{dx^2\sqrt{c+\frac{d}{x^2}}(6bc-ad)}{16c}+\frac{x^4\left(c+\frac{d}{x^2}\right)^{3/2}(6bc-ad)}{24c}+\frac{ax^6\left(c+\frac{d}{x^2}\right)^{5/2}}{6c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x^5,x]
```

```
[Out] (d*(6*b*c - a*d)*Sqrt[c + d/x^2]*x^2)/(16*c) + ((6*b*c - a*d)*(c
+ d/x^2)^(3/2)*x^4)/(24*c) + (a*(c + d/x^2)^(5/2)*x^6)/(6*c) + (d
^2*(6*b*c - a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(16*c^(3/2))
```

Rubi in Sympy [A] time = 19.1018, size = 105, normalized size = 0.85

$$\frac{ax^6\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{6c}-\frac{dx^2\sqrt{c+\frac{d}{x^2}}\,(ad-6bc)}{16c}-\frac{x^4\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(ad-6bc)}{24c}-\frac{d^2\,(ad-6bc)\,\text{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{16c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**5,x)
```

```
[Out] a*x**6*(c + d/x**2)**(5/2)/(6*c) - d*x**2*sqrt(c + d/x**2)*(a*d -
 6*b*c)/(16*c) - x**4*(c + d/x**2)**(3/2)*(a*d - 6*b*c)/(24*c) -
d**2*(a*d - 6*b*c)*atanh(sqrt(c + d/x**2)/sqrt(c))/(16*c**(3/2))
```

Mathematica [A] time = 0.158235, size = 124, normalized size = 1.01

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(\sqrt{c}x\sqrt{cx^2+d}\left(a\left(8c^2x^4+14cdx^2+3d^2\right)+6bc\left(2cx^2+5d\right)\right)-3d^2(ad-6bc)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)\right)}{48c^{3/2}\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x^5,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(Sqrt[c]*x*Sqrt[d + c*x^2]*(6*b*c*(5*d + 2*c*x
^2) + a*(3*d^2 + 14*c*d*x^2 + 8*c^2*x^4)) - 3*d^2*(-6*b*c + a*d)*
Log[c*x + Sqrt[c]*Sqrt[d + c*x^2]]))/(48*c^(3/2)*Sqrt[d + c*x^2])
```

Maple [A] time = 0.014, size = 165, normalized size = 1.3

$$\frac{x^3}{48}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(8\,ax\left(cx^2+d\right)^{5/2}c^{3/2}-2\,adx\left(cx^2+d\right)^{3/2}c^{3/2}+12\,bx\left(cx^2+d\right)^{3/2}c^{5/2}-3\,ad^2x\sqrt{cx^2+d}c^{3/2}+18\,bdx\sqrt{c\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x^5,x)
```

```
[Out] 1/48*((c*x^2+d)/x^2)^(3/2)*x^3*(8*a*x*(c*x^2+d)^(5/2)*c^(3/2)-2*a
*d*x*(c*x^2+d)^(3/2)*c^(3/2)+12*b*x*(c*x^2+d)^(3/2)*c^(5/2)-3*a*d
^2*x*(c*x^2+d)^(1/2)*c^(3/2)+18*b*d*x*(c*x^2+d)^(1/2)*c^(5/2)+18*
b*d^2*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*c^2-3*a*d^3*ln(c^(1/2)*x+(c*x
^2+d)^(1/2))*c)/(c*x^2+d)^(3/2)/c^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.253723, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(6\,bcd^2-ad^3\right)\sqrt{c}\log\left(2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)-2\left(8\,ac^3x^6+2\left(6\,bc^3+7\,ac^2d\right)x^4+3\left(10\,bc^2d+acd^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{96\,c^2},\right.$$
$$\left.-\frac{3\left(6\,bcd^2-ad^3\right)\sqrt{-c}\arctan\left(\frac{\sqrt{-c}}{\sqrt{\frac{cx^2+d}{x^2}}}\right)-\left(8\,ac^3x^6+2\left(6\,bc^3+7\,ac^2d\right)x^4+3\left(10\,bc^2d+acd^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{48\,c^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^5,x, algorithm="fricas")
```

```
[Out] [-1/96*(3*(6*b*c*d^2 - a*d^3)*sqrt(c)*log(2*c*x^2*sqrt((c*x^2 + d
)/x^2) - (2*c*x^2 + d)*sqrt(c)) - 2*(8*a*c^3*x^6 + 2*(6*b*c^3 + 7
*a*c^2*d)*x^4 + 3*(10*b*c^2*d + a*c*d^2)*x^2)*sqrt((c*x^2 + d)/x^
2))/c^2, -1/48*(3*(6*b*c*d^2 - a*d^3)*sqrt(-c)*arctan(sqrt(-c)/sq
rt((c*x^2 + d)/x^2)) - (8*a*c^3*x^6 + 2*(6*b*c^3 + 7*a*c^2*d)*x^4
 + 3*(10*b*c^2*d + a*c*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/c^2]
```

Sympy [A] time = 48.9777, size = 253, normalized size = 2.06

$$\frac{ac^2x^7}{6\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{11ac\sqrt{d}x^5}{24\sqrt{\frac{cx^2}{d}+1}}+\frac{17ad^{\frac{3}{2}}x^3}{48\sqrt{\frac{cx^2}{d}+1}}+\frac{ad^{\frac{5}{2}}x}{16c\sqrt{\frac{cx^2}{d}+1}}-\frac{ad^3\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{16c^{\frac{3}{2}}}$$
$$+\frac{bc^2x^5}{4\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{3bc\sqrt{d}x^3}{8\sqrt{\frac{cx^2}{d}+1}}+\frac{bd^{\frac{3}{2}}x\sqrt{\frac{cx^2}{d}+1}}{2}+\frac{bd^{\frac{3}{2}}x}{8\sqrt{\frac{cx^2}{d}+1}}+\frac{3bd^2\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{8\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**5,x)
```

```
[Out] a*c**2*x**7/(6*sqrt(d)*sqrt(c*x**2/d + 1)) + 11*a*c*sqrt(d)*x**5/
(24*sqrt(c*x**2/d + 1)) + 17*a*d**(3/2)*x**3/(48*sqrt(c*x**2/d +
1)) + a*d**(5/2)*x/(16*c*sqrt(c*x**2/d + 1)) - a*d**3*asinh(sqrt(
c)*x/sqrt(d))/(16*c**(3/2)) + b*c**2*x**5/(4*sqrt(d)*sqrt(c*x**2/
d + 1)) + 3*b*c*sqrt(d)*x**3/(8*sqrt(c*x**2/d + 1)) + b*d**(3/2)*
x*sqrt(c*x**2/d + 1)/2 + b*d**(3/2)*x/(8*sqrt(c*x**2/d + 1)) + 3*
b*d**2*asinh(sqrt(c)*x/sqrt(d))/(8*sqrt(c))
```

GIAC/XCAS [A] time = 0.235508, size = 197, normalized size = 1.6

$$\frac{1}{48}\left(2\left(4\,acx^2\operatorname{sign}(x)+\frac{6\,bc^5\operatorname{sign}(x)+7\,ac^4d\operatorname{sign}(x)}{c^4}\right)x^2+\frac{3\left(10\,bc^4d\operatorname{sign}(x)+ac^3d^2\operatorname{sign}(x)\right)}{c^4}\right)\sqrt{cx^2+d}x-\frac{\left(6\,bcd^2\operatorname{sign}(x)-ad^3\operatorname{sign}(x)\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+d}\right|\right)}{16\,c^{\frac{3}{2}}}+\frac{\left(6\,bcd^2\ln\left(\sqrt{d}\right)-ad^3\ln\left(\sqrt{d}\right)\right)\operatorname{sign}(x)}{16\,c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^5,x, algorithm="giac")
```

```
[Out] 1/48*(2*(4*a*c*x^2*sign(x) + (6*b*c^5*sign(x) + 7*a*c^4*d*sign(x)
)/c^4)*x^2 + 3*(10*b*c^4*d*sign(x) + a*c^3*d^2*sign(x))/c^4)*sqrt
(c*x^2 + d)*x - 1/16*(6*b*c*d^2*sign(x) - a*d^3*sign(x))*ln(abs(-
sqrt(c)*x + sqrt(c*x^2 + d)))/c^(3/2) + 1/16*(6*b*c*d^2*ln(sqrt(d
)) - a*d^3*ln(sqrt(d)))*sign(x)/c^(3/2)
```

3.777 $\int \left(a+\frac{b}{x^2}\right) \left(c+\frac{d}{x^2}\right)^{3/2} x^3 \, dx$

Optimal. Leaf size=115

$$\frac{x^2\left(c+\frac{d}{x^2}\right)^{3/2}(ad+4bc)}{8c}-\frac{3d\sqrt{c+\frac{d}{x^2}}(ad+4bc)}{8c}+\frac{3d(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8\sqrt{c}}+\frac{ax^4\left(c+\frac{d}{x^2}\right)^{5/2}}{4c}$$

```
[Out] (-3*d*(4*b*c + a*d)*Sqrt[c + d/x^2])/(8*c) + ((4*b*c + a*d)*(c +
d/x^2)^(3/2)*x^2)/(8*c) + (a*(c + d/x^2)^(5/2)*x^4)/(4*c) + (3*d*
(4*b*c + a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(8*Sqrt[c])
```

Rubi [A] time = 0.255156, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$

$$\frac{x^2\left(c+\frac{d}{x^2}\right)^{3/2}(ad+4bc)}{8c}-\frac{3d\sqrt{c+\frac{d}{x^2}}(ad+4bc)}{8c}+\frac{3d(ad+4bc)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8\sqrt{c}}+\frac{ax^4\left(c+\frac{d}{x^2}\right)^{5/2}}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x^3,x]
```

```
[Out] (-3*d*(4*b*c + a*d)*Sqrt[c + d/x^2])/(8*c) + ((4*b*c + a*d)*(c +
d/x^2)^(3/2)*x^2)/(8*c) + (a*(c + d/x^2)^(5/2)*x^4)/(4*c) + (3*d*
(4*b*c + a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(8*Sqrt[c])
```

Rubi in Sympy [A] time = 17.7374, size = 104, normalized size = 0.9

$$\frac{ax^4\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{4c}-\frac{3d\sqrt{c+\frac{d}{x^2}}\,(ad+4bc)}{8c}+\frac{x^2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(ad+4bc)}{8c}+\frac{3d\,(ad+4bc)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**3,x)
```

```
[Out] a*x**4*(c + d/x**2)**(5/2)/(4*c) - 3*d*sqrt(c + d/x**2)*(a*d + 4*
b*c)/(8*c) + x**2*(c + d/x**2)**(3/2)*(a*d + 4*b*c)/(8*c) + 3*d*(
a*d + 4*b*c)*atanh(sqrt(c + d/x**2)/sqrt(c))/(8*sqrt(c))
```

Mathematica [A] time = 0.166814, size = 91, normalized size = 0.79

$$\frac{1}{8}\sqrt{c+\frac{d}{x^2}}\left(\frac{3dx(ad+4bc)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{\sqrt{c}\sqrt{cx^2+d}}+2acx^4+5adx^2+4bcx^2-8bd\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x^3,x]
```

```
[Out] (Sqrt[c + d/x^2]*(-8*b*d + 4*b*c*x^2 + 5*a*d*x^2 + 2*a*c*x^4 + (3
*d*(4*b*c + a*d)*x*Log[c*x + Sqrt[c]*Sqrt[d + c*x^2]])/(Sqrt[c]*S
```

```
qrt[d + c*x^2])))/8
```

Maple [A] time = 0.017, size = 174, normalized size = 1.5

$$\frac{x^2}{8d}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(2\,ax^2\left(cx^2+d\right)^{3/2}\sqrt{c}d+8\,bc^{3/2}x^2\left(cx^2+d\right)^{3/2}+12\,bcd^2\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)x-8\,b\left(cx^2+d\right)^{5/2}\sqrt{c}+3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x^3,x)
```

```
[Out] 1/8*((c*x^2+d)/x^2)^(3/2)*x^2*(2*a*x^2*(c*x^2+d)^(3/2)*c^(1/2)*d+
8*b*c^(3/2)*x^2*(c*x^2+d)^(3/2)+12*b*c*d^2*ln(c^(1/2)*x+(c*x^2+d)
^(1/2))*x-8*b*(c*x^2+d)^(5/2)*c^(1/2)+3*a*d^2*x^2*(c*x^2+d)^(1/2)
*c^(1/2)+12*b*c^(3/2)*x^2*(c*x^2+d)^(1/2)*d+3*a*d^3*ln(c^(1/2)*x+
(c*x^2+d)^(1/2))*x)/(c*x^2+d)^(3/2)/c^(1/2)/d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.24319, size = 1, normalized size = 0.01

$$\left[\frac{3\left(4\,bcd+ad^2\right)\sqrt{c}\log\left(-2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)+2\left(2\,ac^2x^4-8\,bcd+\left(4\,bc^2+5\,acd\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{16\,c},\right.$$
$$\left.-\frac{3\left(4\,bcd+ad^2\right)\sqrt{-c}\arctan\left(\frac{\sqrt{-c}}{\sqrt{\frac{cx^2+d}{x^2}}}\right)-\left(2\,ac^2x^4-8\,bcd+\left(4\,bc^2+5\,acd\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{8\,c}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^3,x, algorithm="fricas")
```

```
[Out] [1/16*(3*(4*b*c*d + a*d^2)*sqrt(c)*log(-2*c*x^2*sqrt((c*x^2 + d)/
x^2) - (2*c*x^2 + d)*sqrt(c)) + 2*(2*a*c^2*x^4 - 8*b*c*d + (4*b*c
^2 + 5*a*c*d)*x^2)*sqrt((c*x^2 + d)/x^2))/c, -1/8*(3*(4*b*c*d + a
*d^2)*sqrt(-c)*arctan(sqrt(-c)/sqrt((c*x^2 + d)/x^2)) - (2*a*c^2*
x^4 - 8*b*c*d + (4*b*c^2 + 5*a*c*d)*x^2)*sqrt((c*x^2 + d)/x^2))/c
]
```

Sympy [A] time = 31.9244, size = 216, normalized size = 1.88

$$\frac{ac^2x^5}{4\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{3ac\sqrt{d}x^3}{8\sqrt{\frac{cx^2}{d}+1}}+\frac{ad^{\frac{3}{2}}x\sqrt{\frac{cx^2}{d}+1}}{2}+\frac{ad^{\frac{3}{2}}x}{8\sqrt{\frac{cx^2}{d}+1}}+\frac{3ad^2\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{8\sqrt{c}}+\frac{3b\sqrt{c}d\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{2}+\frac{bc\sqrt{d}x\sqrt{\frac{cx^2}{d}+1}}{2}-\frac{bc\sqrt{d}x}{\sqrt{\frac{cx^2}{d}+1}}-\frac{bd^{\frac{3}{2}}}{x\sqrt{\frac{cx^2}{d}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**3,x)
```

```
[Out] a*c**2*x**5/(4*sqrt(d)*sqrt(c*x**2/d + 1)) + 3*a*c*sqrt(d)*x**3/(
8*sqrt(c*x**2/d + 1)) + a*d**(3/2)*x*sqrt(c*x**2/d + 1)/2 + a*d**
(3/2)*x/(8*sqrt(c*x**2/d + 1)) + 3*a*d**2*asinh(sqrt(c)*x/sqrt(d)
)/(8*sqrt(c)) + 3*b*sqrt(c)*d*asinh(sqrt(c)*x/sqrt(d))/2 + b*c*sq
rt(d)*x*sqrt(c*x**2/d + 1)/2 - b*c*sqrt(d)*x/sqrt(c*x**2/d + 1) -
 b*d**(3/2)/(x*sqrt(c*x**2/d + 1))
```

GIAC/XCAS [A] time = 0.303322, size = 170, normalized size = 1.48

$$\frac{2\,b\sqrt{c}d^2\operatorname{sign}(x)}{\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2-d}+\frac{1}{8}\left(2\,acx^2\operatorname{sign}(x)+\frac{4\,bc^3\operatorname{sign}(x)+5\,ac^2d\operatorname{sign}(x)}{c^2}\right)\sqrt{cx^2+d}x-\frac{3\left(4\,bc^{\frac{3}{2}}d\operatorname{sign}(x)+a\sqrt{c}d^2\operatorname{sign}(x)\right)\ln\left(\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2\right)}{16\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^3,x, algorithm="giac")
```

```
[Out] 2*b*sqrt(c)*d^2*sign(x)/((sqrt(c)*x - sqrt(c*x^2 + d))^2 - d) + 1
/8*(2*a*c*x^2*sign(x) + (4*b*c^3*sign(x) + 5*a*c^2*d*sign(x))/c^2
)*sqrt(c*x^2 + d)*x - 3/16*(4*b*c^(3/2)*d*sign(x) + a*sqrt(c)*d^2
*sign(x))*ln((sqrt(c)*x - sqrt(c*x^2 + d))^2)/c
```

3.778 $\int \left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2} x\,dx$

Optimal. Leaf size=110

$$-\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(3ad+2bc)}{6c}-\frac{1}{2}\sqrt{c+\frac{d}{x^2}}(3ad+2bc)+\frac{1}{2}\sqrt{c}(3ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)+\frac{ax^2\left(c+\frac{d}{x^2}\right)^{5/2}}{2c}$$

```
[Out] -((2*b*c + 3*a*d)*Sqrt[c + d/x^2])/2 - ((2*b*c + 3*a*d)*(c + d/x^
2)^(3/2))/(6*c) + (a*(c + d/x^2)^(5/2)*x^2)/(2*c) + (Sqrt[c]*(2*b
*c + 3*a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/2
```

Rubi [A] time = 0.224199, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(3ad+2bc)}{6c}-\frac{1}{2}\sqrt{c+\frac{d}{x^2}}(3ad+2bc)+\frac{1}{2}\sqrt{c}(3ad+2bc)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)+\frac{ax^2\left(c+\frac{d}{x^2}\right)^{5/2}}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x,x]
```

```
[Out] -((2*b*c + 3*a*d)*Sqrt[c + d/x^2])/2 - ((2*b*c + 3*a*d)*(c + d/x^
2)^(3/2))/(6*c) + (a*(c + d/x^2)^(5/2)*x^2)/(2*c) + (Sqrt[c]*(2*b
*c + 3*a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/2
```

Rubi in Sympy [A] time = 16.9551, size = 94, normalized size = 0.85

$$\frac{ax^2\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{2c}+\sqrt{c}\left(\frac{3ad}{2}+bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)-\sqrt{c+\frac{d}{x^2}}\left(\frac{3ad}{2}+bc\right)-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}\left(\frac{3ad}{2}+bc\right)}{3c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x,x)
```

```
[Out] a*x**2*(c + d/x**2)**(5/2)/(2*c) + sqrt(c)*(3*a*d/2 + b*c)*atanh(
sqrt(c + d/x**2)/sqrt(c)) - sqrt(c + d/x**2)*(3*a*d/2 + b*c) - (c
 + d/x**2)**(3/2)*(3*a*d/2 + b*c)/(3*c)
```

Mathematica [A] time = 0.146106, size = 109, normalized size = 0.99

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(\sqrt{cx^2+d}\left(3acx^4-6adx^2-2b\left(4cx^2+d\right)\right)+3\sqrt{c}x^3(3ad+2bc)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)\right)}{6x^2\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x,x]
```

```
[Out] (Sqrt[c + d/x^2]*(Sqrt[d + c*x^2]*(-6*a*d*x^2 + 3*a*c*x^4 - 2*b*(
d + 4*c*x^2)) + 3*Sqrt[c]*(2*b*c + 3*a*d)*x^3*Log[c*x + Sqrt[c]*S
qrt[d + c*x^2]]))/(6*x^2*Sqrt[d + c*x^2])
```

Maple [B] time = 0.019, size = 203, normalized size = 1.9

$$\frac{1}{6d^2}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(6bc^{3/2}\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)x^3d^2+6acx^4\left(cx^2+d\right)^{3/2}d+4bc^2x^4\left(cx^2+d\right)^{3/2}+9a\sqrt{c}d^3\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x,x)
```

```
[Out] 1/6*((c*x^2+d)/x^2)^(3/2)*(6*b*c^(3/2)*ln(c^(1/2)*x+(c*x^2+d)^(1/
2))*x^3*d^2+6*a*c*x^4*(c*x^2+d)^(3/2)*d+4*b*c^2*x^4*(c*x^2+d)^(3/
2)+9*a*c^(1/2)*d^3*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*x^3-6*a*(c*x^2+d
)^(5/2)*x^2*d-4*b*c*(c*x^2+d)^(5/2)*x^2+9*a*c*x^4*(c*x^2+d)^(1/2)
*d^2+6*b*c^2*x^4*(c*x^2+d)^(1/2)*d-2*b*(c*x^2+d)^(5/2)*d)/(c*x^2+
d)^(3/2)/d^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240651, size = 1, normalized size = 0.01

$$\left[\frac{3\,(2\,bc+3\,ad)\sqrt{c}x^2\log\left(-2\,cx^2-2\,\sqrt{c}x^2\sqrt{\frac{cx^2+d}{x^2}}-d\right)+2\left(3\,acx^4-2\,(4\,bc+3\,ad)x^2-2\,bd\right)\sqrt{\frac{cx^2+d}{x^2}}}{12\,x^2},\ \frac{3\,(2\,bc+3\,ad)\sqrt{-c}x^2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x,x, algorithm="fricas")
```

```
[Out] [1/12*(3*(2*b*c + 3*a*d)*sqrt(c)*x^2*log(-2*c*x^2 - 2*sqrt(c)*x^2
*sqrt((c*x^2 + d)/x^2) - d) + 2*(3*a*c*x^4 - 2*(4*b*c + 3*a*d)*x^
2 - 2*b*d)*sqrt((c*x^2 + d)/x^2))/x^2, 1/6*(3*(2*b*c + 3*a*d)*sqr
t(-c)*x^2*arctan(c/(sqrt(-c)*sqrt((c*x^2 + d)/x^2))) + (3*a*c*x^4
 - 2*(4*b*c + 3*a*d)*x^2 - 2*b*d)*sqrt((c*x^2 + d)/x^2))/x^2]
```

Sympy [A] time = 17.7261, size = 187, normalized size = 1.7

$$\frac{3a\sqrt{c}d\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{2}+\frac{ac\sqrt{d}x\sqrt{\frac{cx^2}{d}+1}}{2}-\frac{ac\sqrt{d}x}{\sqrt{\frac{cx^2}{d}+1}}-\frac{ad^{\frac{3}{2}}}{x\sqrt{\frac{cx^2}{d}+1}}+bc^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)-\frac{bc^2x}{\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}-\frac{bc\sqrt{d}}{x\sqrt{\frac{cx^2}{d}+1}}+bd\left(\begin{cases}-\frac{\sqrt{c}}{2x^2} & \text{for}\ d=0\\ -\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3d} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x,x)
```

```
[Out] 3*a*sqrt(c)*d*asinh(sqrt(c)*x/sqrt(d))/2 + a*c*sqrt(d)*x*sqrt(c*x
**2/d + 1)/2 - a*c*sqrt(d)*x/sqrt(c*x**2/d + 1) - a*d**(3/2)/(x*s
qrt(c*x**2/d + 1)) + b*c**(3/2)*asinh(sqrt(c)*x/sqrt(d)) - b*c**2
*x/(sqrt(d)*sqrt(c*x**2/d + 1)) - b*c*sqrt(d)/(x*sqrt(c*x**2/d +
1)) + b*d*Piecewise((-sqrt(c)/(2*x**2), Eq(d, 0)), (-(c + d/x**2)
**(3/2)/(3*d), True))
```

GIAC/XCAS [A] time = 0.362733, size = 304, normalized size = 2.76

$$\frac{1}{2}\sqrt{cx^2+d}\,acx\operatorname{sign}(x) - \frac{1}{4}\left(2\,bc^{\frac{3}{2}}\operatorname{sign}(x) + 3\,a\sqrt{c}d\operatorname{sign}(x)\right)\ln\left(\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2\right) + \frac{2\left(6\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^4 bc^{\frac{3}{2}}d\operatorname{sign}(x) + 3\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^4 a\sqrt{c}d^2\operatorname{sign}(x) - 6\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2 bc^{\frac{3}{2}}d^2\operatorname{sign}(x) - 6\left(\sqrt{c}x\right.\right.}{3\left(\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2-d\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x,x, algorithm="giac")
```

```
[Out] 1/2*sqrt(c*x^2 + d)*a*c*x*sign(x) - 1/4*(2*b*c^(3/2)*sign(x) + 3*
a*sqrt(c)*d*sign(x))*ln((sqrt(c)*x - sqrt(c*x^2 + d))^2) + 2/3*(6
*(sqrt(c)*x - sqrt(c*x^2 + d))^4*b*c^(3/2)*d*sign(x) + 3*(sqrt(c)
*x - sqrt(c*x^2 + d))^4*a*sqrt(c)*d^2*sign(x) - 6*(sqrt(c)*x - sq
rt(c*x^2 + d))^2*b*c^(3/2)*d^2*sign(x) - 6*(sqrt(c)*x - sqrt(c*x^
2 + d))^2*a*sqrt(c)*d^3*sign(x) + 4*b*c^(3/2)*d^3*sign(x) + 3*a*s
qrt(c)*d^4*sign(x))/((sqrt(c)*x - sqrt(c*x^2 + d))^2 - d)^3
```

3.779 $\int \frac{\left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}}{x}\,dx$

Optimal. Leaf size=76

$$ac^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)-\frac{1}{3}a\left(c+\frac{d}{x^2}\right)^{3/2}-ac\sqrt{c+\frac{d}{x^2}}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{5d}$$

```
[Out] -(a*c*Sqrt[c + d/x^2]) - (a*(c + d/x^2)^(3/2))/3 - (b*(c + d/x^2)
^(5/2))/(5*d) + a*c^(3/2)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]]
```

Rubi [A] time = 0.174141, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$ac^{3/2}\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)-\frac{1}{3}a\left(c+\frac{d}{x^2}\right)^{3/2}-ac\sqrt{c+\frac{d}{x^2}}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{5d}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*(c + d/x^2)^(3/2))/x,x]
```

```
[Out] -(a*c*Sqrt[c + d/x^2]) - (a*(c + d/x^2)^(3/2))/3 - (b*(c + d/x^2)
^(5/2))/(5*d) + a*c^(3/2)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]]
```

Rubi in Sympy [A] time = 14.6129, size = 65, normalized size = 0.86

$$ac^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)-ac\sqrt{c+\frac{d}{x^2}}-\frac{a\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x,x)
```

```
[Out] a*c**(3/2)*atanh(sqrt(c + d/x**2)/sqrt(c)) - a*c*sqrt(c + d/x**2)
 - a*(c + d/x**2)**(3/2)/3 - b*(c + d/x**2)**(5/2)/(5*d)
```

Mathematica [A] time = 0.20923, size = 92, normalized size = 1.21

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(\frac{15ac^{3/2}x^5\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{\sqrt{cx^2+d}}-5ax^2\left(4cx^2+d\right)-\frac{3b\left(cx^2+d\right)^2}{d}\right)}{15x^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*(c + d/x^2)^(3/2))/x,x]
```

```
[Out] (Sqrt[c + d/x^2]*((-3*b*(d + c*x^2)^2)/d - 5*a*x^2*(d + 4*c*x^2)
+ (15*a*c^(3/2)*x^5*Log[c*x + Sqrt[c]*Sqrt[d + c*x^2]])/Sqrt[d +
c*x^2]))/(15*x^4)
```

Maple [B] time = 0.023, size = 142, normalized size = 1.9

$$\frac{1}{15\,x^2d^2}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(15\,ac^{3/2}\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)x^5d^2+10\,ac^2x^6\left(cx^2+d\right)^{3/2}-10\,ac\left(cx^2+d\right)^{5/2}x^4+15\,ac^2x^6\sqrt{cx^2+d}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)/x,x)
```

```
[Out] 1/15*((c*x^2+d)/x^2)^(3/2)/x^2*(15*a*c^(3/2)*ln(c^(1/2)*x+(c*x^2+
d)^(1/2))*x^5*d^2+10*a*c^2*x^6*(c*x^2+d)^(3/2)-10*a*c*(c*x^2+d)^(
5/2)*x^4+15*a*c^2*x^6*(c*x^2+d)^(1/2)*d-5*a*(c*x^2+d)^(5/2)*x^2*d
-3*b*(c*x^2+d)^(5/2)*d)/(c*x^2+d)^(3/2)/d^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.248451, size = 1, normalized size = 0.01

$$\left[\frac{15\,ac^{\frac{3}{2}}dx^4\log\left(-2\,cx^2-2\,\sqrt{c}x^2\sqrt{\frac{cx^2+d}{x^2}}-d\right)-2\left(\left(3\,bc^2+20\,acd\right)x^4+3\,bd^2+\left(6\,bcd+5\,ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{30\,dx^4},\ \frac{15\,a\sqrt{-c}cdx^4\,a\cdots}{\cdots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x,x, algorithm="fricas")
```

```
[Out] [1/30*(15*a*c^(3/2)*d*x^4*log(-2*c*x^2 - 2*sqrt(c)*x^2*sqrt((c*x^
2 + d)/x^2) - d) - 2*((3*b*c^2 + 20*a*c*d)*x^4 + 3*b*d^2 + (6*b*c
*d + 5*a*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(d*x^4), 1/15*(15*a*sqr
t(-c)*c*d*x^4*arctan(c/(sqrt(-c)*sqrt((c*x^2 + d)/x^2))) - ((3*b*
c^2 + 20*a*c*d)*x^4 + 3*b*d^2 + (6*b*c*d + 5*a*d^2)*x^2)*sqrt((c*
x^2 + d)/x^2))/(d*x^4)]
```

Sympy [A] time = 13.4561, size = 134, normalized size = 1.76

$$ac^2\left(\begin{cases}-\frac{\operatorname{atan}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{-c}}\right)}{\sqrt{-c}} & \text{for}\ -c>0\\ \frac{\operatorname{acoth}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{\sqrt{c}} & \text{for}\ -c<0\wedge c<c+\frac{d}{x^2}\\ \frac{\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{\sqrt{c}} & \text{for}\ c>c+\frac{d}{x^2}\wedge -c<0\end{cases}\right)-ac\sqrt{c+\frac{d}{x^2}}-\frac{a\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x,x)
```

```
[Out] a*c**2*Piecewise((-atan(sqrt(c + d/x**2)/sqrt(-c))/sqrt(-c), -c >
 0), (acoth(sqrt(c + d/x**2)/sqrt(c))/sqrt(c), (-c < 0) & (c < c
+ d/x**2)), (atanh(sqrt(c + d/x**2)/sqrt(c))/sqrt(c), (-c < 0) &
(c > c + d/x**2))) - a*c*sqrt(c + d/x**2) - a*(c + d/x**2)**(3/2)
/3 - b*(c + d/x**2)**(5/2)/(5*d)
```

GIAC/XCAS [A] time = 0.504302, size = 343, normalized size = 4.51

$$-\frac{1}{2}\,ac^{\frac{3}{2}}\ln\left(\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^2\right)\operatorname{sign}(x) + \frac{2\left(15\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^8bc^{\frac{5}{2}}\operatorname{sign}(x)+30\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^8ac^{\frac{3}{2}}d\operatorname{sign}(x)-90\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^6ac^{\frac{3}{2}}d^2\operatorname{sign}(x)+30\left(\sqrt{c}\right.\right.}{15}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x,x, algorithm="giac")
```

```
[Out] -1/2*a*c^(3/2)*ln((sqrt(c)*x - sqrt(c*x^2 + d))^2)*sign(x) + 2/15
*(15*(sqrt(c)*x - sqrt(c*x^2 + d))^8*b*c^(5/2)*sign(x) + 30*(sqrt
(c)*x - sqrt(c*x^2 + d))^8*a*c^(3/2)*d*sign(x) - 90*(sqrt(c)*x -
sqrt(c*x^2 + d))^6*a*c^(3/2)*d^2*sign(x) + 30*(sqrt(c)*x - sqrt(c
*x^2 + d))^4*b*c^(5/2)*d^2*sign(x) + 110*(sqrt(c)*x - sqrt(c*x^2
+ d))^4*a*c^(3/2)*d^3*sign(x) - 70*(sqrt(c)*x - sqrt(c*x^2 + d))^
2*a*c^(3/2)*d^4*sign(x) + 3*b*c^(5/2)*d^4*sign(x) + 20*a*c^(3/2)*
d^5*sign(x))/((sqrt(c)*x - sqrt(c*x^2 + d))^2 - d)^5
```

3.780 $\int \frac{\left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}}{x^3}\,dx$

Optimal. Leaf size=46

$$\frac{\left(c+\frac{d}{x^2}\right)^{5/2}(bc-ad)}{5d^2}-\frac{b\left(c+\frac{d}{x^2}\right)^{7/2}}{7d^2}$$

```
[Out] ((b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^2) - (b*(c + d/x^2)^(7/2))/(
7*d^2)
```

Rubi [A] time = 0.122247, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{\left(c+\frac{d}{x^2}\right)^{5/2}(bc-ad)}{5d^2}-\frac{b\left(c+\frac{d}{x^2}\right)^{7/2}}{7d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*(c + d/x^2)^(3/2))/x^3,x]
```

```
[Out] ((b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^2) - (b*(c + d/x^2)^(7/2))/(
7*d^2)
```

Rubi in Sympy [A] time = 12.3842, size = 39, normalized size = 0.85

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7d^2}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(ad-bc)}{5d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**3,x)
```

```
[Out] -b*(c + d/x**2)**(7/2)/(7*d**2) - (c + d/x**2)**(5/2)*(a*d - b*c)
/(5*d**2)
```

Mathematica [A] time = 0.0777933, size = 49, normalized size = 1.07

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)^2\left(7adx^2-2bcx^2+5bd\right)}{35d^2x^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*(c + d/x^2)^(3/2))/x^3,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(d + c*x^2)^2*(5*b*d - 2*b*c*x^2 + 7*a*d*x^2))/
(35*d^2*x^6)
```

Maple [A] time = 0.01, size = 48, normalized size = 1.

$$-\frac{\left(7\,adx^2-2\,bcx^2+5\,bd\right)\left(cx^2+d\right)}{35\,d^2x^4}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)/x^3,x)
```

```
[Out] -1/35*((c*x^2+d)/x^2)^(3/2)*(7*a*d*x^2-2*b*c*x^2+5*b*d)*(c*x^2+d)
/d^2/x^4
```

Maxima [A] time = 1.37175, size = 66, normalized size = 1.43

$$-\frac{a\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5\,d}-\frac{1}{35}\left(\frac{5\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{d^2}-\frac{7\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c}{d^2}\right)b$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^3,x, algorithm="maxima")
```

```
[Out] -1/5*a*(c + d/x^2)^(5/2)/d - 1/35*(5*(c + d/x^2)^(7/2)/d^2 - 7*(c
 + d/x^2)^(5/2)*c/d^2)*b
```

Fricas [A] time = 0.284685, size = 113, normalized size = 2.46

$$\frac{\left(\left(2\,bc^3-7\,ac^2d\right)x^6-\left(bc^2d+14\,acd^2\right)x^4-5\,bd^3-\left(8\,bcd^2+7\,ad^3\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{35\,d^2x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^3,x, algorithm="fricas")
```

```
[Out] 1/35*((2*b*c^3 - 7*a*c^2*d)*x^6 - (b*c^2*d + 14*a*c*d^2)*x^4 - 5*
b*d^3 - (8*b*c*d^2 + 7*a*d^3)*x^2)*sqrt((c*x^2 + d)/x^2)/(d^2*x^6
)
```

Sympy [A] time = 7.37081, size = 138, normalized size = 3.

$$-\frac{ac\left(\begin{cases}\frac{\sqrt{c}}{x^2} & \text{for}\ d=0\\ \frac{2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3d} & \text{otherwise}\end{cases}\right)}{2}-\frac{a\left(-\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}\right)}{d}-\frac{bc\left(-\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}\right)}{d^2}-\frac{b\left(\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{2c\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}\right)}{d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**3,x)
```

```
[Out] -a*c*Piecewise((sqrt(c)/x**2, Eq(d, 0)), (2*(c + d/x**2)**(3/2)/(
3*d), True))/2 - a*(-c*(c + d/x**2)**(3/2)/3 + (c + d/x**2)**(5/2
)/5)/d - b*c*(-c*(c + d/x**2)**(3/2)/3 + (c + d/x**2)**(5/2)/5)/d
**2 - b*(c**2*(c + d/x**2)**(3/2)/3 - 2*c*(c + d/x**2)**(5/2)/5 +
 (c + d/x**2)**(7/2)/7)/d**2
```

GIAC/XCAS [A] time = 0.759235, size = 500, normalized size = 10.87

$$2\left(35\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{12}ac^{\frac{5}{2}}\operatorname{sign}(x)+70\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{10}bc^{\frac{7}{2}}\operatorname{sign}(x)-70\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{10}ac^{\frac{5}{2}}d\operatorname{sign}(x)+70\left(\sqrt{c}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^3,x, algorithm="giac")
```

```
[Out] 2/35*(35*(sqrt(c)*x - sqrt(c*x^2 + d))^12*a*c^(5/2)*sign(x) + 70*
(sqrt(c)*x - sqrt(c*x^2 + d))^10*b*c^(7/2)*sign(x) - 70*(sqrt(c)*
x - sqrt(c*x^2 + d))^10*a*c^(5/2)*d*sign(x) + 70*(sqrt(c)*x - sqr
t(c*x^2 + d))^8*b*c^(7/2)*d*sign(x) + 105*(sqrt(c)*x - sqrt(c*x^2
 + d))^8*a*c^(5/2)*d^2*sign(x) + 140*(sqrt(c)*x - sqrt(c*x^2 + d)
)^6*b*c^(7/2)*d^2*sign(x) - 140*(sqrt(c)*x - sqrt(c*x^2 + d))^6*a
*c^(5/2)*d^3*sign(x) + 28*(sqrt(c)*x - sqrt(c*x^2 + d))^4*b*c^(7/
2)*d^3*sign(x) + 77*(sqrt(c)*x - sqrt(c*x^2 + d))^4*a*c^(5/2)*d^4
*sign(x) + 14*(sqrt(c)*x - sqrt(c*x^2 + d))^2*b*c^(7/2)*d^4*sign(
x) - 14*(sqrt(c)*x - sqrt(c*x^2 + d))^2*a*c^(5/2)*d^5*sign(x) - 2
*b*c^(7/2)*d^5*sign(x) + 7*a*c^(5/2)*d^6*sign(x))/((sqrt(c)*x - s
qrt(c*x^2 + d))^2 - d)^7
```

3.781 $\int \frac{\left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}}{x^5}\,dx$

Optimal. Leaf size=74

$$\frac{\left(c+\frac{d}{x^2}\right)^{7/2}(2bc-ad)}{7d^3}-\frac{c\left(c+\frac{d}{x^2}\right)^{5/2}(bc-ad)}{5d^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{9/2}}{9d^3}$$

```
[Out] -(c*(b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^3) + ((2*b*c - a*d)*(c + d/x^2)^(7/2))/(7*d^3) - (b*(c + d/x^2)^(9/2))/(9*d^3)
```

Rubi [A] time = 0.170576, antiderivative size = 74, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{\left(c+\frac{d}{x^2}\right)^{7/2}(2bc-ad)}{7d^3}-\frac{c\left(c+\frac{d}{x^2}\right)^{5/2}(bc-ad)}{5d^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{9/2}}{9d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*(c + d/x^2)^(3/2))/x^5,x]
```

```
[Out] -(c*(b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^3) + ((2*b*c - a*d)*(c + d/x^2)^(7/2))/(7*d^3) - (b*(c + d/x^2)^(9/2))/(9*d^3)
```

Rubi in Sympy [A] time = 17.3526, size = 63, normalized size = 0.85

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9d^3}+\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(ad-bc)}{5d^3}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}(ad-2bc)}{7d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**5,x)
```

```
[Out] -b*(c + d/x**2)**(9/2)/(9*d**3) + c*(c + d/x**2)**(5/2)*(a*d - b*c)/(5*d**3) - (c + d/x**2)**(7/2)*(a*d - 2*b*c)/(7*d**3)
```

Mathematica [A] time = 0.0851734, size = 71, normalized size = 0.96

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)^2\left(9adx^2\left(2cx^2-5d\right)+b\left(-8c^2x^4+20cdx^2-35d^2\right)\right)}{315d^3x^8}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*(c + d/x^2)^(3/2))/x^5,x]
```

```
[Out] (Sqrt[c + d/x^2]*(d + c*x^2)^2*(9*a*d*x^2*(-5*d + 2*c*x^2) + b*(-35*d^2 + 20*c*d*x^2 - 8*c^2*x^4)))/(315*d^3*x^8)
```

Maple [A] time = 0.009, size = 70, normalized size = 1.

$$\frac{\left(18\,acd x^4-8\,bc^2x^4-45\,ad^2x^2+20\,bcdx^2-35\,bd^2\right)\left(cx^2+d\right)}{315\,d^3x^6}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)/x^5,x)
```

```
[Out] 1/315*((c*x^2+d)/x^2)^(3/2)*(18*a*c*d*x^4-8*b*c^2*x^4-45*a*d^2*x^
2+20*b*c*d*x^2-35*b*d^2)*(c*x^2+d)/d^3/x^6
```

Maxima [A] time = 1.39099, size = 113, normalized size = 1.53

$$-\frac{1}{35}\left(\frac{5\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{d^2}-\frac{7\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c}{d^2}\right)a-\frac{1}{315}\left(\frac{35\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{d^3}-\frac{90\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}c}{d^3}+\frac{63\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c^2}{d^3}\right)b$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^5,x, algorithm="maxima")
```

```
[Out] -1/35*(5*(c + d/x^2)^(7/2)/d^2 - 7*(c + d/x^2)^(5/2)*c/d^2)*a - 1
/315*(35*(c + d/x^2)^(9/2)/d^3 - 90*(c + d/x^2)^(7/2)*c/d^3 + 63*
(c + d/x^2)^(5/2)*c^2/d^3)*b
```

Fricas [A] time = 0.329345, size = 147, normalized size = 1.99

$$-\frac{\left(2\left(4\,bc^4-9\,ac^3d\right)x^8-\left(4\,bc^3d-9\,ac^2d^2\right)x^6+35\,bd^4+3\left(bc^2d^2+24\,acd^3\right)x^4+5\left(10\,bcd^3+9\,ad^4\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{315\,d^3x^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^5,x, algorithm="fricas")
```

```
[Out] -1/315*(2*(4*b*c^4 - 9*a*c^3*d)*x^8 - (4*b*c^3*d - 9*a*c^2*d^2)*x
^6 + 35*b*d^4 + 3*(b*c^2*d^2 + 24*a*c*d^3)*x^4 + 5*(10*b*c*d^3 +
9*a*d^4)*x^2)*sqrt((c*x^2 + d)/x^2)/(d^3*x^8)
```

Sympy [A] time = 7.84015, size = 194, normalized size = 2.62

$$-\frac{ac\left(-\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}\right)}{d^2}-\frac{a\left(\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{2c\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}\right)}{d^2}-\frac{bc\left(\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{2c\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}\right)}{d^3}-\frac{b\left(-\frac{c^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{3c^2\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}-\frac{3c\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9}\right)}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**5,x)
```

```
[Out] -a*c*(-c*(c + d/x**2)**(3/2)/3 + (c + d/x**2)**(5/2)/5)/d**2 - a*
(c**2*(c + d/x**2)**(3/2)/3 - 2*c*(c + d/x**2)**(5/2)/5 + (c + d/
x**2)**(7/2)/7)/d**2 - b*c*(c**2*(c + d/x**2)**(3/2)/3 - 2*c*(c +
 d/x**2)**(5/2)/5 + (c + d/x**2)**(7/2)/7)/d**3 - b*(-c**3*(c + d
/x**2)**(3/2)/3 + 3*c**2*(c + d/x**2)**(5/2)/5 - 3*c*(c + d/x**2)
**(7/2)/7 + (c + d/x**2)**(9/2)/9)/d**3
```

GIAC/XCAS [A] time = 0.952573, size = 581, normalized size = 7.85

$$\frac{4\left(315\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{14}ac^{\frac{7}{2}}\operatorname{sign}(x)+840\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{12}bc^{\frac{9}{2}}\operatorname{sign}(x)-315\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{12}ac^{\frac{7}{2}}d\operatorname{sign}(x)+126\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^5,x, algorithm="giac")
```

```
[Out] 4/315*(315*(sqrt(c)*x - sqrt(c*x^2 + d))^14*a*c^(7/2)*sign(x) + 8
40*(sqrt(c)*x - sqrt(c*x^2 + d))^12*b*c^(9/2)*sign(x) - 315*(sqrt
(c)*x - sqrt(c*x^2 + d))^12*a*c^(7/2)*d*sign(x) + 1260*(sqrt(c)*x
 - sqrt(c*x^2 + d))^10*b*c^(9/2)*d*sign(x) + 315*(sqrt(c)*x - sqr
t(c*x^2 + d))^10*a*c^(7/2)*d^2*sign(x) + 1764*(sqrt(c)*x - sqrt(c
*x^2 + d))^8*b*c^(9/2)*d^2*sign(x) - 819*(sqrt(c)*x - sqrt(c*x^2
+ d))^8*a*c^(7/2)*d^3*sign(x) + 504*(sqrt(c)*x - sqrt(c*x^2 + d))
^6*b*c^(9/2)*d^3*sign(x) + 441*(sqrt(c)*x - sqrt(c*x^2 + d))^6*a*
c^(7/2)*d^4*sign(x) + 144*(sqrt(c)*x - sqrt(c*x^2 + d))^4*b*c^(9/
2)*d^4*sign(x) - 9*(sqrt(c)*x - sqrt(c*x^2 + d))^4*a*c^(7/2)*d^5*
sign(x) - 36*(sqrt(c)*x - sqrt(c*x^2 + d))^2*b*c^(9/2)*d^5*sign(x
) + 81*(sqrt(c)*x - sqrt(c*x^2 + d))^2*a*c^(7/2)*d^6*sign(x) + 4*
b*c^(9/2)*d^6*sign(x) - 9*a*c^(7/2)*d^7*sign(x))/((sqrt(c)*x - sq
rt(c*x^2 + d))^2 - d)^9
```

3.782 $\int \frac{\left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}}{x^7}\,dx$

Optimal. Leaf size=104

$$\frac{c^2\left(c+\frac{d}{x^2}\right)^{5/2}(bc-ad)}{5d^4}+\frac{\left(c+\frac{d}{x^2}\right)^{9/2}(3bc-ad)}{9d^4}-\frac{c\left(c+\frac{d}{x^2}\right)^{7/2}(3bc-2ad)}{7d^4}-\frac{b\left(c+\frac{d}{x^2}\right)^{11/2}}{11d^4}$$

```
[Out] (c^2*(b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^4) - (c*(3*b*c - 2*a*d)*
(c + d/x^2)^(7/2))/(7*d^4) + ((3*b*c - a*d)*(c + d/x^2)^(9/2))/(9
*d^4) - (b*(c + d/x^2)^(11/2))/(11*d^4)
```

Rubi [A] time = 0.230749, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{c^2\left(c+\frac{d}{x^2}\right)^{5/2}(bc-ad)}{5d^4}+\frac{\left(c+\frac{d}{x^2}\right)^{9/2}(3bc-ad)}{9d^4}-\frac{c\left(c+\frac{d}{x^2}\right)^{7/2}(3bc-2ad)}{7d^4}-\frac{b\left(c+\frac{d}{x^2}\right)^{11/2}}{11d^4}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*(c + d/x^2)^(3/2))/x^7,x]
```

```
[Out] (c^2*(b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^4) - (c*(3*b*c - 2*a*d)*
(c + d/x^2)^(7/2))/(7*d^4) + ((3*b*c - a*d)*(c + d/x^2)^(9/2))/(9
*d^4) - (b*(c + d/x^2)^(11/2))/(11*d^4)
```

Rubi in Sympy [A] time = 23.1413, size = 92, normalized size = 0.88

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}}{11d^4}-\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(ad-bc)}{5d^4}+\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}(2ad-3bc)}{7d^4}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}(ad-3bc)}{9d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**7,x)
```

```
[Out] -b*(c + d/x**2)**(11/2)/(11*d**4) - c**2*(c + d/x**2)**(5/2)*(a*d
 - b*c)/(5*d**4) + c*(c + d/x**2)**(7/2)*(2*a*d - 3*b*c)/(7*d**4)
 - (c + d/x**2)**(9/2)*(a*d - 3*b*c)/(9*d**4)
```

Mathematica [A] time = 0.105346, size = 94, normalized size = 0.9

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)^2\left(-11adx^2\left(8c^2x^4-20cdx^2+35d^2\right)-3b\left(-16c^3x^6+40c^2dx^4-70cd^2x^2+105d^3\right)\right)}{3465d^4x^{10}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*(c + d/x^2)^(3/2))/x^7,x]
```

```
[Out] (Sqrt[c + d/x^2]*(d + c*x^2)^2*(-11*a*d*x^2*(35*d^2 - 20*c*d*x^2
+ 8*c^2*x^4) - 3*b*(105*d^3 - 70*c*d^2*x^2 + 40*c^2*d*x^4 - 16*c^
3*x^6)))/(3465*d^4*x^10)
```

Maple [A] time = 0.012, size = 94, normalized size = 0.9

$$-\frac{\left(88\,ac^{2}dx^{6}-48\,bc^{3}x^{6}-220\,acd^{2}x^{4}+120\,bc^{2}dx^{4}+385\,ad^{3}x^{2}-210\,bcd^{2}x^{2}+315\,bd^{3}\right)\left(cx^{2}+d\right)}{3465\,d^{4}x^{8}}\left(\frac{cx^{2}+d}{x^{2}}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((a+b/x^2)*(c+d/x^2)^(3/2)/x^7,x)
```

```
[Out] -1/3465*((c*x^2+d)/x^2)^(3/2)*(88*a*c^2*d*x^6-48*b*c^3*x^6-220*a*
c*d^2*x^4+120*b*c^2*d*x^4+385*a*d^3*x^2-210*b*c*d^2*x^2+315*b*d^3
)*(c*x^2+d)/d^4/x^8
```

Maxima [A] time = 1.37257, size = 159, normalized size = 1.53

$$-\frac{1}{315}\left(\frac{35\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}}}{d^{3}}-\frac{90\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}c}{d^{3}}+\frac{63\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}c^{2}}{d^{3}}\right)a-\frac{1}{1155}\left(\frac{105\left(c+\frac{d}{x^{2}}\right)^{\frac{11}{2}}}{d^{4}}-\frac{385\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}}c}{d^{4}}+\frac{495\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}c^{2}}{d^{4}}-\frac{231\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}c^{3}}{d^{4}}\right)b$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^7,x, algorithm="maxima")
```

```
[Out] -1/315*(35*(c + d/x^2)^(9/2)/d^3 - 90*(c + d/x^2)^(7/2)*c/d^3 + 6
3*(c + d/x^2)^(5/2)*c^2/d^3)*a - 1/1155*(105*(c + d/x^2)^(11/2)/d
^4 - 385*(c + d/x^2)^(9/2)*c/d^4 + 495*(c + d/x^2)^(7/2)*c^2/d^4
- 231*(c + d/x^2)^(5/2)*c^3/d^4)*b
```

Fricas [A] time = 0.488112, size = 181, normalized size = 1.74

$$\frac{\left(8\left(6\,bc^{5}-11\,ac^{4}d\right)x^{10}-4\left(6\,bc^{4}d-11\,ac^{3}d^{2}\right)x^{8}+3\left(6\,bc^{3}d^{2}-11\,ac^{2}d^{3}\right)x^{6}-315\,bd^{5}-5\left(3\,bc^{2}d^{3}+110\,acd^{4}\right)x^{4}-35\,(12\cdots}{3465\,d^{4}x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^7,x, algorithm="fricas")
```

```
[Out] 1/3465*(8*(6*b*c^5 - 11*a*c^4*d)*x^10 - 4*(6*b*c^4*d - 11*a*c^3*d
^2)*x^8 + 3*(6*b*c^3*d^2 - 11*a*c^2*d^3)*x^6 - 315*b*d^5 - 5*(3*b
*c^2*d^3 + 110*a*c*d^4)*x^4 - 35*(12*b*c*d^4 + 11*a*d^5)*x^2)*sqr
t((c*x^2 + d)/x^2)/(d^4*x^10)
```

Sympy [A] time = 9.23717, size = 262, normalized size = 2.52

$$-\frac{ac\left(\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{2c\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}\right)}{d^3}-\frac{a\left(-\frac{c^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{3c^2\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}-\frac{3c\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9}\right)}{d^3}-\frac{bc\left(-\frac{c^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{3c^2\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}-\frac{3c\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9}\right)}{d^4}-\frac{b\left(\frac{c^4\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{4c^3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}+\frac{6c^2\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}-\frac{4c\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}}{11}\right)}{d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**7,x)
```

```
[Out] -a*c*(c**2*(c + d/x**2)**(3/2)/3 - 2*c*(c + d/x**2)**(5/2)/5 + (c
 + d/x**2)**(7/2)/7)/d**3 - a*(-c**3*(c + d/x**2)**(3/2)/3 + 3*c*
*2*(c + d/x**2)**(5/2)/5 - 3*c*(c + d/x**2)**(7/2)/7 + (c + d/x**
2)**(9/2)/9)/d**3 - b*c*(-c**3*(c + d/x**2)**(3/2)/3 + 3*c**2*(c
+ d/x**2)**(5/2)/5 - 3*c*(c + d/x**2)**(7/2)/7 + (c + d/x**2)**(9
/2)/9)/d**4 - b*(c**4*(c + d/x**2)**(3/2)/3 - 4*c**3*(c + d/x**2)
**(5/2)/5 + 6*c**2*(c + d/x**2)**(7/2)/7 - 4*c*(c + d/x**2)**(9/2
)/9 + (c + d/x**2)**(11/2)/11)/d**4
```

GIAC/XCAS [A] time = 1.24163, size = 662, normalized size = 6.37

$$\frac{16\left(2310\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{16}ac^{\frac{9}{2}}\operatorname{sign}(x)+6930\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{14}bc^{\frac{11}{2}}\operatorname{sign}(x)-1155\left(\sqrt{c}x-\sqrt{cx^2+d}\right)^{14}ac^{\frac{9}{2}}d\operatorname{sign}(x)\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^7,x, algorithm="giac")
```

```
[Out] 16/3465*(2310*(sqrt(c)*x - sqrt(c*x^2 + d))^16*a*c^(9/2)*sign(x)
+ 6930*(sqrt(c)*x - sqrt(c*x^2 + d))^14*b*c^(11/2)*sign(x) - 1155
*(sqrt(c)*x - sqrt(c*x^2 + d))^14*a*c^(9/2)*d*sign(x) + 12474*(sq
rt(c)*x - sqrt(c*x^2 + d))^12*b*c^(11/2)*d*sign(x) + 231*(sqrt(c)
*x - sqrt(c*x^2 + d))^12*a*c^(9/2)*d^2*sign(x) + 15246*(sqrt(c)*x
 - sqrt(c*x^2 + d))^10*b*c^(11/2)*d^2*sign(x) - 4851*(sqrt(c)*x -
 sqrt(c*x^2 + d))^10*a*c^(9/2)*d^3*sign(x) + 4950*(sqrt(c)*x - sq
rt(c*x^2 + d))^8*b*c^(11/2)*d^3*sign(x) + 2475*(sqrt(c)*x - sqrt(
c*x^2 + d))^8*a*c^(9/2)*d^4*sign(x) + 990*(sqrt(c)*x - sqrt(c*x^2
 + d))^6*b*c^(11/2)*d^4*sign(x) + 495*(sqrt(c)*x - sqrt(c*x^2 + d
))^6*a*c^(9/2)*d^5*sign(x) - 330*(sqrt(c)*x - sqrt(c*x^2 + d))^4*
b*c^(11/2)*d^5*sign(x) + 605*(sqrt(c)*x - sqrt(c*x^2 + d))^4*a*c^
(9/2)*d^6*sign(x) + 66*(sqrt(c)*x - sqrt(c*x^2 + d))^2*b*c^(11/2)
*d^6*sign(x) - 121*(sqrt(c)*x - sqrt(c*x^2 + d))^2*a*c^(9/2)*d^7*
sign(x) - 6*b*c^(11/2)*d^7*sign(x) + 11*a*c^(9/2)*d^8*sign(x))/((
sqrt(c)*x - sqrt(c*x^2 + d))^2 - d)^11
```

3.783 $\int \frac{\left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}}{x^9}\,dx$

Optimal. Leaf size=134

$$-\frac{c^3\left(c+\frac{d}{x^2}\right)^{5/2}(bc-ad)}{5d^5}+\frac{c^2\left(c+\frac{d}{x^2}\right)^{7/2}(4bc-3ad)}{7d^5}+\frac{\left(c+\frac{d}{x^2}\right)^{11/2}(4bc-ad)}{11d^5}-\frac{c\left(c+\frac{d}{x^2}\right)^{9/2}(2bc-ad)}{3d^5}-\frac{b\left(c+\frac{d}{x^2}\right)^{13/2}}{13d^5}$$

```
[Out] -(c^3*(b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^5) + (c^2*(4*b*c - 3*a*
d)*(c + d/x^2)^(7/2))/(7*d^5) - (c*(2*b*c - a*d)*(c + d/x^2)^(9/2
))/(3*d^5) + ((4*b*c - a*d)*(c + d/x^2)^(11/2))/(11*d^5) - (b*(c
+ d/x^2)^(13/2))/(13*d^5)
```

Rubi [A] time = 0.291596, antiderivative size = 134, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{c^3\left(c+\frac{d}{x^2}\right)^{5/2}(bc-ad)}{5d^5}+\frac{c^2\left(c+\frac{d}{x^2}\right)^{7/2}(4bc-3ad)}{7d^5}+\frac{\left(c+\frac{d}{x^2}\right)^{11/2}(4bc-ad)}{11d^5}-\frac{c\left(c+\frac{d}{x^2}\right)^{9/2}(2bc-ad)}{3d^5}-\frac{b\left(c+\frac{d}{x^2}\right)^{13/2}}{13d^5}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*(c + d/x^2)^(3/2))/x^9,x]
```

```
[Out] -(c^3*(b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^5) + (c^2*(4*b*c - 3*a*
d)*(c + d/x^2)^(7/2))/(7*d^5) - (c*(2*b*c - a*d)*(c + d/x^2)^(9/2
))/(3*d^5) + ((4*b*c - a*d)*(c + d/x^2)^(11/2))/(11*d^5) - (b*(c
+ d/x^2)^(13/2))/(13*d^5)
```

Rubi in Sympy [A] time = 29.5525, size = 119, normalized size = 0.89

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{13}{2}}}{13d^5}+\frac{c^3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(ad-bc)}{5d^5}-\frac{c^2\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}(3ad-4bc)}{7d^5}+\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}(ad-2bc)}{3d^5}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}(ad-4bc)}{11d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**9,x)
```

```
[Out] -b*(c + d/x**2)**(13/2)/(13*d**5) + c**3*(c + d/x**2)**(5/2)*(a*d
 - b*c)/(5*d**5) - c**2*(c + d/x**2)**(7/2)*(3*a*d - 4*b*c)/(7*d*
*5) + c*(c + d/x**2)**(9/2)*(a*d - 2*b*c)/(3*d**5) - (c + d/x**2)
**(11/2)*(a*d - 4*b*c)/(11*d**5)
```

Mathematica [A] time = 0.118424, size = 115, normalized size = 0.86

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)^2\left(13adx^2\left(16c^3x^6-40c^2dx^4+70cd^2x^2-105d^3\right)+b\left(-128c^4x^8+320c^3dx^6-560c^2d^2x^4+840cd^3x^2-1\right.\right.}{15015d^5x^{12}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*(c + d/x^2)^(3/2))/x^9,x]
```

```
[Out] (Sqrt[c + d/x^2]*(d + c*x^2)^2*(13*a*d*x^2*(-105*d^3 + 70*c*d^2*x
^2 - 40*c^2*d*x^4 + 16*c^3*x^6) + b*(-1155*d^4 + 840*c*d^3*x^2 -
560*c^2*d^2*x^4 + 320*c^3*d*x^6 - 128*c^4*x^8)))/(15015*d^5*x^12)
```

Maple [A] time = 0.011, size = 118, normalized size = 0.9

$$\frac{\left(208\,ac^3dx^8-128\,bc^4x^8-520\,ac^2d^2x^6+320\,bc^3dx^6+910\,acd^3x^4-560\,bc^2d^2x^4-1365\,ad^4x^2+840\,bcd^3x^2-1155\,bd^4\right)\left(c\right.}{15015\,d^5x^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)/x^9,x)
```

```
[Out] 1/15015*((c*x^2+d)/x^2)^(3/2)*(208*a*c^3*d*x^8-128*b*c^4*x^8-520*
a*c^2*d^2*x^6+320*b*c^3*d*x^6+910*a*c*d^3*x^4-560*b*c^2*d^2*x^4-1
365*a*d^4*x^2+840*b*c*d^3*x^2-1155*b*d^4)*(c*x^2+d)/d^5/x^10
```

Maxima [A] time = 1.39274, size = 205, normalized size = 1.53

$$-\frac{1}{1155}\left(\frac{105\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}}{d^4}-\frac{385\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}c}{d^4}+\frac{495\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}c^2}{d^4}-\frac{231\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c^3}{d^4}\right)a-\frac{1}{15015}\left(\frac{1155\left(c+\frac{d}{x^2}\right)^{\frac{13}{2}}}{d^5}-\frac{5460\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}c}{d^5}+\frac{10010\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}c^2}{d^5}-\frac{8580\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}c^3}{d^5}+\frac{3003\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c^4}{d^5}\right)b$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^9,x, algorithm="maxima")
```

```
[Out] -1/1155*(105*(c + d/x^2)^(11/2)/d^4 - 385*(c + d/x^2)^(9/2)*c/d^4
 + 495*(c + d/x^2)^(7/2)*c^2/d^4 - 231*(c + d/x^2)^(5/2)*c^3/d^4)
*a - 1/15015*(1155*(c + d/x^2)^(13/2)/d^5 - 5460*(c + d/x^2)^(11/
2)*c/d^5 + 10010*(c + d/x^2)^(9/2)*c^2/d^5 - 8580*(c + d/x^2)^(7/
2)*c^3/d^5 + 3003*(c + d/x^2)^(5/2)*c^4/d^5)*b
```

Fricas [A] time = 0.746095, size = 212, normalized size = 1.58

$$-\frac{\left(16\left(8\,bc^6-13\,ac^5d\right)x^{12}-8\left(8\,bc^5d-13\,ac^4d^2\right)x^{10}+6\left(8\,bc^4d^2-13\,ac^3d^3\right)x^8+1155\,bd^6-5\left(8\,bc^3d^3-13\,ac^2d^4\right)x^6+3\right.}{15015\,d^5x^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^9,x, algorithm="fricas")
```

```
[Out] -1/15015*(16*(8*b*c^6 - 13*a*c^5*d)*x^12 - 8*(8*b*c^5*d - 13*a*c^
4*d^2)*x^10 + 6*(8*b*c^4*d^2 - 13*a*c^3*d^3)*x^8 + 1155*b*d^6 - 5
*(8*b*c^3*d^3 - 13*a*c^2*d^4)*x^6 + 35*(b*c^2*d^4 + 52*a*c*d^5)*x
^4 + 105*(14*b*c*d^5 + 13*a*d^6)*x^2)*sqrt((c*x^2 + d)/x^2)/(d^5*
x^12)
```

Sympy [A] time = 10.9558, size = 326, normalized size = 2.43

$$-\frac{ac\left(-\frac{c^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+\frac{3c^2\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}-\frac{3c\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9}\right)}{d^4}-\frac{a\left(\frac{c^4\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{4c^3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}+\frac{6c^2\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}-\frac{4c\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}}{11}\right)}{d^4}-\frac{bc\left(\frac{c^4\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}-\frac{4c^3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}+\frac{6c^2\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}-\frac{4c\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}}{11}\right)}{d^5}-\frac{b\left(-\frac{c^5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}+c^4\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}-\frac{10c^3\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7}+\frac{10c^2\left(c+\frac{d}{x^2}\right)^{\frac{9}{2}}}{9}-\frac{5c\left(c+\frac{d}{x^2}\right)^{\frac{11}{2}}}{11}+\frac{\left(c+\frac{d}{x^2}\right)^{\frac{13}{2}}}{13}\right)}{d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**9,x)
```

```
[Out] -a*c*(-c**3*(c + d/x**2)**(3/2)/3 + 3*c**2*(c + d/x**2)**(5/2)/5
- 3*c*(c + d/x**2)**(7/2)/7 + (c + d/x**2)**(9/2)/9)/d**4 - a*(c*
*4*(c + d/x**2)**(3/2)/3 - 4*c**3*(c + d/x**2)**(5/2)/5 + 6*c**2*
(c + d/x**2)**(7/2)/7 - 4*c*(c + d/x**2)**(9/2)/9 + (c + d/x**2)*
*(11/2)/11)/d**4 - b*c*(c**4*(c + d/x**2)**(3/2)/3 - 4*c**3*(c +
d/x**2)**(5/2)/5 + 6*c**2*(c + d/x**2)**(7/2)/7 - 4*c*(c + d/x**2
)**(9/2)/9 + (c + d/x**2)**(11/2)/11)/d**5 - b*(-c**5*(c + d/x**2
)**(3/2)/3 + c**4*(c + d/x**2)**(5/2) - 10*c**3*(c + d/x**2)**(7/
2)/7 + 10*c**2*(c + d/x**2)**(9/2)/9 - 5*c*(c + d/x**2)**(11/2)/1
1 + (c + d/x**2)**(13/2)/13)/d**5
```

GIAC/XCAS [A] time = 1.68733, size = 743, normalized size = 5.54

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^9,x, algorithm="giac")
```

```
[Out] 32/15015*(15015*(sqrt(c)*x - sqrt(c*x^2 + d))^18*a*c^(11/2)*sign(
x) + 48048*(sqrt(c)*x - sqrt(c*x^2 + d))^16*b*c^(13/2)*sign(x) -
3003*(sqrt(c)*x - sqrt(c*x^2 + d))^16*a*c^(11/2)*d*sign(x) + 9609
6*(sqrt(c)*x - sqrt(c*x^2 + d))^14*b*c^(13/2)*d*sign(x) - 6006*(s
qrt(c)*x - sqrt(c*x^2 + d))^14*a*c^(11/2)*d^2*sign(x) + 109824*(s
qrt(c)*x - sqrt(c*x^2 + d))^12*b*c^(13/2)*d^2*sign(x) - 28314*(sq
rt(c)*x - sqrt(c*x^2 + d))^12*a*c^(11/2)*d^3*sign(x) + 37752*(sqr
t(c)*x - sqrt(c*x^2 + d))^10*b*c^(13/2)*d^3*sign(x) + 13728*(sqrt
(c)*x - sqrt(c*x^2 + d))^10*a*c^(11/2)*d^4*sign(x) + 5720*(sqrt(c
)*x - sqrt(c*x^2 + d))^8*b*c^(13/2)*d^4*sign(x) + 5720*(sqrt(c)*x
 - sqrt(c*x^2 + d))^8*a*c^(11/2)*d^5*sign(x) - 2288*(sqrt(c)*x -
sqrt(c*x^2 + d))^6*b*c^(13/2)*d^5*sign(x) + 3718*(sqrt(c)*x - sqr
t(c*x^2 + d))^6*a*c^(11/2)*d^6*sign(x) + 624*(sqrt(c)*x - sqrt(c*
x^2 + d))^4*b*c^(13/2)*d^6*sign(x) - 1014*(sqrt(c)*x - sqrt(c*x^2
 + d))^4*a*c^(11/2)*d^7*sign(x) - 104*(sqrt(c)*x - sqrt(c*x^2 + d
))^2*b*c^(13/2)*d^7*sign(x) + 169*(sqrt(c)*x - sqrt(c*x^2 + d))^2
*a*c^(11/2)*d^8*sign(x) + 8*b*c^(13/2)*d^8*sign(x) - 13*a*c^(11/2
)*d^9*sign(x))/((sqrt(c)*x - sqrt(c*x^2 + d))^2 - d)^13
```

3.784 $\int \left(a+\frac{b}{x^2}\right) \left(c+\frac{d}{x^2}\right)^{3/2} x^{12}\,dx$

Optimal. Leaf size=150

$$-\frac{16d^3x^5\left(c+\frac{d}{x^2}\right)^{5/2}(13bc-8ad)}{15015c^5}+\frac{8d^2x^7\left(c+\frac{d}{x^2}\right)^{5/2}(13bc-8ad)}{3003c^4}-\frac{2dx^9\left(c+\frac{d}{x^2}\right)^{5/2}(13bc-8ad)}{429c^3}+\frac{x^{11}\left(c+\frac{d}{x^2}\right)^{5/2}(13bc-8ad)}{143c^2}+\frac{ax^{13}\left(c+\frac{d}{x^2}\right)^{5/2}}{13c}$$

```
[Out] (-16*d^3*(13*b*c - 8*a*d)*(c + d/x^2)^(5/2)*x^5)/(15015*c^5) + (8
*d^2*(13*b*c - 8*a*d)*(c + d/x^2)^(5/2)*x^7)/(3003*c^4) - (2*d*(1
3*b*c - 8*a*d)*(c + d/x^2)^(5/2)*x^9)/(429*c^3) + ((13*b*c - 8*a*
d)*(c + d/x^2)^(5/2)*x^11)/(143*c^2) + (a*(c + d/x^2)^(5/2)*x^13)
/(13*c)
```

Rubi [A] time = 0.262444, antiderivative size = 150, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{16d^3x^5\left(c+\frac{d}{x^2}\right)^{5/2}(13bc-8ad)}{15015c^5}+\frac{8d^2x^7\left(c+\frac{d}{x^2}\right)^{5/2}(13bc-8ad)}{3003c^4}-\frac{2dx^9\left(c+\frac{d}{x^2}\right)^{5/2}(13bc-8ad)}{429c^3}+\frac{x^{11}\left(c+\frac{d}{x^2}\right)^{5/2}(13bc-8ad)}{143c^2}+\frac{ax^{13}\left(c+\frac{d}{x^2}\right)^{5/2}}{13c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x^12,x]
```

```
[Out] (-16*d^3*(13*b*c - 8*a*d)*(c + d/x^2)^(5/2)*x^5)/(15015*c^5) + (8
*d^2*(13*b*c - 8*a*d)*(c + d/x^2)^(5/2)*x^7)/(3003*c^4) - (2*d*(1
3*b*c - 8*a*d)*(c + d/x^2)^(5/2)*x^9)/(429*c^3) + ((13*b*c - 8*a*
d)*(c + d/x^2)^(5/2)*x^11)/(143*c^2) + (a*(c + d/x^2)^(5/2)*x^13)
/(13*c)
```

Rubi in Sympy [A] time = 20.4799, size = 146, normalized size = 0.97

$$\frac{ax^{13}\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{13c}-\frac{x^{11}\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(8ad-13bc)}{143c^2}+\frac{2dx^9\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(8ad-13bc)}{429c^3}-\frac{8d^2x^7\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(8ad-13bc)}{3003c^4}+\frac{16d^3x^5\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(8ad-13bc)}{15015c^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**12,x)
```

```
[Out] a*x**13*(c + d/x**2)**(5/2)/(13*c) - x**11*(c + d/x**2)**(5/2)*(8
*a*d - 13*b*c)/(143*c**2) + 2*d*x**9*(c + d/x**2)**(5/2)*(8*a*d -
 13*b*c)/(429*c**3) - 8*d**2*x**7*(c + d/x**2)**(5/2)*(8*a*d - 13
*b*c)/(3003*c**4) + 16*d**3*x**5*(c + d/x**2)**(5/2)*(8*a*d - 13*
b*c)/(15015*c**5)
```

Mathematica [A] time = 0.0966569, size = 110, normalized size = 0.73

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)^2\left(a\left(1155c^4x^8-840c^3dx^6+560c^2d^2x^4-320cd^3x^2+128d^4\right)+13bc\left(105c^3x^6-70c^2dx^4+40cd^2x^2-1\right.\right.}{15015c^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x^12,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(d + c*x^2)^2*(13*b*c*(-16*d^3 + 40*c*d^2*x^2
- 70*c^2*d*x^4 + 105*c^3*x^6) + a*(128*d^4 - 320*c*d^3*x^2 + 560*
c^2*d^2*x^4 - 840*c^3*d*x^6 + 1155*c^4*x^8)))/(15015*c^5)
```

Maple [A] time = 0.011, size = 115, normalized size = 0.8

$$\frac{x^3 \left(1155\, a x^8 c^4 - 840\, a c^3 d x^6 + 1365\, b c^4 x^6 + 560\, a c^2 d^2 x^4 - 910\, b c^3 d x^4 - 320\, a c d^3 x^2 + 520\, b c^2 d^2 x^2 + 128\, a d^4 - 208\, b c d^3\right) (c$$

$$15015\, c^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x^12,x)
```

```
[Out] 1/15015*((c*x^2+d)/x^2)^(3/2)*x^3*(1155*a*c^4*x^8-840*a*c^3*d*x^6
+1365*b*c^4*x^6+560*a*c^2*d^2*x^4-910*b*c^3*d*x^4-320*a*c*d^3*x^2
+520*b*c^2*d^2*x^2+128*a*d^4-208*b*c*d^3)*(c*x^2+d)/c^5
```

Maxima [A] time = 1.38693, size = 213, normalized size = 1.42

$$\frac{\left(105 \left(c + \frac{d}{x^2}\right)^{\frac{11}{2}} x^{11} - 385 \left(c + \frac{d}{x^2}\right)^{\frac{9}{2}} d x^9 + 495 \left(c + \frac{d}{x^2}\right)^{\frac{7}{2}} d^2 x^7 - 231 \left(c + \frac{d}{x^2}\right)^{\frac{5}{2}} d^3 x^5\right) b}{1155\, c^4} + \frac{\left(1155 \left(c + \frac{d}{x^2}\right)^{\frac{13}{2}} x^{13} - 5460 \left(c + \frac{d}{x^2}\right)^{\frac{11}{2}} d x^{11} + 10010 \left(c + \frac{d}{x^2}\right)^{\frac{9}{2}} d^2 x^9 - 8580 \left(c + \frac{d}{x^2}\right)^{\frac{7}{2}} d^3 x^7 + 3003 \left(c + \frac{d}{x^2}\right)^{\frac{5}{2}} d^4 x^5\right) a}{15015\, c^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^12,x, algorithm="maxima")
```

```
[Out] 1/1155*(105*(c + d/x^2)^(11/2)*x^11 - 385*(c + d/x^2)^(9/2)*d*x^9
 + 495*(c + d/x^2)^(7/2)*d^2*x^7 - 231*(c + d/x^2)^(5/2)*d^3*x^5)
*b/c^4 + 1/15015*(1155*(c + d/x^2)^(13/2)*x^13 - 5460*(c + d/x^2)
^(11/2)*d*x^11 + 10010*(c + d/x^2)^(9/2)*d^2*x^9 - 8580*(c + d/x^
2)^(7/2)*d^3*x^7 + 3003*(c + d/x^2)^(5/2)*d^4*x^5)*a/c^5
```

Fricas [A] time = 0.227339, size = 209, normalized size = 1.39

$$\frac{\left(1155\, a c^6 x^{13} + 105 \left(13\, b c^6 + 14\, a c^5 d\right) x^{11} + 35 \left(52\, b c^5 d + a c^4 d^2\right) x^9 + 5 \left(13\, b c^4 d^2 - 8\, a c^3 d^3\right) x^7 - 6 \left(13\, b c^3 d^3 - 8\, a c^2 d^4\right) x^5 +}{15015\, c^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^12,x, algorithm="fricas")
```

```
[Out] 1/15015*(1155*a*c^6*x^13 + 105*(13*b*c^6 + 14*a*c^5*d)*x^11 + 35*
(52*b*c^5*d + a*c^4*d^2)*x^9 + 5*(13*b*c^4*d^2 - 8*a*c^3*d^3)*x^7
 - 6*(13*b*c^3*d^3 - 8*a*c^2*d^4)*x^5 + 8*(13*b*c^2*d^4 - 8*a*c*d
^5)*x^3 - 16*(13*b*c*d^5 - 8*a*d^6)*x)*sqrt((c*x^2 + d)/x^2)/c^5
```

Sympy [A] time = 35.9518, size = 3351, normalized size = 22.34

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**12,x)
```

```
[Out] 693*a*c**12*d**(51/2)*x**22*sqrt(c*x**2/d + 1)/(9009*c**11*d**25*
x**10 + 45045*c**10*d**26*x**8 + 90090*c**9*d**27*x**6 + 90090*c*
*8*d**28*x**4 + 45045*c**7*d**29*x**2 + 9009*c**6*d**30) + 3528*a
*c**11*d**(53/2)*x**20*sqrt(c*x**2/d + 1)/(9009*c**11*d**25*x**10
 + 45045*c**10*d**26*x**8 + 90090*c**9*d**27*x**6 + 90090*c**8*d*
*28*x**4 + 45045*c**7*d**29*x**2 + 9009*c**6*d**30) + 7175*a*c**1
0*d**(55/2)*x**18*sqrt(c*x**2/d + 1)/(9009*c**11*d**25*x**10 + 45
045*c**10*d**26*x**8 + 90090*c**9*d**27*x**6 + 90090*c**8*d**28*x
**4 + 45045*c**7*d**29*x**2 + 9009*c**6*d**30) + 7290*a*c**9*d**(
57/2)*x**16*sqrt(c*x**2/d + 1)/(9009*c**11*d**25*x**10 + 45045*c*
*10*d**26*x**8 + 90090*c**9*d**27*x**6 + 90090*c**8*d**28*x**4 +
45045*c**7*d**29*x**2 + 9009*c**6*d**30) + 315*a*c**9*d**(35/2)*x
**18*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*
x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*
d**20) + 3699*a*c**8*d**(59/2)*x**14*sqrt(c*x**2/d + 1)/(9009*c**
11*d**25*x**10 + 45045*c**10*d**26*x**8 + 90090*c**9*d**27*x**6 +
 90090*c**8*d**28*x**4 + 45045*c**7*d**29*x**2 + 9009*c**6*d**30)
 + 1295*a*c**8*d**(37/2)*x**16*sqrt(c*x**2/d + 1)/(3465*c**9*d**1
6*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c*
*6*d**19*x**2 + 3465*c**5*d**20) + 756*a*c**7*d**(61/2)*x**12*sqr
t(c*x**2/d + 1)/(9009*c**11*d**25*x**10 + 45045*c**10*d**26*x**8
+ 90090*c**9*d**27*x**6 + 90090*c**8*d**28*x**4 + 45045*c**7*d**2
9*x**2 + 9009*c**6*d**30) + 1990*a*c**7*d**(39/2)*x**14*sqrt(c*x*
*2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c
**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) - 63*a*
c**6*d**(63/2)*x**10*sqrt(c*x**2/d + 1)/(9009*c**11*d**25*x**10 +
 45045*c**10*d**26*x**8 + 90090*c**9*d**27*x**6 + 90090*c**8*d**2
8*x**4 + 45045*c**7*d**29*x**2 + 9009*c**6*d**30) + 1358*a*c**6*d
**(41/2)*x**12*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c
**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 +
3465*c**5*d**20) - 630*a*c**5*d**(65/2)*x**8*sqrt(c*x**2/d + 1)/(
9009*c**11*d**25*x**10 + 45045*c**10*d**26*x**8 + 90090*c**9*d**2
7*x**6 + 90090*c**8*d**28*x**4 + 45045*c**7*d**29*x**2 + 9009*c**
6*d**30) + 343*a*c**5*d**(43/2)*x**10*sqrt(c*x**2/d + 1)/(3465*c*
*9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 1
3860*c**6*d**19*x**2 + 3465*c**5*d**20) - 1680*a*c**4*d**(67/2)*x
**6*sqrt(c*x**2/d + 1)/(9009*c**11*d**25*x**10 + 45045*c**10*d**2
6*x**8 + 90090*c**9*d**27*x**6 + 90090*c**8*d**28*x**4 + 45045*c*
*7*d**29*x**2 + 9009*c**6*d**30) + 35*a*c**4*d**(45/2)*x**8*sqrt(
c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 207
90*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) - 2
016*a*c**3*d**(69/2)*x**4*sqrt(c*x**2/d + 1)/(9009*c**11*d**25*x*
*10 + 45045*c**10*d**26*x**8 + 90090*c**9*d**27*x**6 + 90090*c**8
*d**28*x**4 + 45045*c**7*d**29*x**2 + 9009*c**6*d**30) + 280*a*c*
*3*d**(47/2)*x**6*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 1386
0*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2
 + 3465*c**5*d**20) - 1152*a*c**2*d**(71/2)*x**2*sqrt(c*x**2/d +
1)/(9009*c**11*d**25*x**10 + 45045*c**10*d**26*x**8 + 90090*c**9*
d**27*x**6 + 90090*c**8*d**28*x**4 + 45045*c**7*d**29*x**2 + 9009
*c**6*d**30) + 560*a*c**2*d**(49/2)*x**4*sqrt(c*x**2/d + 1)/(3465
*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4
+ 13860*c**6*d**19*x**2 + 3465*c**5*d**20) - 256*a*c*d**(73/2)*sq
rt(c*x**2/d + 1)/(9009*c**11*d**25*x**10 + 45045*c**10*d**26*x**8
 + 90090*c**9*d**27*x**6 + 90090*c**8*d**28*x**4 + 45045*c**7*d**
29*x**2 + 9009*c**6*d**30) + 448*a*c*d**(51/2)*x**2*sqrt(c*x**2/d
 + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*
d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 128*a*d**
(53/2)*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**1
7*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**
5*d**20) + 315*b*c**10*d**(33/2)*x**18*sqrt(c*x**2/d + 1)/(3465*c
**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 +
13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 1295*b*c**9*d**(35/2)*
x**16*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17
*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5
```

```
*d**20) + 1990*b*c**8*d**(37/2)*x**14*sqrt(c*x**2/d + 1)/(3465*c*
*9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 1
3860*c**6*d**19*x**2 + 3465*c**5*d**20) + 1358*b*c**7*d**(39/2)*x
**12*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*
x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*
d**20) + 35*b*c**7*d**(21/2)*x**14*sqrt(c*x**2/d + 1)/(315*c**7*d
**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d
**12) + 343*b*c**6*d**(41/2)*x**10*sqrt(c*x**2/d + 1)/(3465*c**9*
d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 1386
0*c**6*d**19*x**2 + 3465*c**5*d**20) + 110*b*c**6*d**(23/2)*x**12
*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 9
45*c**5*d**11*x**2 + 315*c**4*d**12) + 35*b*c**5*d**(43/2)*x**8*s
qrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 +
 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20)
 + 114*b*c**5*d**(25/2)*x**10*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x
**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12)
 + 280*b*c**4*d**(45/2)*x**6*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*
x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6
*d**19*x**2 + 3465*c**5*d**20) + 40*b*c**4*d**(27/2)*x**8*sqrt(c*
x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*
d**11*x**2 + 315*c**4*d**12) + 560*b*c**3*d**(47/2)*x**4*sqrt(c*x
**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*
c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) - 5*b*
c**3*d**(29/2)*x**6*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*
c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 448*b*c
**2*d**(49/2)*x**2*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 138
60*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**
2 + 3465*c**5*d**20) - 30*b*c**2*d**(31/2)*x**4*sqrt(c*x**2/d + 1
)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2
 + 315*c**4*d**12) + 128*b*c*d**(51/2)*sqrt(c*x**2/d + 1)/(3465*c
**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 +
13860*c**6*d**19*x**2 + 3465*c**5*d**20) - 40*b*c*d**(33/2)*x**2*
sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 94
5*c**5*d**11*x**2 + 315*c**4*d**12) - 16*b*d**(35/2)*sqrt(c*x**2/
d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11
*x**2 + 315*c**4*d**12)
```

GIAC/XCAS [A] time = 0.237939, size = 440, normalized size = 2.93

$$\frac{143\left(35\left(cx^2+d\right)^{\frac{9}{2}}-135\left(cx^2+d\right)^{\frac{7}{2}}d+189\left(cx^2+d\right)^{\frac{5}{2}}d^2-105\left(cx^2+d\right)^{\frac{3}{2}}d^3\right)bd\,\mathrm{sign}(x)}{c^3}+\frac{13\left(315\left(cx^2+d\right)^{\frac{11}{2}}-1540\left(cx^2+d\right)^{\frac{9}{2}}d+2970\left(cx^2+d\right)^{\frac{7}{2}}d^2-2772\left(cx^2+d\right)\right.}{c^3}$$

$$+\frac{16\left(13\,bcd^{\frac{11}{2}}-8\,ad^{\frac{13}{2}}\right)\mathrm{sign}\left(x\right)}{15015\,c^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^12,x, algorithm="giac")
```

```
[Out] 1/45045*(143*(35*(c*x^2 + d)^(9/2) - 135*(c*x^2 + d)^(7/2)*d + 18
9*(c*x^2 + d)^(5/2)*d^2 - 105*(c*x^2 + d)^(3/2)*d^3)*b*d*sign(x)/
c^3 + 13*(315*(c*x^2 + d)^(11/2) - 1540*(c*x^2 + d)^(9/2)*d + 297
0*(c*x^2 + d)^(7/2)*d^2 - 2772*(c*x^2 + d)^(5/2)*d^3 + 1155*(c*x^
2 + d)^(3/2)*d^4)*b*sign(x)/c^3 + 13*(315*(c*x^2 + d)^(11/2) - 15
40*(c*x^2 + d)^(9/2)*d + 2970*(c*x^2 + d)^(7/2)*d^2 - 2772*(c*x^2
 + d)^(5/2)*d^3 + 1155*(c*x^2 + d)^(3/2)*d^4)*a*d*sign(x)/c^4 + 5
*(693*(c*x^2 + d)^(13/2) - 4095*(c*x^2 + d)^(11/2)*d + 10010*(c*x
^2 + d)^(9/2)*d^2 - 12870*(c*x^2 + d)^(7/2)*d^3 + 9009*(c*x^2 + d
)^(5/2)*d^4 - 3003*(c*x^2 + d)^(3/2)*d^5)*a*sign(x)/c^4)/c + 16/1
5015*(13*b*c*d^(11/2) - 8*a*d^(13/2))*sign(x)/c^5
```

3.785 $\int \left(a+\frac{b}{x^2}\right) \left(c+\frac{d}{x^2}\right)^{3/2} x^{10}\,dx$

Optimal. Leaf size=117

$$\frac{8d^2x^5\left(c+\frac{d}{x^2}\right)^{5/2}(11bc-6ad)}{3465c^4}-\frac{4dx^7\left(c+\frac{d}{x^2}\right)^{5/2}(11bc-6ad)}{693c^3}+\frac{x^9\left(c+\frac{d}{x^2}\right)^{5/2}(11bc-6ad)}{99c^2}+\frac{ax^{11}\left(c+\frac{d}{x^2}\right)^{5/2}}{11c}$$

```
[Out] (8*d^2*(11*b*c - 6*a*d)*(c + d/x^2)^(5/2)*x^5)/(3465*c^4) - (4*d*
(11*b*c - 6*a*d)*(c + d/x^2)^(5/2)*x^7)/(693*c^3) + ((11*b*c - 6*
a*d)*(c + d/x^2)^(5/2)*x^9)/(99*c^2) + (a*(c + d/x^2)^(5/2)*x^11)
/(11*c)
```

Rubi [A] time = 0.204545, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{8d^2x^5\left(c+\frac{d}{x^2}\right)^{5/2}(11bc-6ad)}{3465c^4}-\frac{4dx^7\left(c+\frac{d}{x^2}\right)^{5/2}(11bc-6ad)}{693c^3}+\frac{x^9\left(c+\frac{d}{x^2}\right)^{5/2}(11bc-6ad)}{99c^2}+\frac{ax^{11}\left(c+\frac{d}{x^2}\right)^{5/2}}{11c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x^10,x]
```

```
[Out] (8*d^2*(11*b*c - 6*a*d)*(c + d/x^2)^(5/2)*x^5)/(3465*c^4) - (4*d*
(11*b*c - 6*a*d)*(c + d/x^2)^(5/2)*x^7)/(693*c^3) + ((11*b*c - 6*
a*d)*(c + d/x^2)^(5/2)*x^9)/(99*c^2) + (a*(c + d/x^2)^(5/2)*x^11)
/(11*c)
```

Rubi in Sympy [A] time = 14.9209, size = 112, normalized size = 0.96

$$\frac{ax^{11}\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{11c}-\frac{x^9\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(6ad-11bc)}{99c^2}+\frac{4dx^7\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(6ad-11bc)}{693c^3}-\frac{8d^2x^5\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(6ad-11bc)}{3465c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**10,x)
```

```
[Out] a*x**11*(c + d/x**2)**(5/2)/(11*c) - x**9*(c + d/x**2)**(5/2)*(6*
a*d - 11*b*c)/(99*c**2) + 4*d*x**7*(c + d/x**2)**(5/2)*(6*a*d - 1
1*b*c)/(693*c**3) - 8*d**2*x**5*(c + d/x**2)**(5/2)*(6*a*d - 11*b
*c)/(3465*c**4)
```

Mathematica [A] time = 0.0859084, size = 89, normalized size = 0.76

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)^2\left(3a\left(105c^3x^6-70c^2dx^4+40cd^2x^2-16d^3\right)+11bc\left(35c^2x^4-20cdx^2+8d^2\right)\right)}{3465c^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x^10,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(d + c*x^2)^2*(11*b*c*(8*d^2 - 20*c*d*x^2 + 35
*c^2*x^4) + 3*a*(-16*d^3 + 40*c*d^2*x^2 - 70*c^2*d*x^4 + 105*c^3*
x^6)))/(3465*c^4)
```

Maple [A] time = 0.011, size = 91, normalized size = 0.8

$$\frac{x^{3}\left(315\,a x^{6} c^{3}-210\,a c^{2} d x^{4}+385\,b c^{3} x^{4}+120\,a c d^{2} x^{2}-220\,b c^{2} d x^{2}-48\,a d^{3}+88\,b c d^{2}\right)\left(c x^{2}+d\right)}{3465\,c^{4}}\left(\frac{c x^{2}+d}{x^{2}}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x^10,x)
```

```
[Out] 1/3465*((c*x^2+d)/x^2)^(3/2)*x^3*(315*a*c^3*x^6-210*a*c^2*d*x^4+3
85*b*c^3*x^4+120*a*c*d^2*x^2-220*b*c^2*d*x^2-48*a*d^3+88*b*c*d^2)
*(c*x^2+d)/c^4
```

Maxima [A] time = 1.39063, size = 167, normalized size = 1.43

$$\frac{\left(35\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}} x^{9}-90\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}} d x^{7}+63\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}} d^{2} x^{5}\right) b}{315\,c^{3}}+\frac{\left(105\left(c+\frac{d}{x^{2}}\right)^{\frac{11}{2}} x^{11}-385\left(c+\frac{d}{x^{2}}\right)^{\frac{9}{2}} d x^{9}+495\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}} d^{2} x^{7}-231\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}} d^{3} x^{5}\right) a}{1155\,c^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^10,x, algorithm="maxima")
```

```
[Out] 1/315*(35*(c + d/x^2)^(9/2)*x^9 - 90*(c + d/x^2)^(7/2)*d*x^7 + 63
*(c + d/x^2)^(5/2)*d^2*x^5)*b/c^3 + 1/1155*(105*(c + d/x^2)^(11/2
)*x^11 - 385*(c + d/x^2)^(9/2)*d*x^9 + 495*(c + d/x^2)^(7/2)*d^2*
x^7 - 231*(c + d/x^2)^(5/2)*d^3*x^5)*a/c^4
```

Fricas [A] time = 0.226516, size = 178, normalized size = 1.52

$$\frac{\left(315\,a c^{5} x^{11}+35\left(11\,b c^{5}+12\,a c^{4} d\right) x^{9}+5\left(110\,b c^{4} d+3\,a c^{3} d^{2}\right) x^{7}+3\left(11\,b c^{3} d^{2}-6\,a c^{2} d^{3}\right) x^{5}-4\left(11\,b c^{2} d^{3}-6\,a c d^{4}\right) x^{3}+8\,(}{3465\,c^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^10,x, algorithm="fricas")
```

```
[Out] 1/3465*(315*a*c^5*x^11 + 35*(11*b*c^5 + 12*a*c^4*d)*x^9 + 5*(110*
b*c^4*d + 3*a*c^3*d^2)*x^7 + 3*(11*b*c^3*d^2 - 6*a*c^2*d^3)*x^5 -
 4*(11*b*c^2*d^3 - 6*a*c*d^4)*x^3 + 8*(11*b*c*d^4 - 6*a*d^5)*x)*s
qrt((c*x^2 + d)/x^2)/c^4
```

Sympy [A] time = 26.1882, size = 2304, normalized size = 19.69

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**10,x)
```

```
[Out] 315*a*c**10*d**(33/2)*x**18*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x
**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*
d**19*x**2 + 3465*c**5*d**20) + 1295*a*c**9*d**(35/2)*x**16*sqrt(
c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 207
90*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 1
990*a*c**8*d**(37/2)*x**14*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x*
*8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d
**19*x**2 + 3465*c**5*d**20) + 1358*a*c**7*d**(39/2)*x**12*sqrt(c
*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 2079
0*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 35
*a*c**7*d**(21/2)*x**14*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 +
945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 343
*a*c**6*d**(41/2)*x**10*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8
+ 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**1
9*x**2 + 3465*c**5*d**20) + 110*a*c**6*d**(23/2)*x**12*sqrt(c*x**
2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**
11*x**2 + 315*c**4*d**12) + 35*a*c**5*d**(43/2)*x**8*sqrt(c*x**2/
d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7
*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) + 114*a*c*
*5*d**(25/2)*x**10*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c
**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 280*a*c*
*4*d**(45/2)*x**6*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 1386
0*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2
 + 3465*c**5*d**20) + 40*a*c**4*d**(27/2)*x**8*sqrt(c*x**2/d + 1)
/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2
+ 315*c**4*d**12) + 560*a*c**3*d**(47/2)*x**4*sqrt(c*x**2/d + 1)/
(3465*c**9*d**16*x**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*
x**4 + 13860*c**6*d**19*x**2 + 3465*c**5*d**20) - 5*a*c**3*d**(29
/2)*x**6*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*
x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 448*a*c**2*d**(49/
2)*x**2*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x**8 + 13860*c**8*d**
17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*d**19*x**2 + 3465*c*
*5*d**20) - 30*a*c**2*d**(31/2)*x**4*sqrt(c*x**2/d + 1)/(315*c**7
*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4
*d**12) + 128*a*c*d**(51/2)*sqrt(c*x**2/d + 1)/(3465*c**9*d**16*x
**8 + 13860*c**8*d**17*x**6 + 20790*c**7*d**18*x**4 + 13860*c**6*
d**19*x**2 + 3465*c**5*d**20) - 40*a*c*d**(33/2)*x**2*sqrt(c*x**2
/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**1
1*x**2 + 315*c**4*d**12) - 16*a*d**(35/2)*sqrt(c*x**2/d + 1)/(315
*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315
*c**4*d**12) + 35*b*c**8*d**(19/2)*x**14*sqrt(c*x**2/d + 1)/(315*
c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*
c**4*d**12) + 110*b*c**7*d**(21/2)*x**12*sqrt(c*x**2/d + 1)/(315*
c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*
c**4*d**12) + 114*b*c**6*d**(23/2)*x**10*sqrt(c*x**2/d + 1)/(315*
c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*
c**4*d**12) + 40*b*c**5*d**(25/2)*x**8*sqrt(c*x**2/d + 1)/(315*c*
*7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c*
*4*d**12) + 15*b*c**5*d**(11/2)*x**10*sqrt(c*x**2/d + 1)/(105*c**
5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) - 5*b*c**4*d**(
27/2)*x**6*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**1
0*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 33*b*c**4*d**(13
/2)*x**8*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x
**2 + 105*c**3*d**6) - 30*b*c**3*d**(29/2)*x**4*sqrt(c*x**2/d + 1
)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2
 + 315*c**4*d**12) + 17*b*c**3*d**(15/2)*x**6*sqrt(c*x**2/d + 1)/
(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) - 40*b*
c**2*d**(31/2)*x**2*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*
c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 3*b*c**
2*d**(17/2)*x**4*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**
4*d**5*x**2 + 105*c**3*d**6) - 16*b*c*d**(33/2)*sqrt(c*x**2/d + 1
)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2
 + 315*c**4*d**12) + 12*b*c*d**(19/2)*x**2*sqrt(c*x**2/d + 1)/(10
5*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 8*b*d**(
21/2)*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2
 + 105*c**3*d**6)
```

GIAC/XCAS [A] time = 0.219748, size = 363, normalized size = 3.1

$$\frac{\frac{33\left(15\left(cx^2+d\right)^{\frac{7}{2}}-42\left(cx^2+d\right)^{\frac{5}{2}}d+35\left(cx^2+d\right)^{\frac{3}{2}}d^2\right)bd\,\mathrm{sign}(x)}{c^2}+\frac{11\left(35\left(cx^2+d\right)^{\frac{9}{2}}-135\left(cx^2+d\right)^{\frac{7}{2}}d+189\left(cx^2+d\right)^{\frac{5}{2}}d^2-105\left(cx^2+d\right)^{\frac{3}{2}}d^3\right)b\,\mathrm{sign}(x)}{c^2}+\frac{11\left(35\left(c\right.\right.}{}}{}$$

$$-\frac{8\left(11\,bcd^{\frac{9}{2}}-6\,ad^{\frac{11}{2}}\right)\mathrm{sign}\left(x\right)}{3465\,c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^10,x, algorithm="giac")
```

```
[Out] 1/3465*(33*(15*(c*x^2 + d)^(7/2) - 42*(c*x^2 + d)^(5/2)*d + 35*(c
*x^2 + d)^(3/2)*d^2)*b*d*sign(x)/c^2 + 11*(35*(c*x^2 + d)^(9/2) -
 135*(c*x^2 + d)^(7/2)*d + 189*(c*x^2 + d)^(5/2)*d^2 - 105*(c*x^2
 + d)^(3/2)*d^3)*b*sign(x)/c^2 + 11*(35*(c*x^2 + d)^(9/2) - 135*(
c*x^2 + d)^(7/2)*d + 189*(c*x^2 + d)^(5/2)*d^2 - 105*(c*x^2 + d)^
(3/2)*d^3)*a*d*sign(x)/c^3 + (315*(c*x^2 + d)^(11/2) - 1540*(c*x^
2 + d)^(9/2)*d + 2970*(c*x^2 + d)^(7/2)*d^2 - 2772*(c*x^2 + d)^(5
/2)*d^3 + 1155*(c*x^2 + d)^(3/2)*d^4)*a*sign(x)/c^3)/c - 8/3465*(
11*b*c*d^(9/2) - 6*a*d^(11/2))*sign(x)/c^4
```

3.786 $\int \left(a+\frac{b}{x^2}\right) \left(c+\frac{d}{x^2}\right)^{3/2} x^8 \, dx$

Optimal. Leaf size=84

$$-\frac{2dx^5\left(c+\frac{d}{x^2}\right)^{5/2}(9bc-4ad)}{315c^3}+\frac{x^7\left(c+\frac{d}{x^2}\right)^{5/2}(9bc-4ad)}{63c^2}+\frac{ax^9\left(c+\frac{d}{x^2}\right)^{5/2}}{9c}$$

```
[Out] (-2*d*(9*b*c - 4*a*d)*(c + d/x^2)^(5/2)*x^5)/(315*c^3) + ((9*b*c
- 4*a*d)*(c + d/x^2)^(5/2)*x^7)/(63*c^2) + (a*(c + d/x^2)^(5/2)*x
^9)/(9*c)
```

Rubi [A] time = 0.155344, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{2dx^5\left(c+\frac{d}{x^2}\right)^{5/2}(9bc-4ad)}{315c^3}+\frac{x^7\left(c+\frac{d}{x^2}\right)^{5/2}(9bc-4ad)}{63c^2}+\frac{ax^9\left(c+\frac{d}{x^2}\right)^{5/2}}{9c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x^8,x]
```

```
[Out] (-2*d*(9*b*c - 4*a*d)*(c + d/x^2)^(5/2)*x^5)/(315*c^3) + ((9*b*c
- 4*a*d)*(c + d/x^2)^(5/2)*x^7)/(63*c^2) + (a*(c + d/x^2)^(5/2)*x
^9)/(9*c)
```

Rubi in Sympy [A] time = 10.9749, size = 78, normalized size = 0.93

$$\frac{ax^9\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{9c}-\frac{x^7\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(4ad-9bc)}{63c^2}+\frac{2dx^5\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(4ad-9bc)}{315c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**8,x)
```

```
[Out] a*x**9*(c + d/x**2)**(5/2)/(9*c) - x**7*(c + d/x**2)**(5/2)*(4*a*
d - 9*b*c)/(63*c**2) + 2*d*x**5*(c + d/x**2)**(5/2)*(4*a*d - 9*b*
c)/(315*c**3)
```

Mathematica [A] time = 0.0701137, size = 66, normalized size = 0.79

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)^2\left(a\left(35c^2x^4-20cdx^2+8d^2\right)+9bc\left(5cx^2-2d\right)\right)}{315c^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x^8,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(d + c*x^2)^2*(9*b*c*(-2*d + 5*c*x^2) + a*(8*d
^2 - 20*c*d*x^2 + 35*c^2*x^4)))/(315*c^3)
```

Maple [A] time = 0.011, size = 67, normalized size = 0.8

$$\frac{x^3 \left(35\, a x^4 c^2 - 20\, a c d x^2 + 45\, b c^2 x^2 + 8\, a d^2 - 18\, b c d\right) \left(c x^2 + d\right)}{315\, c^3} \left(\frac{c x^2 + d}{x^2}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x^8,x)
```

```
[Out] 1/315*((c*x^2+d)/x^2)^(3/2)*x^3*(35*a*c^2*x^4-20*a*c*d*x^2+45*b*c
^2*x^2+8*a*d^2-18*b*c*d)*(c*x^2+d)/c^3
```

Maxima [A] time = 1.39321, size = 122, normalized size = 1.45

$$\frac{\left(5 \left(c + \frac{d}{x^2}\right)^{\frac{7}{2}} x^7 - 7 \left(c + \frac{d}{x^2}\right)^{\frac{5}{2}} d x^5\right) b}{35\, c^2} + \frac{\left(35 \left(c + \frac{d}{x^2}\right)^{\frac{9}{2}} x^9 - 90 \left(c + \frac{d}{x^2}\right)^{\frac{7}{2}} d x^7 + 63 \left(c + \frac{d}{x^2}\right)^{\frac{5}{2}} d^2 x^5\right) a}{315\, c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^8,x, algorithm="maxima")
```

```
[Out] 1/35*(5*(c + d/x^2)^(7/2)*x^7 - 7*(c + d/x^2)^(5/2)*d*x^5)*b/c^2
+ 1/315*(35*(c + d/x^2)^(9/2)*x^9 - 90*(c + d/x^2)^(7/2)*d*x^7 +
63*(c + d/x^2)^(5/2)*d^2*x^5)*a/c^3
```

Fricas [A] time = 0.225214, size = 143, normalized size = 1.7

$$\frac{\left(35\, a c^4 x^9 + 5 \left(9\, b c^4 + 10\, a c^3 d\right) x^7 + 3 \left(24\, b c^3 d + a c^2 d^2\right) x^5 + \left(9\, b c^2 d^2 - 4\, a c d^3\right) x^3 - 2 \left(9\, b c d^3 - 4\, a d^4\right) x\right) \sqrt{\frac{c x^2 + d}{x^2}}}{315\, c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^8,x, algorithm="fricas")
```

```
[Out] 1/315*(35*a*c^4*x^9 + 5*(9*b*c^4 + 10*a*c^3*d)*x^7 + 3*(24*b*c^3*
d + a*c^2*d^2)*x^5 + (9*b*c^2*d^2 - 4*a*c*d^3)*x^3 - 2*(9*b*c*d^3
 - 4*a*d^4)*x)*sqrt((c*x^2 + d)/x^2)/c^3
```

Sympy [A] time = 17.4011, size = 1340, normalized size = 15.95

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**8,x)
```

```
[Out] 35*a*c**8*d**(19/2)*x**14*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6
+ 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 1
10*a*c**7*d**(21/2)*x**12*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6
+ 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 1
14*a*c**6*d**(23/2)*x**10*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6
+ 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 4
0*a*c**5*d**(25/2)*x**8*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 +
945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 15*
a*c**5*d**(11/2)*x**10*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 2
```

```
10*c**4*d**5*x**2 + 105*c**3*d**6) - 5*a*c**4*d**(27/2)*x**6*sqrt
(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4 + 945*c*
*5*d**11*x**2 + 315*c**4*d**12) + 33*a*c**4*d**(13/2)*x**8*sqrt(c
*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*
d**6) - 30*a*c**3*d**(29/2)*x**4*sqrt(c*x**2/d + 1)/(315*c**7*d**
9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**
12) + 17*a*c**3*d**(15/2)*x**6*sqrt(c*x**2/d + 1)/(105*c**5*d**4*
x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) - 40*a*c**2*d**(31/2)*
x**2*sqrt(c*x**2/d + 1)/(315*c**7*d**9*x**6 + 945*c**6*d**10*x**4
 + 945*c**5*d**11*x**2 + 315*c**4*d**12) + 3*a*c**2*d**(17/2)*x**
4*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 1
05*c**3*d**6) - 16*a*c*d**(33/2)*sqrt(c*x**2/d + 1)/(315*c**7*d**
9*x**6 + 945*c**6*d**10*x**4 + 945*c**5*d**11*x**2 + 315*c**4*d**
12) + 12*a*c*d**(19/2)*x**2*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**
4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 8*a*d**(21/2)*sqrt(c*x*
*2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**
6) + 15*b*c**6*d**(9/2)*x**10*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x
**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 33*b*c**5*d**(11/2)*x
**8*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 +
 105*c**3*d**6) + 17*b*c**4*d**(13/2)*x**6*sqrt(c*x**2/d + 1)/(10
5*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 3*b*c**3
*d**(15/2)*x**4*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4
*d**5*x**2 + 105*c**3*d**6) + 12*b*c**2*d**(17/2)*x**2*sqrt(c*x**
2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6
) + 8*b*c*d**(19/2)*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*
c**4*d**5*x**2 + 105*c**3*d**6) + b*d**(3/2)*x**4*sqrt(c*x**2/d +
 1)/5 + b*d**(5/2)*x**2*sqrt(c*x**2/d + 1)/(15*c) - 2*b*d**(7/2)*
sqrt(c*x**2/d + 1)/(15*c**2)
```

GIAC/XCAS [A] time = 0.218895, size = 288, normalized size = 3.43

$$\frac{\frac{21\left(3\left(cx^2+d\right)^{\frac{5}{2}}-5\left(cx^2+d\right)^{\frac{3}{2}}d\right)bd\mathrm{sign}(x)}{c}+\frac{3\left(15\left(cx^2+d\right)^{\frac{7}{2}}-42\left(cx^2+d\right)^{\frac{5}{2}}d+35\left(cx^2+d\right)^{\frac{3}{2}}d^2\right)b\mathrm{sign}(x)}{c}+\frac{3\left(15\left(cx^2+d\right)^{\frac{7}{2}}-42\left(cx^2+d\right)^{\frac{5}{2}}d+35\left(cx^2+d\right)^{\frac{3}{2}}d^2\right)}{c^2}}{315\,c}$$
$$+\frac{2\left(9\,bcd^{\frac{7}{2}}-4\,ad^{\frac{9}{2}}\right)\mathrm{sign}\left(x\right)}{315\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^8,x, algorithm="giac")
```

```
[Out] 1/315*(21*(3*(c*x^2 + d)^(5/2) - 5*(c*x^2 + d)^(3/2)*d)*b*d*sign(
x)/c + 3*(15*(c*x^2 + d)^(7/2) - 42*(c*x^2 + d)^(5/2)*d + 35*(c*x
^2 + d)^(3/2)*d^2)*b*sign(x)/c + 3*(15*(c*x^2 + d)^(7/2) - 42*(c*
x^2 + d)^(5/2)*d + 35*(c*x^2 + d)^(3/2)*d^2)*a*d*sign(x)/c^2 + (3
5*(c*x^2 + d)^(9/2) - 135*(c*x^2 + d)^(7/2)*d + 189*(c*x^2 + d)^(
5/2)*d^2 - 105*(c*x^2 + d)^(3/2)*d^3)*a*sign(x)/c^2)/c + 2/315*(9
*b*c*d^(7/2) - 4*a*d^(9/2))*sign(x)/c^3
```

3.787 $\int \left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2} x^6\,dx$

Optimal. Leaf size=53

$$\frac{x^5\left(c+\frac{d}{x^2}\right)^{5/2}(7bc-2ad)}{35c^2}+\frac{ax^7\left(c+\frac{d}{x^2}\right)^{5/2}}{7c}$$

```
[Out] ((7*b*c - 2*a*d)*(c + d/x^2)^(5/2)*x^5)/(35*c^2) + (a*(c + d/x^2)
^(5/2)*x^7)/(7*c)
```

Rubi [A] time = 0.103252, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{x^5\left(c+\frac{d}{x^2}\right)^{5/2}(7bc-2ad)}{35c^2}+\frac{ax^7\left(c+\frac{d}{x^2}\right)^{5/2}}{7c}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x^6,x]
```

```
[Out] ((7*b*c - 2*a*d)*(c + d/x^2)^(5/2)*x^5)/(35*c^2) + (a*(c + d/x^2)
^(5/2)*x^7)/(7*c)
```

Rubi in Sympy [A] time = 8.2219, size = 46, normalized size = 0.87

$$\frac{ax^7\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{7c}-\frac{x^5\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(2ad-7bc)}{35c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**6,x)
```

```
[Out] a*x**7*(c + d/x**2)**(5/2)/(7*c) - x**5*(c + d/x**2)**(5/2)*(2*a*
d - 7*b*c)/(35*c**2)
```

Mathematica [A] time = 0.0485513, size = 44, normalized size = 0.83

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(cx^2+d\right)^2\left(5acx^2-2ad+7bc\right)}{35c^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x^6,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(d + c*x^2)^2*(7*b*c - 2*a*d + 5*a*c*x^2))/(35
*c^2)
```

Maple [A] time = 0.008, size = 45, normalized size = 0.9

$$\frac{x^3\left(5\,ax^2c-2\,ad+7\,bc\right)\left(cx^2+d\right)}{35\,c^2}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x^6,x)
```

```
[Out] 1/35*((c*x^2+d)/x^2)^(3/2)*x^3*(5*a*c*x^2-2*a*d+7*b*c)*(c*x^2+d)/
c^2
```

Maxima [A] time = 1.44227, size = 74, normalized size = 1.4

$$\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}x^5}{5\,c}+\frac{\left(5\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}x^7-7\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}dx^5\right)a}{35\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^6,x, algorithm="maxima")
```

```
[Out] 1/5*b*(c + d/x^2)^(5/2)*x^5/c + 1/35*(5*(c + d/x^2)^(7/2)*x^7 - 7
*(c + d/x^2)^(5/2)*d*x^5)*a/c^2
```

Fricas [A] time = 0.222626, size = 108, normalized size = 2.04

$$\frac{\left(5\,ac^3x^7+\left(7\,bc^3+8\,ac^2d\right)x^5+\left(14\,bc^2d+acd^2\right)x^3+\left(7\,bcd^2-2\,ad^3\right)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{35\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^6,x, algorithm="fricas")
```

```
[Out] 1/35*(5*a*c^3*x^7 + (7*b*c^3 + 8*a*c^2*d)*x^5 + (14*b*c^2*d + a*c
*d^2)*x^3 + (7*b*c*d^2 - 2*a*d^3)*x)*sqrt((c*x^2 + d)/x^2)/c^2
```

Sympy [A] time = 11.1271, size = 498, normalized size = 9.4

$$\frac{15ac^6d^{\frac{9}{2}}x^{10}\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{33ac^5d^{\frac{11}{2}}x^8\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{17ac^4d^{\frac{13}{2}}x^6\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{3ac^3d^{\frac{15}{2}}x^4\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{12ac^2d^{\frac{17}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{8acd^{\frac{19}{2}}\sqrt{\frac{cx^2}{d}+1}}{105c^5d^4x^4+210c^4d^5x^2+105c^3d^6}+\frac{ad^{\frac{3}{2}}x^4\sqrt{\frac{cx^2}{d}+1}}{5}+\frac{ad^{\frac{5}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{15c}-\frac{2ad^{\frac{7}{2}}\sqrt{\frac{cx^2}{d}+1}}{15c^2}+\frac{bc\sqrt{d}x^4\sqrt{\frac{cx^2}{d}+1}}{5}+\frac{2bd^{\frac{3}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{5}+\frac{bd^{\frac{5}{2}}\sqrt{\frac{cx^2}{d}+1}}{5c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**6,x)
```

```
[Out] 15*a*c**6*d**(9/2)*x**10*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 +
 210*c**4*d**5*x**2 + 105*c**3*d**6) + 33*a*c**5*d**(11/2)*x**8*s
qrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*
c**3*d**6) + 17*a*c**4*d**(13/2)*x**6*sqrt(c*x**2/d + 1)/(105*c**
5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 3*a*c**3*d**(
15/2)*x**4*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5
*x**2 + 105*c**3*d**6) + 12*a*c**2*d**(17/2)*x**2*sqrt(c*x**2/d +
```

```
 1)/(105*c**5*d**4*x**4 + 210*c**4*d**5*x**2 + 105*c**3*d**6) + 8
*a*c*d**(19/2)*sqrt(c*x**2/d + 1)/(105*c**5*d**4*x**4 + 210*c**4*
d**5*x**2 + 105*c**3*d**6) + a*d**(3/2)*x**4*sqrt(c*x**2/d + 1)/5
 + a*d**(5/2)*x**2*sqrt(c*x**2/d + 1)/(15*c) - 2*a*d**(7/2)*sqrt(
c*x**2/d + 1)/(15*c**2) + b*c*sqrt(d)*x**4*sqrt(c*x**2/d + 1)/5 +
 2*b*d**(3/2)*x**2*sqrt(c*x**2/d + 1)/5 + b*d**(5/2)*sqrt(c*x**2/
d + 1)/(5*c)
```

GIAC/XCAS [A] time = 0.215442, size = 203, normalized size = 3.83

$$\frac{35\left(cx^2+d\right)^{\frac{3}{2}}bd\mathrm{sign}\left(x\right)+7\left(3\left(cx^2+d\right)^{\frac{5}{2}}-5\left(cx^2+d\right)^{\frac{3}{2}}d\right)b\mathrm{sign}\left(x\right)+\frac{7\left(3\left(cx^2+d\right)^{\frac{5}{2}}-5\left(cx^2+d\right)^{\frac{3}{2}}d\right)ad\mathrm{sign}(x)}{c}+\frac{\left(15\left(cx^2+d\right)^{\frac{7}{2}}-42\left(cx\right.\right.}{}}{105\,c}$$

$$-\frac{\left(7\,bcd^{\frac{5}{2}}-2\,ad^{\frac{7}{2}}\right)\mathrm{sign}\left(x\right)}{35\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^6,x, algorithm="giac")
```

```
[Out] 1/105*(35*(c*x^2 + d)^(3/2)*b*d*sign(x) + 7*(3*(c*x^2 + d)^(5/2)
- 5*(c*x^2 + d)^(3/2)*d)*b*sign(x) + 7*(3*(c*x^2 + d)^(5/2) - 5*(
c*x^2 + d)^(3/2)*d)*a*d*sign(x)/c + (15*(c*x^2 + d)^(7/2) - 42*(c
*x^2 + d)^(5/2)*d + 35*(c*x^2 + d)^(3/2)*d^2)*a*sign(x)/c)/c - 1/
35*(7*b*c*d^(5/2) - 2*a*d^(7/2))*sign(x)/c^2
```

3.788 $\int \left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2} x^4\,dx$

Optimal. Leaf size=86

$$\frac{ax^5\left(c+\frac{d}{x^2}\right)^{5/2}}{5c}-bd^{3/2}\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)+bdx\sqrt{c+\frac{d}{x^2}}+\frac{1}{3}bx^3\left(c+\frac{d}{x^2}\right)^{3/2}$$

```
[Out] b*d*Sqrt[c + d/x^2]*x + (b*(c + d/x^2)^(3/2)*x^3)/3 + (a*(c + d/x
^2)^(5/2)*x^5)/(5*c) - b*d^(3/2)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]
*x)]
```

Rubi [A] time = 0.177461, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{ax^5\left(c+\frac{d}{x^2}\right)^{5/2}}{5c}-bd^{3/2}\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)+bdx\sqrt{c+\frac{d}{x^2}}+\frac{1}{3}bx^3\left(c+\frac{d}{x^2}\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x^4,x]
```

```
[Out] b*d*Sqrt[c + d/x^2]*x + (b*(c + d/x^2)^(3/2)*x^3)/3 + (a*(c + d/x
^2)^(5/2)*x^5)/(5*c) - b*d^(3/2)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]
*x)]
```

Rubi in Sympy [A] time = 15.7138, size = 75, normalized size = 0.87

$$\frac{ax^5\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5c}-bd^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)+bdx\sqrt{c+\frac{d}{x^2}}+\frac{bx^3\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**4,x)
```

```
[Out] a*x**5*(c + d/x**2)**(5/2)/(5*c) - b*d**(3/2)*atanh(sqrt(d)/(x*sq
rt(c + d/x**2))) + b*d*x*sqrt(c + d/x**2) + b*x**3*(c + d/x**2)**
(3/2)/3
```

Mathematica [A] time = 0.202274, size = 109, normalized size = 1.27

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(\sqrt{cx^2+d}\left(3a\left(cx^2+d\right)^2+5bc\left(cx^2+4d\right)\right)-15bcd^{3/2}\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)+15bcd^{3/2}\log(x)\right)}{15c\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x^4,x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(Sqrt[d + c*x^2]*(3*a*(d + c*x^2)^2 + 5*b*c*(4
*d + c*x^2)) + 15*b*c*d^(3/2)*Log[x] - 15*b*c*d^(3/2)*Log[d + Sqr
t[d]*Sqrt[d + c*x^2]]))/(15*c*Sqrt[d + c*x^2])
```

Maple [A] time = 0.015, size = 99, normalized size = 1.2

$$-\frac{x^3}{15\,c}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(15\,bd^{3/2}\ln\left(2\,\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)c-3\,a\left(cx^2+d\right)^{5/2}-5\,b\left(cx^2+d\right)^{3/2}c-15\,b\sqrt{cx^2+d}\,dc\right)\left(cx^2+d\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x^4,x)
```

```
[Out] -1/15*((c*x^2+d)/x^2)^(3/2)*x^3*(15*b*d^(3/2)*ln(2*(d^(1/2)*(c*x^
2+d)^(1/2)+d)/x)*c-3*a*(c*x^2+d)^(5/2)-5*b*(c*x^2+d)^(3/2)*c-15*b
*(c*x^2+d)^(1/2)*d*c)/(c*x^2+d)^(3/2)/c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.236264, size = 1, normalized size = 0.01

$$\left[\frac{15\,bcd^{\frac{3}{2}}\log\left(-\frac{cx^2-2\,\sqrt{d}x\sqrt{\frac{cx^2+d}{x^2}}+2\,d}{x^2}\right)+2\left(3\,ac^2x^5+\left(5\,bc^2+6\,acd\right)x^3+\left(20\,bcd+3\,ad^2\right)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{30\,c},\right.$$
$$\left.-\frac{15\,bc\sqrt{-d}d\arctan\left(\frac{d}{\sqrt{-d}x\sqrt{\frac{cx^2+d}{x^2}}}\right)-\left(3\,ac^2x^5+\left(5\,bc^2+6\,acd\right)x^3+\left(20\,bcd+3\,ad^2\right)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{15\,c}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^4,x, algorithm="fricas")
```

```
[Out] [1/30*(15*b*c*d^(3/2)*log(-(c*x^2 - 2*sqrt(d)*x*sqrt((c*x^2 + d)/
x^2) + 2*d)/x^2) + 2*(3*a*c^2*x^5 + (5*b*c^2 + 6*a*c*d)*x^3 + (20
*b*c*d + 3*a*d^2)*x)*sqrt((c*x^2 + d)/x^2))/c, -1/15*(15*b*c*sqrt
(-d)*d*arctan(d/(sqrt(-d)*x*sqrt((c*x^2 + d)/x^2))) - (3*a*c^2*x^
5 + (5*b*c^2 + 6*a*c*d)*x^3 + (20*b*c*d + 3*a*d^2)*x)*sqrt((c*x^2
 + d)/x^2))/c]
```

Sympy [A] time = 8.6311, size = 184, normalized size = 2.14

$$\frac{ac\sqrt{d}x^4\sqrt{\frac{cx^2}{d}+1}}{5}+\frac{2ad^{\frac{3}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{5}+\frac{ad^{\frac{5}{2}}\sqrt{\frac{cx^2}{d}+1}}{5c}+\frac{b\sqrt{c}dx}{\sqrt{1+\frac{d}{cx^2}}}$$
$$+\frac{bc\sqrt{d}x^2\sqrt{\frac{cx^2}{d}+1}}{3}+\frac{bd^{\frac{3}{2}}\sqrt{\frac{cx^2}{d}+1}}{3}-bd^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)+\frac{bd^2}{\sqrt{c}x\sqrt{1+\frac{d}{cx^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**4,x)
```

```
[Out] a*c*sqrt(d)*x**4*sqrt(c*x**2/d + 1)/5 + 2*a*d**(3/2)*x**2*sqrt(c*
x**2/d + 1)/5 + a*d**(5/2)*sqrt(c*x**2/d + 1)/(5*c) + b*sqrt(c)*d
*x/sqrt(1 + d/(c*x**2)) + b*c*sqrt(d)*x**2*sqrt(c*x**2/d + 1)/3 +
 b*d**(3/2)*sqrt(c*x**2/d + 1)/3 - b*d**(3/2)*asinh(sqrt(d)/(sqrt
(c)*x)) + b*d**2/(sqrt(c)*x*sqrt(1 + d/(c*x**2)))
```

GIAC/XCAS [A] time = 0.218334, size = 189, normalized size = 2.2

$$\frac{bd^2\arctan\left(\frac{\sqrt{cx^2+d}}{\sqrt{-d}}\right)\operatorname{sign}(x)}{\sqrt{-d}}-\frac{\left(15\,bcd^2\arctan\left(\frac{\sqrt{d}}{\sqrt{-d}}\right)+20\,bc\sqrt{-d}d^{\frac{3}{2}}+3\,a\sqrt{-d}d^{\frac{5}{2}}\right)\operatorname{sign}(x)}{15\,c\sqrt{-d}}+\frac{3\left(cx^2+d\right)^{\frac{5}{2}}ac^4\operatorname{sign}(x)+5\left(cx^2+d\right)^{\frac{3}{2}}bc^5\operatorname{sign}(x)+15\sqrt{cx^2+d}bc^5d\operatorname{sign}(x)}{15\,c^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^4,x, algorithm="giac")
```

```
[Out] b*d^2*arctan(sqrt(c*x^2 + d)/sqrt(-d))*sign(x)/sqrt(-d) - 1/15*(1
5*b*c*d^2*arctan(sqrt(d)/sqrt(-d)) + 20*b*c*sqrt(-d)*d^(3/2) + 3*
a*sqrt(-d)*d^(5/2))*sign(x)/(c*sqrt(-d)) + 1/15*(3*(c*x^2 + d)^(5
/2)*a*c^4*sign(x) + 5*(c*x^2 + d)^(3/2)*b*c^5*sign(x) + 15*sqrt(c
*x^2 + d)*b*c^5*d*sign(x))/c^5
```

3.789 $\int \left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}x^2\,dx$

Optimal. Leaf size=121

$$\frac{x\left(c+\frac{d}{x^2}\right)^{3/2}(2ad+3bc)}{3c}-\frac{d\sqrt{c+\frac{d}{x^2}}(2ad+3bc)}{2cx}-\frac{1}{2}\sqrt{d}(2ad+3bc)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)+\frac{ax^3\left(c+\frac{d}{x^2}\right)^{5/2}}{3c}$$

```
[Out] -(d*(3*b*c + 2*a*d)*Sqrt[c + d/x^2])/(2*c*x) + ((3*b*c + 2*a*d)*(
c + d/x^2)^(3/2)*x)/(3*c) + (a*(c + d/x^2)^(5/2)*x^3)/(3*c) - (Sq
rt[d]*(3*b*c + 2*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/2
```

Rubi [A] time = 0.178709, antiderivative size = 121, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$\frac{x\left(c+\frac{d}{x^2}\right)^{3/2}(2ad+3bc)}{3c}-\frac{d\sqrt{c+\frac{d}{x^2}}(2ad+3bc)}{2cx}-\frac{1}{2}\sqrt{d}(2ad+3bc)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)+\frac{ax^3\left(c+\frac{d}{x^2}\right)^{5/2}}{3c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)*(c + d/x^2)^(3/2)*x^2,x]
```

```
[Out] -(d*(3*b*c + 2*a*d)*Sqrt[c + d/x^2])/(2*c*x) + ((3*b*c + 2*a*d)*(
c + d/x^2)^(3/2)*x)/(3*c) + (a*(c + d/x^2)^(5/2)*x^3)/(3*c) - (Sq
rt[d]*(3*b*c + 2*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/2
```

Rubi in Sympy [A] time = 14.8302, size = 105, normalized size = 0.87

$$\frac{ax^3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{3c}-\frac{\sqrt{d}\,(2ad+3bc)\,\operatorname{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2}-\frac{d\sqrt{c+\frac{d}{x^2}}\,(2ad+3bc)}{2cx}+\frac{x\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(2ad+3bc)}{3c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**2,x)
```

```
[Out] a*x**3*(c + d/x**2)**(5/2)/(3*c) - sqrt(d)*(2*a*d + 3*b*c)*atanh(
sqrt(d)/(x*sqrt(c + d/x**2)))/2 - d*sqrt(c + d/x**2)*(2*a*d + 3*b
*c)/(2*c*x) + x*(c + d/x**2)**(3/2)*(2*a*d + 3*b*c)/(3*c)
```

Mathematica [A] time = 0.173112, size = 128, normalized size = 1.06

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(3\sqrt{d}x^2\log(x)(2ad+3bc)-3\sqrt{d}x^2(2ad+3bc)\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)+\sqrt{cx^2+d}\left(2acx^4+8adx^2+6bcx^2-3bd\right)\right)}{6x\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)*(c + d/x^2)^(3/2)*x^2,x]
```

```
[Out] (Sqrt[c + d/x^2]*(Sqrt[d + c*x^2]*(-3*b*d + 6*b*c*x^2 + 8*a*d*x^2
 + 2*a*c*x^4) + 3*Sqrt[d]*(3*b*c + 2*a*d)*x^2*Log[x] - 3*Sqrt[d]*
(3*b*c + 2*a*d)*x^2*Log[d + Sqrt[d]*Sqrt[d + c*x^2]]))/(6*x*Sqrt[
```

```
d + c*x^2])
```

Maple [A] time = 0.018, size = 170, normalized size = 1.4

$$-\frac{x}{6\,d}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(6\,ad^{5/2}\ln\left(2\,\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)x^2+9\,d^{3/2}\ln\left(2\,\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)bcx^2-2\,a\left(cx^2+d\right)^{3/2}x^2d-3\,bc\,(cx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)*x^2,x)
```

```
[Out] -1/6*((c*x^2+d)/x^2)^(3/2)*x*(6*a*d^(5/2)*ln(2*(d^(1/2)*(c*x^2+d)
^(1/2)+d)/x)*x^2+9*d^(3/2)*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*b*
c*x^2-2*a*(c*x^2+d)^(3/2)*x^2*d-3*b*c*(c*x^2+d)^(3/2)*x^2+3*b*(c*
x^2+d)^(5/2)-6*a*(c*x^2+d)^(1/2)*d^2*x^2-9*b*c*(c*x^2+d)^(1/2)*x^
2*d)/(c*x^2+d)^(3/2)/d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.23976, size = 1, normalized size = 0.01

$$\left[\frac{3\,(3\,bc+2\,ad)\sqrt{d}x\log\left(-\frac{cx^2-2\,\sqrt{d}x\sqrt{\frac{cx^2+d}{x^2}}+2\,d}{x^2}\right)+2\,\left(2\,acx^4+2\,(3\,bc+4\,ad)x^2-3\,bd\right)\sqrt{\frac{cx^2+d}{x^2}}}{12\,x},\right.$$
$$\left.-\frac{3\,(3\,bc+2\,ad)\sqrt{-d}x\arctan\left(\frac{d}{\sqrt{-d}x\sqrt{\frac{cx^2+d}{x^2}}}\right)-\left(2\,acx^4+2\,(3\,bc+4\,ad)x^2-3\,bd\right)\sqrt{\frac{cx^2+d}{x^2}}}{6\,x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^2,x, algorithm="fricas")
```

```
[Out] [1/12*(3*(3*b*c + 2*a*d)*sqrt(d)*x*log(-(c*x^2 - 2*sqrt(d)*x*sqrt
((c*x^2 + d)/x^2) + 2*d)/x^2) + 2*(2*a*c*x^4 + 2*(3*b*c + 4*a*d)*
x^2 - 3*b*d)*sqrt((c*x^2 + d)/x^2))/x, -1/6*(3*(3*b*c + 2*a*d)*sq
rt(-d)*x*arctan(d/(sqrt(-d)*x*sqrt((c*x^2 + d)/x^2))) - (2*a*c*x^
4 + 2*(3*b*c + 4*a*d)*x^2 - 3*b*d)*sqrt((c*x^2 + d)/x^2))/x]
```

Sympy [A] time = 10.4421, size = 202, normalized size = 1.67

$$\frac{a\sqrt{c}dx}{\sqrt{1+\frac{d}{cx^2}}} + \frac{ac\sqrt{d}x^2\sqrt{\frac{cx^2}{d}+1}}{3} + \frac{ad^{\frac{3}{2}}\sqrt{\frac{cx^2}{d}+1}}{3} - ad^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right) + \frac{ad^2}{\sqrt{c}x\sqrt{1+\frac{d}{cx^2}}} + \frac{bc^{\frac{3}{2}}x}{\sqrt{1+\frac{d}{cx^2}}} - \frac{b\sqrt{c}d\sqrt{1+\frac{d}{cx^2}}}{2x} + \frac{b\sqrt{c}d}{x\sqrt{1+\frac{d}{cx^2}}} - \frac{3bc\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)*x**2,x)
```

```
[Out] a*sqrt(c)*d*x/sqrt(1 + d/(c*x**2)) + a*c*sqrt(d)*x**2*sqrt(c*x**2
/d + 1)/3 + a*d**(3/2)*sqrt(c*x**2/d + 1)/3 - a*d**(3/2)*asinh(sq
rt(d)/(sqrt(c)*x)) + a*d**2/(sqrt(c)*x*sqrt(1 + d/(c*x**2))) + b*
c**(3/2)*x/sqrt(1 + d/(c*x**2)) - b*sqrt(c)*d*sqrt(1 + d/(c*x**2)
)/(2*x) + b*sqrt(c)*d/(x*sqrt(1 + d/(c*x**2))) - 3*b*c*sqrt(d)*as
inh(sqrt(d)/(sqrt(c)*x))/2
```

GIAC/XCAS [A] time = 0.246426, size = 155, normalized size = 1.28

$$\frac{2\left(cx^2+d\right)^{\frac{3}{2}}ac\operatorname{sign}(x) + 6\sqrt{cx^2+d}\,bc^2\operatorname{sign}(x) + 6\sqrt{cx^2+d}\,acd\operatorname{sign}(x) - \frac{3\sqrt{cx^2+d}\,bcd\operatorname{sign}(x)}{x^2} + \frac{3\left(3\,bc^2d\operatorname{sign}(x)+2\,acd^2\operatorname{sign}(x)\right)\text{arcta}}{\sqrt{-d}}}{6\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)*x^2,x, algorithm="giac")
```

```
[Out] 1/6*(2*(c*x^2 + d)^(3/2)*a*c*sign(x) + 6*sqrt(c*x^2 + d)*b*c^2*si
gn(x) + 6*sqrt(c*x^2 + d)*a*c*d*sign(x) - 3*sqrt(c*x^2 + d)*b*c*d
*sign(x)/x^2 + 3*(3*b*c^2*d*sign(x) + 2*a*c*d^2*sign(x))*arctan(s
qrt(c*x^2 + d)/sqrt(-d))/sqrt(-d))/c
```

3.790 $\int \left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}\,dx$

Optimal. Leaf size=112

$$-\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(4ad+bc)}{4cx}-\frac{3\sqrt{c+\frac{d}{x^2}}(4ad+bc)}{8x}-\frac{3c(4ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8\sqrt{d}}+\frac{ax\left(c+\frac{d}{x^2}\right)^{5/2}}{c}$$

```
[Out] (-3*(b*c + 4*a*d)*Sqrt[c + d/x^2])/(8*x) - ((b*c + 4*a*d)*(c + d/
x^2)^(3/2))/(4*c*x) + (a*(c + d/x^2)^(5/2)*x)/c - (3*c*(b*c + 4*a
*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(8*Sqrt[d])
```

Rubi [A] time = 0.179567, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$-\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(4ad+bc)}{4cx}-\frac{3\sqrt{c+\frac{d}{x^2}}(4ad+bc)}{8x}-\frac{3c(4ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8\sqrt{d}}+\frac{ax\left(c+\frac{d}{x^2}\right)^{5/2}}{c}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b/x^2)*(c + d/x^2)^(3/2),x]
```

```
[Out] (-3*(b*c + 4*a*d)*Sqrt[c + d/x^2])/(8*x) - ((b*c + 4*a*d)*(c + d/
x^2)^(3/2))/(4*c*x) + (a*(c + d/x^2)^(5/2)*x)/c - (3*c*(b*c + 4*a
*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(8*Sqrt[d])
```

Rubi in Sympy [A] time = 16.356, size = 100, normalized size = 0.89

$$\frac{ax\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{c}-\frac{3c\,(4ad+bc)\,\mathrm{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8\sqrt{d}}-\frac{\sqrt{c+\frac{d}{x^2}}\left(\frac{3ad}{2}+\frac{3bc}{8}\right)}{x}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(4ad+bc)}{4cx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2),x)
```

```
[Out] a*x*(c + d/x**2)**(5/2)/c - 3*c*(4*a*d + b*c)*atanh(sqrt(d)/(x*sq
rt(c + d/x**2)))/(8*sqrt(d)) - sqrt(c + d/x**2)*(3*a*d/2 + 3*b*c/
8)/x - (c + d/x**2)**(3/2)*(4*a*d + b*c)/(4*c*x)
```

Mathematica [A] time = 0.194194, size = 129, normalized size = 1.15

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(3cx^4\log(x)(4ad+bc)-\sqrt{d}\sqrt{cx^2+d}\left(-8acx^4+4adx^2+5bcx^2+2bd\right)-3cx^4(4ad+bc)\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)\right)}{8\sqrt{d}x^3\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b/x^2)*(c + d/x^2)^(3/2),x]
```

```
[Out] (Sqrt[c + d/x^2]*(-(Sqrt[d]*Sqrt[d + c*x^2]*(2*b*d + 5*b*c*x^2 +
4*a*d*x^2 - 8*a*c*x^4)) + 3*c*(b*c + 4*a*d)*x^4*Log[x] - 3*c*(b*c
 + 4*a*d)*x^4*Log[d + Sqrt[d]*Sqrt[d + c*x^2]]))/(8*Sqrt[d]*x^3*S
```

```
qrt[d + c*x^2])
```

Maple [B] time = 0.019, size = 227, normalized size = 2.

$$\frac{1}{8\,x}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(12\,ac\sqrt{cx^2+d}x^4d^{5/2}+4\,ac\left(cx^2+d\right)^{3/2}x^4d^{3/2}-4\,a\left(cx^2+d\right)^{5/2}x^2d^{3/2}+3\,bc^2\sqrt{cx^2+d}x^4d^{3/2}+bc^2\left(cx^2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2),x)
```

```
[Out] 1/8*((c*x^2+d)/x^2)^(3/2)*(12*a*c*(c*x^2+d)^(1/2)*x^4*d^(5/2)+4*a
*c*(c*x^2+d)^(3/2)*x^4*d^(3/2)-4*a*(c*x^2+d)^(5/2)*x^2*d^(3/2)+3*
b*c^2*(c*x^2+d)^(1/2)*x^4*d^(3/2)+b*c^2*(c*x^2+d)^(3/2)*x^4*d^(1/
2)-b*c*(c*x^2+d)^(5/2)*x^2*d^(1/2)-12*a*c*ln(2*(d^(1/2)*(c*x^2+d)
^(1/2)+d)/x)*x^4*d^3-3*b*c^2*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*
x^4*d^2-2*b*(c*x^2+d)^(5/2)*d^(3/2))/x/(c*x^2+d)^(3/2)/d^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.23879, size = 1, normalized size = 0.01

$$\left[\frac{3\left(bc^2+4\,acd\right)\sqrt{d}x^3\log\left(\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}-\left(cx^2+2\,d\right)\sqrt{d}}{x^2}\right)+2\left(8\,acdx^4-2\,bd^2-\left(5\,bcd+4\,ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{16\,dx^3},\ \frac{3\left(bc^2+4\,acd\right)\sqrt{-d}x}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] [1/16*(3*(b*c^2 + 4*a*c*d)*sqrt(d)*x^3*log((2*d*x*sqrt((c*x^2 + d
)/x^2) - (c*x^2 + 2*d)*sqrt(d))/x^2) + 2*(8*a*c*d*x^4 - 2*b*d^2 -
 (5*b*c*d + 4*a*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(d*x^3), 1/8*(3*
(b*c^2 + 4*a*c*d)*sqrt(-d)*x^3*arctan(sqrt(-d)/(x*sqrt((c*x^2 + d
)/x^2))) + (8*a*c*d*x^4 - 2*b*d^2 - (5*b*c*d + 4*a*d^2)*x^2)*sqrt
((c*x^2 + d)/x^2))/(d*x^3)]
```

Sympy [A] time = 16.0014, size = 216, normalized size = 1.93

$$\frac{ac^{\frac{3}{2}}x}{\sqrt{1+\frac{d}{cx^2}}}-\frac{a\sqrt{c}d\sqrt{1+\frac{d}{cx^2}}}{2x}+\frac{a\sqrt{c}d}{x\sqrt{1+\frac{d}{cx^2}}}-\frac{3ac\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{2}-\frac{bc^{\frac{3}{2}}\sqrt{1+\frac{d}{cx^2}}}{2x}$$
$$-\frac{bc^{\frac{3}{2}}}{8x\sqrt{1+\frac{d}{cx^2}}}-\frac{3b\sqrt{c}d}{8x^3\sqrt{1+\frac{d}{cx^2}}}-\frac{3bc^2\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{8\sqrt{d}}-\frac{bd^2}{4\sqrt{c}x^5\sqrt{1+\frac{d}{cx^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2),x)
```

```
[Out] a*c**(3/2)*x/sqrt(1 + d/(c*x**2)) - a*sqrt(c)*d*sqrt(1 + d/(c*x**
2))/(2*x) + a*sqrt(c)*d/(x*sqrt(1 + d/(c*x**2))) - 3*a*c*sqrt(d)*
asinh(sqrt(d)/(sqrt(c)*x))/2 - b*c**(3/2)*sqrt(1 + d/(c*x**2))/(2
*x) - b*c**(3/2)/(8*x*sqrt(1 + d/(c*x**2))) - 3*b*sqrt(c)*d/(8*x*
*3*sqrt(1 + d/(c*x**2))) - 3*b*c**2*asinh(sqrt(d)/(sqrt(c)*x))/(8
*sqrt(d)) - b*d**2/(4*sqrt(c)*x**5*sqrt(1 + d/(c*x**2)))
```

GIAC/XCAS [A] time = 0.253282, size = 196, normalized size = 1.75

$$\frac{8\sqrt{cx^2+d}ac^2\operatorname{sign}(x) + \frac{3\left(bc^3\operatorname{sign}(x)+4ac^2d\operatorname{sign}(x)\right)\arctan\left(\frac{\sqrt{cx^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}} - \frac{5\left(cx^2+d\right)^{\frac{3}{2}}bc^3\operatorname{sign}(x)+4\left(cx^2+d\right)^{\frac{3}{2}}ac^2d\operatorname{sign}(x)-3\sqrt{cx^2+d}bc^3d\operatorname{sign}(x)-4\sqrt{\cdots}}{c^2x^4}}{8c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2),x, algorithm="giac")
```

```
[Out] 1/8*(8*sqrt(c*x^2 + d)*a*c^2*sign(x) + 3*(b*c^3*sign(x) + 4*a*c^2
*d*sign(x))*arctan(sqrt(c*x^2 + d)/sqrt(-d))/sqrt(-d) - (5*(c*x^2
 + d)^(3/2)*b*c^3*sign(x) + 4*(c*x^2 + d)^(3/2)*a*c^2*d*sign(x) -
 3*sqrt(c*x^2 + d)*b*c^3*d*sign(x) - 4*sqrt(c*x^2 + d)*a*c^2*d^2*
sign(x))/(c^2*x^4))/c
```

3.791 $\int \frac{\left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}}{x^2}\,dx$

Optimal. Leaf size=123

$$\frac{c^2(bc-6ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{16d^{3/2}}+\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(bc-6ad)}{24dx}+\frac{c\sqrt{c+\frac{d}{x^2}}(bc-6ad)}{16dx}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{6dx}$$

```
[Out] (c*(b*c - 6*a*d)*Sqrt[c + d/x^2])/(16*d*x) + ((b*c - 6*a*d)*(c +
d/x^2)^(3/2))/(24*d*x) - (b*(c + d/x^2)^(5/2))/(6*d*x) + (c^2*(b*
c - 6*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(16*d^(3/2))
```

Rubi [A] time = 0.19716, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{c^2(bc-6ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{16d^{3/2}}+\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(bc-6ad)}{24dx}+\frac{c\sqrt{c+\frac{d}{x^2}}(bc-6ad)}{16dx}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{6dx}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*(c + d/x^2)^(3/2))/x^2,x]
```

```
[Out] (c*(b*c - 6*a*d)*Sqrt[c + d/x^2])/(16*d*x) + ((b*c - 6*a*d)*(c +
d/x^2)^(3/2))/(24*d*x) - (b*(c + d/x^2)^(5/2))/(6*d*x) + (c^2*(b*
c - 6*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(16*d^(3/2))
```

Rubi in Sympy [A] time = 15.5839, size = 104, normalized size = 0.85

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{6dx}-\frac{c^2\left(6ad-bc\right)\operatorname{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{16d^{\frac{3}{2}}}-\frac{c\sqrt{c+\frac{d}{x^2}}\left(6ad-bc\right)}{16dx}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}\left(6ad-bc\right)}{24dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**2,x)
```

```
[Out] -b*(c + d/x**2)**(5/2)/(6*d*x) - c**2*(6*a*d - b*c)*atanh(sqrt(d)
/(x*sqrt(c + d/x**2)))/(16*d**(3/2)) - c*sqrt(c + d/x**2)*(6*a*d
- b*c)/(16*d*x) - (c + d/x**2)**(3/2)*(6*a*d - b*c)/(24*d*x)
```

Mathematica [A] time = 0.227799, size = 147, normalized size = 1.2

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(\sqrt{d}\sqrt{cx^2+d}\left(6adx^2\left(5cx^2+2d\right)+b\left(3c^2x^4+14cdx^2+8d^2\right)\right)+3c^2x^6\log(x)(bc-6ad)-3c^2x^6(bc-6ad)\log\left(\sqrt{\right.\right.}{48d^{3/2}x^5\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*(c + d/x^2)^(3/2))/x^2,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(Sqrt[d]*Sqrt[d + c*x^2]*(6*a*d*x^2*(2*d + 5*c*
x^2) + b*(8*d^2 + 14*c*d*x^2 + 3*c^2*x^4)) + 3*c^2*(b*c - 6*a*d)*
x^6*Log[x] - 3*c^2*(b*c - 6*a*d)*x^6*Log[d + Sqrt[d]*Sqrt[d + c*x
```

```
^2]]))/(48*d^(3/2)*x^5*Sqrt[d + c*x^2])
```

Maple [B] time = 0.024, size = 273, normalized size = 2.2

$$-\frac{1}{48 x^3}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(-6\,ac^2\left(cx^2+d\right)^{3/2}x^6d^{5/2}+bc^3\left(cx^2+d\right)^{\frac{3}{2}}x^6d^{\frac{3}{2}}+18\,ac^2\ln\left(2\,\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)x^6d^4+6\,ac\left(cx^2+d\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)/x^2,x)
```

```
[Out] -1/48*((c*x^2+d)/x^2)^(3/2)/x^3*(-6*a*c^2*(c*x^2+d)^(3/2)*x^6*d^(
5/2)+b*c^3*(c*x^2+d)^(3/2)*x^6*d^(3/2)+18*a*c^2*ln(2*(d^(1/2)*(c*
x^2+d)^(1/2)+d)/x)*x^6*d^4+6*a*c*(c*x^2+d)^(5/2)*x^4*d^(5/2)-b*c^
2*(c*x^2+d)^(5/2)*x^4*d^(3/2)-18*a*c^2*(c*x^2+d)^(1/2)*x^6*d^(7/2
)+3*b*c^3*(c*x^2+d)^(1/2)*x^6*d^(5/2)-3*b*c^3*ln(2*(d^(1/2)*(c*x^
2+d)^(1/2)+d)/x)*x^6*d^3+12*a*(c*x^2+d)^(5/2)*x^2*d^(7/2)-2*b*c*(
c*x^2+d)^(5/2)*x^2*d^(5/2)+8*b*(c*x^2+d)^(5/2)*d^(7/2))/(c*x^2+d)
^(3/2)/d^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.257574, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(bc^3-6\,ac^2d\right)\sqrt{d}x^5\log\left(\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}-\left(cx^2+2\,d\right)\sqrt{d}}{x^2}\right)+2\left(3\left(bc^2d+10\,acd^2\right)x^4+8\,bd^3+2\left(7\,bcd^2+6\,ad^3\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{96\,d^2x^5},\right.$$
$$\left.-\frac{3\left(bc^3-6\,ac^2d\right)\sqrt{-d}x^5\arctan\left(\frac{\sqrt{-d}}{x\sqrt{\frac{cx^2+d}{x^2}}}\right)+\left(3\left(bc^2d+10\,acd^2\right)x^4+8\,bd^3+2\left(7\,bcd^2+6\,ad^3\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{48\,d^2x^5}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^2,x, algorithm="fricas")
```

```
[Out] [-1/96*(3*(b*c^3 - 6*a*c^2*d)*sqrt(d)*x^5*log((2*d*x*sqrt((c*x^2
+ d)/x^2) - (c*x^2 + 2*d)*sqrt(d))/x^2) + 2*(3*(b*c^2*d + 10*a*c*
d^2)*x^4 + 8*b*d^3 + 2*(7*b*c*d^2 + 6*a*d^3)*x^2)*sqrt((c*x^2 + d
)/x^2))/(d^2*x^5), -1/48*(3*(b*c^3 - 6*a*c^2*d)*sqrt(-d)*x^5*arct
an(sqrt(-d)/(x*sqrt((c*x^2 + d)/x^2))) + (3*(b*c^2*d + 10*a*c*d^2
)*x^4 + 8*b*d^3 + 2*(7*b*c*d^2 + 6*a*d^3)*x^2)*sqrt((c*x^2 + d)/x
^2))/(d^2*x^5)]
```

Sympy [A] time = 26.2621, size = 253, normalized size = 2.06

$$-\frac{ac^{\frac{3}{2}}\sqrt{1+\frac{d}{cx^2}}}{2x}-\frac{ac^{\frac{3}{2}}}{8x\sqrt{1+\frac{d}{cx^2}}}-\frac{3a\sqrt{c}d}{8x^3\sqrt{1+\frac{d}{cx^2}}}-\frac{3ac^2\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{8\sqrt{d}}-\frac{ad^2}{4\sqrt{c}x^5\sqrt{1+\frac{d}{cx^2}}}$$
$$-\frac{bc^{\frac{5}{2}}}{16dx\sqrt{1+\frac{d}{cx^2}}}-\frac{17bc^{\frac{3}{2}}}{48x^3\sqrt{1+\frac{d}{cx^2}}}-\frac{11b\sqrt{c}d}{24x^5\sqrt{1+\frac{d}{cx^2}}}+\frac{bc^3\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{16d^{\frac{3}{2}}}-\frac{bd^2}{6\sqrt{c}x^7\sqrt{1+\frac{d}{cx^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**2,x)
```

```
[Out] -a*c**(3/2)*sqrt(1 + d/(c*x**2))/(2*x) - a*c**(3/2)/(8*x*sqrt(1 +
 d/(c*x**2))) - 3*a*sqrt(c)*d/(8*x**3*sqrt(1 + d/(c*x**2))) - 3*a
*c**2*asinh(sqrt(d)/(sqrt(c)*x))/(8*sqrt(d)) - a*d**2/(4*sqrt(c)*
x**5*sqrt(1 + d/(c*x**2))) - b*c**(5/2)/(16*d*x*sqrt(1 + d/(c*x**
2))) - 17*b*c**(3/2)/(48*x**3*sqrt(1 + d/(c*x**2))) - 11*b*sqrt(c
)*d/(24*x**5*sqrt(1 + d/(c*x**2))) + b*c**3*asinh(sqrt(d)/(sqrt(c
)*x))/(16*d**(3/2)) - b*d**2/(6*sqrt(c)*x**7*sqrt(1 + d/(c*x**2))
)
```

GIAC/XCAS [A] time = 0.260858, size = 234, normalized size = 1.9

$$-\frac{\frac{3\left(bc^4\operatorname{sign}(x)-6\,ac^3d\operatorname{sign}(x)\right)\arctan\left(\frac{\sqrt{cx^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}d}+\frac{3\left(cx^2+d\right)^{\frac{5}{2}}bc^4\operatorname{sign}(x)+30\left(cx^2+d\right)^{\frac{5}{2}}ac^3d\operatorname{sign}(x)+8\left(cx^2+d\right)^{\frac{3}{2}}bc^4d\operatorname{sign}(x)-48\left(cx^2+d\right)^{\frac{3}{2}}ac^3d^2\operatorname{sign}(x)-3}{c^3dx^6}}{48\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^2,x, algorithm="giac")
```

```
[Out] -1/48*(3*(b*c^4*sign(x) - 6*a*c^3*d*sign(x))*arctan(sqrt(c*x^2 +
d)/sqrt(-d))/(sqrt(-d)*d) + (3*(c*x^2 + d)^(5/2)*b*c^4*sign(x) +
30*(c*x^2 + d)^(5/2)*a*c^3*d*sign(x) + 8*(c*x^2 + d)^(3/2)*b*c^4*
d*sign(x) - 48*(c*x^2 + d)^(3/2)*a*c^3*d^2*sign(x) - 3*sqrt(c*x^2
 + d)*b*c^4*d^2*sign(x) + 18*sqrt(c*x^2 + d)*a*c^3*d^3*sign(x))/(
c^3*d*x^6))/c
```

3.792 $\int \frac{\left(a+\frac{b}{x^2}\right)\left(c+\frac{d}{x^2}\right)^{3/2}}{x^4}\,dx$

Optimal. Leaf size=159

$$-\frac{c^3(3bc-8ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{128d^{5/2}}+\frac{c^2\sqrt{c+\frac{d}{x^2}}(3bc-8ad)}{128d^2x}+\frac{c\sqrt{c+\frac{d}{x^2}}(3bc-8ad)}{64dx^3}+\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-8ad)}{48dx^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{8dx^3}$$

```
[Out] (c*(3*b*c - 8*a*d)*Sqrt[c + d/x^2])/(64*d*x^3) + ((3*b*c - 8*a*d)
*(c + d/x^2)^(3/2))/(48*d*x^3) - (b*(c + d/x^2)^(5/2))/(8*d*x^3)
+ (c^2*(3*b*c - 8*a*d)*Sqrt[c + d/x^2])/(128*d^2*x) - (c^3*(3*b*c
 - 8*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(128*d^(5/2))
```

Rubi [A] time = 0.282074, antiderivative size = 159, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{c^3(3bc-8ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{128d^{5/2}}+\frac{c^2\sqrt{c+\frac{d}{x^2}}(3bc-8ad)}{128d^2x}+\frac{c\sqrt{c+\frac{d}{x^2}}(3bc-8ad)}{64dx^3}+\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-8ad)}{48dx^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{8dx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*(c + d/x^2)^(3/2))/x^4,x]
```

```
[Out] (c*(3*b*c - 8*a*d)*Sqrt[c + d/x^2])/(64*d*x^3) + ((3*b*c - 8*a*d)
*(c + d/x^2)^(3/2))/(48*d*x^3) - (b*(c + d/x^2)^(5/2))/(8*d*x^3)
+ (c^2*(3*b*c - 8*a*d)*Sqrt[c + d/x^2])/(128*d^2*x) - (c^3*(3*b*c
 - 8*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(128*d^(5/2))
```

Rubi in Sympy [A] time = 23.5431, size = 143, normalized size = 0.9

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{8dx^3}+\frac{c^3\left(8ad-3bc\right)\operatorname{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{128d^{\frac{5}{2}}}-\frac{c^2\sqrt{c+\frac{d}{x^2}}\left(8ad-3bc\right)}{128d^2x}-\frac{c\sqrt{c+\frac{d}{x^2}}\left(8ad-3bc\right)}{64dx^3}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}\left(8ad-3bc\right)}{48dx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**4,x)
```

```
[Out] -b*(c + d/x**2)**(5/2)/(8*d*x**3) + c**3*(8*a*d - 3*b*c)*atanh(sq
rt(d)/(x*sqrt(c + d/x**2)))/(128*d**(5/2)) - c**2*sqrt(c + d/x**2
)*(8*a*d - 3*b*c)/(128*d**2*x) - c*sqrt(c + d/x**2)*(8*a*d - 3*b*
c)/(64*d*x**3) - (c + d/x**2)**(3/2)*(8*a*d - 3*b*c)/(48*d*x**3)
```

Mathematica [A] time = 0.430904, size = 171, normalized size = 1.08

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(3c^3x^8\log(x)(8ad-3bc)+3c^3x^8(3bc-8ad)\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)+\sqrt{d}\sqrt{cx^2+d}\left(8adx^2\left(3c^2x^4+14cdx^2+8d^2\right)\right.\right.}{384d^{5/2}x^7\sqrt{cx^2+d}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*(c + d/x^2)^(3/2))/x^4,x]
```

```
[Out] -(Sqrt[c + d/x^2]*(Sqrt[d]*Sqrt[d + c*x^2]*(8*a*d*x^2*(8*d^2 + 14
*c*d*x^2 + 3*c^2*x^4) + b*(48*d^3 + 72*c*d^2*x^2 + 6*c^2*d*x^4 -
9*c^3*x^6)) + 3*c^3*(-3*b*c + 8*a*d)*x^8*Log[x] + 3*c^3*(3*b*c -
8*a*d)*x^8*Log[d + Sqrt[d]*Sqrt[d + c*x^2]]))/(384*d^(5/2)*x^7*Sq
rt[d + c*x^2])
```

Maple [B] time = 0.029, size = 316, normalized size = 2.

$$\frac{1}{384\,x^5}\left(\frac{cx^2+d}{x^2}\right)^{\frac{3}{2}}\left(-8\,ac^3\left(cx^2+d\right)^{3/2}x^8d^{7/2}+3\,bc^4\left(cx^2+d\right)^{3/2}x^8d^{5/2}+8\,ac^2\left(cx^2+d\right)^{5/2}x^6d^{7/2}-3\,bc^3\left(cx^2+d\right)^{5/2}x\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*(c+d/x^2)^(3/2)/x^4,x)
```

```
[Out] 1/384*((c*x^2+d)/x^2)^(3/2)/x^5*(-8*a*c^3*(c*x^2+d)^(3/2)*x^8*d^(
7/2)+3*b*c^4*(c*x^2+d)^(3/2)*x^8*d^(5/2)+8*a*c^2*(c*x^2+d)^(5/2)*
x^6*d^(7/2)-3*b*c^3*(c*x^2+d)^(5/2)*x^6*d^(5/2)-24*a*c^3*(c*x^2+d
)^(1/2)*x^8*d^(9/2)+9*b*c^4*(c*x^2+d)^(1/2)*x^8*d^(7/2)+24*a*c^3*
ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*x^8*d^5-9*b*c^4*ln(2*(d^(1/2)
*(c*x^2+d)^(1/2)+d)/x)*x^8*d^4+16*a*c*(c*x^2+d)^(5/2)*x^4*d^(9/2)
-6*b*c^2*(c*x^2+d)^(5/2)*x^4*d^(7/2)-64*a*(c*x^2+d)^(5/2)*x^2*d^(
11/2)+24*b*c*(c*x^2+d)^(5/2)*x^2*d^(9/2)-48*b*(c*x^2+d)^(5/2)*d^(
11/2))/(c*x^2+d)^(3/2)/d^(13/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.305749, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(3\,bc^4-8\,ac^3d\right)\sqrt{d}x^7\log\left(-\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}+\left(cx^2+2\,d\right)\sqrt{d}}{x^2}\right)-2\left(3\left(3\,bc^3d-8\,ac^2d^2\right)x^6-48\,bd^4-2\left(3\,bc^2d^2+56\,acd^3\right)x^4-\right.}{768\,d^3x^7}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^4,x, algorithm="fricas")
```

```
[Out] [-1/768*(3*(3*b*c^4 - 8*a*c^3*d)*sqrt(d)*x^7*log(-(2*d*x*sqrt((c*
x^2 + d)/x^2) + (c*x^2 + 2*d)*sqrt(d))/x^2) - 2*(3*(3*b*c^3*d - 8
*a*c^2*d^2)*x^6 - 48*b*d^4 - 2*(3*b*c^2*d^2 + 56*a*c*d^3)*x^4 - 8
*(9*b*c*d^3 + 8*a*d^4)*x^2)*sqrt((c*x^2 + d)/x^2))/(d^3*x^7), 1/3
84*(3*(3*b*c^4 - 8*a*c^3*d)*sqrt(-d)*x^7*arctan(sqrt(-d)/(x*sqrt(
(c*x^2 + d)/x^2))) + (3*(3*b*c^3*d - 8*a*c^2*d^2)*x^6 - 48*b*d^4
- 2*(3*b*c^2*d^2 + 56*a*c*d^3)*x^4 - 8*(9*b*c*d^3 + 8*a*d^4)*x^2)
```

```
*sqrt((c*x^2 + d)/x^2))/(d^3*x^7)]
```

Sympy [A] time = 42.2857, size = 287, normalized size = 1.81

$$-\frac{ac^{\frac{5}{2}}}{16dx\sqrt{1+\frac{d}{cx^2}}}-\frac{17ac^{\frac{3}{2}}}{48x^3\sqrt{1+\frac{d}{cx^2}}}-\frac{11a\sqrt{c}d}{24x^5\sqrt{1+\frac{d}{cx^2}}}+\frac{ac^3\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{16d^{\frac{3}{2}}}-\frac{ad^2}{6\sqrt{c}x^7\sqrt{1+\frac{d}{cx^2}}}+\frac{3bc^{\frac{7}{2}}}{128d^2x\sqrt{1+\frac{d}{cx^2}}}+\frac{bc^{\frac{5}{2}}}{128dx^3\sqrt{1+\frac{d}{cx^2}}}-\frac{13bc^{\frac{3}{2}}}{64x^5\sqrt{1+\frac{d}{cx^2}}}-\frac{5b\sqrt{c}d}{16x^7\sqrt{1+\frac{d}{cx^2}}}-\frac{3bc^4\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{128d^{\frac{5}{2}}}-\frac{bd^2}{8\sqrt{c}x^9\sqrt{1+\frac{d}{cx^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*(c+d/x**2)**(3/2)/x**4,x)
```

```
[Out] -a*c**(5/2)/(16*d*x*sqrt(1 + d/(c*x**2))) - 17*a*c**(3/2)/(48*x**
3*sqrt(1 + d/(c*x**2))) - 11*a*sqrt(c)*d/(24*x**5*sqrt(1 + d/(c*x
**2))) + a*c**3*asinh(sqrt(d)/(sqrt(c)*x))/(16*d**(3/2)) - a*d**2
/(6*sqrt(c)*x**7*sqrt(1 + d/(c*x**2))) + 3*b*c**(7/2)/(128*d**2*x
*sqrt(1 + d/(c*x**2))) + b*c**(5/2)/(128*d*x**3*sqrt(1 + d/(c*x**
2))) - 13*b*c**(3/2)/(64*x**5*sqrt(1 + d/(c*x**2))) - 5*b*sqrt(c)
*d/(16*x**7*sqrt(1 + d/(c*x**2))) - 3*b*c**4*asinh(sqrt(d)/(sqrt(
c)*x))/(128*d**(5/2)) - b*d**2/(8*sqrt(c)*x**9*sqrt(1 + d/(c*x**2
)))
```

GIAC/XCAS [A] time = 0.27015, size = 289, normalized size = 1.82

$$\frac{\frac{3\left(3bc^5\operatorname{sign}(x)-8ac^4d\operatorname{sign}(x)\right)\arctan\left(\frac{\sqrt{cx^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}d^2}+\frac{9\left(cx^2+d\right)^{\frac{7}{2}}bc^5\operatorname{sign}(x)-24\left(cx^2+d\right)^{\frac{7}{2}}ac^4d\operatorname{sign}(x)-33\left(cx^2+d\right)^{\frac{5}{2}}bc^5d\operatorname{sign}(x)-40\left(cx^2+d\right)^{\frac{5}{2}}ac^4d^2\operatorname{sign}(x)-3}{c^4d^2x}}{384c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*(c + d/x^2)^(3/2)/x^4,x, algorithm="giac")
```

```
[Out] 1/384*(3*(3*b*c^5*sign(x) - 8*a*c^4*d*sign(x))*arctan(sqrt(c*x^2
+ d)/sqrt(-d))/(sqrt(-d)*d^2) + (9*(c*x^2 + d)^(7/2)*b*c^5*sign(x
) - 24*(c*x^2 + d)^(7/2)*a*c^4*d*sign(x) - 33*(c*x^2 + d)^(5/2)*b
*c^5*d*sign(x) - 40*(c*x^2 + d)^(5/2)*a*c^4*d^2*sign(x) - 33*(c*x
^2 + d)^(3/2)*b*c^5*d^2*sign(x) + 88*(c*x^2 + d)^(3/2)*a*c^4*d^3*
sign(x) + 9*sqrt(c*x^2 + d)*b*c^5*d^3*sign(x) - 24*sqrt(c*x^2 + d
)*a*c^4*d^4*sign(x))/(c^4*d^2*x^8))/c
```

3.793 $\int \frac{\left(a+\frac{b}{x^2}\right)x^3}{\sqrt{c+\frac{d}{x^2}}}\,dx$

Optimal. Leaf size=90

$$-\frac{d(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{5/2}}+\frac{x^2\sqrt{c+\frac{d}{x^2}}(4bc-3ad)}{8c^2}+\frac{ax^4\sqrt{c+\frac{d}{x^2}}}{4c}$$

```
[Out] ((4*b*c - 3*a*d)*Sqrt[c + d/x^2]*x^2)/(8*c^2) + (a*Sqrt[c + d/x^2
]*x^4)/(4*c) - (d*(4*b*c - 3*a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]
])/(8*c^(5/2))
```

Rubi [A] time = 0.218531, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{d(4bc-3ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{5/2}}+\frac{x^2\sqrt{c+\frac{d}{x^2}}(4bc-3ad)}{8c^2}+\frac{ax^4\sqrt{c+\frac{d}{x^2}}}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*x^3)/Sqrt[c + d/x^2],x]
```

```
[Out] ((4*b*c - 3*a*d)*Sqrt[c + d/x^2]*x^2)/(8*c^2) + (a*Sqrt[c + d/x^2
]*x^4)/(4*c) - (d*(4*b*c - 3*a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]
])/(8*c^(5/2))
```

Rubi in Sympy [A] time = 16.5434, size = 82, normalized size = 0.91

$$\frac{ax^4\sqrt{c+\frac{d}{x^2}}}{4c}-\frac{x^2\sqrt{c+\frac{d}{x^2}}\,(3ad-4bc)}{8c^2}+\frac{d\,(3ad-4bc)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**3/(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**4*sqrt(c + d/x**2)/(4*c) - x**2*sqrt(c + d/x**2)*(3*a*d - 4*
b*c)/(8*c**2) + d*(3*a*d - 4*b*c)*atanh(sqrt(c + d/x**2)/sqrt(c))
/(8*c**(5/2))
```

Mathematica [A] time = 0.11793, size = 98, normalized size = 1.09

$$\frac{\sqrt{c}x\left(cx^2+d\right)\left(2acx^2-3ad+4bc\right)+d\sqrt{cx^2+d}(3ad-4bc)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{8c^{5/2}x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*x^3)/Sqrt[c + d/x^2],x]
```

```
[Out] (Sqrt[c]*x*(d + c*x^2)*(4*b*c - 3*a*d + 2*a*c*x^2) + d*(-4*b*c +
3*a*d)*Sqrt[d + c*x^2]*Log[c*x + Sqrt[c]*Sqrt[d + c*x^2]])/(8*c^(
```

```
5/2)*Sqrt[c + d/x^2]*x)
```

Maple [A] time = 0.015, size = 131, normalized size = 1.5

$$\frac{1}{8x}\sqrt{cx^2+d}\left(2\,ax^3\sqrt{cx^2+d}c^{7/2}-3\,adx\sqrt{cx^2+d}c^{5/2}+4\,bx\sqrt{cx^2+d}c^{7/2}-4\,bd\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)c^3+3\,ad^2\ln\left(\sqrt{c}x+\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^3/(c+d/x^2)^(1/2),x)
```

```
[Out] 1/8*(c*x^2+d)^(1/2)*(2*a*x^3*(c*x^2+d)^(1/2)*c^(7/2)-3*a*d*x*(c*x
^2+d)^(1/2)*c^(5/2)+4*b*x*(c*x^2+d)^(1/2)*c^(7/2)-4*b*d*ln(c^(1/2
)*x+(c*x^2+d)^(1/2))*c^3+3*a*d^2*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*c^
2)/((c*x^2+d)/x^2)^(1/2)/x/c^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^3/sqrt(c + d/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.23529, size = 1, normalized size = 0.01

$$\left[-\frac{\left(4\,bcd-3\,ad^2\right)\sqrt{c}\log\left(-2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)-2\left(2\,ac^2x^4+\left(4\,bc^2-3\,acd\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{16\,c^3},\ \frac{\left(4\,bcd-3\,ad^2\right)\sqrt{-c}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^3/sqrt(c + d/x^2),x, algorithm="fricas")
```

```
[Out] [-1/16*((4*b*c*d - 3*a*d^2)*sqrt(c)*log(-2*c*x^2*sqrt((c*x^2 + d)
/x^2) - (2*c*x^2 + d)*sqrt(c)) - 2*(2*a*c^2*x^4 + (4*b*c^2 - 3*a*
c*d)*x^2)*sqrt((c*x^2 + d)/x^2))/c^3, 1/8*((4*b*c*d - 3*a*d^2)*sq
rt(-c)*arctan(sqrt(-c)/sqrt((c*x^2 + d)/x^2)) + (2*a*c^2*x^4 + (4
*b*c^2 - 3*a*c*d)*x^2)*sqrt((c*x^2 + d)/x^2))/c^3]
```

Sympy [A] time = 24.6507, size = 150, normalized size = 1.67

$$\frac{ax^5}{4\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}-\frac{a\sqrt{d}x^3}{8c\sqrt{\frac{cx^2}{d}+1}}-\frac{3ad^{\frac{3}{2}}x}{8c^2\sqrt{\frac{cx^2}{d}+1}}+\frac{3ad^2\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{8c^{\frac{5}{2}}}+\frac{b\sqrt{d}x\sqrt{\frac{cx^2}{d}+1}}{2c}-\frac{bd\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**3/(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**5/(4*sqrt(d)*sqrt(c*x**2/d + 1)) - a*sqrt(d)*x**3/(8*c*sqrt(
c*x**2/d + 1)) - 3*a*d**(3/2)*x/(8*c**2*sqrt(c*x**2/d + 1)) + 3*a
*d**2*asinh(sqrt(c)*x/sqrt(d))/(8*c**(5/2)) + b*sqrt(d)*x*sqrt(c*
x**2/d + 1)/(2*c) - b*d*asinh(sqrt(c)*x/sqrt(d))/(2*c**(3/2))
```

GIAC/XCAS [A] time = 0.248383, size = 220, normalized size = 2.44

$$\frac{1}{8}d^2\left(\frac{(4\,bc-3\,ad)\arctan\left(\frac{\sqrt{\frac{cx^2+d}{x^2}}}{\sqrt{-c}}\right)}{\sqrt{-c}c^2d}-\frac{4\,bc^2\sqrt{\frac{cx^2+d}{x^2}}-5\,acd\sqrt{\frac{cx^2+d}{x^2}}-\frac{4\,(cx^2+d)\,bc\sqrt{\frac{cx^2+d}{x^2}}}{x^2}+\frac{3\,(cx^2+d)\,ad\sqrt{\frac{cx^2+d}{x^2}}}{x^2}}{\left(c-\frac{cx^2+d}{x^2}\right)^2c^2d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^3/sqrt(c + d/x^2),x, algorithm="giac")
```

```
[Out] 1/8*d^2*((4*b*c - 3*a*d)*arctan(sqrt((c*x^2 + d)/x^2)/sqrt(-c))/(
sqrt(-c)*c^2*d) - (4*b*c^2*sqrt((c*x^2 + d)/x^2) - 5*a*c*d*sqrt((
c*x^2 + d)/x^2) - 4*(c*x^2 + d)*b*c*sqrt((c*x^2 + d)/x^2)/x^2 + 3
*(c*x^2 + d)*a*d*sqrt((c*x^2 + d)/x^2)/x^2)/((c - (c*x^2 + d)/x^2
)^2*c^2*d))
```

3.794 $\int \frac{\left(a+\frac{b}{x^2}\right)x}{\sqrt{c+\frac{d}{x^2}}}\,dx$

Optimal. Leaf size=59

$$\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{2c^{3/2}}+\frac{ax^2\sqrt{c+\frac{d}{x^2}}}{2c}$$

```
[Out] (a*Sqrt[c + d/x^2]*x^2)/(2*c) + ((2*b*c - a*d)*ArcTanh[Sqrt[c + d
/x^2]/Sqrt[c]])/(2*c^(3/2))
```

Rubi [A] time = 0.139945, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{(2bc-ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{2c^{3/2}}+\frac{ax^2\sqrt{c+\frac{d}{x^2}}}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*x)/Sqrt[c + d/x^2],x]
```

```
[Out] (a*Sqrt[c + d/x^2]*x^2)/(2*c) + ((2*b*c - a*d)*ArcTanh[Sqrt[c + d
/x^2]/Sqrt[c]])/(2*c^(3/2))
```

Rubi in Sympy [A] time = 11.3052, size = 48, normalized size = 0.81

$$\frac{ax^2\sqrt{c+\frac{d}{x^2}}}{2c}-\frac{\left(\frac{ad}{2}-bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x/(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**2*sqrt(c + d/x**2)/(2*c) - (a*d/2 - b*c)*atanh(sqrt(c + d/x*
*2)/sqrt(c))/c**(3/2)
```

Mathematica [A] time = 0.0749944, size = 82, normalized size = 1.39

$$\frac{\sqrt{cx^2+d}(2bc-ad)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)+a\sqrt{c}x\left(cx^2+d\right)}{2c^{3/2}x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*x)/Sqrt[c + d/x^2],x]
```

```
[Out] (a*Sqrt[c]*x*(d + c*x^2) + (2*b*c - a*d)*Sqrt[d + c*x^2]*Log[c*x
+ Sqrt[c]*Sqrt[d + c*x^2]])/(2*c^(3/2)*Sqrt[c + d/x^2]*x)
```

Maple [A] time = 0.01, size = 90, normalized size = 1.5

$$\frac{1}{2x}\sqrt{cx^2+d}\left(ax\sqrt{cx^2+d}c^{\frac{3}{2}}+2b\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)c^2-ad\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)c\right)\frac{1}{\sqrt{\frac{cx^2+d}{x^2}}}c^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x/(c+d/x^2)^(1/2),x)
```

```
[Out] 1/2*(c*x^2+d)^(1/2)*(a*x*(c*x^2+d)^(1/2)*c^(3/2)+2*b*ln(c^(1/2)*x
+(c*x^2+d)^(1/2))*c^2-a*d*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*c)/((c*x^
2+d)/x^2)^(1/2)/x/c^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x/sqrt(c + d/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.233514, size = 1, normalized size = 0.02

$$\left[\frac{2\,acx^2\sqrt{\frac{cx^2+d}{x^2}}-(2\,bc-ad)\sqrt{c}\log\left(2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)}{4\,c^2},\ \frac{acx^2\sqrt{\frac{cx^2+d}{x^2}}-(2\,bc-ad)\sqrt{-c}\arctan\left(\frac{\sqrt{-c}}{\sqrt{\frac{cx^2+d}{x^2}}}\right)}{2\,c^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x/sqrt(c + d/x^2),x, algorithm="fricas")
```

```
[Out] [1/4*(2*a*c*x^2*sqrt((c*x^2 + d)/x^2) - (2*b*c - a*d)*sqrt(c)*log
(2*c*x^2*sqrt((c*x^2 + d)/x^2) - (2*c*x^2 + d)*sqrt(c)))/c^2, 1/2
*(a*c*x^2*sqrt((c*x^2 + d)/x^2) - (2*b*c - a*d)*sqrt(-c)*arctan(s
qrt(-c)/sqrt((c*x^2 + d)/x^2)))/c^2]
```

Sympy [A] time = 12.4467, size = 66, normalized size = 1.12

$$\frac{a\sqrt{d}x\sqrt{\frac{cx^2}{d}+1}}{2c}-\frac{ad\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{2c^{\frac{3}{2}}}+\frac{b\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x/(c+d/x**2)**(1/2),x)
```

```
[Out] a*sqrt(d)*x*sqrt(c*x**2/d + 1)/(2*c) - a*d*asinh(sqrt(c)*x/sqrt(d
))/(2*c**(3/2)) + b*asinh(sqrt(c)*x/sqrt(d))/sqrt(c)
```

GIAC/XCAS [A] time = 0.246198, size = 107, normalized size = 1.81

$$-\frac{1}{2}\,d\left(\frac{a\sqrt{\frac{cx^2+d}{x^2}}}{\left(c-\frac{cx^2+d}{x^2}\right)c}+\frac{(2\,bc-ad)\arctan\left(\frac{\sqrt{\frac{cx^2+d}{x^2}}}{\sqrt{-c}}\right)}{\sqrt{-c}cd}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x/sqrt(c + d/x^2),x, algorithm="giac")
```

```
[Out] -1/2*d*(a*sqrt((c*x^2 + d)/x^2)/((c - (c*x^2 + d)/x^2)*c) + (2*b*
c - a*d)*arctan(sqrt((c*x^2 + d)/x^2)/sqrt(-c))/(sqrt(-c)*c*d))
```

3.795 $\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}\,x}\,dx$

Optimal. Leaf size=43

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{\sqrt{c}}-\frac{b\sqrt{c+\frac{d}{x^2}}}{d}$$

```
[Out] -((b*Sqrt[c + d/x^2])/d) + (a*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/S
qrt[c]
```

Rubi [A] time = 0.12937, antiderivative size = 43, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{\sqrt{c}}-\frac{b\sqrt{c+\frac{d}{x^2}}}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b/x^2)/(Sqrt[c + d/x^2]*x),x]
```

```
[Out] -((b*Sqrt[c + d/x^2])/d) + (a*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/S
qrt[c]
```

Rubi in Sympy [A] time = 10.8749, size = 36, normalized size = 0.84

$$\frac{a\,\mathrm{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{\sqrt{c}}-\frac{b\sqrt{c+\frac{d}{x^2}}}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)/x/(c+d/x**2)**(1/2),x)
```

```
[Out] a*atanh(sqrt(c + d/x**2)/sqrt(c))/sqrt(c) - b*sqrt(c + d/x**2)/d
```

Mathematica [A] time = 0.063596, size = 76, normalized size = 1.77

$$\frac{adx\sqrt{cx^2+d}\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)-b\sqrt{c}\left(cx^2+d\right)}{\sqrt{c}dx^2\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b/x^2)/(Sqrt[c + d/x^2]*x),x]
```

```
[Out] (-(b*Sqrt[c]*(d + c*x^2)) + a*d*x*Sqrt[d + c*x^2]*Log[c*x + Sqrt[
c]*Sqrt[d + c*x^2]])/(Sqrt[c]*d*Sqrt[c + d/x^2]*x^2)
```

Maple [A] time = 0.016, size = 70, normalized size = 1.6

$$-\frac{1}{dx^2}\sqrt{cx^2+d}\left(-a\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)xd+b\sqrt{cx^2+d}\sqrt{c}\right)\frac{1}{\sqrt{\frac{cx^2+d}{x^2}}}\frac{1}{\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/x/(c+d/x^2)^(1/2),x)
```

```
[Out] -(c*x^2+d)^(1/2)*(-a*ln(c^(1/2)*x+(c*x^2+d)^(1/2))*x*d+b*(c*x^2+d
)^(1/2)*c^(1/2))/((c*x^2+d)/x^2)^(1/2)/x^2/c^(1/2)/d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.227924, size = 1, normalized size = 0.02

$$\left[\frac{a\sqrt{c}d\log\left(-2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)-2\,bc\sqrt{\frac{cx^2+d}{x^2}}}{2\,cd},-\frac{a\sqrt{-c}d\arctan\left(\frac{\sqrt{-c}}{\sqrt{\frac{cx^2+d}{x^2}}}\right)+bc\sqrt{\frac{cx^2+d}{x^2}}}{cd}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x),x, algorithm="fricas")
```

```
[Out] [1/2*(a*sqrt(c)*d*log(-2*c*x^2*sqrt((c*x^2 + d)/x^2) - (2*c*x^2 +
 d)*sqrt(c)) - 2*b*c*sqrt((c*x^2 + d)/x^2))/(c*d), -(a*sqrt(-c)*d
*arctan(sqrt(-c)/sqrt((c*x^2 + d)/x^2)) + b*c*sqrt((c*x^2 + d)/x^
2))/(c*d)]
```

Sympy [A] time = 4.85985, size = 138, normalized size = 3.21

$$-a\left(\begin{cases}\frac{\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{c}}\sqrt{c+\frac{d}{x^2}}}\right)}{c\sqrt{-\frac{1}{c}}} & \text{for } -\frac{1}{c}>0\\ -\frac{\operatorname{acoth}\left(\frac{1}{\sqrt{c+\frac{d}{x^2}}\sqrt{\frac{1}{c}}}\right)}{c\sqrt{\frac{1}{c}}} & \text{for } -\frac{1}{c}<0\wedge\frac{1}{c}<\frac{1}{c+\frac{d}{x^2}}\\ -\frac{\operatorname{atanh}\left(\frac{1}{\sqrt{c+\frac{d}{x^2}}\sqrt{\frac{1}{c}}}\right)}{c\sqrt{\frac{1}{c}}} & \text{for } \frac{1}{c}>\frac{1}{c+\frac{d}{x^2}}\wedge-\frac{1}{c}<0\end{cases}\right)-\frac{b\sqrt{c+\frac{d}{x^2}}}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/x/(c+d/x**2)**(1/2),x)
```

```
[Out] -a*Piecewise((atan(1/(sqrt(-1/c)*sqrt(c + d/x**2)))/(c*sqrt(-1/c)
), -1/c > 0), (-acoth(1/(sqrt(c + d/x**2)*sqrt(1/c)))/(c*sqrt(1/c
)), (-1/c < 0) & (1/c < 1/(c + d/x**2))), (-atanh(1/(sqrt(c + d/x
**2)*sqrt(1/c)))/(c*sqrt(1/c)), (-1/c < 0) & (1/c > 1/(c + d/x**2
)))) - b*sqrt(c + d/x**2)/d
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/(sqrt(c + d/x^2)*x), x)
```

3.796 $\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}x^3}\,dx$

Optimal. Leaf size=43

$$\frac{\sqrt{c+\frac{d}{x^2}}(bc-ad)}{d^2}-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{3d^2}$$

```
[Out] ((b*c - a*d)*Sqrt[c + d/x^2])/d^2 - (b*(c + d/x^2)^(3/2))/(3*d^2)
```

Rubi [A] time = 0.11996, antiderivative size = 43, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{\sqrt{c+\frac{d}{x^2}}(bc-ad)}{d^2}-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{3d^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/(Sqrt[c + d/x^2]*x^3),x]
```

```
[Out] ((b*c - a*d)*Sqrt[c + d/x^2])/d^2 - (b*(c + d/x^2)^(3/2))/(3*d^2)
```

Rubi in Sympy [A] time = 12.4314, size = 37, normalized size = 0.86

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3d^2}-\frac{\sqrt{c+\frac{d}{x^2}}\,(ad-bc)}{d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/x**3/(c+d/x**2)**(1/2),x)
```

```
[Out] -b*(c + d/x**2)**(3/2)/(3*d**2) - sqrt(c + d/x**2)*(a*d - b*c)/d*
*2
```

Mathematica [A] time = 0.0676604, size = 39, normalized size = 0.91

$$-\frac{\sqrt{c+\frac{d}{x^2}}\left(3adx^2+b\left(d-2cx^2\right)\right)}{3d^2x^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/(Sqrt[c + d/x^2]*x^3),x]
```

```
[Out] -(Sqrt[c + d/x^2]*(3*a*d*x^2 + b*(d - 2*c*x^2)))/(3*d^2*x^2)
```

Maple [A] time = 0.01, size = 47, normalized size = 1.1

$$-\frac{\left(3\,adx^2-2\,bcx^2+bd\right)\left(cx^2+d\right)}{3\,d^2x^4}\frac{1}{\sqrt{\frac{cx^2+d}{x^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/x^3/(c+d/x^2)^(1/2),x)
```

```
[Out] -1/3*(3*a*d*x^2-2*b*c*x^2+b*d)*(c*x^2+d)/((c*x^2+d)/x^2)^(1/2)/d^
2/x^4
```

Maxima [A] time = 1.42115, size = 65, normalized size = 1.51

$$-\frac{1}{3}\,b\left(\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{d^2}-\frac{3\,\sqrt{c+\frac{d}{x^2}}\,c}{d^2}\right)-\frac{a\sqrt{c+\frac{d}{x^2}}}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^3),x, algorithm="maxima")
```

```
[Out] -1/3*b*((c + d/x^2)^(3/2)/d^2 - 3*sqrt(c + d/x^2)*c/d^2) - a*sqrt
(c + d/x^2)/d
```

Fricas [A] time = 0.215378, size = 53, normalized size = 1.23

$$\frac{\left((2\,bc-3\,ad)x^2-bd\right)\sqrt{\frac{cx^2+d}{x^2}}}{3\,d^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^3),x, algorithm="fricas")
```

```
[Out] 1/3*((2*b*c - 3*a*d)*x^2 - b*d)*sqrt((c*x^2 + d)/x^2)/(d^2*x^2)
```

Sympy [A] time = 3.50127, size = 139, normalized size = 3.23

$$-\frac{\begin{cases}\frac{\frac{a}{x^2}+\frac{b}{2x^4}}{\sqrt{c}} & \text{for } d=0\\ -\frac{\frac{2ac}{\sqrt{c+\frac{d}{x^2}}}+2a\left(-\frac{c}{\sqrt{c+\frac{d}{x^2}}}-\sqrt{c+\frac{d}{x^2}}\right)+\frac{2bc\left(-\frac{c}{\sqrt{c+\frac{d}{x^2}}}-\sqrt{c+\frac{d}{x^2}}\right)}{d}+\frac{2b\left(\frac{c^2}{\sqrt{c+\frac{d}{x^2}}}+2c\sqrt{c+\frac{d}{x^2}}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}\right)}{d}}{d} & \text{otherwise}\end{cases}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/x**3/(c+d/x**2)**(1/2),x)
```

```
[Out] -Piecewise(((a/x**2 + b/(2*x**4))/sqrt(c), Eq(d, 0)), (-(2*a*c/sq
rt(c + d/x**2) + 2*a*(-c/sqrt(c + d/x**2) - sqrt(c + d/x**2)) + 2
*b*c*(-c/sqrt(c + d/x**2) - sqrt(c + d/x**2))/d + 2*b*(c**2/sqrt(
c + d/x**2) + 2*c*sqrt(c + d/x**2) - (c + d/x**2)**(3/2)/3)/d)/d,
 True))/2
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^3),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^3), x)
```

3.797 $\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}x^5}\,dx$

Optimal. Leaf size=72

$$\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(2bc-ad)}{3d^3}-\frac{c\sqrt{c+\frac{d}{x^2}}(bc-ad)}{d^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{5d^3}$$

```
[Out] -((c*(b*c - a*d)*Sqrt[c + d/x^2])/d^3) + ((2*b*c - a*d)*(c + d/x^
2)^(3/2))/(3*d^3) - (b*(c + d/x^2)^(5/2))/(5*d^3)
```

Rubi [A] time = 0.178179, antiderivative size = 72, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(2bc-ad)}{3d^3}-\frac{c\sqrt{c+\frac{d}{x^2}}(bc-ad)}{d^3}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{5d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/(Sqrt[c + d/x^2]*x^5),x]
```

```
[Out] -((c*(b*c - a*d)*Sqrt[c + d/x^2])/d^3) + ((2*b*c - a*d)*(c + d/x^
2)^(3/2))/(3*d^3) - (b*(c + d/x^2)^(5/2))/(5*d^3)
```

Rubi in Sympy [A] time = 17.4303, size = 61, normalized size = 0.85

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5d^3}+\frac{c\sqrt{c+\frac{d}{x^2}}\,(ad-bc)}{d^3}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(ad-2bc)}{3d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/x**5/(c+d/x**2)**(1/2),x)
```

```
[Out] -b*(c + d/x**2)**(5/2)/(5*d**3) + c*sqrt(c + d/x**2)*(a*d - b*c)/
d**3 - (c + d/x**2)**(3/2)*(a*d - 2*b*c)/(3*d**3)
```

Mathematica [A] time = 0.0798956, size = 60, normalized size = 0.83

$$\frac{\sqrt{c+\frac{d}{x^2}}\left(b\left(-8c^2x^4+4cdx^2-3d^2\right)-5adx^2\left(d-2cx^2\right)\right)}{15d^3x^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/(Sqrt[c + d/x^2]*x^5),x]
```

```
[Out] (Sqrt[c + d/x^2]*(-5*a*d*x^2*(d - 2*c*x^2) + b*(-3*d^2 + 4*c*d*x^
2 - 8*c^2*x^4)))/(15*d^3*x^4)
```

Maple [A] time = 0.012, size = 70, normalized size = 1.

$$\frac{\left(10\,acd{x}^{4}-8\,b{c}^{2}{x}^{4}-5\,a{d}^{2}{x}^{2}+4\,bcd{x}^{2}-3\,b{d}^{2}\right)\left(c{x}^{2}+d\right)}{15\,{d}^{3}{x}^{6}}\frac{1}{\sqrt{\frac{c{x}^{2}+d}{{x}^{2}}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/x^5/(c+d/x^2)^(1/2),x)
```

```
[Out] 1/15*(10*a*c*d*x^4-8*b*c^2*x^4-5*a*d^2*x^2+4*b*c*d*x^2-3*b*d^2)*(
c*x^2+d)/((c*x^2+d)/x^2)^(1/2)/d^3/x^6
```

Maxima [A] time = 1.39216, size = 112, normalized size = 1.56

$$-\frac{1}{15}\,b\left(\frac{3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{d^3}-\frac{10\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c}{d^3}+\frac{15\sqrt{c+\frac{d}{x^2}}\,c^2}{d^3}\right)-\frac{1}{3}\,a\left(\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{d^2}-\frac{3\sqrt{c+\frac{d}{x^2}}\,c}{d^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^5),x, algorithm="maxima")
```

```
[Out] -1/15*b*(3*(c + d/x^2)^(5/2)/d^3 - 10*(c + d/x^2)^(3/2)*c/d^3 + 1
5*sqrt(c + d/x^2)*c^2/d^3) - 1/3*a*((c + d/x^2)^(3/2)/d^2 - 3*sqr
t(c + d/x^2)*c/d^2)
```

Fricas [A] time = 0.225838, size = 84, normalized size = 1.17

$$-\frac{\left(2\left(4\,bc^2-5\,acd\right)x^4+3\,bd^2-\left(4\,bcd-5\,ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{15\,d^3x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^5),x, algorithm="fricas")
```

```
[Out] -1/15*(2*(4*b*c^2 - 5*a*c*d)*x^4 + 3*b*d^2 - (4*b*c*d - 5*a*d^2)*
x^2)*sqrt((c*x^2 + d)/x^2)/(d^3*x^4)
```

Sympy [A] time = 5.67736, size = 206, normalized size = 2.86

$$-\frac{\begin{cases}\frac{\frac{a}{2x^4}+\frac{b}{3x^6}}{\sqrt{c}} & \text{for } d = \\ -\frac{\frac{2ac\left(-\frac{c}{\sqrt{c+\frac{d}{x^2}}}-\sqrt{c+\frac{d}{x^2}}\right)}{d}+\frac{2a\left(\frac{c^2}{\sqrt{c+\frac{d}{x^2}}}+2c\sqrt{c+\frac{d}{x^2}}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}\right)}{d}+\frac{2bc\left(\frac{c^2}{\sqrt{c+\frac{d}{x^2}}}+2c\sqrt{c+\frac{d}{x^2}}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3}\right)}{d^2}+\frac{2b\left(-\frac{c^3}{\sqrt{c+\frac{d}{x^2}}}-3c^2\sqrt{c+\frac{d}{x^2}}+c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5}\right)}{d^2}}{d} & \text{otherw}\end{cases}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/x**5/(c+d/x**2)**(1/2),x)
```

```
[Out] -Piecewise(((a/(2*x**4) + b/(3*x**6))/sqrt(c), Eq(d, 0)), (-(2*a*
c*(-c/sqrt(c + d/x**2) - sqrt(c + d/x**2))/d + 2*a*(c**2/sqrt(c +
 d/x**2) + 2*c*sqrt(c + d/x**2) - (c + d/x**2)**(3/2)/3)/d + 2*b*
c*(c**2/sqrt(c + d/x**2) + 2*c*sqrt(c + d/x**2) - (c + d/x**2)**(
3/2)/3)/d**2 + 2*b*(-c**3/sqrt(c + d/x**2) - 3*c**2*sqrt(c + d/x*
*2) + c*(c + d/x**2)**(3/2) - (c + d/x**2)**(5/2)/5)/d**2)/d, Tru
e))/2
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a + \frac{b}{x^2}}{\sqrt{c + \frac{d}{x^2}}x^5} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^5),x, algorithm="giac")

[Out] integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^5), x)
```

3.798 $\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}x^7} dx$

Optimal. Leaf size=101

$$\frac{c^2\sqrt{c+\frac{d}{x^2}}(bc-ad)}{d^4}+\frac{\left(c+\frac{d}{x^2}\right)^{5/2}(3bc-ad)}{5d^4}-\frac{c\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-2ad)}{3d^4}-\frac{b\left(c+\frac{d}{x^2}\right)^{7/2}}{7d^4}$$

```
[Out] (c^2*(b*c - a*d)*Sqrt[c + d/x^2])/d^4 - (c*(3*b*c - 2*a*d)*(c + d
/x^2)^(3/2))/(3*d^4) + ((3*b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^4)
- (b*(c + d/x^2)^(7/2))/(7*d^4)
```

Rubi [A] time = 0.229816, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{c^2\sqrt{c+\frac{d}{x^2}}(bc-ad)}{d^4}+\frac{\left(c+\frac{d}{x^2}\right)^{5/2}(3bc-ad)}{5d^4}-\frac{c\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-2ad)}{3d^4}-\frac{b\left(c+\frac{d}{x^2}\right)^{7/2}}{7d^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/(Sqrt[c + d/x^2]*x^7),x]
```

```
[Out] (c^2*(b*c - a*d)*Sqrt[c + d/x^2])/d^4 - (c*(3*b*c - 2*a*d)*(c + d
/x^2)^(3/2))/(3*d^4) + ((3*b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^4)
- (b*(c + d/x^2)^(7/2))/(7*d^4)
```

Rubi in Sympy [A] time = 23.0346, size = 90, normalized size = 0.89

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7d^4}-\frac{c^2\sqrt{c+\frac{d}{x^2}}\,(ad-bc)}{d^4}+\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}(2ad-3bc)}{3d^4}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}(ad-3bc)}{5d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/x**7/(c+d/x**2)**(1/2),x)
```

```
[Out] -b*(c + d/x**2)**(7/2)/(7*d**4) - c**2*sqrt(c + d/x**2)*(a*d - b*
c)/d**4 + c*(c + d/x**2)**(3/2)*(2*a*d - 3*b*c)/(3*d**4) - (c + d
/x**2)**(5/2)*(a*d - 3*b*c)/(5*d**4)
```

Mathematica [A] time = 0.0876917, size = 92, normalized size = 0.91

$$-\frac{(cx^2+d)\left(7adx^2\left(8c^2x^4-4cdx^2+3d^2\right)+3b\left(-16c^3x^6+8c^2dx^4-6cd^2x^2+5d^3\right)\right)}{105d^4x^8\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/(Sqrt[c + d/x^2]*x^7),x]
```

```
[Out] -((d + c*x^2)*(7*a*d*x^2*(3*d^2 - 4*c*d*x^2 + 8*c^2*x^4) + 3*b*(5
*d^3 - 6*c*d^2*x^2 + 8*c^2*d*x^4 - 16*c^3*x^6)))/(105*d^4*Sqrt[c
+ d/x^2]*x^8)
```

Maple [A] time = 0.011, size = 94, normalized size = 0.9

$$-\frac{\left(56\,ac^{2}dx^{6}-48\,bc^{3}x^{6}-28\,acd^{2}x^{4}+24\,bc^{2}dx^{4}+21\,ad^{3}x^{2}-18\,bcd^{2}x^{2}+15\,bd^{3}\right)\left(cx^{2}+d\right)}{105\,d^{4}x^{8}}\frac{1}{\sqrt{\frac{cx^{2}+d}{x^{2}}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/x^7/(c+d/x^2)^(1/2),x)
```

```
[Out] -1/105*(56*a*c^2*d*x^6-48*b*c^3*x^6-28*a*c*d^2*x^4+24*b*c^2*d*x^4
+21*a*d^3*x^2-18*b*c*d^2*x^2+15*b*d^3)*(c*x^2+d)/((c*x^2+d)/x^2)^
(1/2)/d^4/x^8
```

Maxima [A] time = 1.39053, size = 159, normalized size = 1.57

$$-\frac{1}{35}\,b\left(\frac{5\left(c+\frac{d}{x^{2}}\right)^{\frac{7}{2}}}{d^{4}}-\frac{21\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}c}{d^{4}}+\frac{35\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}c^{2}}{d^{4}}-\frac{35\sqrt{c+\frac{d}{x^{2}}}\,c^{3}}{d^{4}}\right)-\frac{1}{15}\,a\left(\frac{3\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}}{d^{3}}-\frac{10\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}c}{d^{3}}+\frac{15\sqrt{c+\frac{d}{x^{2}}}\,c^{2}}{d^{3}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^7),x, algorithm="maxima")
```

```
[Out] -1/35*b*(5*(c + d/x^2)^(7/2)/d^4 - 21*(c + d/x^2)^(5/2)*c/d^4 + 3
5*(c + d/x^2)^(3/2)*c^2/d^4 - 35*sqrt(c + d/x^2)*c^3/d^4) - 1/15*
a*(3*(c + d/x^2)^(5/2)/d^3 - 10*(c + d/x^2)^(3/2)*c/d^3 + 15*sqrt
(c + d/x^2)*c^2/d^3)
```

Fricas [A] time = 0.255508, size = 116, normalized size = 1.15

$$\frac{\left(8\left(6\,bc^{3}-7\,ac^{2}d\right)x^{6}-4\left(6\,bc^{2}d-7\,acd^{2}\right)x^{4}-15\,bd^{3}+3\left(6\,bcd^{2}-7\,ad^{3}\right)x^{2}\right)\sqrt{\frac{cx^{2}+d}{x^{2}}}}{105\,d^{4}x^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^7),x, algorithm="fricas")
```

```
[Out] 1/105*(8*(6*b*c^3 - 7*a*c^2*d)*x^6 - 4*(6*b*c^2*d - 7*a*c*d^2)*x^
4 - 15*b*d^3 + 3*(6*b*c*d^2 - 7*a*d^3)*x^2)*sqrt((c*x^2 + d)/x^2)
/(d^4*x^6)
```

Sympy [A] time = 8.30104, size = 270, normalized size = 2.67

$$-\frac{\begin{cases}\frac{\frac{a}{3x^{6}}+\frac{b}{4x^{8}}}{\sqrt{c}}\\ -\frac{\frac{2ac\left(\frac{c^{2}}{\sqrt{c+\frac{d}{x^{2}}}}+2c\sqrt{c+\frac{d}{x^{2}}}-\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}}{3}\right)}{d^{2}}+\frac{2a\left(-\frac{c^{3}}{\sqrt{c+\frac{d}{x^{2}}}}-3c^{2}\sqrt{c+\frac{d}{x^{2}}}+c\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}-\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}}{5}\right)}{d^{2}}+\frac{2bc\left(-\frac{c^{3}}{\sqrt{c+\frac{d}{x^{2}}}}-3c^{2}\sqrt{c+\frac{d}{x^{2}}}+c\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}-\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}}}{5}\right)}{d^{3}}+\frac{2b\left(\frac{c^{4}}{\sqrt{c+\frac{d}{x^{2}}}}+4c^{3}\sqrt{c+\frac{d}{x^{2}}}\right.}{}}{d}\end{cases}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/x**7/(c+d/x**2)**(1/2),x)
```

```
[Out] -Piecewise(((a/(3*x**6) + b/(4*x**8))/sqrt(c), Eq(d, 0)), (-(2*a*
c*(c**2/sqrt(c + d/x**2) + 2*c*sqrt(c + d/x**2) - (c + d/x**2)**(
3/2)/3)/d**2 + 2*a*(-c**3/sqrt(c + d/x**2) - 3*c**2*sqrt(c + d/x*
*2) + c*(c + d/x**2)**(3/2) - (c + d/x**2)**(5/2)/5)/d**2 + 2*b*c
*(-c**3/sqrt(c + d/x**2) - 3*c**2*sqrt(c + d/x**2) + c*(c + d/x**
2)**(3/2) - (c + d/x**2)**(5/2)/5)/d**3 + 2*b*(c**4/sqrt(c + d/x*
*2) + 4*c**3*sqrt(c + d/x**2) - 2*c**2*(c + d/x**2)**(3/2) + 4*c*
(c + d/x**2)**(5/2)/5 - (c + d/x**2)**(7/2)/7)/d**3)/d, True))/2
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}\,x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^7),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^7), x)
```

3.799 $\int \frac{\left(a+\frac{b}{x^2}\right)x^4}{\sqrt{c+\frac{d}{x^2}}}\,dx$

Optimal. Leaf size=82

$$-\frac{2dx\sqrt{c+\frac{d}{x^2}}(5bc-4ad)}{15c^3}+\frac{x^3\sqrt{c+\frac{d}{x^2}}(5bc-4ad)}{15c^2}+\frac{ax^5\sqrt{c+\frac{d}{x^2}}}{5c}$$

```
[Out] (-2*d*(5*b*c - 4*a*d)*Sqrt[c + d/x^2]*x)/(15*c^3) + ((5*b*c - 4*a
*d)*Sqrt[c + d/x^2]*x^3)/(15*c^2) + (a*Sqrt[c + d/x^2]*x^5)/(5*c)
```

Rubi [A] time = 0.132708, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{2dx\sqrt{c+\frac{d}{x^2}}(5bc-4ad)}{15c^3}+\frac{x^3\sqrt{c+\frac{d}{x^2}}(5bc-4ad)}{15c^2}+\frac{ax^5\sqrt{c+\frac{d}{x^2}}}{5c}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*x^4)/Sqrt[c + d/x^2],x]
```

```
[Out] (-2*d*(5*b*c - 4*a*d)*Sqrt[c + d/x^2]*x)/(15*c^3) + ((5*b*c - 4*a
*d)*Sqrt[c + d/x^2]*x^3)/(15*c^2) + (a*Sqrt[c + d/x^2]*x^5)/(5*c)
```

Rubi in Sympy [A] time = 9.94061, size = 76, normalized size = 0.93

$$\frac{ax^5\sqrt{c+\frac{d}{x^2}}}{5c}-\frac{x^3\sqrt{c+\frac{d}{x^2}}(4ad-5bc)}{15c^2}+\frac{2dx\sqrt{c+\frac{d}{x^2}}(4ad-5bc)}{15c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**4/(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**5*sqrt(c + d/x**2)/(5*c) - x**3*sqrt(c + d/x**2)*(4*a*d - 5*
b*c)/(15*c**2) + 2*d*x*sqrt(c + d/x**2)*(4*a*d - 5*b*c)/(15*c**3)
```

Mathematica [A] time = 0.0788054, size = 56, normalized size = 0.68

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(a\left(3c^2x^4-4cdx^2+8d^2\right)+5bc\left(cx^2-2d\right)\right)}{15c^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*x^4)/Sqrt[c + d/x^2],x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(5*b*c*(-2*d + c*x^2) + a*(8*d^2 - 4*c*d*x^2 +
 3*c^2*x^4)))/(15*c^3)
```

Maple [A] time = 0.011, size = 67, normalized size = 0.8

$$\frac{\left(3\,ax^4c^2-4\,acdx^2+5\,bc^2x^2+8\,ad^2-10\,bcd\right)\left(cx^2+d\right)}{15\,xc^3}\frac{1}{\sqrt{\frac{cx^2+d}{x^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^4/(c+d/x^2)^(1/2),x)
```

```
[Out] 1/15/x*(3*a*c^2*x^4-4*a*c*d*x^2+5*b*c^2*x^2+8*a*d^2-10*b*c*d)*(c*
x^2+d)/((c*x^2+d)/x^2)^(1/2)/c^3
```

Maxima [A] time = 1.38609, size = 115, normalized size = 1.4

$$\frac{\left(\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}x^3-3\sqrt{c+\frac{d}{x^2}}dx\right)b}{3c^2}+\frac{\left(3\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}x^5-10\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}dx^3+15\sqrt{c+\frac{d}{x^2}}d^2x\right)a}{15c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^4/sqrt(c + d/x^2),x, algorithm="maxima")
```

```
[Out] 1/3*((c + d/x^2)^(3/2)*x^3 - 3*sqrt(c + d/x^2)*d*x)*b/c^2 + 1/15*
(3*(c + d/x^2)^(5/2)*x^5 - 10*(c + d/x^2)^(3/2)*d*x^3 + 15*sqrt(c
 + d/x^2)*d^2*x)*a/c^3
```

Fricas [A] time = 0.216559, size = 80, normalized size = 0.98

$$\frac{\left(3\,ac^2x^5+\left(5\,bc^2-4\,acd\right)x^3-2\left(5\,bcd-4\,ad^2\right)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{15\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^4/sqrt(c + d/x^2),x, algorithm="fricas")
```

```
[Out] 1/15*(3*a*c^2*x^5 + (5*b*c^2 - 4*a*c*d)*x^3 - 2*(5*b*c*d - 4*a*d^
2)*x)*sqrt((c*x^2 + d)/x^2)/c^3
```

Sympy [A] time = 4.2258, size = 338, normalized size = 4.12

$$\frac{3ac^4d^{\frac{9}{2}}x^8\sqrt{\frac{cx^2}{d}+1}}{15c^5d^4x^4+30c^4d^5x^2+15c^3d^6}+\frac{2ac^3d^{\frac{11}{2}}x^6\sqrt{\frac{cx^2}{d}+1}}{15c^5d^4x^4+30c^4d^5x^2+15c^3d^6}+\frac{3ac^2d^{\frac{13}{2}}x^4\sqrt{\frac{cx^2}{d}+1}}{15c^5d^4x^4+30c^4d^5x^2+15c^3d^6}+\frac{12acd^{\frac{15}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{15c^5d^4x^4+30c^4d^5x^2+15c^3d^6}+\frac{8ad^{\frac{17}{2}}\sqrt{\frac{cx^2}{d}+1}}{15c^5d^4x^4+30c^4d^5x^2+15c^3d^6}+\frac{b\sqrt{d}x^2\sqrt{\frac{cx^2}{d}+1}}{3c}-\frac{2bd^{\frac{3}{2}}\sqrt{\frac{cx^2}{d}+1}}{3c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**4/(c+d/x**2)**(1/2),x)
```

```
[Out] 3*a*c**4*d**(9/2)*x**8*sqrt(c*x**2/d + 1)/(15*c**5*d**4*x**4 + 30
*c**4*d**5*x**2 + 15*c**3*d**6) + 2*a*c**3*d**(11/2)*x**6*sqrt(c*
x**2/d + 1)/(15*c**5*d**4*x**4 + 30*c**4*d**5*x**2 + 15*c**3*d**6
) + 3*a*c**2*d**(13/2)*x**4*sqrt(c*x**2/d + 1)/(15*c**5*d**4*x**4
 + 30*c**4*d**5*x**2 + 15*c**3*d**6) + 12*a*c*d**(15/2)*x**2*sqrt
(c*x**2/d + 1)/(15*c**5*d**4*x**4 + 30*c**4*d**5*x**2 + 15*c**3*d
**6) + 8*a*d**(17/2)*sqrt(c*x**2/d + 1)/(15*c**5*d**4*x**4 + 30*c
**4*d**5*x**2 + 15*c**3*d**6) + b*sqrt(d)*x**2*sqrt(c*x**2/d + 1)
/(3*c) - 2*b*d**(3/2)*sqrt(c*x**2/d + 1)/(3*c**2)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a + \frac{b}{x^2}\right)x^4}{\sqrt{c + \frac{d}{x^2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^4/sqrt(c + d/x^2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)*x^4/sqrt(c + d/x^2), x)
```

3.800 $\int \frac{\left(a+\frac{b}{x^2}\right)x^2}{\sqrt{c+\frac{d}{x^2}}}\,dx$

Optimal. Leaf size=51

$$\frac{x\sqrt{c+\frac{d}{x^2}}(3bc-2ad)}{3c^2}+\frac{ax^3\sqrt{c+\frac{d}{x^2}}}{3c}$$

```
[Out] ((3*b*c - 2*a*d)*Sqrt[c + d/x^2]*x)/(3*c^2) + (a*Sqrt[c + d/x^2]*
x^3)/(3*c)
```

Rubi [A] time = 0.0847891, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{x\sqrt{c+\frac{d}{x^2}}(3bc-2ad)}{3c^2}+\frac{ax^3\sqrt{c+\frac{d}{x^2}}}{3c}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*x^2)/Sqrt[c + d/x^2],x]
```

```
[Out] ((3*b*c - 2*a*d)*Sqrt[c + d/x^2]*x)/(3*c^2) + (a*Sqrt[c + d/x^2]*
x^3)/(3*c)
```

Rubi in Sympy [A] time = 7.11603, size = 44, normalized size = 0.86

$$\frac{ax^3\sqrt{c+\frac{d}{x^2}}}{3c}-\frac{x\sqrt{c+\frac{d}{x^2}}\,(2ad-3bc)}{3c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**2/(c+d/x**2)**(1/2),x)
```

```
[Out] a*x**3*sqrt(c + d/x**2)/(3*c) - x*sqrt(c + d/x**2)*(2*a*d - 3*b*c
)/(3*c**2)
```

Mathematica [A] time = 0.042313, size = 34, normalized size = 0.67

$$\frac{x\sqrt{c+\frac{d}{x^2}}\left(acx^2-2ad+3bc\right)}{3c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*x^2)/Sqrt[c + d/x^2],x]
```

```
[Out] (Sqrt[c + d/x^2]*x*(3*b*c - 2*a*d + a*c*x^2))/(3*c^2)
```

Maple [A] time = 0.009, size = 44, normalized size = 0.9

$$\frac{\left(ax^2c-2\,ad+3\,bc\right)\left(cx^2+d\right)}{3\,xc^2}\frac{1}{\sqrt{\frac{cx^2+d}{x^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^2/(c+d/x^2)^(1/2),x)
```

```
[Out] 1/3/x*(a*c*x^2-2*a*d+3*b*c)*(c*x^2+d)/((c*x^2+d)/x^2)^(1/2)/c^2
```

Maxima [A] time = 1.39092, size = 66, normalized size = 1.29

$$\frac{b\sqrt{c+\frac{d}{x^2}}\,x}{c}+\frac{\left(\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}x^3-3\sqrt{c+\frac{d}{x^2}}\,dx\right)a}{3\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^2/sqrt(c + d/x^2),x, algorithm="maxima")
```

```
[Out] b*sqrt(c + d/x^2)*x/c + 1/3*((c + d/x^2)^(3/2)*x^3 - 3*sqrt(c + d
/x^2)*d*x)*a/c^2
```

Fricas [A] time = 0.215878, size = 49, normalized size = 0.96

$$\frac{\left(acx^3+(3\,bc-2\,ad)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{3\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^2/sqrt(c + d/x^2),x, algorithm="fricas")
```

```
[Out] 1/3*(a*c*x^3 + (3*b*c - 2*a*d)*x)*sqrt((c*x^2 + d)/x^2)/c^2
```

Sympy [A] time = 2.79483, size = 70, normalized size = 1.37

$$\frac{a\sqrt{d}x^2\sqrt{\frac{cx^2}{d}+1}}{3c}-\frac{2ad^{\frac{3}{2}}\sqrt{\frac{cx^2}{d}+1}}{3c^2}+\frac{b\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**2/(c+d/x**2)**(1/2),x)
```

```
[Out] a*sqrt(d)*x**2*sqrt(c*x**2/d + 1)/(3*c) - 2*a*d**(3/2)*sqrt(c*x**
2/d + 1)/(3*c**2) + b*sqrt(d)*sqrt(c*x**2/d + 1)/c
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(a+\frac{b}{x^2}\right)x^2}{\sqrt{c+\frac{d}{x^2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^2/sqrt(c + d/x^2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)*x^2/sqrt(c + d/x^2), x)
```

3.801 $\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}}\,dx$

Optimal. Leaf size=47

$$\frac{ax\sqrt{c+\frac{d}{x^2}}}{c}-\frac{b\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{\sqrt{d}}$$

```
[Out] (a*Sqrt[c + d/x^2]*x)/c - (b*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)]
)/Sqrt[d]
```

Rubi [A] time = 0.0975331, antiderivative size = 47, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{ax\sqrt{c+\frac{d}{x^2}}}{c}-\frac{b\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/Sqrt[c + d/x^2],x]
```

```
[Out] (a*Sqrt[c + d/x^2]*x)/c - (b*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)]
)/Sqrt[d]
```

Rubi in Sympy [A] time = 11.3511, size = 39, normalized size = 0.83

$$\frac{ax\sqrt{c+\frac{d}{x^2}}}{c}-\frac{b\,\mathrm{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/(c+d/x**2)**(1/2),x)
```

```
[Out] a*x*sqrt(c + d/x**2)/c - b*atanh(sqrt(d)/(x*sqrt(c + d/x**2)))/sq
rt(d)
```

Mathematica [A] time = 0.0920009, size = 89, normalized size = 1.89

$$\frac{a\sqrt{d}\left(cx^2+d\right)+bc\log(x)\sqrt{cx^2+d}-bc\sqrt{cx^2+d}\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)}{c\sqrt{d}x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/Sqrt[c + d/x^2],x]
```

```
[Out] (a*Sqrt[d]*(d + c*x^2) + b*c*Sqrt[d + c*x^2]*Log[x] - b*c*Sqrt[d
+ c*x^2]*Log[d + Sqrt[d]*Sqrt[d + c*x^2]])/(c*Sqrt[d]*Sqrt[c + d/
x^2]*x)
```

Maple [A] time = 0.014, size = 73, normalized size = 1.6

$$\frac{1}{cx}\sqrt{cx^2+d}\left(a\sqrt{cx^2+d}\sqrt{d}-b\ln\left(2\,\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)c\right)\frac{1}{\sqrt{\frac{cx^2+d}{x^2}}}\frac{1}{\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(1/2),x)
```

```
[Out] (c*x^2+d)^(1/2)*(a*(c*x^2+d)^(1/2)*d^(1/2)-b*ln(2*(d^(1/2)*(c*x^2
+d)^(1/2)+d)/x)*c)/((c*x^2+d)/x^2)^(1/2)/x/c/d^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/sqrt(c + d/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229864, size = 1, normalized size = 0.02

$$\left[\frac{2\,adx\sqrt{\frac{cx^2+d}{x^2}}+bc\sqrt{d}\log\left(\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}-(cx^2+2\,d)\sqrt{d}}{x^2}\right)}{2\,cd},\ \frac{adx\sqrt{\frac{cx^2+d}{x^2}}+bc\sqrt{-d}\arctan\left(\frac{\sqrt{-d}}{x\sqrt{\frac{cx^2+d}{x^2}}}\right)}{cd}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/sqrt(c + d/x^2),x, algorithm="fricas")
```

```
[Out] [1/2*(2*a*d*x*sqrt((c*x^2 + d)/x^2) + b*c*sqrt(d)*log((2*d*x*sqrt
((c*x^2 + d)/x^2) - (c*x^2 + 2*d)*sqrt(d))/x^2))/(c*d), (a*d*x*sq
rt((c*x^2 + d)/x^2) + b*c*sqrt(-d)*arctan(sqrt(-d)/(x*sqrt((c*x^2
 + d)/x^2))))/(c*d)]
```

Sympy [A] time = 3.51324, size = 39, normalized size = 0.83

$$\frac{a\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}{c}-\frac{b\,\mathrm{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{\sqrt{d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(1/2),x)
```

```
[Out] a*sqrt(d)*sqrt(c*x**2/d + 1)/c - b*asinh(sqrt(d)/(sqrt(c)*x))/sqr
t(d)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/sqrt(c + d/x^2),x, algorithm="giac")

[Out] integrate((a + b/x^2)/sqrt(c + d/x^2), x)
```

3.802 $\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}x^2}\,dx$

Optimal. Leaf size=61

$$\frac{(bc-2ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2d^{3/2}}-\frac{b\sqrt{c+\frac{d}{x^2}}}{2dx}$$

```
[Out] -(b*Sqrt[c + d/x^2])/(2*d*x) + ((b*c - 2*a*d)*ArcTanh[Sqrt[d]/(Sq
rt[c + d/x^2]*x)])/(2*d^(3/2))
```

Rubi [A] time = 0.12548, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{(bc-2ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2d^{3/2}}-\frac{b\sqrt{c+\frac{d}{x^2}}}{2dx}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/(Sqrt[c + d/x^2]*x^2),x]
```

```
[Out] -(b*Sqrt[c + d/x^2])/(2*d*x) + ((b*c - 2*a*d)*ArcTanh[Sqrt[d]/(Sq
rt[c + d/x^2]*x)])/(2*d^(3/2))
```

Rubi in Sympy [A] time = 11.4797, size = 51, normalized size = 0.84

$$-\frac{b\sqrt{c+\frac{d}{x^2}}}{2dx}-\frac{(2ad-bc)\,\text{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2d^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/x**2/(c+d/x**2)**(1/2),x)
```

```
[Out] -b*sqrt(c + d/x**2)/(2*d*x) - (2*a*d - b*c)*atanh(sqrt(d)/(x*sqrt
(c + d/x**2)))/(2*d**(3/2))
```

Mathematica [A] time = 0.131212, size = 108, normalized size = 1.77

$$\frac{x^2\log(x)\sqrt{cx^2+d}(2ad-bc)+x^2\sqrt{cx^2+d}(bc-2ad)\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)-b\sqrt{d}\left(cx^2+d\right)}{2d^{3/2}x^3\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/(Sqrt[c + d/x^2]*x^2),x]
```

```
[Out] (-(b*Sqrt[d]*(d + c*x^2)) + (-(b*c) + 2*a*d)*x^2*Sqrt[d + c*x^2]*
Log[x] + (b*c - 2*a*d)*x^2*Sqrt[d + c*x^2]*Log[d + Sqrt[d]*Sqrt[d
 + c*x^2]])/(2*d^(3/2)*Sqrt[c + d/x^2]*x^3)
```

Maple [B] time = 0.017, size = 105, normalized size = 1.7

$$-\frac{1}{2x^3}\sqrt{cx^2+d}\left(2d^2\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)ax^2-bc\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)x^2d+b\sqrt{cx^2+d}d^{\frac{3}{2}}\right)\frac{1}{\sqrt{\frac{cx^2+d}{x^2}}}d^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/x^2/(c+d/x^2)^(1/2),x)
```

```
[Out] -1/2*(c*x^2+d)^(1/2)*(2*d^2*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*a
*x^2-b*c*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*x^2*d+b*(c*x^2+d)^(1
/2)*d^(3/2))/((c*x^2+d)/x^2)^(1/2)/x^3/d^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229325, size = 1, normalized size = 0.02

$$\left[-\frac{(bc-2\,ad)\sqrt{d}x\log\left(\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}-(cx^2+2\,d)\sqrt{d}}{x^2}\right)+2\,bd\sqrt{\frac{cx^2+d}{x^2}}}{4\,d^2x},\ -\frac{(bc-2\,ad)\sqrt{-d}x\arctan\left(\frac{\sqrt{-d}}{x\sqrt{\frac{cx^2+d}{x^2}}}\right)+bd\sqrt{\frac{cx^2+d}{x^2}}}{2\,d^2x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^2),x, algorithm="fricas")
```

```
[Out] [-1/4*((b*c - 2*a*d)*sqrt(d)*x*log((2*d*x*sqrt((c*x^2 + d)/x^2) -
 (c*x^2 + 2*d)*sqrt(d))/x^2) + 2*b*d*sqrt((c*x^2 + d)/x^2))/(d^2*
x), -1/2*((b*c - 2*a*d)*sqrt(-d)*x*arctan(sqrt(-d)/(x*sqrt((c*x^2
 + d)/x^2))) + b*d*sqrt((c*x^2 + d)/x^2))/(d^2*x)]
```

Sympy [A] time = 6.75813, size = 66, normalized size = 1.08

$$-\frac{a\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{\sqrt{d}}-\frac{b\sqrt{c}\sqrt{1+\frac{d}{cx^2}}}{2dx}+\frac{bc\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{2d^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/x**2/(c+d/x**2)**(1/2),x)
```

```
[Out] -a*asinh(sqrt(d)/(sqrt(c)*x))/sqrt(d) - b*sqrt(c)*sqrt(1 + d/(c*x
**2))/(2*d*x) + b*c*asinh(sqrt(d)/(sqrt(c)*x))/(2*d**(3/2))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}\,x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^2), x)
```

3.803 $\int \frac{a+\frac{b}{x^2}}{\sqrt{c+\frac{d}{x^2}}x^4} \, dx$

Optimal. Leaf size=93

$$-\frac{c(3bc-4ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{5/2}}+\frac{\sqrt{c+\frac{d}{x^2}}(3bc-4ad)}{8d^2x}-\frac{b\sqrt{c+\frac{d}{x^2}}}{4dx^3}$$

```
[Out] -(b*Sqrt[c + d/x^2])/(4*d*x^3) + ((3*b*c - 4*a*d)*Sqrt[c + d/x^2]
)/(8*d^2*x) - (c*(3*b*c - 4*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]
*x)])/(8*d^(5/2))
```

Rubi [A] time = 0.173637, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$-\frac{c(3bc-4ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{5/2}}+\frac{\sqrt{c+\frac{d}{x^2}}(3bc-4ad)}{8d^2x}-\frac{b\sqrt{c+\frac{d}{x^2}}}{4dx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/(Sqrt[c + d/x^2]*x^4),x]
```

```
[Out] -(b*Sqrt[c + d/x^2])/(4*d*x^3) + ((3*b*c - 4*a*d)*Sqrt[c + d/x^2]
)/(8*d^2*x) - (c*(3*b*c - 4*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]
*x)])/(8*d^(5/2))
```

Rubi in Sympy [A] time = 14.415, size = 82, normalized size = 0.88

$$-\frac{b\sqrt{c+\frac{d}{x^2}}}{4dx^3}+\frac{c\,(4ad-3bc)\operatorname{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{\frac{5}{2}}}-\frac{\sqrt{c+\frac{d}{x^2}}\,(4ad-3bc)}{8d^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/x**4/(c+d/x**2)**(1/2),x)
```

```
[Out] -b*sqrt(c + d/x**2)/(4*d*x**3) + c*(4*a*d - 3*b*c)*atanh(sqrt(d)/
(x*sqrt(c + d/x**2)))/(8*d**(5/2)) - sqrt(c + d/x**2)*(4*a*d - 3*
b*c)/(8*d**2*x)
```

Mathematica [A] time = 0.181506, size = 129, normalized size = 1.39

$$\frac{-\sqrt{d}\left(cx^2+d\right)\left(4adx^2-3bcx^2+2bd\right)+cx^4\log(x)\sqrt{cx^2+d}(3bc-4ad)+cx^4\sqrt{cx^2+d}(4ad-3bc)\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)}{8d^{5/2}x^5\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/(Sqrt[c + d/x^2]*x^4),x]
```

```
[Out] (-(Sqrt[d]*(d + c*x^2)*(2*b*d - 3*b*c*x^2 + 4*a*d*x^2)) + c*(3*b*
c - 4*a*d)*x^4*Sqrt[d + c*x^2]*Log[x] + c*(-3*b*c + 4*a*d)*x^4*Sq
```

```
rt[d + c*x^2]*Log[d + Sqrt[d]*Sqrt[d + c*x^2]])/(8*d^(5/2)*Sqrt[c
 + d/x^2]*x^5)
```

Maple [A] time = 0.032, size = 148, normalized size = 1.6

$$-\frac{1}{8x^5}\sqrt{cx^2+d}\left(-4ac\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)x^4d^3+4a\sqrt{cx^2+d}\,x^2d^{7/2}-3bc\sqrt{cx^2+d}\,x^2d^{5/2}+3bc^2\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/x^4/(c+d/x^2)^(1/2),x)
```

```
[Out] -1/8*(c*x^2+d)^(1/2)*(-4*a*c*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*
x^4*d^3+4*a*(c*x^2+d)^(1/2)*x^2*d^(7/2)-3*b*c*(c*x^2+d)^(1/2)*x^2
*d^(5/2)+3*b*c^2*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*x^4*d^2+2*b*
(c*x^2+d)^(1/2)*d^(7/2))/((c*x^2+d)/x^2)^(1/2)/x^5/d^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^4),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.235741, size = 1, normalized size = 0.01

$$\left[-\frac{\left(3\,bc^2-4\,acd\right)\sqrt{d}x^3\log\left(-\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}+\left(cx^2+2\,d\right)\sqrt{d}}{x^2}\right)+2\left(2\,bd^2-\left(3\,bcd-4\,ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{16\,d^3x^3},\ \frac{\left(3\,bc^2-4\,acd\right)\sqrt{-d}x^3\,\mathrm{arcta}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/16*((3*b*c^2 - 4*a*c*d)*sqrt(d)*x^3*log(-(2*d*x*sqrt((c*x^2 +
 d)/x^2) + (c*x^2 + 2*d)*sqrt(d))/x^2) + 2*(2*b*d^2 - (3*b*c*d -
4*a*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(d^3*x^3), 1/8*((3*b*c^2 - 4
*a*c*d)*sqrt(-d)*x^3*arctan(sqrt(-d)/(x*sqrt((c*x^2 + d)/x^2))) -
 (2*b*d^2 - (3*b*c*d - 4*a*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(d^3*
x^3)]
```

Sympy [A] time = 12.8797, size = 150, normalized size = 1.61

$$-\frac{a\sqrt{c}\sqrt{1+\frac{d}{cx^2}}}{2dx}+\frac{ac\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{2d^{\frac{3}{2}}}+\frac{3bc^{\frac{3}{2}}}{8d^2x\sqrt{1+\frac{d}{cx^2}}}+\frac{b\sqrt{c}}{8dx^3\sqrt{1+\frac{d}{cx^2}}}-\frac{3bc^2\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{8d^{\frac{5}{2}}}-\frac{b}{4\sqrt{c}x^5\sqrt{1+\frac{d}{cx^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/x**4/(c+d/x**2)**(1/2),x)
```

```
[Out] -a*sqrt(c)*sqrt(1 + d/(c*x**2))/(2*d*x) + a*c*asinh(sqrt(d)/(sqrt
(c)*x))/(2*d**(3/2)) + 3*b*c**(3/2)/(8*d**2*x*sqrt(1 + d/(c*x**2)
)) + b*sqrt(c)/(8*d*x**3*sqrt(1 + d/(c*x**2))) - 3*b*c**2*asinh(s
qrt(d)/(sqrt(c)*x))/(8*d**(5/2)) - b/(4*sqrt(c)*x**5*sqrt(1 + d/(
c*x**2)))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a + \frac{b}{x^2}}{\sqrt{c + \frac{d}{x^2}}\, x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^4),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/(sqrt(c + d/x^2)*x^4), x)
```

3.804 $\int \frac{\left(a+\frac{b}{x^2}\right)x^3}{\left(c+\frac{d}{x^2}\right)^{3/2}}\,dx$

Optimal. Leaf size=120

$$-\frac{3d(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{7/2}}+\frac{3x^2\sqrt{c+\frac{d}{x^2}}(4bc-5ad)}{8c^3}-\frac{x^2(4bc-5ad)}{4c^2\sqrt{c+\frac{d}{x^2}}}+\frac{ax^4}{4c\sqrt{c+\frac{d}{x^2}}}$$

```
[Out] -((4*b*c - 5*a*d)*x^2)/(4*c^2*Sqrt[c + d/x^2]) + (3*(4*b*c - 5*a*
d)*Sqrt[c + d/x^2]*x^2)/(8*c^3) + (a*x^4)/(4*c*Sqrt[c + d/x^2]) -
 (3*d*(4*b*c - 5*a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(8*c^(7/2
))
```

Rubi [A] time = 0.269688, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{3d(4bc-5ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{7/2}}+\frac{3x^2\sqrt{c+\frac{d}{x^2}}(4bc-5ad)}{8c^3}-\frac{x^2(4bc-5ad)}{4c^2\sqrt{c+\frac{d}{x^2}}}+\frac{ax^4}{4c\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*x^3)/(c + d/x^2)^(3/2),x]
```

```
[Out] -((4*b*c - 5*a*d)*x^2)/(4*c^2*Sqrt[c + d/x^2]) + (3*(4*b*c - 5*a*
d)*Sqrt[c + d/x^2]*x^2)/(8*c^3) + (a*x^4)/(4*c*Sqrt[c + d/x^2]) -
 (3*d*(4*b*c - 5*a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(8*c^(7/2
))
```

Rubi in Sympy [A] time = 19.0362, size = 114, normalized size = 0.95

$$\frac{ax^4}{4c\sqrt{c+\frac{d}{x^2}}}+\frac{x^2\left(5ad-4bc\right)}{4c^2\sqrt{c+\frac{d}{x^2}}}-\frac{3x^2\sqrt{c+\frac{d}{x^2}}\left(5ad-4bc\right)}{8c^3}+\frac{3d\left(5ad-4bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{8c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**3/(c+d/x**2)**(3/2),x)
```

```
[Out] a*x**4/(4*c*sqrt(c + d/x**2)) + x**2*(5*a*d - 4*b*c)/(4*c**2*sqrt
(c + d/x**2)) - 3*x**2*sqrt(c + d/x**2)*(5*a*d - 4*b*c)/(8*c**3)
+ 3*d*(5*a*d - 4*b*c)*atanh(sqrt(c + d/x**2)/sqrt(c))/(8*c**(7/2)
)
```

Mathematica [A] time = 0.147545, size = 113, normalized size = 0.94

$$\frac{\sqrt{c}x\left(a\left(2c^2x^4-5cdx^2-15d^2\right)+4bc\left(cx^2+3d\right)\right)+3d\sqrt{cx^2+d}(5ad-4bc)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{8c^{7/2}x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*x^3)/(c + d/x^2)^(3/2),x]
```

```
[Out] (Sqrt[c]*x*(4*b*c*(3*d + c*x^2) + a*(-15*d^2 - 5*c*d*x^2 + 2*c^2*
x^4)) + 3*d*(-4*b*c + 5*a*d)*Sqrt[d + c*x^2]*Log[c*x + Sqrt[c]*Sq
rt[d + c*x^2]])/(8*c^(7/2)*Sqrt[c + d/x^2]*x)
```

Maple [A] time = 0.02, size = 142, normalized size = 1.2

$$\frac{cx^2+d}{8\,x^3}\left(2\,ax^5c^{11/2}-5\,adx^3c^{9/2}+4\,x^3bc^{11/2}-15\,ad^2xc^{7/2}+12\,xbdc^{9/2}-12\,bd\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)c^4\sqrt{cx^2+d}+15\,ad^2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^3/(c+d/x^2)^(3/2),x)
```

```
[Out] 1/8*(c*x^2+d)*(2*a*x^5*c^(11/2)-5*a*d*x^3*c^(9/2)+4*x^3*b*c^(11/2
)-15*a*d^2*x*c^(7/2)+12*x*b*d*c^(9/2)-12*b*d*ln(c^(1/2)*x+(c*x^2+
d)^(1/2))*c^4*(c*x^2+d)^(1/2)+15*a*d^2*ln(c^(1/2)*x+(c*x^2+d)^(1/
2))*c^3*(c*x^2+d)^(1/2))/((c*x^2+d)/x^2)^(3/2)/x^3/c^(13/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^3/(c + d/x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.244504, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(4\,bcd^2-5\,ad^3+\left(4\,bc^2d-5\,acd^2\right)x^2\right)\sqrt{c}\log\left(-2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)-2\left(2\,ac^3x^6+\left(4\,bc^3-5\,ac^2d\right)x^4+3\left(\right.\right.}{16\left(c^5x^2+c^4d\right)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^3/(c + d/x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] [-1/16*(3*(4*b*c*d^2 - 5*a*d^3 + (4*b*c^2*d - 5*a*c*d^2)*x^2)*sqr
t(c)*log(-2*c*x^2*sqrt((c*x^2 + d)/x^2) - (2*c*x^2 + d)*sqrt(c))
- 2*(2*a*c^3*x^6 + (4*b*c^3 - 5*a*c^2*d)*x^4 + 3*(4*b*c^2*d - 5*a
*c*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(c^5*x^2 + c^4*d), 1/8*(3*(4*
b*c*d^2 - 5*a*d^3 + (4*b*c^2*d - 5*a*c*d^2)*x^2)*sqrt(-c)*arctan(
sqrt(-c)/sqrt((c*x^2 + d)/x^2)) + (2*a*c^3*x^6 + (4*b*c^3 - 5*a*c
^2*d)*x^4 + 3*(4*b*c^2*d - 5*a*c*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))
/(c^5*x^2 + c^4*d)]
```

Sympy [A] time = 24.2744, size = 177, normalized size = 1.48

$$a\left(\frac{x^5}{4c\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}-\frac{5\sqrt{d}x^3}{8c^2\sqrt{\frac{cx^2}{d}+1}}-\frac{15d^{\frac{3}{2}}x}{8c^3\sqrt{\frac{cx^2}{d}+1}}+\frac{15d^2\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{8c^{\frac{7}{2}}}\right)+b\left(\frac{x^3}{2c\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{3\sqrt{d}x}{2c^2\sqrt{\frac{cx^2}{d}+1}}-\frac{3d\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{2c^{\frac{5}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**3/(c+d/x**2)**(3/2),x)
```

```
[Out] a*(x**5/(4*c*sqrt(d)*sqrt(c*x**2/d + 1)) - 5*sqrt(d)*x**3/(8*c**2
*sqrt(c*x**2/d + 1)) - 15*d**(3/2)*x/(8*c**3*sqrt(c*x**2/d + 1))
+ 15*d**2*asinh(sqrt(c)*x/sqrt(d))/(8*c**(7/2))) + b*(x**3/(2*c*s
qrt(d)*sqrt(c*x**2/d + 1)) + 3*sqrt(d)*x/(2*c**2*sqrt(c*x**2/d +
1)) - 3*d*asinh(sqrt(c)*x/sqrt(d))/(2*c**(5/2)))
```

GIAC/XCAS [A] time = 0.254722, size = 261, normalized size = 2.17

$$\frac{1}{8}d^2\left(\frac{3(4bc-5ad)\arctan\left(\frac{\sqrt{\frac{cx^2+d}{x^2}}}{\sqrt{-c}}\right)}{\sqrt{-c}c^3d}+\frac{8(bc-ad)}{c^3d\sqrt{\frac{cx^2+d}{x^2}}}-\frac{4bc^2\sqrt{\frac{cx^2+d}{x^2}}-9acd\sqrt{\frac{cx^2+d}{x^2}}-\frac{4(cx^2+d)bc\sqrt{\frac{cx^2+d}{x^2}}}{x^2}+\frac{7(cx^2+d)ad\sqrt{\frac{cx^2+d}{x^2}}}{x^2}}{\left(c-\frac{cx^2+d}{x^2}\right)^2c^3d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^3/(c + d/x^2)^(3/2),x, algorithm="giac")
```

```
[Out] 1/8*d^2*(3*(4*b*c - 5*a*d)*arctan(sqrt((c*x^2 + d)/x^2)/sqrt(-c))
/(sqrt(-c)*c^3*d) + 8*(b*c - a*d)/(c^3*d*sqrt((c*x^2 + d)/x^2)) -
 (4*b*c^2*sqrt((c*x^2 + d)/x^2) - 9*a*c*d*sqrt((c*x^2 + d)/x^2) -
 4*(c*x^2 + d)*b*c*sqrt((c*x^2 + d)/x^2)/x^2 + 7*(c*x^2 + d)*a*d*
sqrt((c*x^2 + d)/x^2)/x^2)/((c - (c*x^2 + d)/x^2)^2*c^3*d))
```

3.805 $\int \frac{\left(a+\frac{b}{x^2}\right)x}{\left(c+\frac{d}{x^2}\right)^{3/2}}\,dx$

Optimal. Leaf size=86

$$\frac{(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{2c^{5/2}}-\frac{2bc-3ad}{2c^2\sqrt{c+\frac{d}{x^2}}}+\frac{ax^2}{2c\sqrt{c+\frac{d}{x^2}}}$$

```
[Out] -(2*b*c - 3*a*d)/(2*c^2*Sqrt[c + d/x^2]) + (a*x^2)/(2*c*Sqrt[c +
d/x^2]) + ((2*b*c - 3*a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(2*c
^(5/2))
```

Rubi [A] time = 0.189811, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$\frac{(2bc-3ad)\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{2c^{5/2}}-\frac{2bc-3ad}{2c^2\sqrt{c+\frac{d}{x^2}}}+\frac{ax^2}{2c\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*x)/(c + d/x^2)^(3/2),x]
```

```
[Out] -(2*b*c - 3*a*d)/(2*c^2*Sqrt[c + d/x^2]) + (a*x^2)/(2*c*Sqrt[c +
d/x^2]) + ((2*b*c - 3*a*d)*ArcTanh[Sqrt[c + d/x^2]/Sqrt[c]])/(2*c
^(5/2))
```

Rubi in Sympy [A] time = 14.7331, size = 73, normalized size = 0.85

$$\frac{ax^2}{2c\sqrt{c+\frac{d}{x^2}}}+\frac{\frac{3ad}{2}-bc}{c^2\sqrt{c+\frac{d}{x^2}}}-\frac{\left(\frac{3ad}{2}-bc\right)\operatorname{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x/(c+d/x**2)**(3/2),x)
```

```
[Out] a*x**2/(2*c*sqrt(c + d/x**2)) + (3*a*d/2 - b*c)/(c**2*sqrt(c + d/
x**2)) - (3*a*d/2 - b*c)*atanh(sqrt(c + d/x**2)/sqrt(c))/c**(5/2)
```

Mathematica [A] time = 0.105913, size = 89, normalized size = 1.03

$$\frac{\sqrt{c}x\left(acx^2+3ad-2bc\right)+\sqrt{cx^2+d}(2bc-3ad)\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{2c^{5/2}x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*x)/(c + d/x^2)^(3/2),x]
```

```
[Out] (Sqrt[c]*x*(-2*b*c + 3*a*d + a*c*x^2) + (2*b*c - 3*a*d)*Sqrt[d +
c*x^2]*Log[c*x + Sqrt[c]*Sqrt[d + c*x^2]])/(2*c^(5/2)*Sqrt[c + d/
x^2]*x)
```

Maple [A] time = 0.016, size = 116, normalized size = 1.4

$$\frac{cx^2+d}{2\,x^3}\left(x^3ac^{\frac{7}{2}}+3\,adxc^{5/2}-2\,xbc^{7/2}+2\,b\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)c^3\sqrt{cx^2+d}-3\,ad\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)c^2\sqrt{cx^2+d}\right)\left(\frac{cx^2}{x}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x/(c+d/x^2)^(3/2),x)
```

```
[Out] 1/2*(c*x^2+d)*(x^3*a*c^(7/2)+3*a*d*x*c^(5/2)-2*x*b*c^(7/2)+2*b*ln
(c^(1/2)*x+(c*x^2+d)^(1/2))*c^3*(c*x^2+d)^(1/2)-3*a*d*ln(c^(1/2)*
x+(c*x^2+d)^(1/2))*c^2*(c*x^2+d)^(1/2))/((c*x^2+d)/x^2)^(3/2)/x^3
/c^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x/(c + d/x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238511, size = 1, normalized size = 0.01

$$\left[-\frac{\left(2\,bcd-3\,ad^2+\left(2\,bc^2-3\,acd\right)x^2\right)\sqrt{c}\log\left(2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)-2\left(ac^2x^4-\left(2\,bc^2-3\,acd\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{4\left(c^4x^2+c^3d\right)},\right.$$
$$\left.-\frac{\left(2\,bcd-3\,ad^2+\left(2\,bc^2-3\,acd\right)x^2\right)\sqrt{-c}\arctan\left(\frac{\sqrt{-c}}{\sqrt{\frac{cx^2+d}{x^2}}}\right)-\left(ac^2x^4-\left(2\,bc^2-3\,acd\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{2\left(c^4x^2+c^3d\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x/(c + d/x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] [-1/4*((2*b*c*d - 3*a*d^2 + (2*b*c^2 - 3*a*c*d)*x^2)*sqrt(c)*log(
2*c*x^2*sqrt((c*x^2 + d)/x^2) - (2*c*x^2 + d)*sqrt(c)) - 2*(a*c^2
*x^4 - (2*b*c^2 - 3*a*c*d)*x^2)*sqrt((c*x^2 + d)/x^2))/(c^4*x^2 +
 c^3*d), -1/2*((2*b*c*d - 3*a*d^2 + (2*b*c^2 - 3*a*c*d)*x^2)*sqrt
(-c)*arctan(sqrt(-c)/sqrt((c*x^2 + d)/x^2)) - (a*c^2*x^4 - (2*b*c
^2 - 3*a*c*d)*x^2)*sqrt((c*x^2 + d)/x^2))/(c^4*x^2 + c^3*d)]
```

Sympy [A] time = 16.3772, size = 264, normalized size = 3.07

$$a\left(\frac{x^3}{2c\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{3\sqrt{d}x}{2c^2\sqrt{\frac{cx^2}{d}+1}}-\frac{3d\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{d}}\right)}{2c^{\frac{5}{2}}}\right)+b\left(-\frac{2c^3x^2\sqrt{1+\frac{d}{cx^2}}}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}-\frac{c^3x^2\log\left(\frac{d}{cx^2}\right)}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}+\frac{2c^3x^2\log\left(\sqrt{1+\frac{d}{cx^2}}+1\right)}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}-\frac{c^2d\log\left(\frac{d}{cx^2}\right)}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}+\frac{2c^2d\log\left(\sqrt{1+\frac{d}{cx^2}}+1\right)}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a+b/x**2)*x/(c+d/x**2)**(3/2),x)
```

```
[Out] a*(x**3/(2*c*sqrt(d)*sqrt(c*x**2/d + 1)) + 3*sqrt(d)*x/(2*c**2*sq
rt(c*x**2/d + 1)) - 3*d*asinh(sqrt(c)*x/sqrt(d))/(2*c**(5/2))) +
b*(-2*c**3*x**2*sqrt(1 + d/(c*x**2))/(2*c**(9/2)*x**2 + 2*c**(7/2
)*d) - c**3*x**2*log(d/(c*x**2))/(2*c**(9/2)*x**2 + 2*c**(7/2)*d)
 + 2*c**3*x**2*log(sqrt(1 + d/(c*x**2)) + 1)/(2*c**(9/2)*x**2 + 2
*c**(7/2)*d) - c**2*d*log(d/(c*x**2))/(2*c**(9/2)*x**2 + 2*c**(7/
2)*d) + 2*c**2*d*log(sqrt(1 + d/(c*x**2)) + 1)/(2*c**(9/2)*x**2 +
 2*c**(7/2)*d))
```

GIAC/XCAS [A] time = 0.249726, size = 182, normalized size = 2.12

$$-\frac{1}{2}d\left(\frac{(2bc-3ad)\arctan\left(\frac{\sqrt{\frac{cx^2+d}{x^2}}}{\sqrt{-c}}\right)}{\sqrt{-c}c^2d}+\frac{2bc^2-2acd-\frac{2(cx^2+d)bc}{x^2}+\frac{3(cx^2+d)ad}{x^2}}{\left(c\sqrt{\frac{cx^2+d}{x^2}}-\frac{(cx^2+d)\sqrt{\frac{cx^2+d}{x^2}}}{x^2}\right)c^2d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)*x/(c + d/x^2)^(3/2),x, algorithm="giac")
```

```
[Out] -1/2*d*((2*b*c - 3*a*d)*arctan(sqrt((c*x^2 + d)/x^2)/sqrt(-c))/(s
qrt(-c)*c^2*d) + (2*b*c^2 - 2*a*c*d - 2*(c*x^2 + d)*b*c/x^2 + 3*(
c*x^2 + d)*a*d/x^2)/((c*sqrt((c*x^2 + d)/x^2) - (c*x^2 + d)*sqrt(
(c*x^2 + d)/x^2)/x^2)*c^2*d))
```

3.806 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2} x} \, dx$

Optimal. Leaf size=52

$$\frac{bc-ad}{cd\sqrt{c+\frac{d}{x^2}}}+\frac{a\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{c^{3/2}}$$

```
[Out] (b*c - a*d)/(c*d*Sqrt[c + d/x^2]) + (a*ArcTanh[Sqrt[c + d/x^2]/Sq
rt[c]])/c^(3/2)
```

Rubi [A] time = 0.148333, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{bc-ad}{cd\sqrt{c+\frac{d}{x^2}}}+\frac{a\tanh^{-1}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{c^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/((c + d/x^2)^(3/2)*x),x]
```

```
[Out] (b*c - a*d)/(c*d*Sqrt[c + d/x^2]) + (a*ArcTanh[Sqrt[c + d/x^2]/Sq
rt[c]])/c^(3/2)
```

Rubi in Sympy [A] time = 12.1826, size = 42, normalized size = 0.81

$$\frac{a\,\text{atanh}\left(\frac{\sqrt{c+\frac{d}{x^2}}}{\sqrt{c}}\right)}{c^{\frac{3}{2}}}-\frac{ad-bc}{cd\sqrt{c+\frac{d}{x^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x,x)
```

```
[Out] a*atanh(sqrt(c + d/x**2)/sqrt(c))/c**(3/2) - (a*d - b*c)/(c*d*sqr
t(c + d/x**2))
```

Mathematica [A] time = 0.0669372, size = 75, normalized size = 1.44

$$\frac{\sqrt{c}x(bc-ad)+ad\sqrt{cx^2+d}\log\left(\sqrt{c}\sqrt{cx^2+d}+cx\right)}{c^{3/2}dx\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/((c + d/x^2)^(3/2)*x),x]
```

```
[Out] (Sqrt[c]*(b*c - a*d)*x + a*d*Sqrt[d + c*x^2]*Log[c*x + Sqrt[c]*Sq
rt[d + c*x^2]])/(c^(3/2)*d*Sqrt[c + d/x^2]*x)
```

Maple [A] time = 0.013, size = 75, normalized size = 1.4

$$\frac{cx^2+d}{dx^3}\left(xbc^{\frac{5}{2}}-axdc^{\frac{3}{2}}+a\ln\left(\sqrt{c}x+\sqrt{cx^2+d}\right)d\sqrt{cx^2+d}c\right)\left(\frac{cx^2+d}{x^2}\right)^{-\frac{3}{2}}c^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(3/2)/x,x)
```

```
[Out] (c*x^2+d)*(x*b*c^(5/2)-a*x*d*c^(3/2)+a*ln(c^(1/2)*x+(c*x^2+d)^(1/
2))*d*(c*x^2+d)^(1/2)*c)/((c*x^2+d)/x^2)^(3/2)/x^3/d/c^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229632, size = 1, normalized size = 0.02

$$\left[\frac{2\left(bc^2-acd\right)x^2\sqrt{\frac{cx^2+d}{x^2}}+\left(acdx^2+ad^2\right)\sqrt{c}\log\left(-2\,cx^2\sqrt{\frac{cx^2+d}{x^2}}-\left(2\,cx^2+d\right)\sqrt{c}\right)}{2\left(c^3dx^2+c^2d^2\right)},\ \frac{\left(bc^2-acd\right)x^2\sqrt{\frac{cx^2+d}{x^2}}-\left(acdx^2+ad^2\right)}{c^3dx^2+c^2d^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x),x, algorithm="fricas")
```

```
[Out] [1/2*(2*(b*c^2 - a*c*d)*x^2*sqrt((c*x^2 + d)/x^2) + (a*c*d*x^2 +
a*d^2)*sqrt(c)*log(-2*c*x^2*sqrt((c*x^2 + d)/x^2) - (2*c*x^2 + d)
*sqrt(c)))/(c^3*d*x^2 + c^2*d^2), ((b*c^2 - a*c*d)*x^2*sqrt((c*x^
2 + d)/x^2) - (a*c*d*x^2 + a*d^2)*sqrt(-c)*arctan(sqrt(-c)/sqrt((
c*x^2 + d)/x^2)))/(c^3*d*x^2 + c^2*d^2)]
```

Sympy [A] time = 15.6087, size = 218, normalized size = 4.19

$$a\left(-\frac{2c^3x^2\sqrt{1+\frac{d}{cx^2}}}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}-\frac{c^3x^2\log\left(\frac{d}{cx^2}\right)}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}+\frac{2c^3x^2\log\left(\sqrt{1+\frac{d}{cx^2}}+1\right)}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}-\frac{c^2d\log\left(\frac{d}{cx^2}\right)}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}+\frac{2c^2d\log\left(\sqrt{1+\frac{d}{cx^2}}+1\right)}{2c^{\frac{9}{2}}x^2+2c^{\frac{7}{2}}d}\right)+b\left(\begin{cases}\frac{1}{d\sqrt{c+\frac{d}{x^2}}} & \text{for}\ d\neq 0\\-\frac{1}{2c^{\frac{3}{2}}x^2} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x,x)
```

```
[Out] a*(-2*c**3*x**2*sqrt(1 + d/(c*x**2))/(2*c**(9/2)*x**2 + 2*c**(7/2
)*d) - c**3*x**2*log(d/(c*x**2))/(2*c**(9/2)*x**2 + 2*c**(7/2)*d)
 + 2*c**3*x**2*log(sqrt(1 + d/(c*x**2)) + 1)/(2*c**(9/2)*x**2 + 2
*c**(7/2)*d) - c**2*d*log(d/(c*x**2))/(2*c**(9/2)*x**2 + 2*c**(7/
2)*d) + 2*c**2*d*log(sqrt(1 + d/(c*x**2)) + 1)/(2*c**(9/2)*x**2 +
 2*c**(7/2)*d)) + b*Piecewise((1/(d*sqrt(c + d/x**2)), Ne(d, 0)),
 (-1/(2*c**(3/2)*x**2), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x), x)
```

3.807 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2} x^3} \, dx$

Optimal. Leaf size=42

$$-\frac{bc-ad}{d^2\sqrt{c+\frac{d}{x^2}}}-\frac{b\sqrt{c+\frac{d}{x^2}}}{d^2}$$

```
[Out] -((b*c - a*d)/(d^2*Sqrt[c + d/x^2])) - (b*Sqrt[c + d/x^2])/d^2
```

Rubi [A] time = 0.122619, antiderivative size = 42, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{bc-ad}{d^2\sqrt{c+\frac{d}{x^2}}}-\frac{b\sqrt{c+\frac{d}{x^2}}}{d^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b/x^2)/((c + d/x^2)^(3/2)*x^3),x]

[Out] -((b*c - a*d)/(d^2*Sqrt[c + d/x^2])) - (b*Sqrt[c + d/x^2])/d^2
```

Rubi in Sympy [A] time = 12.1969, size = 34, normalized size = 0.81

$$-\frac{b\sqrt{c+\frac{d}{x^2}}}{d^2}+\frac{ad-bc}{d^2\sqrt{c+\frac{d}{x^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**3,x)

[Out] -b*sqrt(c + d/x**2)/d**2 + (a*d - b*c)/(d**2*sqrt(c + d/x**2))
```

Mathematica [A] time = 0.0532218, size = 36, normalized size = 0.86

$$\frac{adx^2-b\left(2cx^2+d\right)}{d^2x^2\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b/x^2)/((c + d/x^2)^(3/2)*x^3),x]

[Out] (a*d*x^2 - b*(d + 2*c*x^2))/(d^2*Sqrt[c + d/x^2]*x^2)
```

Maple [A] time = 0.01, size = 46, normalized size = 1.1

$$\frac{\left(adx^2-2\,bcx^2-bd\right)\left(cx^2+d\right)}{d^2x^4}\left(\frac{cx^2+d}{x^2}\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(3/2)/x^3,x)
```

```
[Out] (a*d*x^2-2*b*c*x^2-b*d)*(c*x^2+d)/((c*x^2+d)/x^2)^(3/2)/d^2/x^4
```

Maxima [A] time = 1.38262, size = 62, normalized size = 1.48

$$-b\left(\frac{\sqrt{c+\frac{d}{x^2}}}{d^2}+\frac{c}{\sqrt{c+\frac{d}{x^2}}\,d^2}\right)+\frac{a}{\sqrt{c+\frac{d}{x^2}}\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^3),x, algorithm="maxima")
```

```
[Out] -b*(sqrt(c + d/x^2)/d^2 + c/(sqrt(c + d/x^2)*d^2)) + a/(sqrt(c +
d/x^2)*d)
```

Fricas [A] time = 0.216663, size = 62, normalized size = 1.48

$$-\frac{\left((2\,bc-ad)x^2+bd\right)\sqrt{\frac{cx^2+d}{x^2}}}{cd^2x^2+d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^3),x, algorithm="fricas")
```

```
[Out] -((2*b*c - a*d)*x^2 + b*d)*sqrt((c*x^2 + d)/x^2)/(c*d^2*x^2 + d^3
)
```

Sympy [A] time = 5.5744, size = 68, normalized size = 1.62

$$\begin{cases} \frac{a}{d\sqrt{c+\frac{d}{x^2}}}-\frac{2bc}{d^2\sqrt{c+\frac{d}{x^2}}}-\frac{b}{dx^2\sqrt{c+\frac{d}{x^2}}} & \text{for}\ d\neq 0 \\ \frac{-\frac{a}{2x^2}-\frac{b}{4x^4}}{c^{\frac{3}{2}}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**3,x)
```

```
[Out] Piecewise((a/(d*sqrt(c + d/x**2)) - 2*b*c/(d**2*sqrt(c + d/x**2))
 - b/(d*x**2*sqrt(c + d/x**2)), Ne(d, 0)), ((-a/(2*x**2) - b/(4*x
**4))/c**(3/2), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^3),x, algorithm="giac")

[Out] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^3), x)
```

3.808 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2}x^5}\,dx$

Optimal. Leaf size=68

$$\frac{\sqrt{c+\frac{d}{x^2}}(2bc-ad)}{d^3}+\frac{c(bc-ad)}{d^3\sqrt{c+\frac{d}{x^2}}}-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{3d^3}$$

```
[Out] (c*(b*c - a*d))/(d^3*Sqrt[c + d/x^2]) + ((2*b*c - a*d)*Sqrt[c + d
/x^2])/d^3 - (b*(c + d/x^2)^(3/2))/(3*d^3)
```

Rubi [A] time = 0.172851, antiderivative size = 68, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{\sqrt{c+\frac{d}{x^2}}(2bc-ad)}{d^3}+\frac{c(bc-ad)}{d^3\sqrt{c+\frac{d}{x^2}}}-\frac{b\left(c+\frac{d}{x^2}\right)^{3/2}}{3d^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/((c + d/x^2)^(3/2)*x^5),x]
```

```
[Out] (c*(b*c - a*d))/(d^3*Sqrt[c + d/x^2]) + ((2*b*c - a*d)*Sqrt[c + d
/x^2])/d^3 - (b*(c + d/x^2)^(3/2))/(3*d^3)
```

Rubi in Sympy [A] time = 16.955, size = 61, normalized size = 0.9

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{3d^3}-\frac{c\left(ad-bc\right)}{d^3\sqrt{c+\frac{d}{x^2}}}-\frac{\sqrt{c+\frac{d}{x^2}}\left(ad-2bc\right)}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**5,x)
```

```
[Out] -b*(c + d/x**2)**(3/2)/(3*d**3) - c*(a*d - b*c)/(d**3*sqrt(c + d/
x**2)) - sqrt(c + d/x**2)*(a*d - 2*b*c)/d**3
```

Mathematica [A] time = 0.074885, size = 60, normalized size = 0.88

$$\frac{b\left(8c^2x^4+4cdx^2-d^2\right)-3adx^2\left(2cx^2+d\right)}{3d^3x^4\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/((c + d/x^2)^(3/2)*x^5),x]
```

```
[Out] (-3*a*d*x^2*(d + 2*c*x^2) + b*(-d^2 + 4*c*d*x^2 + 8*c^2*x^4))/(3*
d^3*Sqrt[c + d/x^2]*x^4)
```

Maple [A] time = 0.011, size = 69, normalized size = 1.

$$-\frac{\left(6\,acd x^4-8\,b c^2 x^4+3\,a d^2 x^2-4\,b c d x^2+b d^2\right)\left(c x^2+d\right)}{3\,d^3 x^6}\left(\frac{c x^2+d}{x^2}\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(3/2)/x^5,x)
```

```
[Out] -1/3*(6*a*c*d*x^4-8*b*c^2*x^4+3*a*d^2*x^2-4*b*c*d*x^2+b*d^2)*(c*x
^2+d)/((c*x^2+d)/x^2)^(3/2)/d^3/x^6
```

Maxima [A] time = 1.46481, size = 109, normalized size = 1.6

$$-\frac{1}{3}\,b\left(\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{d^3}-\frac{6\,\sqrt{c+\frac{d}{x^2}}\,c}{d^3}-\frac{3\,c^2}{\sqrt{c+\frac{d}{x^2}}\,d^3}\right)-a\left(\frac{\sqrt{c+\frac{d}{x^2}}}{d^2}+\frac{c}{\sqrt{c+\frac{d}{x^2}}\,d^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^5),x, algorithm="maxima")
```

```
[Out] -1/3*b*((c + d/x^2)^(3/2)/d^3 - 6*sqrt(c + d/x^2)*c/d^3 - 3*c^2/(
sqrt(c + d/x^2)*d^3)) - a*(sqrt(c + d/x^2)/d^2 + c/(sqrt(c + d/x^
2)*d^2))
```

Fricas [A] time = 0.225291, size = 99, normalized size = 1.46

$$\frac{\left(2\left(4\,bc^2-3\,acd\right)x^4-bd^2+\left(4\,bcd-3\,ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{3\left(cd^3x^4+d^4x^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^5),x, algorithm="fricas")
```

```
[Out] 1/3*(2*(4*b*c^2 - 3*a*c*d)*x^4 - b*d^2 + (4*b*c*d - 3*a*d^2)*x^2)
*sqrt((c*x^2 + d)/x^2)/(c*d^3*x^4 + d^4*x^2)
```

Sympy [A] time = 37.0914, size = 476, normalized size = 7.

$$a\left(\begin{cases}-\frac{2c}{d^2\sqrt{c+\frac{d}{x^2}}}-\frac{1}{dx^2\sqrt{c+\frac{d}{x^2}}} & \text{for}\ d\neq 0\\ -\frac{1}{4c^{\frac{3}{2}}x^4} & \text{otherwise}\end{cases}\right)+b\left(\frac{8c^{\frac{9}{2}}d^{\frac{7}{2}}x^6\sqrt{\frac{cx^2}{d}+1}}{3c^{\frac{7}{2}}d^6x^7+6c^{\frac{5}{2}}d^7x^5+3c^{\frac{3}{2}}d^8x^3}+\frac{12c^{\frac{7}{2}}d^{\frac{9}{2}}x^4\sqrt{\frac{cx^2}{d}+1}}{3c^{\frac{7}{2}}d^6x^7+6c^{\frac{5}{2}}d^7x^5+3c^{\frac{3}{2}}d^8x^3}+\frac{3c^{\frac{5}{2}}d^{\frac{11}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{3c^{\frac{7}{2}}d^6x^7+6c^{\frac{5}{2}}d^7x^5+3c^{\frac{3}{2}}d^8x^3}-\frac{c^{\frac{3}{2}}d^{\frac{13}{2}}\sqrt{\frac{cx^2}{d}+1}}{3c^{\frac{7}{2}}d^6x^7+6c^{\frac{5}{2}}d^7x^5+3c^{\frac{3}{2}}d^8x^3}-\frac{8c^5d^3x^7}{3c^{\frac{7}{2}}d^6x^7+6c^{\frac{5}{2}}d^7x^5+3c^{\frac{3}{2}}d^8x^3}-\frac{16c^4d^4x^5}{3c^{\frac{7}{2}}d^6x^7+6c^{\frac{5}{2}}d^7x^5+3c^{\frac{3}{2}}d^8x^3}-\frac{8c^3d^5x^3}{3c^{\frac{7}{2}}d^6x^7+6c^{\frac{5}{2}}d^7x^5+3c^{\frac{3}{2}}d^8x^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**5,x)
```

```
[Out] a*Piecewise((-2*c/(d**2*sqrt(c + d/x**2)) - 1/(d*x**2*sqrt(c + d/
x**2)), Ne(d, 0)), (-1/(4*c**(3/2)*x**4), True)) + b*(8*c**(9/2)*
d**(7/2)*x**6*sqrt(c*x**2/d + 1)/(3*c**(7/2)*d**6*x**7 + 6*c**(5/
2)*d**7*x**5 + 3*c**(3/2)*d**8*x**3) + 12*c**(7/2)*d**(9/2)*x**4*
sqrt(c*x**2/d + 1)/(3*c**(7/2)*d**6*x**7 + 6*c**(5/2)*d**7*x**5 +
 3*c**(3/2)*d**8*x**3) + 3*c**(5/2)*d**(11/2)*x**2*sqrt(c*x**2/d
+ 1)/(3*c**(7/2)*d**6*x**7 + 6*c**(5/2)*d**7*x**5 + 3*c**(3/2)*d*
*8*x**3) - c**(3/2)*d**(13/2)*sqrt(c*x**2/d + 1)/(3*c**(7/2)*d**6
*x**7 + 6*c**(5/2)*d**7*x**5 + 3*c**(3/2)*d**8*x**3) - 8*c**5*d**
3*x**7/(3*c**(7/2)*d**6*x**7 + 6*c**(5/2)*d**7*x**5 + 3*c**(3/2)*
d**8*x**3) - 16*c**4*d**4*x**5/(3*c**(7/2)*d**6*x**7 + 6*c**(5/2)
*d**7*x**5 + 3*c**(3/2)*d**8*x**3) - 8*c**3*d**5*x**3/(3*c**(7/2)
*d**6*x**7 + 6*c**(5/2)*d**7*x**5 + 3*c**(3/2)*d**8*x**3))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a + \frac{b}{x^2}}{\left(c + \frac{d}{x^2}\right)^{\frac{3}{2}} x^5} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^5),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^5), x)
```

3.809 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2} x^7} \, dx$

Optimal. Leaf size=100

$$-\frac{c^2(bc-ad)}{d^4\sqrt{c+\frac{d}{x^2}}}+\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-ad)}{3d^4}-\frac{c\sqrt{c+\frac{d}{x^2}}(3bc-2ad)}{d^4}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{5d^4}$$

```
[Out] -((c^2*(b*c - a*d))/(d^4*Sqrt[c + d/x^2])) - (c*(3*b*c - 2*a*d)*S
qrt[c + d/x^2])/d^4 + ((3*b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^4) -
 (b*(c + d/x^2)^(5/2))/(5*d^4)
```

Rubi [A] time = 0.225897, antiderivative size = 100, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{c^2(bc-ad)}{d^4\sqrt{c+\frac{d}{x^2}}}+\frac{\left(c+\frac{d}{x^2}\right)^{3/2}(3bc-ad)}{3d^4}-\frac{c\sqrt{c+\frac{d}{x^2}}(3bc-2ad)}{d^4}-\frac{b\left(c+\frac{d}{x^2}\right)^{5/2}}{5d^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/((c + d/x^2)^(3/2)*x^7),x]
```

```
[Out] -((c^2*(b*c - a*d))/(d^4*Sqrt[c + d/x^2])) - (c*(3*b*c - 2*a*d)*S
qrt[c + d/x^2])/d^4 + ((3*b*c - a*d)*(c + d/x^2)^(3/2))/(3*d^4) -
 (b*(c + d/x^2)^(5/2))/(5*d^4)
```

Rubi in Sympy [A] time = 22.8028, size = 88, normalized size = 0.88

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{5d^4}+\frac{c^2\left(ad-bc\right)}{d^4\sqrt{c+\frac{d}{x^2}}}+\frac{c\sqrt{c+\frac{d}{x^2}}\left(2ad-3bc\right)}{d^4}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}\left(ad-3bc\right)}{3d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**7,x)
```

```
[Out] -b*(c + d/x**2)**(5/2)/(5*d**4) + c**2*(a*d - b*c)/(d**4*sqrt(c +
 d/x**2)) + c*sqrt(c + d/x**2)*(2*a*d - 3*b*c)/d**4 - (c + d/x**2
)**(3/2)*(a*d - 3*b*c)/(3*d**4)
```

Mathematica [A] time = 0.100012, size = 81, normalized size = 0.81

$$\frac{-5adx^2\left(-8c^2x^4-4cdx^2+d^2\right)-3b\left(16c^3x^6+8c^2dx^4-2cd^2x^2+d^3\right)}{15d^4x^6\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/((c + d/x^2)^(3/2)*x^7),x]
```

```
[Out] (-5*a*d*x^2*(d^2 - 4*c*d*x^2 - 8*c^2*x^4) - 3*b*(d^3 - 2*c*d^2*x^
2 + 8*c^2*d*x^4 + 16*c^3*x^6))/(15*d^4*Sqrt[c + d/x^2]*x^6)
```

Maple [A] time = 0.011, size = 94, normalized size = 0.9

$$\frac{(40\,ac^2dx^6-48\,bc^3x^6+20\,acd^2x^4-24\,bc^2dx^4-5\,ad^3x^2+6\,bcd^2x^2-3\,bd^3)\,(cx^2+d)}{15\,d^4x^8}\left(\frac{cx^2+d}{x^2}\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(3/2)/x^7,x)
```

```
[Out] 1/15*(40*a*c^2*d*x^6-48*b*c^3*x^6+20*a*c*d^2*x^4-24*b*c^2*d*x^4-5
*a*d^3*x^2+6*b*c*d^2*x^2-3*b*d^3)*(c*x^2+d)/((c*x^2+d)/x^2)^(3/2)
/d^4/x^8
```

Maxima [A] time = 1.41474, size = 157, normalized size = 1.57

$$-\frac{1}{5}\,b\left(\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{d^4}-\frac{5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c}{d^4}+\frac{15\sqrt{c+\frac{d}{x^2}}\,c^2}{d^4}+\frac{5\,c^3}{\sqrt{c+\frac{d}{x^2}}\,d^4}\right)-\frac{1}{3}\,a\left(\frac{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}{d^3}-\frac{6\sqrt{c+\frac{d}{x^2}}\,c}{d^3}-\frac{3\,c^2}{\sqrt{c+\frac{d}{x^2}}\,d^3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^7),x, algorithm="maxima")
```

```
[Out] -1/5*b*((c + d/x^2)^(5/2)/d^4 - 5*(c + d/x^2)^(3/2)*c/d^4 + 15*sq
rt(c + d/x^2)*c^2/d^4 + 5*c^3/(sqrt(c + d/x^2)*d^4)) - 1/3*a*((c
+ d/x^2)^(3/2)/d^3 - 6*sqrt(c + d/x^2)*c/d^3 - 3*c^2/(sqrt(c + d/
x^2)*d^3))
```

Fricas [A] time = 0.247626, size = 132, normalized size = 1.32

$$-\frac{\left(8\,(6\,bc^3-5\,ac^2d)\,x^6+4\,(6\,bc^2d-5\,acd^2)\,x^4+3\,bd^3-(6\,bcd^2-5\,ad^3)\,x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{15\,(cd^4x^6+d^5x^4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^7),x, algorithm="fricas")
```

```
[Out] -1/15*(8*(6*b*c^3 - 5*a*c^2*d)*x^6 + 4*(6*b*c^2*d - 5*a*c*d^2)*x^
4 + 3*b*d^3 - (6*b*c*d^2 - 5*a*d^3)*x^2)*sqrt((c*x^2 + d)/x^2)/(c
*d^4*x^6 + d^5*x^4)
```

Sympy [A] time = 56.2123, size = 2273, normalized size = 22.73

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**7,x)
```

```
[Out] a*(8*c**(9/2)*d**(7/2)*x**6*sqrt(c*x**2/d + 1)/(3*c**(7/2)*d**6*x
**7 + 6*c**(5/2)*d**7*x**5 + 3*c**(3/2)*d**8*x**3) + 12*c**(7/2)*
d**(9/2)*x**4*sqrt(c*x**2/d + 1)/(3*c**(7/2)*d**6*x**7 + 6*c**(5/
2)*d**7*x**5 + 3*c**(3/2)*d**8*x**3) + 3*c**(5/2)*d**(11/2)*x**2*
```

```
sqrt(c*x**2/d + 1)/(3*c**(7/2)*d**6*x**7 + 6*c**(5/2)*d**7*x**5 +
 3*c**(3/2)*d**8*x**3) - c**(3/2)*d**(13/2)*sqrt(c*x**2/d + 1)/(3
*c**(7/2)*d**6*x**7 + 6*c**(5/2)*d**7*x**5 + 3*c**(3/2)*d**8*x**3
) - 8*c**5*d**3*x**7/(3*c**(7/2)*d**6*x**7 + 6*c**(5/2)*d**7*x**5
 + 3*c**(3/2)*d**8*x**3) - 16*c**4*d**4*x**5/(3*c**(7/2)*d**6*x**
7 + 6*c**(5/2)*d**7*x**5 + 3*c**(3/2)*d**8*x**3) - 8*c**3*d**5*x*
*3/(3*c**(7/2)*d**6*x**7 + 6*c**(5/2)*d**7*x**5 + 3*c**(3/2)*d**8
*x**3)) + b*(-16*c**(21/2)*d**(23/2)*x**16*sqrt(c*x**2/d + 1)/(5*
c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d
**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 +
 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) - 88*c**(19/2)*d
**(25/2)*x**14*sqrt(c*x**2/d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c
**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d
**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*
c**(5/2)*d**21*x**5) - 198*c**(17/2)*d**(27/2)*x**12*sqrt(c*x**2/
d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c
**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d*
*19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) - 231*
c**(15/2)*d**(29/2)*x**10*sqrt(c*x**2/d + 1)/(5*c**(17/2)*d**15*x
**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*
c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**2
0*x**7 + 5*c**(5/2)*d**21*x**5) - 145*c**(13/2)*d**(31/2)*x**8*sq
rt(c*x**2/d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x*
*15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c
**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x*
*5) - 46*c**(11/2)*d**(33/2)*x**6*sqrt(c*x**2/d + 1)/(5*c**(17/2)
*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**1
3 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7
/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) - 8*c**(9/2)*d**(35/2)*x*
*4*sqrt(c*x**2/d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**
16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 +
 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**
21*x**5) - 3*c**(7/2)*d**(37/2)*x**2*sqrt(c*x**2/d + 1)/(5*c**(17
/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x
**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c*
*(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) - c**(5/2)*d**(39/2)*s
qrt(c*x**2/d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x
**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*
c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x
**5) + 16*c**11*d**11*x**17/(5*c**(17/2)*d**15*x**17 + 30*c**(15/
2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x
**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/
2)*d**21*x**5) + 96*c**10*d**12*x**15/(5*c**(17/2)*d**15*x**17 +
30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/
2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7
+ 5*c**(5/2)*d**21*x**5) + 240*c**9*d**13*x**13/(5*c**(17/2)*d**1
5*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 1
00*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d
**20*x**7 + 5*c**(5/2)*d**21*x**5) + 320*c**8*d**14*x**11/(5*c**(
17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17
*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*
c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) + 240*c**7*d**15*x**
9/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13
/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x
**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) + 96*c**6*d
**16*x**7/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 7
5*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)
*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) + 1
6*c**5*d**17*x**5/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x
**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*
c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x
**5))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a + \frac{b}{x^2}}{\left(c + \frac{d}{x^2}\right)^{\frac{3}{2}} x^7}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^7),x, algorithm="giac")

[Out] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^7), x)
```

3.810 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2} x^9} \, dx$

Optimal. Leaf size=126

$$\frac{c^3(bc-ad)}{d^5\sqrt{c+\frac{d}{x^2}}}+\frac{c^2\sqrt{c+\frac{d}{x^2}}(4bc-3ad)}{d^5}+\frac{\left(c+\frac{d}{x^2}\right)^{5/2}(4bc-ad)}{5d^5}-\frac{c\left(c+\frac{d}{x^2}\right)^{3/2}(2bc-ad)}{d^5}-\frac{b\left(c+\frac{d}{x^2}\right)^{7/2}}{7d^5}$$

```
[Out] (c^3*(b*c - a*d))/(d^5*Sqrt[c + d/x^2]) + (c^2*(4*b*c - 3*a*d)*Sq
rt[c + d/x^2])/d^5 - (c*(2*b*c - a*d)*(c + d/x^2)^(3/2))/d^5 + ((
4*b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^5) - (b*(c + d/x^2)^(7/2))/(
7*d^5)
```

Rubi [A] time = 0.290172, antiderivative size = 126, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{c^3(bc-ad)}{d^5\sqrt{c+\frac{d}{x^2}}}+\frac{c^2\sqrt{c+\frac{d}{x^2}}(4bc-3ad)}{d^5}+\frac{\left(c+\frac{d}{x^2}\right)^{5/2}(4bc-ad)}{5d^5}-\frac{c\left(c+\frac{d}{x^2}\right)^{3/2}(2bc-ad)}{d^5}-\frac{b\left(c+\frac{d}{x^2}\right)^{7/2}}{7d^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/((c + d/x^2)^(3/2)*x^9),x]
```

```
[Out] (c^3*(b*c - a*d))/(d^5*Sqrt[c + d/x^2]) + (c^2*(4*b*c - 3*a*d)*Sq
rt[c + d/x^2])/d^5 - (c*(2*b*c - a*d)*(c + d/x^2)^(3/2))/d^5 + ((
4*b*c - a*d)*(c + d/x^2)^(5/2))/(5*d^5) - (b*(c + d/x^2)^(7/2))/(
7*d^5)
```

Rubi in Sympy [A] time = 28.5105, size = 114, normalized size = 0.9

$$-\frac{b\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{7d^5}-\frac{c^3\left(ad-bc\right)}{d^5\sqrt{c+\frac{d}{x^2}}}-\frac{c^2\sqrt{c+\frac{d}{x^2}}\left(3ad-4bc\right)}{d^5}+\frac{c\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}\left(ad-2bc\right)}{d^5}-\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}\left(ad-4bc\right)}{5d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**9,x)
```

```
[Out] -b*(c + d/x**2)**(7/2)/(7*d**5) - c**3*(a*d - b*c)/(d**5*sqrt(c +
 d/x**2)) - c**2*sqrt(c + d/x**2)*(3*a*d - 4*b*c)/d**5 + c*(c + d
/x**2)**(3/2)*(a*d - 2*b*c)/d**5 - (c + d/x**2)**(5/2)*(a*d - 4*b
*c)/(5*d**5)
```

Mathematica [A] time = 0.120138, size = 104, normalized size = 0.83

$$\frac{b\left(128c^4x^8+64c^3dx^6-16c^2d^2x^4+8cd^3x^2-5d^4\right)-7adx^2\left(16c^3x^6+8c^2dx^4-2cd^2x^2+d^3\right)}{35d^5x^8\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/((c + d/x^2)^(3/2)*x^9),x]
```

```
[Out] (-7*a*d*x^2*(d^3 - 2*c*d^2*x^2 + 8*c^2*d*x^4 + 16*c^3*x^6) + b*(-
5*d^4 + 8*c*d^3*x^2 - 16*c^2*d^2*x^4 + 64*c^3*d*x^6 + 128*c^4*x^8
))/(35*d^5*Sqrt[c + d/x^2]*x^8)
```

Maple [A] time = 0.011, size = 118, normalized size = 0.9

$$-\frac{\left(112\,ac^3dx^8-128\,bc^4x^8+56\,ac^2d^2x^6-64\,bc^3dx^6-14\,acd^3x^4+16\,bc^2d^2x^4+7\,ad^4x^2-8\,bcd^3x^2+5\,bd^4\right)\left(cx^2+d\right)}{35\,d^5x^{10}}\left(\frac{cx^2}{\ldots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(3/2)/x^9,x)
```

```
[Out] -1/35*(112*a*c^3*d*x^8-128*b*c^4*x^8+56*a*c^2*d^2*x^6-64*b*c^3*d*
x^6-14*a*c*d^3*x^4+16*b*c^2*d^2*x^4+7*a*d^4*x^2-8*b*c*d^3*x^2+5*b
*d^4)*(c*x^2+d)/((c*x^2+d)/x^2)^(3/2)/d^5/x^10
```

Maxima [A] time = 1.3907, size = 204, normalized size = 1.62

$$-\frac{1}{35}\,b\left(\frac{5\left(c+\frac{d}{x^2}\right)^{\frac{7}{2}}}{d^5}-\frac{28\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}c}{d^5}+\frac{70\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c^2}{d^5}-\frac{140\sqrt{c+\frac{d}{x^2}}\,c^3}{d^5}-\frac{35\,c^4}{\sqrt{c+\frac{d}{x^2}}\,d^5}\right)-\frac{1}{5}\,a\left(\frac{\left(c+\frac{d}{x^2}\right)^{\frac{5}{2}}}{d^4}-\frac{5\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}c}{d^4}+\frac{15\sqrt{c+\frac{d}{x^2}}\,c^2}{d^4}+\frac{5\,c^3}{\sqrt{c+\frac{d}{x^2}}\,d^4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^9),x, algorithm="maxima")
```

```
[Out] -1/35*b*(5*(c + d/x^2)^(7/2)/d^5 - 28*(c + d/x^2)^(5/2)*c/d^5 + 7
0*(c + d/x^2)^(3/2)*c^2/d^5 - 140*sqrt(c + d/x^2)*c^3/d^5 - 35*c^
4/(sqrt(c + d/x^2)*d^5)) - 1/5*a*((c + d/x^2)^(5/2)/d^4 - 5*(c +
d/x^2)^(3/2)*c/d^4 + 15*sqrt(c + d/x^2)*c^2/d^4 + 5*c^3/(sqrt(c +
 d/x^2)*d^4))
```

Fricas [A] time = 0.309144, size = 163, normalized size = 1.29

$$\frac{\left(16\left(8\,bc^4-7\,ac^3d\right)x^8+8\left(8\,bc^3d-7\,ac^2d^2\right)x^6-5\,bd^4-2\left(8\,bc^2d^2-7\,acd^3\right)x^4+\left(8\,bcd^3-7\,ad^4\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{35\left(cd^5x^8+d^6x^6\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^9),x, algorithm="fricas")
```

```
[Out] 1/35*(16*(8*b*c^4 - 7*a*c^3*d)*x^8 + 8*(8*b*c^3*d - 7*a*c^2*d^2)*
x^6 - 5*b*d^4 - 2*(8*b*c^2*d^2 - 7*a*c*d^3)*x^4 + (8*b*c*d^3 - 7*
a*d^4)*x^2)*sqrt((c*x^2 + d)/x^2)/(c*d^5*x^8 + d^6*x^6)
```

Sympy [A] time = 93.8743, size = 6096, normalized size = 48.38

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**9,x)
```

```
[Out] a*(-16*c**(21/2)*d**(23/2)*x**16*sqrt(c*x**2/d + 1)/(5*c**(17/2)*
d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13
 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/
2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) - 88*c**(19/2)*d**(25/2)*x
**14*sqrt(c*x**2/d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d
**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11
 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d
**21*x**5) - 198*c**(17/2)*d**(27/2)*x**12*sqrt(c*x**2/d + 1)/(5*
c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d
**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 +
 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) - 231*c**(15/2)*
d**(29/2)*x**10*sqrt(c*x**2/d + 1)/(5*c**(17/2)*d**15*x**17 + 30*
c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*
d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5
*c**(5/2)*d**21*x**5) - 145*c**(13/2)*d**(31/2)*x**8*sqrt(c*x**2/
d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c
**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d*
*19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) - 46*c
**(11/2)*d**(33/2)*x**6*sqrt(c*x**2/d + 1)/(5*c**(17/2)*d**15*x**
17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c*
*(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*
x**7 + 5*c**(5/2)*d**21*x**5) - 8*c**(9/2)*d**(35/2)*x**4*sqrt(c*
x**2/d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 +
 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/
2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) -
 3*c**(7/2)*d**(37/2)*x**2*sqrt(c*x**2/d + 1)/(5*c**(17/2)*d**15*
x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100
*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**
20*x**7 + 5*c**(5/2)*d**21*x**5) - c**(5/2)*d**(39/2)*sqrt(c*x**2
/d + 1)/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*
c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d
**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) + 16*
c**11*d**11*x**17/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x
**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*
c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x
**5) + 96*c**10*d**12*x**15/(5*c**(17/2)*d**15*x**17 + 30*c**(15/
2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x
**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/
2)*d**21*x**5) + 240*c**9*d**13*x**13/(5*c**(17/2)*d**15*x**17 +
30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 100*c**(11/
2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d**20*x**7
+ 5*c**(5/2)*d**21*x**5) + 320*c**8*d**14*x**11/(5*c**(17/2)*d**1
5*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*x**13 + 1
00*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c**(7/2)*d
**20*x**7 + 5*c**(5/2)*d**21*x**5) + 240*c**7*d**15*x**9/(5*c**(1
7/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2)*d**17*
x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**9 + 30*c
**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) + 96*c**6*d**16*x**7/
(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*c**(13/2
)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d**19*x**
9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5) + 16*c**5*d**
17*x**5/(5*c**(17/2)*d**15*x**17 + 30*c**(15/2)*d**16*x**15 + 75*
c**(13/2)*d**17*x**13 + 100*c**(11/2)*d**18*x**11 + 75*c**(9/2)*d
**19*x**9 + 30*c**(7/2)*d**20*x**7 + 5*c**(5/2)*d**21*x**5)) + b*
(128*c**(33/2)*d**(49/2)*x**26*sqrt(c*x**2/d + 1)/(35*c**(27/2)*d
**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x**
23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19 + 88
20*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**(
13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d**
38*x**9 + 35*c**(7/2)*d**39*x**7) + 1216*c**(31/2)*d**(51/2)*x**2
4*sqrt(c*x**2/d + 1)/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d*
*30*x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**
21 + 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 73
50*c**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(
11/2)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x
**7) + 5168*c**(29/2)*d**(53/2)*x**22*sqrt(c*x**2/d + 1)/(35*c**(
27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d*
*31*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**
19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 42
```

```
00*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9
/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) + 12920*c**(27/2)*d**(55
/2)*x**20*sqrt(c*x**2/d + 1)/(35*c**(27/2)*d**29*x**27 + 350*c**(
25/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d
**32*x**21 + 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x*
*17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1
575*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)
*d**39*x**7) + 20995*c**(25/2)*d**(57/2)*x**18*sqrt(c*x**2/d + 1)
/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**
(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*
d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x
**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 +
350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) + 23091*c**(23/
2)*d**(59/2)*x**16*sqrt(c*x**2/d + 1)/(35*c**(27/2)*d**29*x**27 +
 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c*
*(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)
*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*
x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35
*c**(7/2)*d**39*x**7) + 17292*c**(21/2)*d**(61/2)*x**14*sqrt(c*x*
*2/d + 1)/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 +
 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c
**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2
)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37
*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) + 8556
*c**(19/2)*d**(63/2)*x**12*sqrt(c*x**2/d + 1)/(35*c**(27/2)*d**29
*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x**23 +
 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19 + 8820*c
**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**(13/2
)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d**38*x
**9 + 35*c**(7/2)*d**39*x**7) + 2490*c**(17/2)*d**(65/2)*x**10*sq
rt(c*x**2/d + 1)/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*
x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21 +
 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*c
**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/2
)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7)
 + 170*c**(15/2)*d**(67/2)*x**8*sqrt(c*x**2/d + 1)/(35*c**(27/2)*
d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x*
*23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19 + 8
820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**
(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d*
*38*x**9 + 35*c**(7/2)*d**39*x**7) - 212*c**(13/2)*d**(69/2)*x**6
*sqrt(c*x**2/d + 1)/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**
30*x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**2
1 + 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 735
0*c**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(1
1/2)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x*
*7) - 124*c**(11/2)*d**(71/2)*x**4*sqrt(c*x**2/d + 1)/(35*c**(27/
2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**31
*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19
+ 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200*
c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2)
*d**38*x**9 + 35*c**(7/2)*d**39*x**7) - 37*c**(9/2)*d**(73/2)*x**
2*sqrt(c*x**2/d + 1)/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d*
*30*x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**
21 + 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 73
50*c**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(
11/2)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x
**7) - 5*c**(7/2)*d**(75/2)*sqrt(c*x**2/d + 1)/(35*c**(27/2)*d**2
9*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x**23
+ 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19 + 8820*
c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**(13/
2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d**38*
x**9 + 35*c**(7/2)*d**39*x**7) - 128*c**17*d**24*x**27/(35*c**(27
/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**3
1*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19
 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200
*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2
)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) - 1280*c**16*d**25*x**25/(
35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(2
3/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d*
*33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**
15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 35
0*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) - 5760*c**15*d**2
6*x**23/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1
```

```
575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**
(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*
d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x
**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) - 15360*
c**14*d**27*x**21/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30
*x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21
+ 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*
c**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/
2)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7
) - 26880*c**13*d**28*x**19/(35*c**(27/2)*d**29*x**27 + 350*c**(2
5/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d*
*32*x**21 + 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**
17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 15
75*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*
d**39*x**7) - 32256*c**12*d**29*x**17/(35*c**(27/2)*d**29*x**27 +
 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x**23 + 4200*c*
*(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19 + 8820*c**(17/2)
*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*
x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35
*c**(7/2)*d**39*x**7) - 26880*c**11*d**30*x**15/(35*c**(27/2)*d**
29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d**31*x**23
 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x**19 + 8820
*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4200*c**(13
/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(9/2)*d**38
*x**9 + 35*c**(7/2)*d**39*x**7) - 15360*c**10*d**31*x**13/(35*c**
(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**(23/2)*d
**31*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*d**33*x*
*19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x**15 + 4
200*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 + 350*c**(
9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) - 5760*c**9*d**32*x**11
/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1575*c**
(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**(19/2)*
d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*d**35*x
**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x**11 +
350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) - 1280*c**8*d**
33*x**9/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**25 + 1
575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21 + 7350*c**
(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(15/2)*
d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d**37*x
**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7) - 128*c*
*7*d**34*x**7/(35*c**(27/2)*d**29*x**27 + 350*c**(25/2)*d**30*x**
25 + 1575*c**(23/2)*d**31*x**23 + 4200*c**(21/2)*d**32*x**21 + 73
50*c**(19/2)*d**33*x**19 + 8820*c**(17/2)*d**34*x**17 + 7350*c**(
15/2)*d**35*x**15 + 4200*c**(13/2)*d**36*x**13 + 1575*c**(11/2)*d
**37*x**11 + 350*c**(9/2)*d**38*x**9 + 35*c**(7/2)*d**39*x**7))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a + \frac{b}{x^2}}{\left(c + \frac{d}{x^2}\right)^{\frac{3}{2}} x^9} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^9),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^9), x)
```

3.811 $\int \frac{\left(a+\frac{b}{x^2}\right)x^4}{\left(c+\frac{d}{x^2}\right)^{3/2}}\,dx$

Optimal. Leaf size=111

$$-\frac{8dx\sqrt{c+\frac{d}{x^2}}(5bc-6ad)}{15c^4}+\frac{4dx(5bc-6ad)}{15c^3\sqrt{c+\frac{d}{x^2}}}+\frac{x^3(5bc-6ad)}{15c^2\sqrt{c+\frac{d}{x^2}}}+\frac{ax^5}{5c\sqrt{c+\frac{d}{x^2}}}$$

```
[Out] (4*d*(5*b*c - 6*a*d)*x)/(15*c^3*Sqrt[c + d/x^2]) - (8*d*(5*b*c -
6*a*d)*Sqrt[c + d/x^2]*x)/(15*c^4) + ((5*b*c - 6*a*d)*x^3)/(15*c^
2*Sqrt[c + d/x^2]) + (a*x^5)/(5*c*Sqrt[c + d/x^2])
```

Rubi [A] time = 0.16344, antiderivative size = 111, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{8dx\sqrt{c+\frac{d}{x^2}}(5bc-6ad)}{15c^4}+\frac{4dx(5bc-6ad)}{15c^3\sqrt{c+\frac{d}{x^2}}}+\frac{x^3(5bc-6ad)}{15c^2\sqrt{c+\frac{d}{x^2}}}+\frac{ax^5}{5c\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*x^4)/(c + d/x^2)^(3/2),x]
```

```
[Out] (4*d*(5*b*c - 6*a*d)*x)/(15*c^3*Sqrt[c + d/x^2]) - (8*d*(5*b*c -
6*a*d)*Sqrt[c + d/x^2]*x)/(15*c^4) + ((5*b*c - 6*a*d)*x^3)/(15*c^
2*Sqrt[c + d/x^2]) + (a*x^5)/(5*c*Sqrt[c + d/x^2])
```

Rubi in Sympy [A] time = 11.9217, size = 107, normalized size = 0.96

$$\frac{ax^5}{5c\sqrt{c+\frac{d}{x^2}}}-\frac{x^3\left(6ad-5bc\right)}{15c^2\sqrt{c+\frac{d}{x^2}}}-\frac{4dx\left(6ad-5bc\right)}{15c^3\sqrt{c+\frac{d}{x^2}}}+\frac{8dx\sqrt{c+\frac{d}{x^2}}\left(6ad-5bc\right)}{15c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**4/(c+d/x**2)**(3/2),x)
```

```
[Out] a*x**5/(5*c*sqrt(c + d/x**2)) - x**3*(6*a*d - 5*b*c)/(15*c**2*sqr
t(c + d/x**2)) - 4*d*x*(6*a*d - 5*b*c)/(15*c**3*sqrt(c + d/x**2))
 + 8*d*x*sqrt(c + d/x**2)*(6*a*d - 5*b*c)/(15*c**4)
```

Mathematica [A] time = 0.0881316, size = 80, normalized size = 0.72

$$\frac{3a\left(c^3x^6-2c^2dx^4+8cd^2x^2+16d^3\right)+5bc\left(c^2x^4-4cdx^2-8d^2\right)}{15c^4x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*x^4)/(c + d/x^2)^(3/2),x]
```

```
[Out] (5*b*c*(-8*d^2 - 4*c*d*x^2 + c^2*x^4) + 3*a*(16*d^3 + 8*c*d^2*x^2
 - 2*c^2*d*x^4 + c^3*x^6))/(15*c^4*Sqrt[c + d/x^2]*x)
```

Maple [A] time = 0.012, size = 91, normalized size = 0.8

$$\frac{\left(3\,a x^{6} c^{3}-6\,a c^{2} d x^{4}+5\,b c^{3} x^{4}+24\,a c d^{2} x^{2}-20\,b c^{2} d x^{2}+48\,a d^{3}-40\,b c d^{2}\right)\left(c x^{2}+d\right)}{15\,x^{3} c^{4}}\left(\frac{c x^{2}+d}{x^{2}}\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^4/(c+d/x^2)^(3/2),x)
```

```
[Out] 1/15*(3*a*c^3*x^6-6*a*c^2*d*x^4+5*b*c^3*x^4+24*a*c*d^2*x^2-20*b*c
^2*d*x^2+48*a*d^3-40*b*c*d^2)*(c*x^2+d)/((c*x^2+d)/x^2)^(3/2)/x^3
/c^4
```

Maxima [A] time = 1.39, size = 173, normalized size = 1.56

$$\frac{1}{3}\,b\left(\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}} x^{3}-6\,\sqrt{c+\frac{d}{x^{2}}}\,d x}{c^{3}}-\frac{3\,d^{2}}{\sqrt{c+\frac{d}{x^{2}}}\,c^{3} x}\right)+\frac{1}{5}\,a\left(\frac{5\,d^{3}}{\sqrt{c+\frac{d}{x^{2}}}\,c^{4} x}+\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{5}{2}} x^{5}-5\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}} d x^{3}+15\,\sqrt{c+\frac{d}{x^{2}}}\,d^{2} x}{c^{4}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^4/(c + d/x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] 1/3*b*(((c + d/x^2)^(3/2)*x^3 - 6*sqrt(c + d/x^2)*d*x)/c^3 - 3*d^
2/(sqrt(c + d/x^2)*c^3*x)) + 1/5*a*(5*d^3/(sqrt(c + d/x^2)*c^4*x)
 + ((c + d/x^2)^(5/2)*x^5 - 5*(c + d/x^2)^(3/2)*d*x^3 + 15*sqrt(c
 + d/x^2)*d^2*x)/c^4)
```

Fricas [A] time = 0.231258, size = 128, normalized size = 1.15

$$\frac{\left(3\,a c^{3} x^{7}+\left(5\,b c^{3}-6\,a c^{2} d\right) x^{5}-4\left(5\,b c^{2} d-6\,a c d^{2}\right) x^{3}-8\left(5\,b c d^{2}-6\,a d^{3}\right) x\right)\sqrt{\frac{c x^{2}+d}{x^{2}}}}{15\left(c^{5} x^{2}+c^{4} d\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^4/(c + d/x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/15*(3*a*c^3*x^7 + (5*b*c^3 - 6*a*c^2*d)*x^5 - 4*(5*b*c^2*d - 6*
a*c*d^2)*x^3 - 8*(5*b*c*d^2 - 6*a*d^3)*x)*sqrt((c*x^2 + d)/x^2)/(
c^5*x^2 + c^4*d)
```

Sympy [A] time = 16.4018, size = 561, normalized size = 5.05

$$a\left(\frac{c^5d^{\frac{19}{2}}x^{10}\sqrt{\frac{cx^2}{d}+1}}{5c^7d^9x^6+15c^6d^{10}x^4+15c^5d^{11}x^2+5c^4d^{12}}+\frac{5c^3d^{\frac{23}{2}}x^6\sqrt{\frac{cx^2}{d}+1}}{5c^7d^9x^6+15c^6d^{10}x^4+15c^5d^{11}x^2+5c^4d^{12}}+\frac{30c^2d^{\frac{25}{2}}x^4\sqrt{\frac{cx^2}{d}+1}}{5c^7d^9x^6+15c^6d^{10}x^4+15c^5d^{11}x^2+5c^4d^{12}}+\frac{40cd^{\frac{27}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{5c^7d^9x^6+15c^6d^{10}x^4+15c^5d^{11}x^2+5c^4d^{12}}+\frac{16d^{\frac{29}{2}}\sqrt{\frac{cx^2}{d}+1}}{5c^7d^9x^6+15c^6d^{10}x^4+15c^5d^{11}x^2+5c^4d^{12}}\right)+b\left(\frac{c^3d^{\frac{9}{2}}x^6\sqrt{\frac{cx^2}{d}+1}}{3c^5d^4x^4+6c^4d^5x^2+3c^3d^6}-\frac{3c^2d^{\frac{11}{2}}x^4\sqrt{\frac{cx^2}{d}+1}}{3c^5d^4x^4+6c^4d^5x^2+3c^3d^6}-\frac{12cd^{\frac{13}{2}}x^2\sqrt{\frac{cx^2}{d}+1}}{3c^5d^4x^4+6c^4d^5x^2+3c^3d^6}-\frac{8d^{\frac{15}{2}}\sqrt{\frac{cx^2}{d}+1}}{3c^5d^4x^4+6c^4d^5x^2+3c^3d^6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**4/(c+d/x**2)**(3/2),x)
```

```
[Out] a*(c**5*d**(19/2)*x**10*sqrt(c*x**2/d + 1)/(5*c**7*d**9*x**6 + 15
*c**6*d**10*x**4 + 15*c**5*d**11*x**2 + 5*c**4*d**12) + 5*c**3*d*
*(23/2)*x**6*sqrt(c*x**2/d + 1)/(5*c**7*d**9*x**6 + 15*c**6*d**10
*x**4 + 15*c**5*d**11*x**2 + 5*c**4*d**12) + 30*c**2*d**(25/2)*x*
*4*sqrt(c*x**2/d + 1)/(5*c**7*d**9*x**6 + 15*c**6*d**10*x**4 + 15
*c**5*d**11*x**2 + 5*c**4*d**12) + 40*c*d**(27/2)*x**2*sqrt(c*x**
2/d + 1)/(5*c**7*d**9*x**6 + 15*c**6*d**10*x**4 + 15*c**5*d**11*x
**2 + 5*c**4*d**12) + 16*d**(29/2)*sqrt(c*x**2/d + 1)/(5*c**7*d**
9*x**6 + 15*c**6*d**10*x**4 + 15*c**5*d**11*x**2 + 5*c**4*d**12))
 + b*(c**3*d**(9/2)*x**6*sqrt(c*x**2/d + 1)/(3*c**5*d**4*x**4 + 6
*c**4*d**5*x**2 + 3*c**3*d**6) - 3*c**2*d**(11/2)*x**4*sqrt(c*x**
2/d + 1)/(3*c**5*d**4*x**4 + 6*c**4*d**5*x**2 + 3*c**3*d**6) - 12
*c*d**(13/2)*x**2*sqrt(c*x**2/d + 1)/(3*c**5*d**4*x**4 + 6*c**4*d
**5*x**2 + 3*c**3*d**6) - 8*d**(15/2)*sqrt(c*x**2/d + 1)/(3*c**5*
d**4*x**4 + 6*c**4*d**5*x**2 + 3*c**3*d**6))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)x^4}{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^4/(c + d/x^2)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)*x^4/(c + d/x^2)^(3/2), x)
```

3.812 $\int \frac{\left(a+\frac{b}{x^2}\right)x^2}{\left(c+\frac{d}{x^2}\right)^{3/2}}\,dx$

Optimal. Leaf size=79

$$\frac{2x\sqrt{c+\frac{d}{x^2}}(3bc-4ad)}{3c^3}-\frac{x(3bc-4ad)}{3c^2\sqrt{c+\frac{d}{x^2}}}+\frac{ax^3}{3c\sqrt{c+\frac{d}{x^2}}}$$

```
[Out] -((3*b*c - 4*a*d)*x)/(3*c^2*Sqrt[c + d/x^2]) + (2*(3*b*c - 4*a*d)
*Sqrt[c + d/x^2]*x)/(3*c^3) + (a*x^3)/(3*c*Sqrt[c + d/x^2])
```

Rubi [A] time = 0.11222, antiderivative size = 79, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{2x\sqrt{c+\frac{d}{x^2}}(3bc-4ad)}{3c^3}-\frac{x(3bc-4ad)}{3c^2\sqrt{c+\frac{d}{x^2}}}+\frac{ax^3}{3c\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)*x^2)/(c + d/x^2)^(3/2),x]
```

```
[Out] -((3*b*c - 4*a*d)*x)/(3*c^2*Sqrt[c + d/x^2]) + (2*(3*b*c - 4*a*d)
*Sqrt[c + d/x^2]*x)/(3*c^3) + (a*x^3)/(3*c*Sqrt[c + d/x^2])
```

Rubi in Sympy [A] time = 8.76509, size = 73, normalized size = 0.92

$$\frac{ax^3}{3c\sqrt{c+\frac{d}{x^2}}}+\frac{x\left(4ad-3bc\right)}{3c^2\sqrt{c+\frac{d}{x^2}}}-\frac{2x\sqrt{c+\frac{d}{x^2}}\left(4ad-3bc\right)}{3c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)*x**2/(c+d/x**2)**(3/2),x)
```

```
[Out] a*x**3/(3*c*sqrt(c + d/x**2)) + x*(4*a*d - 3*b*c)/(3*c**2*sqrt(c
+ d/x**2)) - 2*x*sqrt(c + d/x**2)*(4*a*d - 3*b*c)/(3*c**3)
```

Mathematica [A] time = 0.070274, size = 57, normalized size = 0.72

$$\frac{a\left(c^2x^4-4cdx^2-8d^2\right)+3bc\left(cx^2+2d\right)}{3c^3x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)*x^2)/(c + d/x^2)^(3/2),x]
```

```
[Out] (3*b*c*(2*d + c*x^2) + a*(-8*d^2 - 4*c*d*x^2 + c^2*x^4))/(3*c^3*S
qrt[c + d/x^2]*x)
```

Maple [A] time = 0.01, size = 66, normalized size = 0.8

$$\frac{\left(ax^{4}c^{2}-4\,acd\,x^{2}+3\,bc^{2}x^{2}-8\,ad^{2}+6\,bcd\right)\left(cx^{2}+d\right)}{3\,x^{3}c^{3}}\left(\frac{cx^{2}+d}{x^{2}}\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)*x^2/(c+d/x^2)^(3/2),x)
```

```
[Out] 1/3*(a*c^2*x^4-4*a*c*d*x^2+3*b*c^2*x^2-8*a*d^2+6*b*c*d)*(c*x^2+d)
/((c*x^2+d)/x^2)^(3/2)/x^3/c^3
```

Maxima [A] time = 1.38796, size = 122, normalized size = 1.54

$$b\left(\frac{\sqrt{c+\frac{d}{x^{2}}}\,x}{c^{2}}+\frac{d}{\sqrt{c+\frac{d}{x^{2}}}\,c^{2}x}\right)+\frac{1}{3}\,a\left(\frac{\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}x^{3}-6\,\sqrt{c+\frac{d}{x^{2}}}\,dx}{c^{3}}-\frac{3\,d^{2}}{\sqrt{c+\frac{d}{x^{2}}}\,c^{3}x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^2/(c + d/x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] b*(sqrt(c + d/x^2)*x/c^2 + d/(sqrt(c + d/x^2)*c^2*x)) + 1/3*a*(((
c + d/x^2)^(3/2)*x^3 - 6*sqrt(c + d/x^2)*d*x)/c^3 - 3*d^2/(sqrt(c
 + d/x^2)*c^3*x))
```

Fricas [A] time = 0.228403, size = 95, normalized size = 1.2

$$\frac{\left(ac^{2}x^{5}+\left(3\,bc^{2}-4\,acd\right)x^{3}+2\left(3\,bcd-4\,ad^{2}\right)x\right)\sqrt{\frac{cx^{2}+d}{x^{2}}}}{3\left(c^{4}x^{2}+c^{3}d\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^2/(c + d/x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/3*(a*c^2*x^5 + (3*b*c^2 - 4*a*c*d)*x^3 + 2*(3*b*c*d - 4*a*d^2)*
x)*sqrt((c*x^2 + d)/x^2)/(c^4*x^2 + c^3*d)
```

Sympy [A] time = 11.4922, size = 267, normalized size = 3.38

$$a\left(\frac{c^{3}d^{\frac{9}{2}}x^{6}\sqrt{\frac{cx^{2}}{d}+1}}{3c^{5}d^{4}x^{4}+6c^{4}d^{5}x^{2}+3c^{3}d^{6}}-\frac{3c^{2}d^{\frac{11}{2}}x^{4}\sqrt{\frac{cx^{2}}{d}+1}}{3c^{5}d^{4}x^{4}+6c^{4}d^{5}x^{2}+3c^{3}d^{6}}-\frac{12cd^{\frac{13}{2}}x^{2}\sqrt{\frac{cx^{2}}{d}+1}}{3c^{5}d^{4}x^{4}+6c^{4}d^{5}x^{2}+3c^{3}d^{6}}-\frac{8d^{\frac{15}{2}}\sqrt{\frac{cx^{2}}{d}+1}}{3c^{5}d^{4}x^{4}+6c^{4}d^{5}x^{2}+3c^{3}d^{6}}\right)+b\left(\frac{x^{2}}{c\sqrt{d}\sqrt{\frac{cx^{2}}{d}+1}}+\frac{2\sqrt{d}}{c^{2}\sqrt{\frac{cx^{2}}{d}+1}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)*x**2/(c+d/x**2)**(3/2),x)
```

```
[Out] a*(c**3*d**(9/2)*x**6*sqrt(c*x**2/d + 1)/(3*c**5*d**4*x**4 + 6*c*
*4*d**5*x**2 + 3*c**3*d**6) - 3*c**2*d**(11/2)*x**4*sqrt(c*x**2/d
 + 1)/(3*c**5*d**4*x**4 + 6*c**4*d**5*x**2 + 3*c**3*d**6) - 12*c*
```

```
d**(13/2)*x**2*sqrt(c*x**2/d + 1)/(3*c**5*d**4*x**4 + 6*c**4*d**5
*x**2 + 3*c**3*d**6) - 8*d**(15/2)*sqrt(c*x**2/d + 1)/(3*c**5*d**
4*x**4 + 6*c**4*d**5*x**2 + 3*c**3*d**6)) + b*(x**2/(c*sqrt(d)*sq
rt(c*x**2/d + 1)) + 2*sqrt(d)/(c**2*sqrt(c*x**2/d + 1)))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)x^2}{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)*x^2/(c + d/x^2)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)*x^2/(c + d/x^2)^(3/2), x)
```

3.813 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2}} dx$

Optimal. Leaf size=45

$$\frac{ax}{c\sqrt{c+\frac{d}{x^2}}}-\frac{bc-2ad}{c^2x\sqrt{c+\frac{d}{x^2}}}$$

```
[Out] -((b*c - 2*a*d)/(c^2*Sqrt[c + d/x^2]*x)) + (a*x)/(c*Sqrt[c + d/x^
2])
```

Rubi [A] time = 0.103355, antiderivative size = 45, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{ax}{c\sqrt{c+\frac{d}{x^2}}}-\frac{bc-2ad}{c^2x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/(c + d/x^2)^(3/2),x]
```

```
[Out] -((b*c - 2*a*d)/(c^2*Sqrt[c + d/x^2]*x)) + (a*x)/(c*Sqrt[c + d/x^
2])
```

Rubi in Sympy [A] time = 10.7126, size = 37, normalized size = 0.82

$$\frac{ax}{c\sqrt{c+\frac{d}{x^2}}}+\frac{2ad-bc}{c^2x\sqrt{c+\frac{d}{x^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2),x)
```

```
[Out] a*x/(c*sqrt(c + d/x**2)) + (2*a*d - b*c)/(c**2*x*sqrt(c + d/x**2)
)
```

Mathematica [A] time = 0.0339211, size = 33, normalized size = 0.73

$$\frac{acx^2+2ad-bc}{c^2x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/(c + d/x^2)^(3/2),x]
```

```
[Out] (-(b*c) + 2*a*d + a*c*x^2)/(c^2*Sqrt[c + d/x^2]*x)
```

Maple [A] time = 0.008, size = 43, normalized size = 1.

$$\frac{\left(ax^2c+2\,ad-bc\right)\left(cx^2+d\right)}{x^3c^2}\left(\frac{cx^2+d}{x^2}\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((a+b/x^2)/(c+d/x^2)^(3/2),x)
```

```
[Out] (a*c*x^2+2*a*d-b*c)*(c*x^2+d)/((c*x^2+d)/x^2)^(3/2)/x^3/c^2
```

Maxima [A] time = 1.423, size = 72, normalized size = 1.6

$$a\left(\frac{\sqrt{c+\frac{d}{x^2}}x}{c^2}+\frac{d}{\sqrt{c+\frac{d}{x^2}}c^2x}\right)-\frac{b}{\sqrt{c+\frac{d}{x^2}}cx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)/(c + d/x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] a*(sqrt(c + d/x^2)*x/c^2 + d/(sqrt(c + d/x^2)*c^2*x)) - b/(sqrt(c
 + d/x^2)*c*x)
```

Fricas [A] time = 0.232242, size = 63, normalized size = 1.4

$$\frac{\left(acx^3-(bc-2\,ad)x\right)\sqrt{\frac{cx^2+d}{x^2}}}{c^3x^2+c^2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)/(c + d/x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] (a*c*x^3 - (b*c - 2*a*d)*x)*sqrt((c*x^2 + d)/x^2)/(c^3*x^2 + c^2*
d)
```

Sympy [A] time = 10.101, size = 65, normalized size = 1.44

$$a\left(\frac{x^2}{c\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+\frac{2\sqrt{d}}{c^2\sqrt{\frac{cx^2}{d}+1}}\right)-\frac{b}{c\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a+b/x**2)/(c+d/x**2)**(3/2),x)
```

```
[Out] a*(x**2/(c*sqrt(d)*sqrt(c*x**2/d + 1)) + 2*sqrt(d)/(c**2*sqrt(c*x
**2/d + 1))) - b/(c*sqrt(d)*sqrt(c*x**2/d + 1))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a + b/x^2)/(c + d/x^2)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/(c + d/x^2)^(3/2), x)
```

3.814 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2} x^2} \, dx$

Optimal. Leaf size=59

$$\frac{bc-ad}{cdx\sqrt{c+\frac{d}{x^2}}}-\frac{b\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{d^{3/2}}$$

```
[Out] (b*c - a*d)/(c*d*Sqrt[c + d/x^2]*x) - (b*ArcTanh[Sqrt[d]/(Sqrt[c
+ d/x^2]*x)])/d^(3/2)
```

Rubi [A] time = 0.122652, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{bc-ad}{cdx\sqrt{c+\frac{d}{x^2}}}-\frac{b\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{d^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b/x^2)/((c + d/x^2)^(3/2)*x^2),x]
```

```
[Out] (b*c - a*d)/(c*d*Sqrt[c + d/x^2]*x) - (b*ArcTanh[Sqrt[d]/(Sqrt[c
+ d/x^2]*x)])/d^(3/2)
```

Rubi in Sympy [A] time = 12.0733, size = 48, normalized size = 0.81

$$-\frac{b\,\text{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{d^{\frac{3}{2}}}-\frac{ad-bc}{cdx\sqrt{c+\frac{d}{x^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**2,x)
```

```
[Out] -b*atanh(sqrt(d)/(x*sqrt(c + d/x**2)))/d**(3/2) - (a*d - b*c)/(c*
d*x*sqrt(c + d/x**2))
```

Mathematica [A] time = 0.107482, size = 89, normalized size = 1.51

$$\frac{\sqrt{d}(bc-ad)+bc\log(x)\sqrt{cx^2+d}-bc\sqrt{cx^2+d}\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)}{cd^{3/2}x\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b/x^2)/((c + d/x^2)^(3/2)*x^2),x]
```

```
[Out] (Sqrt[d]*(b*c - a*d) + b*c*Sqrt[d + c*x^2]*Log[x] - b*c*Sqrt[d +
c*x^2]*Log[d + Sqrt[d]*Sqrt[d + c*x^2]])/(c*d^(3/2)*Sqrt[c + d/x^
```

```
2]*x)
```

Maple [A] time = 0.016, size = 79, normalized size = 1.3

$$-\frac{cx^2+d}{cx^3}\left(ad^{\frac{5}{2}}-bcd^{\frac{3}{2}}+b\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)c\sqrt{cx^2+d}d\right)\left(\frac{cx^2+d}{x^2}\right)^{-\frac{3}{2}}d^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(3/2)/x^2,x)
```

```
[Out] -(c*x^2+d)*(a*d^(5/2)-b*c*d^(3/2)+b*ln(2*(d^(1/2)*(c*x^2+d)^(1/2)
+d)/x)*c*(c*x^2+d)^(1/2)*d)/((c*x^2+d)/x^2)^(3/2)/x^3/c/d^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.255286, size = 1, normalized size = 0.02

$$\left[\frac{2\left(bcd-ad^2\right)x\sqrt{\frac{cx^2+d}{x^2}}+\left(bc^2x^2+bcd\right)\sqrt{d}\log\left(\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}-(cx^2+2\,d)\sqrt{d}}{x^2}\right)}{2\left(c^2d^2x^2+cd^3\right)},\ \frac{\left(bcd-ad^2\right)x\sqrt{\frac{cx^2+d}{x^2}}+\left(bc^2x^2+bcd\right)\sqrt{-d}\operatorname{arctan}\right.}{c^2d^2x^2+cd^3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] [1/2*(2*(b*c*d - a*d^2)*x*sqrt((c*x^2 + d)/x^2) + (b*c^2*x^2 + b*
c*d)*sqrt(d)*log((2*d*x*sqrt((c*x^2 + d)/x^2) - (c*x^2 + 2*d)*sqr
t(d))/x^2))/(c^2*d^2*x^2 + c*d^3), ((b*c*d - a*d^2)*x*sqrt((c*x^2
 + d)/x^2) + (b*c^2*x^2 + b*c*d)*sqrt(-d)*arctan(sqrt(-d)/(x*sqrt
((c*x^2 + d)/x^2))))/(c^2*d^2*x^2 + c*d^3)]
```

Sympy [A] time = 18.2554, size = 206, normalized size = 3.49

$$-\frac{a}{c\sqrt{d}\sqrt{\frac{cx^2}{d}+1}}+b\left(\frac{cd^2x^2\log\left(\frac{cx^2}{d}\right)}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}-\frac{2cd^2x^2\log\left(\sqrt{\frac{cx^2}{d}+1}+1\right)}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}+\frac{2d^3\sqrt{\frac{cx^2}{d}+1}}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}+\frac{d^3\log\left(\frac{cx^2}{d}\right)}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}-\frac{2d^3\log\left(\sqrt{\frac{cx^2}{d}+1}+1\right)}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**2,x)
```

```
[Out] -a/(c*sqrt(d)*sqrt(c*x**2/d + 1)) + b*(c*d**2*x**2*log(c*x**2/d)/
(2*c*d**(7/2)*x**2 + 2*d**(9/2)) - 2*c*d**2*x**2*log(sqrt(c*x**2/
d + 1) + 1)/(2*c*d**(7/2)*x**2 + 2*d**(9/2)) + 2*d**3*sqrt(c*x**2
/d + 1)/(2*c*d**(7/2)*x**2 + 2*d**(9/2)) + d**3*log(c*x**2/d)/(2*
c*d**(7/2)*x**2 + 2*d**(9/2)) - 2*d**3*log(sqrt(c*x**2/d + 1) + 1
)/(2*c*d**(7/2)*x**2 + 2*d**(9/2)))
```

GIAC/XCAS [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^2), x)
```

3.815 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2} x^4} \, dx$

Optimal. Leaf size=92

$$\frac{(3bc-2ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2d^{5/2}}-\frac{3bc-2ad}{2d^2x\sqrt{c+\frac{d}{x^2}}}-\frac{b}{2dx^3\sqrt{c+\frac{d}{x^2}}}$$

```
[Out] -b/(2*d*Sqrt[c + d/x^2]*x^3) - (3*b*c - 2*a*d)/(2*d^2*Sqrt[c + d/
x^2]*x) + ((3*b*c - 2*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/
(2*d^(5/2))
```

Rubi [A] time = 0.170773, antiderivative size = 92, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{(3bc-2ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2d^{5/2}}-\frac{3bc-2ad}{2d^2x\sqrt{c+\frac{d}{x^2}}}-\frac{b}{2dx^3\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/((c + d/x^2)^(3/2)*x^4),x]
```

```
[Out] -b/(2*d*Sqrt[c + d/x^2]*x^3) - (3*b*c - 2*a*d)/(2*d^2*Sqrt[c + d/
x^2]*x) + ((3*b*c - 2*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/
(2*d^(5/2))
```

Rubi in Sympy [A] time = 14.2511, size = 80, normalized size = 0.87

$$-\frac{b}{2dx^3\sqrt{c+\frac{d}{x^2}}}+\frac{2ad-3bc}{2d^2x\sqrt{c+\frac{d}{x^2}}}-\frac{(2ad-3bc)\,\mathrm{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{2d^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**4,x)
```

```
[Out] -b/(2*d*x**3*sqrt(c + d/x**2)) + (2*a*d - 3*b*c)/(2*d**2*x*sqrt(c
 + d/x**2)) - (2*a*d - 3*b*c)*atanh(sqrt(d)/(x*sqrt(c + d/x**2)))
/(2*d**(5/2))
```

Mathematica [A] time = 0.164244, size = 119, normalized size = 1.29

$$\frac{\sqrt{d}\left(2adx^2-b\left(3cx^2+d\right)\right)+x^2\log(x)\sqrt{cx^2+d}(2ad-3bc)+x^2\sqrt{cx^2+d}(3bc-2ad)\log\left(\sqrt{d}\sqrt{cx^2+d}+d\right)}{2d^{5/2}x^3\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/((c + d/x^2)^(3/2)*x^4),x]
```

```
[Out] (Sqrt[d]*(2*a*d*x^2 - b*(d + 3*c*x^2)) + (-3*b*c + 2*a*d)*x^2*Sqr
t[d + c*x^2]*Log[x] + (3*b*c - 2*a*d)*x^2*Sqrt[d + c*x^2]*Log[d +
 Sqrt[d]*Sqrt[d + c*x^2]])/(2*d^(5/2)*Sqrt[c + d/x^2]*x^3)
```

Maple [A] time = 0.017, size = 134, normalized size = 1.5

$$\frac{cx^2+d}{2x^5}\left(2ad^{7/2}x^2-3bcd^{5/2}x^2-2a\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)d^3\sqrt{cx^2+d}x^2+3bc\ln\left(2\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)d^2\sqrt{cx^2+d}x^2-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(3/2)/x^4,x)
```

```
[Out] 1/2*(c*x^2+d)*(2*a*d^(7/2)*x^2-3*b*c*d^(5/2)*x^2-2*a*ln(2*(d^(1/2
)*(c*x^2+d)^(1/2)+d)/x)*d^3*(c*x^2+d)^(1/2)*x^2+3*b*c*ln(2*(d^(1/
2)*(c*x^2+d)^(1/2)+d)/x)*d^2*(c*x^2+d)^(1/2)*x^2-b*d^(7/2))/((c*x
^2+d)/x^2)^(3/2)/x^5/d^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^4),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.259195, size = 1, normalized size = 0.01

$$\left[-\frac{\left(\left(3\,bc^2-2\,acd\right)x^3+\left(3\,bcd-2\,ad^2\right)x\right)\sqrt{d}\log\left(\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}-\left(cx^2+2\,d\right)\sqrt{d}}{x^2}\right)+2\left(bd^2+\left(3\,bcd-2\,ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{4\left(cd^3x^3+d^4x\right)},\right.$$
$$\left.-\frac{\left(\left(3\,bc^2-2\,acd\right)x^3+\left(3\,bcd-2\,ad^2\right)x\right)\sqrt{-d}\arctan\left(\frac{\sqrt{-d}}{x\sqrt{\frac{cx^2+d}{x^2}}}\right)+\left(bd^2+\left(3\,bcd-2\,ad^2\right)x^2\right)\sqrt{\frac{cx^2+d}{x^2}}}{2\left(cd^3x^3+d^4x\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^4),x, algorithm="fricas")
```

```
[Out] [-1/4*(((3*b*c^2 - 2*a*c*d)*x^3 + (3*b*c*d - 2*a*d^2)*x)*sqrt(d)*
log((2*d*x*sqrt((c*x^2 + d)/x^2) - (c*x^2 + 2*d)*sqrt(d))/x^2) +
2*(b*d^2 + (3*b*c*d - 2*a*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(c*d^3
*x^3 + d^4*x), -1/2*(((3*b*c^2 - 2*a*c*d)*x^3 + (3*b*c*d - 2*a*d^
2)*x)*sqrt(-d)*arctan(sqrt(-d)/(x*sqrt((c*x^2 + d)/x^2))) + (b*d^
2 + (3*b*c*d - 2*a*d^2)*x^2)*sqrt((c*x^2 + d)/x^2))/(c*d^3*x^3 +
d^4*x)]
```

Sympy [A] time = 30.6519, size = 262, normalized size = 2.85

$$a\left(\frac{cd^2x^2\log\left(\frac{cx^2}{d}\right)}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}-\frac{2cd^2x^2\log\left(\sqrt{\frac{cx^2}{d}+1}+1\right)}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}+\frac{2d^3\sqrt{\frac{cx^2}{d}+1}}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}+\frac{d^3\log\left(\frac{cx^2}{d}\right)}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}-\frac{2d^3\log\left(\sqrt{\frac{cx^2}{d}+1}+1\right)}{2cd^{\frac{7}{2}}x^2+2d^{\frac{9}{2}}}\right)+b\left(-\frac{3\sqrt{c}}{2d^2x\sqrt{1+\frac{d}{cx^2}}}+\frac{3c\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{2d^{\frac{5}{2}}}-\frac{1}{2\sqrt{c}dx^3\sqrt{1+\frac{d}{cx^2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**4,x)
```

```
[Out] a*(c*d**2*x**2*log(c*x**2/d)/(2*c*d**(7/2)*x**2 + 2*d**(9/2)) - 2
*c*d**2*x**2*log(sqrt(c*x**2/d + 1) + 1)/(2*c*d**(7/2)*x**2 + 2*d
**(9/2)) + 2*d**3*sqrt(c*x**2/d + 1)/(2*c*d**(7/2)*x**2 + 2*d**(9
/2)) + d**3*log(c*x**2/d)/(2*c*d**(7/2)*x**2 + 2*d**(9/2)) - 2*d*
*3*log(sqrt(c*x**2/d + 1) + 1)/(2*c*d**(7/2)*x**2 + 2*d**(9/2)))
+ b*(-3*sqrt(c)/(2*d**2*x*sqrt(1 + d/(c*x**2))) + 3*c*asinh(sqrt(
d)/(sqrt(c)*x))/(2*d**(5/2)) - 1/(2*sqrt(c)*d*x**3*sqrt(1 + d/(c*
x**2))))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{\frac{3}{2}}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^4),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^4), x)
```

3.816 $\int \frac{a+\frac{b}{x^2}}{\left(c+\frac{d}{x^2}\right)^{3/2} x^6} \, dx$

Optimal. Leaf size=123

$$-\frac{3c(5bc-4ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{7/2}}+\frac{3\sqrt{c+\frac{d}{x^2}}(5bc-4ad)}{8d^3x}-\frac{5bc-4ad}{4d^2x^3\sqrt{c+\frac{d}{x^2}}}-\frac{b}{4dx^5\sqrt{c+\frac{d}{x^2}}}$$

```
[Out] -b/(4*d*Sqrt[c + d/x^2]*x^5) - (5*b*c - 4*a*d)/(4*d^2*Sqrt[c + d/
x^2]*x^3) + (3*(5*b*c - 4*a*d)*Sqrt[c + d/x^2])/(8*d^3*x) - (3*c*
(5*b*c - 4*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(8*d^(7/2))
```

Rubi [A] time = 0.224599, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{3c(5bc-4ad)\tanh^{-1}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{7/2}}+\frac{3\sqrt{c+\frac{d}{x^2}}(5bc-4ad)}{8d^3x}-\frac{5bc-4ad}{4d^2x^3\sqrt{c+\frac{d}{x^2}}}-\frac{b}{4dx^5\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)/((c + d/x^2)^(3/2)*x^6),x]
```

```
[Out] -b/(4*d*Sqrt[c + d/x^2]*x^5) - (5*b*c - 4*a*d)/(4*d^2*Sqrt[c + d/
x^2]*x^3) + (3*(5*b*c - 4*a*d)*Sqrt[c + d/x^2])/(8*d^3*x) - (3*c*
(5*b*c - 4*a*d)*ArcTanh[Sqrt[d]/(Sqrt[c + d/x^2]*x)])/(8*d^(7/2))
```

Rubi in Sympy [A] time = 18.7608, size = 114, normalized size = 0.93

$$-\frac{b}{4dx^5\sqrt{c+\frac{d}{x^2}}}+\frac{3c\,(4ad-5bc)\,\mathrm{atanh}\left(\frac{\sqrt{d}}{x\sqrt{c+\frac{d}{x^2}}}\right)}{8d^{\frac{7}{2}}}+\frac{4ad-5bc}{4d^2x^3\sqrt{c+\frac{d}{x^2}}}-\frac{3\sqrt{c+\frac{d}{x^2}}\,(4ad-5bc)}{8d^3x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**6,x)
```

```
[Out] -b/(4*d*x**5*sqrt(c + d/x**2)) + 3*c*(4*a*d - 5*b*c)*atanh(sqrt(d
)/(x*sqrt(c + d/x**2)))/(8*d**(7/2)) + (4*a*d - 5*b*c)/(4*d**2*x*
*3*sqrt(c + d/x**2)) - 3*sqrt(c + d/x**2)*(4*a*d - 5*b*c)/(8*d**3
*x)
```

Mathematica [A] time = 0.216183, size = 143, normalized size = 1.16

$$\frac{\sqrt{d}\left(b\left(15c^2x^4+5cdx^2-2d^2\right)-4adx^2\left(3cx^2+d\right)\right)+3cx^4\log(x)\sqrt{cx^2+d}(5bc-4ad)-3cx^4\sqrt{cx^2+d}(5bc-4ad)\log\left(\sqrt{d}\right.}{8d^{7/2}x^5\sqrt{c+\frac{d}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b/x^2)/((c + d/x^2)^(3/2)*x^6),x]
```

```
[Out] (Sqrt[d]*(-4*a*d*x^2*(d + 3*c*x^2) + b*(-2*d^2 + 5*c*d*x^2 + 15*c
^2*x^4)) + 3*c*(5*b*c - 4*a*d)*x^4*Sqrt[d + c*x^2]*Log[x] - 3*c*(
5*b*c - 4*a*d)*x^4*Sqrt[d + c*x^2]*Log[d + Sqrt[d]*Sqrt[d + c*x^2
]])/(8*d^(7/2)*Sqrt[c + d/x^2]*x^5)
```

Maple [A] time = 0.019, size = 159, normalized size = 1.3

$$-\frac{cx^2+d}{8x^7}\left(12\,acd^{9/2}x^4-15\,bc^2x^4d^{7/2}-12\,ac\ln\left(2\,\frac{\sqrt{d}\sqrt{cx^2+d}+d}{x}\right)d^4x^4\sqrt{cx^2+d}+4\,ad^{11/2}x^2-5\,bcd^{9/2}x^2+15\,bc^2\ln\left(2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)/(c+d/x^2)^(3/2)/x^6,x)
```

```
[Out] -1/8*(c*x^2+d)*(12*a*c*d^(9/2)*x^4-15*b*c^2*x^4*d^(7/2)-12*a*c*ln
(2*(d^(1/2)*(c*x^2+d)^(1/2)+d)/x)*d^4*x^4*(c*x^2+d)^(1/2)+4*a*d^(
11/2)*x^2-5*b*c*d^(9/2)*x^2+15*b*c^2*ln(2*(d^(1/2)*(c*x^2+d)^(1/2
)+d)/x)*d^3*x^4*(c*x^2+d)^(1/2)+2*b*d^(11/2))/((c*x^2+d)/x^2)^(3/
2)/x^7/d^(13/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^6),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.254471, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(\left(5\,bc^3-4\,ac^2d\right)x^5+\left(5\,bc^2d-4\,acd^2\right)x^3\right)\sqrt{d}\log\left(-\frac{2\,dx\sqrt{\frac{cx^2+d}{x^2}}+\left(cx^2+2\,d\right)\sqrt{d}}{x^2}\right)-2\left(3\left(5\,bc^2d-4\,acd^2\right)x^4-2\,bd^3+\left(5\,bc\right.\right.}{16\left(cd^4x^5+d^5x^3\right)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^6),x, algorithm="fricas")
```

```
[Out] [-1/16*(3*((5*b*c^3 - 4*a*c^2*d)*x^5 + (5*b*c^2*d - 4*a*c*d^2)*x^
3)*sqrt(d)*log(-(2*d*x*sqrt((c*x^2 + d)/x^2) + (c*x^2 + 2*d)*sqrt
(d))/x^2) - 2*(3*(5*b*c^2*d - 4*a*c*d^2)*x^4 - 2*b*d^3 + (5*b*c*d
^2 - 4*a*d^3)*x^2)*sqrt((c*x^2 + d)/x^2))/(c*d^4*x^5 + d^5*x^3),
1/8*(3*((5*b*c^3 - 4*a*c^2*d)*x^5 + (5*b*c^2*d - 4*a*c*d^2)*x^3)*
sqrt(-d)*arctan(sqrt(-d)/(x*sqrt((c*x^2 + d)/x^2))) + (3*(5*b*c^2
*d - 4*a*c*d^2)*x^4 - 2*b*d^3 + (5*b*c*d^2 - 4*a*d^3)*x^2)*sqrt((
c*x^2 + d)/x^2))/(c*d^4*x^5 + d^5*x^3)]
```

Sympy [A] time = 53.3011, size = 180, normalized size = 1.46

$$a\left(-\frac{3\sqrt{c}}{2d^{2}x\sqrt{1+\frac{d}{cx^{2}}}}+\frac{3c\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{2d^{\frac{5}{2}}}-\frac{1}{2\sqrt{c}dx^{3}\sqrt{1+\frac{d}{cx^{2}}}}\right)$$
$$+b\left(\frac{15c^{\frac{3}{2}}}{8d^{3}x\sqrt{1+\frac{d}{cx^{2}}}}+\frac{5\sqrt{c}}{8d^{2}x^{3}\sqrt{1+\frac{d}{cx^{2}}}}-\frac{15c^{2}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{c}x}\right)}{8d^{\frac{7}{2}}}-\frac{1}{4\sqrt{c}dx^{5}\sqrt{1+\frac{d}{cx^{2}}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)/(c+d/x**2)**(3/2)/x**6,x)
```

```
[Out] a*(-3*sqrt(c)/(2*d**2*x*sqrt(1 + d/(c*x**2))) + 3*c*asinh(sqrt(d)
/(sqrt(c)*x))/(2*d**(5/2)) - 1/(2*sqrt(c)*d*x**3*sqrt(1 + d/(c*x*
*2)))) + b*(15*c**(3/2)/(8*d**3*x*sqrt(1 + d/(c*x**2))) + 5*sqrt(
c)/(8*d**2*x**3*sqrt(1 + d/(c*x**2))) - 15*c**2*asinh(sqrt(d)/(sq
rt(c)*x))/(8*d**(7/2)) - 1/(4*sqrt(c)*d*x**5*sqrt(1 + d/(c*x**2))
))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{a+\frac{b}{x^{2}}}{\left(c+\frac{d}{x^{2}}\right)^{\frac{3}{2}}x^{6}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^6),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)/((c + d/x^2)^(3/2)*x^6), x)
```

3.817 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q (ex)^m \, dx$

Optimal. Leaf size=105

$$\frac{(ex)^{m+1}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(\frac{1}{2}(-m-1);-p,-q;\frac{1-m}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{e(m+1)}$$

```
[Out] ((a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(1 + m)*AppellF1[(-1 - m)/2, -
p, -q, (1 - m)/2, -(b/(a*x^2)), -(d/(c*x^2))])/(e*(1 + m)*(1 + b/
(a*x^2))^p*(1 + d/(c*x^2))^q)
```

Rubi [A] time = 0.317676, antiderivative size = 101, normalized size of antiderivative = 0.96, number of steps used = 4, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{x(ex)^m\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(\frac{1}{2}(-m-1);-p,-q;\frac{1-m}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{m+1}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^m,x]
```

```
[Out] ((a + b/x^2)^p*(c + d/x^2)^q*x*(e*x)^m*AppellF1[(-1 - m)/2, -p, -
q, (1 - m)/2, -(b/(a*x^2)), -(d/(c*x^2))])/((1 + m)*(1 + b/(a*x^2
))^p*(1 + d/(c*x^2))^q)
```

Rubi in Sympy [A] time = 40.7598, size = 90, normalized size = 0.86

$$\frac{(ex)^m\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q\left(\frac{1}{x}\right)^m\left(\frac{1}{x}\right)^{-m-1}\operatorname{appellf}_1\left(-\frac{m}{2}-\frac{1}{2},-p,-q,-\frac{m}{2}+\frac{1}{2},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q*(e*x)**m,x)
```

```
[Out] (e*x)**m*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/x**
2)**p*(c + d/x**2)**q*(1/x)**m*(1/x)**(-m - 1)*appellf1(-m/2 - 1/
2, -p, -q, -m/2 + 1/2, -b/(a*x**2), -d/(c*x**2))/(m + 1)
```

Mathematica [B] time = 0.779692, size = 284, normalized size = 2.7

$$\frac{bdx(ex)^m(m-2p-2q+3)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1}{(m-2p-2q+1)\left(2x^2\left(adpF_1\left(\frac{1}{2}(m-2p-2q+3);1-p,-q;\frac{1}{2}(m-2p-2q+5);-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(\frac{1}{2}(m-2p-2q+3\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^m,x]
```

```
[Out] (b*d*(3 + m - 2*p - 2*q)*(a + b/x^2)^p*(c + d/x^2)^q*x*(e*x)^m*Ap
pellF1[(1 + m - 2*p - 2*q)/2, -p, -q, (3 + m - 2*p - 2*q)/2, -((a
*x^2)/b), -((c*x^2)/d)])/((1 + m - 2*p - 2*q)*(b*d*(3 + m - 2*p -
 2*q)*AppellF1[(1 + m - 2*p - 2*q)/2, -p, -q, (3 + m - 2*p - 2*q)
/2, -((a*x^2)/b), -((c*x^2)/d)] + 2*x^2*(a*d*p*AppellF1[(3 + m -
2*p - 2*q)/2, 1 - p, -q, (5 + m - 2*p - 2*q)/2, -((a*x^2)/b), -((
```

```
c*x^2)/d)] + b*c*q*AppellF1[(3 + m - 2*p - 2*q)/2, -p, 1 - q, (5
+ m - 2*p - 2*q)/2, -((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.26, size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q (ex)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q*(e*x)^m,x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q*(e*x)^m,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (ex)^m \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="maxima")

[Out] integrate((e*x)^m*(a + b/x^2)^p*(c + d/x^2)^q, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left((ex)^m \left(\frac{ax^2+b}{x^2}\right)^p \left(\frac{cx^2+d}{x^2}\right)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="fricas")

[Out] integral((e*x)^m*((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q*(e*x)**m,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (ex)^m \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="giac")

[Out] integrate((e*x)^m*(a + b/x^2)^p*(c + d/x^2)^q, x)
```

3.818 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^4\,dx$

Optimal. Leaf size=84

$$\frac{1}{5}x^5\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{5}{2};-p,-q;-\frac{3}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)$$

```
[Out] ((a + b/x^2)^p*(c + d/x^2)^q*x^5*AppellF1[-5/2, -p, -q, -3/2, -(b
/(a*x^2)), -(d/(c*x^2))])/(5*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q)
```

Rubi [A] time = 0.262858, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{1}{5}x^5\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{5}{2};-p,-q;-\frac{3}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)^p*(c + d/x^2)^q*x^4,x]
```

```
[Out] ((a + b/x^2)^p*(c + d/x^2)^q*x^5*AppellF1[-5/2, -p, -q, -3/2, -(b
/(a*x^2)), -(d/(c*x^2))])/(5*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q)
```

Rubi in Sympy [A] time = 34.8253, size = 68, normalized size = 0.81

$$\frac{x^5\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf}_1\left(-\frac{5}{2},-p,-q,-\frac{3}{2},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q*x**4,x)
```

```
[Out] x**5*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/x**2)**
p*(c + d/x**2)**q*appellf1(-5/2, -p, -q, -3/2, -b/(a*x**2), -d/(c
*x**2))/5
```

Mathematica [B] time = 0.731808, size = 254, normalized size = 3.02

$$\frac{bdx^5(2p+2q-7)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+\frac{5}{2};-p,-q;-p\right.}{(2p+2q-5)\left(2x^2\left(adpF_1\left(-p-q+\frac{7}{2};1-p,-q;-p-q+\frac{9}{2};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{7}{2};-p,1-q;-p-q+\frac{9}{2};-\frac{ax^2}{b}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b/x^2)^p*(c + d/x^2)^q*x^4,x]
```

```
[Out] (b*d*(-7 + 2*p + 2*q)*(a + b/x^2)^p*(c + d/x^2)^q*x^5*AppellF1[5/
2 - p - q, -p, -q, 7/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/((-5
 + 2*p + 2*q)*(b*d*(7 - 2*p - 2*q)*AppellF1[5/2 - p - q, -p, -q,
7/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 2*x^2*(a*d*p*AppellF1[
7/2 - p - q, 1 - p, -q, 9/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)]
+ b*c*q*AppellF1[7/2 - p - q, -p, 1 - q, 9/2 - p - q, -((a*x^2)/b
), -((c*x^2)/d)])))
```

Maple [F] time = 0.088, size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^{2}}\right)^{p} \left(c+\frac{d}{x^{2}}\right)^{q} x^{4} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q*x^4,x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q*x^4,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^{2}}\right)^{p} \left(c+\frac{d}{x^{2}}\right)^{q} x^{4} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^4,x, algorithm="maxima")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q*x^4, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(x^{4} \left(\frac{ax^{2}+b}{x^{2}}\right)^{p} \left(\frac{cx^{2}+d}{x^{2}}\right)^{q}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^4,x, algorithm="fricas")

[Out] integral(x^4*((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q*x**4,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^{2}}\right)^{p} \left(c+\frac{d}{x^{2}}\right)^{q} x^{4} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^4,x, algorithm="giac")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q*x^4, x)
```

3.819 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^3\,dx$

Optimal. Leaf size=100

$$\frac{b^2\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\left(\frac{b\left(c+\frac{d}{x^2}\right)}{bc-ad}\right)^{-q}F_1\left(p+1;-q,3;p+2;-\frac{d\left(a+\frac{b}{x^2}\right)}{bc-ad},\frac{a+\frac{b}{x^2}}{a}\right)}{2a^3(p+1)}$$

```
[Out] (b^2*(a + b/x^2)^(1 + p)*(c + d/x^2)^q*AppellF1[1 + p, -q, 3, 2 +
 p, -((d*(a + b/x^2))/(b*c - a*d)), (a + b/x^2)/a])/(2*a^3*(1 + p
)*((b*(c + d/x^2))/(b*c - a*d))^q)
```

Rubi [A] time = 0.242479, antiderivative size = 100, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{b^2\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\left(\frac{b\left(c+\frac{d}{x^2}\right)}{bc-ad}\right)^{-q}F_1\left(p+1;-q,3;p+2;-\frac{d\left(a+\frac{b}{x^2}\right)}{bc-ad},\frac{a+\frac{b}{x^2}}{a}\right)}{2a^3(p+1)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b/x^2)^p*(c + d/x^2)^q*x^3,x]
```

```
[Out] (b^2*(a + b/x^2)^(1 + p)*(c + d/x^2)^q*AppellF1[1 + p, -q, 3, 2 +
 p, -((d*(a + b/x^2))/(b*c - a*d)), (a + b/x^2)/a])/(2*a^3*(1 + p
)*((b*(c + d/x^2))/(b*c - a*d))^q)
```

Rubi in Sympy [A] time = 29.8999, size = 76, normalized size = 0.76

$$\frac{b^2\left(\frac{b\left(-c-\frac{d}{x^2}\right)}{ad-bc}\right)^{-q}\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\operatorname{appellf}_1\left(p+1,3,-q,p+2,\frac{a+\frac{b}{x^2}}{a},\frac{d\left(a+\frac{b}{x^2}\right)}{ad-bc}\right)}{2a^3\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q*x**3,x)
```

```
[Out] b**2*(b*(-c - d/x**2)/(a*d - b*c))**(-q)*(a + b/x**2)**(p + 1)*(c
 + d/x**2)**q*appellf1(p + 1, 3, -q, p + 2, (a + b/x**2)/a, d*(a
+ b/x**2)/(a*d - b*c))/(2*a**3*(p + 1))
```

Mathematica [B] time = 0.704965, size = 229, normalized size = 2.29

$$\frac{bdx^4(p+q-3)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+2;-p,-q;-p-q+\right.}{2(p+q-2)\left(x^2\left(adpF_1\left(-p-q+3;1-p,-q;-p-q+4;-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+3;-p,1-q;-p-q+4;-\frac{ax^2}{b},-\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b/x^2)^p*(c + d/x^2)^q*x^3,x]
```

```
[Out] (b*d*(-3 + p + q)*(a + b/x^2)^p*(c + d/x^2)^q*x^4*AppellF1[2 - p
- q, -p, -q, 3 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/(2*(-2 + p +
```

```
 q)*(-(b*d*(-3 + p + q)*AppellF1[2 - p - q, -p, -q, 3 - p - q, -(
(a*x^2)/b), -((c*x^2)/d)]) + x^2*(a*d*p*AppellF1[3 - p - q, 1 - p
, -q, 4 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + b*c*q*AppellF1[3 -
 p - q, -p, 1 - q, 4 - p - q, -((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.084, size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q*x^3,x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q*x^3,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^3,x, algorithm="maxima")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q*x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(x^3 \left(\frac{ax^2+b}{x^2}\right)^p \left(\frac{cx^2+d}{x^2}\right)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^3,x, algorithm="fricas")

[Out] integral(x^3*((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q*x**3,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^3,x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q*x^3, x)
```

3.820 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^2\,dx$

Optimal. Leaf size=84

$$\frac{1}{3}x^3\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{3}{2};-p,-q;-\frac{1}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)$$

```
[Out] ((a + b/x^2)^p*(c + d/x^2)^q*x^3*AppellF1[-3/2, -p, -q, -1/2, -(b
/(a*x^2)), -(d/(c*x^2))])/(3*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q)
```

Rubi [A] time = 0.264216, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{1}{3}x^3\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{3}{2};-p,-q;-\frac{1}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)^p*(c + d/x^2)^q*x^2,x]
```

```
[Out] ((a + b/x^2)^p*(c + d/x^2)^q*x^3*AppellF1[-3/2, -p, -q, -1/2, -(b
/(a*x^2)), -(d/(c*x^2))])/(3*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q)
```

Rubi in Sympy [A] time = 34.8633, size = 68, normalized size = 0.81

$$\frac{x^3\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf}_1\left(-\frac{3}{2},-p,-q,-\frac{1}{2},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q*x**2,x)
```

```
[Out] x**3*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/x**2)**
p*(c + d/x**2)**q*appellf1(-3/2, -p, -q, -1/2, -b/(a*x**2), -d/(c
*x**2))/3
```

Mathematica [B] time = 0.718015, size = 254, normalized size = 3.02

$$\frac{bdx^3(2p+2q-5)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+\frac{3}{2};-p,-q;-p\right.}{(2p+2q-3)\left(2x^2\left(adpF_1\left(-p-q+\frac{5}{2};1-p,-q;-p-q+\frac{7}{2};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{5}{2};-p,1-q;-p-q+\frac{7}{2};-\frac{ax^2}{b}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b/x^2)^p*(c + d/x^2)^q*x^2,x]
```

```
[Out] (b*d*(-5 + 2*p + 2*q)*(a + b/x^2)^p*(c + d/x^2)^q*x^3*AppellF1[3/
2 - p - q, -p, -q, 5/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/((-3
 + 2*p + 2*q)*(b*d*(5 - 2*p - 2*q)*AppellF1[3/2 - p - q, -p, -q,
5/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 2*x^2*(a*d*p*AppellF1[
5/2 - p - q, 1 - p, -q, 7/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)]
+ b*c*q*AppellF1[5/2 - p - q, -p, 1 - q, 7/2 - p - q, -((a*x^2)/b
), -((c*x^2)/d)])))
```

Maple [F] time = 0.082, size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q*x^2,x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q*x^2,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^2,x, algorithm="maxima")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q*x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(x^2 \left(\frac{ax^2+b}{x^2}\right)^p \left(\frac{cx^2+d}{x^2}\right)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^2,x, algorithm="fricas")

[Out] integral(x^2*((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q*x**2,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x^2,x, algorithm="giac")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q*x^2, x)
```

3.821 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x\,dx$

Optimal. Leaf size=98

$$-\frac{b\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\left(\frac{b\left(c+\frac{d}{x^2}\right)}{bc-ad}\right)^{-q}F_1\left(p+1;-q,2;p+2;-\frac{d\left(a+\frac{b}{x^2}\right)}{bc-ad},\frac{a+\frac{b}{x^2}}{a}\right)}{2a^2(p+1)}$$

```
[Out] -(b*(a + b/x^2)^(1 + p)*(c + d/x^2)^q*AppellF1[1 + p, -q, 2, 2 +
p, -((d*(a + b/x^2))/(b*c - a*d)), (a + b/x^2)/a])/(2*a^2*(1 + p)
*((b*(c + d/x^2))/(b*c - a*d))^q)
```

Rubi [A] time = 0.213183, antiderivative size = 98, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.15$

$$-\frac{b\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\left(\frac{b\left(c+\frac{d}{x^2}\right)}{bc-ad}\right)^{-q}F_1\left(p+1;-q,2;p+2;-\frac{d\left(a+\frac{b}{x^2}\right)}{bc-ad},\frac{a+\frac{b}{x^2}}{a}\right)}{2a^2(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)^p*(c + d/x^2)^q*x,x]
```

```
[Out] -(b*(a + b/x^2)^(1 + p)*(c + d/x^2)^q*AppellF1[1 + p, -q, 2, 2 +
p, -((d*(a + b/x^2))/(b*c - a*d)), (a + b/x^2)/a])/(2*a^2*(1 + p)
*((b*(c + d/x^2))/(b*c - a*d))^q)
```

Rubi in Sympy [A] time = 27.2869, size = 76, normalized size = 0.78

$$-\frac{b\left(\frac{b\left(-c-\frac{d}{x^2}\right)}{ad-bc}\right)^{-q}\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf}_1\left(p+1,2,-q,p+2,\frac{a+\frac{b}{x^2}}{a},\frac{d\left(a+\frac{b}{x^2}\right)}{ad-bc}\right)}{2a^2\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q*x,x)
```

```
[Out] -b*(b*(-c - d/x**2)/(a*d - b*c))**(-q)*(a + b/x**2)**(p + 1)*(c +
 d/x**2)**q*appellf1(p + 1, 2, -q, p + 2, (a + b/x**2)/a, d*(a +
b/x**2)/(a*d - b*c))/(2*a**2*(p + 1))
```

Mathematica [B] time = 0.699803, size = 229, normalized size = 2.34

$$\frac{bdx^2(p+q-2)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+1;-p,-q;-p-q+\right.}{2(p+q-1)\left(x^2\left(adpF_1\left(-p-q+2;1-p,-q;-p-q+3;-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+2;-p,1-q;-p-q+3;-\frac{ax^2}{b},-\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b/x^2)^p*(c + d/x^2)^q*x,x]
```

```
[Out] (b*d*(-2 + p + q)*(a + b/x^2)^p*(c + d/x^2)^q*x^2*AppellF1[1 - p
- q, -p, -q, 2 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/(2*(-1 + p +
```

```
 q)*(-(b*d*(-2 + p + q)*AppellF1[1 - p - q, -p, -q, 2 - p - q, -(
(a*x^2)/b), -((c*x^2)/d)]) + x^2*(a*d*p*AppellF1[2 - p - q, 1 - p
, -q, 3 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + b*c*q*AppellF1[2 -
 p - q, -p, 1 - q, 3 - p - q, -((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.099, size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q*x,x)
```

```
[Out] int((a+b/x^2)^p*(c+d/x^2)^q*x,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x,x, algorithm="maxima")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q*x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(x\left(\frac{ax^2+b}{x^2}\right)^p\left(\frac{cx^2+d}{x^2}\right)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x,x, algorithm="fricas")
```

```
[Out] integral(x*((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q*x,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q*x,x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q*x, x)
```

3.822 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q \, dx$

Optimal. Leaf size=79

$$x\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{1}{2};-p,-q;\frac{1}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)$$

```
[Out] ((a + b/x^2)^p*(c + d/x^2)^q*x*AppellF1[-1/2, -p, -q, 1/2, -(b/(a
*x^2)), -(d/(c*x^2))])/((1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q)
```

Rubi [A] time = 0.229705, antiderivative size = 79, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$x\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{1}{2};-p,-q;\frac{1}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)^p*(c + d/x^2)^q,x]
```

```
[Out] ((a + b/x^2)^p*(c + d/x^2)^q*x*AppellF1[-1/2, -p, -q, 1/2, -(b/(a
*x^2)), -(d/(c*x^2))])/((1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q)
```

Rubi in Sympy [A] time = 33.2437, size = 63, normalized size = 0.8

$$x\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf}_1\left(-\frac{1}{2},-p,-q,\frac{1}{2},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q,x)
```

```
[Out] x*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/x**2)**p*(
c + d/x**2)**q*appellf1(-1/2, -p, -q, 1/2, -b/(a*x**2), -d/(c*x**
2))
```

Mathematica [B] time = 0.741864, size = 252, normalized size = 3.19

$$\frac{bdx(2p+2q-3)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+\frac{1}{2};-p,-q;-p\cdots\right.}{(2p+2q-1)\left(2x^2\left(adpF_1\left(-p-q+\frac{3}{2};1-p,-q;-p-q+\frac{5}{2};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{3}{2};-p,1-q;-p-q+\frac{5}{2};-\frac{ax^2}{b}\cdots\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b/x^2)^p*(c + d/x^2)^q,x]
```

```
[Out] (b*d*(-3 + 2*p + 2*q)*(a + b/x^2)^p*(c + d/x^2)^q*x*AppellF1[1/2
- p - q, -p, -q, 3/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/((-1 +
 2*p + 2*q)*(b*d*(3 - 2*p - 2*q)*AppellF1[1/2 - p - q, -p, -q, 3/
2 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 2*x^2*(a*d*p*AppellF1[3/
2 - p - q, 1 - p, -q, 5/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)] +
b*c*q*AppellF1[3/2 - p - q, -p, 1 - q, 5/2 - p - q, -((a*x^2)/b),
 -((c*x^2)/d)])))
```

Maple [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q,x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="maxima")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(\frac{ax^2+b}{x^2}\right)^p \left(\frac{cx^2+d}{x^2}\right)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="fricas")

[Out] integral(((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="giac")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q, x)
```

3.823 $\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{x}\,dx$

Optimal. Leaf size=97

$$\frac{\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\left(\frac{b\left(c+\frac{d}{x^2}\right)}{bc-ad}\right)^{-q}F_1\left(p+1;-q,1;p+2;-\frac{d\left(a+\frac{b}{x^2}\right)}{bc-ad},\frac{a+\frac{b}{x^2}}{a}\right)}{2a(p+1)}$$

```
[Out] ((a + b/x^2)^(1 + p)*(c + d/x^2)^q*AppellF1[1 + p, -q, 1, 2 + p,
-((d*(a + b/x^2))/(b*c - a*d)), (a + b/x^2)/a])/(2*a*(1 + p)*((b*
(c + d/x^2))/(b*c - a*d))^q)
```

Rubi [A] time = 0.21558, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\left(\frac{b\left(c+\frac{d}{x^2}\right)}{bc-ad}\right)^{-q}F_1\left(p+1;-q,1;p+2;-\frac{d\left(a+\frac{b}{x^2}\right)}{bc-ad},\frac{a+\frac{b}{x^2}}{a}\right)}{2a(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)^p*(c + d/x^2)^q)/x,x]
```

```
[Out] ((a + b/x^2)^(1 + p)*(c + d/x^2)^q*AppellF1[1 + p, -q, 1, 2 + p,
-((d*(a + b/x^2))/(b*c - a*d)), (a + b/x^2)/a])/(2*a*(1 + p)*((b*
(c + d/x^2))/(b*c - a*d))^q)
```

Rubi in Sympy [A] time = 28.1379, size = 71, normalized size = 0.73

$$\frac{\left(\frac{b\left(-c-\frac{d}{x^2}\right)}{ad-bc}\right)^{-q}\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf}_1\left(p+1,1,-q,p+2,\frac{a+\frac{b}{x^2}}{a},\frac{d\left(a+\frac{b}{x^2}\right)}{ad-bc}\right)}{2a\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q/x,x)
```

```
[Out] (b*(-c - d/x**2)/(a*d - b*c))**(-q)*(a + b/x**2)**(p + 1)*(c + d/
x**2)**q*appellf1(p + 1, 1, -q, p + 2, (a + b/x**2)/a, d*(a + b/x
**2)/(a*d - b*c))/(2*a*(p + 1))
```

Mathematica [B] time = 0.592541, size = 223, normalized size = 2.3

$$-\frac{bd(p+q-1)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q;-p,-q;-p-q+1;-\right.}{2(p+q)\left(bd(p+q-1)F_1\left(-p-q;-p,-q;-p-q+1;-\frac{ax^2}{b},-\frac{cx^2}{d}\right)-x^2\left(adpF_1\left(-p-q+1;1-p,-q;-p-q+2;-\frac{ax^2}{b},-\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b/x^2)^p*(c + d/x^2)^q)/x,x]
```

```
[Out] -(b*d*(-1 + p + q)*(a + b/x^2)^p*(c + d/x^2)^q*AppellF1[-p - q, -
p, -q, 1 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/(2*(p + q)*(b*d*(-
```

```
1 + p + q)*AppellF1[-p - q, -p, -q, 1 - p - q, -((a*x^2)/b), -((c
*x^2)/d)] - x^2*(a*d*p*AppellF1[1 - p - q, 1 - p, -q, 2 - p - q,
-((a*x^2)/b), -((c*x^2)/d)] + b*c*q*AppellF1[1 - p - q, -p, 1 - q
, 2 - p - q, -((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.077, size = 0, normalized size = 0.

$$\int \frac{1}{x}\left(a+\frac{b}{x^{2}}\right)^{p}\left(c+\frac{d}{x^{2}}\right)^{q}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q/x,x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q/x,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^{2}}\right)^{p}\left(c+\frac{d}{x^{2}}\right)^{q}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x,x, algorithm="maxima")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(\frac{ax^{2}+b}{x^{2}}\right)^{p}\left(\frac{cx^{2}+d}{x^{2}}\right)^{q}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x,x, algorithm="fricas")

[Out] integral(((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q/x, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q/x,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^{2}}\right)^{p}\left(c+\frac{d}{x^{2}}\right)^{q}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x,x, algorithm="giac")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/x, x)
```

3.824 $\int \frac{\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q}{x^2} dx$

Optimal. Leaf size=82

$$-\frac{\left(a+\frac{b}{x^2}\right)^p \left(\frac{b}{ax^2}+1\right)^{-p} \left(c+\frac{d}{x^2}\right)^q \left(\frac{d}{cx^2}+1\right)^{-q} F_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{x}$$

```
[Out] -(((a + b/x^2)^p*(c + d/x^2)^q*AppellF1[1/2, -p, -q, 3/2, -(b/(a*
x^2)), -(d/(c*x^2))])/((1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q*x))
```

Rubi [A] time = 0.181357, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{\left(a+\frac{b}{x^2}\right)^p \left(\frac{b}{ax^2}+1\right)^{-p} \left(c+\frac{d}{x^2}\right)^q \left(\frac{d}{cx^2}+1\right)^{-q} F_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{x}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)^p*(c + d/x^2)^q)/x^2,x]
```

```
[Out] -(((a + b/x^2)^p*(c + d/x^2)^q*AppellF1[1/2, -p, -q, 3/2, -(b/(a*
x^2)), -(d/(c*x^2))])/((1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q*x))
```

Rubi in Sympy [A] time = 32.9574, size = 63, normalized size = 0.77

$$-\frac{\left(1+\frac{b}{ax^2}\right)^{-p} \left(1+\frac{d}{cx^2}\right)^{-q} \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q \operatorname{appellf}_1\left(\frac{1}{2},-p,-q,\frac{3}{2},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q/x**2,x)
```

```
[Out] -(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/x**2)**p*(c
 + d/x**2)**q*appellf1(1/2, -p, -q, 3/2, -b/(a*x**2), -d/(c*x**2)
)/x
```

Mathematica [B] time = 0.704765, size = 254, normalized size = 3.1

$$\frac{bd(2p+2q-1)\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q-\frac{1}{2};-p,-q;-p\cdots\right.}{x(2p+2q+1)\left(2x^2\left(adpF_1\left(-p-q+\frac{1}{2};1-p,-q;-p-q+\frac{3}{2};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{1}{2};-p,1-q;-p-q+\frac{3}{2};-\frac{ax}{b}\cdots\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b/x^2)^p*(c + d/x^2)^q)/x^2,x]
```

```
[Out] (b*d*(-1 + 2*p + 2*q)*(a + b/x^2)^p*(c + d/x^2)^q*AppellF1[-1/2 -
 p - q, -p, -q, 1/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/((1 + 2
*p + 2*q)*x*(b*d*(1 - 2*p - 2*q)*AppellF1[-1/2 - p - q, -p, -q, 1
/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 2*x^2*(a*d*p*AppellF1[1
/2 - p - q, 1 - p, -q, 3/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)] +
 b*c*q*AppellF1[1/2 - p - q, -p, 1 - q, 3/2 - p - q, -((a*x^2)/b)
, -((c*x^2)/d)])))
```

Maple [F] time = 0.107, size = 0, normalized size = 0.

$$\int \frac{1}{x^2}\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q/x^2,x)
```

```
[Out] int((a+b/x^2)^p*(c+d/x^2)^q/x^2,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^2,x, algorithm="maxima")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(\frac{ax^2+b}{x^2}\right)^p \left(\frac{cx^2+d}{x^2}\right)^q}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^2,x, algorithm="fricas")
```

```
[Out] integral(((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q/x^2, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q/x**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^2,x, algorithm="giac")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/x^2, x)
```

3.825 $\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{x^3}\,dx$

Optimal. Leaf size=85

$$-\frac{\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\left(\frac{b\left(c+\frac{d}{x^2}\right)}{bc-ad}\right)^{-q}{}_2F_1\left(p+1,-q;p+2;-\frac{d\left(a+\frac{b}{x^2}\right)}{bc-ad}\right)}{2b(p+1)}$$

```
[Out] -((a + b/x^2)^(1 + p)*(c + d/x^2)^q*Hypergeometric2F1[1 + p, -q,
2 + p, -((d*(a + b/x^2))/(b*c - a*d))])/(2*b*(1 + p)*((b*(c + d/x
^2))/(b*c - a*d))^q)
```

Rubi [A] time = 0.169153, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q\left(\frac{b\left(c+\frac{d}{x^2}\right)}{bc-ad}\right)^{-q}{}_2F_1\left(p+1,-q;p+2;-\frac{d\left(a+\frac{b}{x^2}\right)}{bc-ad}\right)}{2b(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)^p*(c + d/x^2)^q)/x^3,x]
```

```
[Out] -((a + b/x^2)^(1 + p)*(c + d/x^2)^q*Hypergeometric2F1[1 + p, -q,
2 + p, -((d*(a + b/x^2))/(b*c - a*d))])/(2*b*(1 + p)*((b*(c + d/x
^2))/(b*c - a*d))^q)
```

Rubi in Sympy [A] time = 24.1578, size = 66, normalized size = 0.78

$$-\frac{\left(\frac{b\left(-c-\frac{d}{x^2}\right)}{ad-bc}\right)^{-q}\left(a+\frac{b}{x^2}\right)^{p+1}\left(c+\frac{d}{x^2}\right)^q{}_2F_1\left(\begin{matrix}-q,p+1\\p+2\end{matrix}\middle|\frac{d\left(a+\frac{b}{x^2}\right)}{ad-bc}\right)}{2b\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q/x**3,x)
```

```
[Out] -(b*(-c - d/x**2)/(a*d - b*c))**(-q)*(a + b/x**2)**(p + 1)*(c + d
/x**2)**q*hyper((-q, p + 1), (p + 2,), d*(a + b/x**2)/(a*d - b*c)
)/(2*b*(p + 1))
```

Mathematica [A] time = 0.524801, size = 109, normalized size = 1.28

$$-\frac{\left(cx^2+d\right)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q\left(\frac{d\left(ax^2+b\right)}{b\left(cx^2+d\right)}\right)^{-p}{}_2F_1\left(-p,-p-q-1;-p-q;\frac{(bc-ad)x^2}{b\left(cx^2+d\right)}\right)}{2dx^2(p+q+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b/x^2)^p*(c + d/x^2)^q)/x^3,x]
```

```
[Out] -((a + b/x^2)^p*(c + d/x^2)^q*(d + c*x^2)*Hypergeometric2F1[-p, -
1 - p - q, -p - q, ((b*c - a*d)*x^2)/(b*(d + c*x^2))])/(2*d*(1 +
```

```
p + q)*x^2*((d*(b + a*x^2))/(b*(d + c*x^2)))^p)
```

Maple [F] time = 0.09, size = 0, normalized size = 0.

$$\int \frac{1}{x^3}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q/x^3,x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q/x^3,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^3,x, algorithm="maxima")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\left(\frac{ax^2+b}{x^2}\right)^p\left(\frac{cx^2+d}{x^2}\right)^q}{x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^3,x, algorithm="fricas")

[Out] integral(((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q/x^3, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q/x**3,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^3,x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/x^3, x)
```

3.826 $\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{x^4}\,dx$

Optimal. Leaf size=84

$$-\frac{\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3x^3}$$

```
[Out] -((a + b/x^2)^p*(c + d/x^2)^q*AppellF1[3/2, -p, -q, 5/2, -(b/(a*x
^2)), -(d/(c*x^2))])/(3*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q*x^3)
```

Rubi [A] time = 0.280176, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$-\frac{\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)^p*(c + d/x^2)^q)/x^4,x]
```

```
[Out] -((a + b/x^2)^p*(c + d/x^2)^q*AppellF1[3/2, -p, -q, 5/2, -(b/(a*x
^2)), -(d/(c*x^2))])/(3*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q*x^3)
```

Rubi in Sympy [A] time = 40.765, size = 66, normalized size = 0.79

$$-\frac{\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q\operatorname{appellf}_1\left(\frac{3}{2},-p,-q,\frac{5}{2},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q/x**4,x)
```

```
[Out] -(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/x**2)**p*(c
 + d/x**2)**q*appellf1(3/2, -p, -q, 5/2, -b/(a*x**2), -d/(c*x**2)
)/(3*x**3)
```

Mathematica [B] time = 0.876186, size = 255, normalized size = 3.04

$$\frac{bd(2p+2q+1)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q-\frac{3}{2};-p,-q;-p\right.}{x^3(2p+2q+3)\left(2x^2\left(adpF_1\left(-p-q-\frac{1}{2};1-p,-q;-p-q+\frac{1}{2};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q-\frac{1}{2};-p,1-q;-p-q+\frac{1}{2};-\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b/x^2)^p*(c + d/x^2)^q)/x^4,x]
```

```
[Out] (b*d*(1 + 2*p + 2*q)*(a + b/x^2)^p*(c + d/x^2)^q*AppellF1[-3/2 -
p - q, -p, -q, -1/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/((3 + 2
*p + 2*q)*x^3*(-(b*d*(1 + 2*p + 2*q)*AppellF1[-3/2 - p - q, -p, -
q, -1/2 - p - q, -((a*x^2)/b), -((c*x^2)/d)]) + 2*x^2*(a*d*p*Appe
llF1[-1/2 - p - q, 1 - p, -q, 1/2 - p - q, -((a*x^2)/b), -((c*x^2
)/d)] + b*c*q*AppellF1[-1/2 - p - q, -p, 1 - q, 1/2 - p - q, -((a
*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.1, size = 0, normalized size = 0.

$$\int \frac{1}{x^4}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q/x^4,x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q/x^4,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^4,x, algorithm="maxima")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/x^4, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\left(\frac{ax^2+b}{x^2}\right)^p\left(\frac{cx^2+d}{x^2}\right)^q}{x^4}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^4,x, algorithm="fricas")

[Out] integral(((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q/x^4, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q/x**4,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/x^4,x, algorithm="giac")

[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/x^4, x)
```

3.827 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q (ex)^{5/2}\,dx$

Optimal. Leaf size=91

$$\frac{2(ex)^{7/2}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{7}{4};-p,-q;-\frac{3}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{7e}$$

```
[Out] (2*(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(7/2)*AppellF1[-7/4, -p, -q,
 -3/4, -(b/(a*x^2)), -(d/(c*x^2))])/(7*e*(1 + b/(a*x^2))^p*(1 + d
/(c*x^2))^q)
```

Rubi [A] time = 0.328624, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$\frac{2(ex)^{7/2}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{7}{4};-p,-q;-\frac{3}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{7e}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(5/2),x]
```

```
[Out] (2*(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(7/2)*AppellF1[-7/4, -p, -q,
 -3/4, -(b/(a*x^2)), -(d/(c*x^2))])/(7*e*(1 + b/(a*x^2))^p*(1 + d
/(c*x^2))^q)
```

Rubi in Sympy [A] time = 49.8652, size = 75, normalized size = 0.82

$$\frac{2\,(ex)^{\frac{7}{2}}\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf_1}\left(-\frac{7}{4},-p,-q,-\frac{3}{4},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{7e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q*(e*x)**(5/2),x)
```

```
[Out] 2*(e*x)**(7/2)*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a +
 b/x**2)**p*(c + d/x**2)**q*appellf1(-7/4, -p, -q, -3/4, -b/(a*x*
*2), -d/(c*x**2))/(7*e)
```

Mathematica [B] time = 0.851592, size = 260, normalized size = 2.86

$$\frac{2bdx(ex)^{5/2}(4p+4q-11)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+\frac{7}{4};-p,-\right.}{(4p+4q-7)\left(4x^2\left(adpF_1\left(-p-q+\frac{11}{4};1-p,-q;-p-q+\frac{15}{4};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{11}{4};-p,1-q;-p-q+\frac{15}{4};-\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(5/2),x]
```

```
[Out] (2*b*d*(-11 + 4*p + 4*q)*(a + b/x^2)^p*(c + d/x^2)^q*x*(e*x)^(5/2
)*AppellF1[7/4 - p - q, -p, -q, 11/4 - p - q, -((a*x^2)/b), -((c*
x^2)/d)])/((-7 + 4*p + 4*q)*(b*d*(11 - 4*p - 4*q)*AppellF1[7/4 -
p - q, -p, -q, 11/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 4*x^2*
(a*d*p*AppellF1[11/4 - p - q, 1 - p, -q, 15/4 - p - q, -((a*x^2)/
b), -((c*x^2)/d)] + b*c*q*AppellF1[11/4 - p - q, -p, 1 - q, 15/4
```

```
- p - q, -((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.038, size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q (ex)^{\frac{5}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q*(e*x)^(5/2),x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q*(e*x)^(5/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (ex)^{\frac{5}{2}} \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^(5/2)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="maxima")

[Out] integrate((e*x)^(5/2)*(a + b/x^2)^p*(c + d/x^2)^q, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\sqrt{ex}e^2x^2\left(\frac{ax^2+b}{x^2}\right)^p\left(\frac{cx^2+d}{x^2}\right)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^(5/2)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="fricas")

[Out] integral(sqrt(e*x)*e^2*x^2*((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^
q, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q*(e*x)**(5/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (ex)^{\frac{5}{2}} \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^(5/2)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="giac")

[Out] integrate((e*x)^(5/2)*(a + b/x^2)^p*(c + d/x^2)^q, x)
```

3.828 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q (ex)^{3/2}\,dx$

Optimal. Leaf size=91

$$\frac{2(ex)^{5/2}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{5}{4};-p,-q;-\frac{1}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{5e}$$

```
[Out] (2*(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(5/2)*AppellF1[-5/4, -p, -q,
 -1/4, -(b/(a*x^2)), -(d/(c*x^2))])/(5*e*(1 + b/(a*x^2))^p*(1 + d
/(c*x^2))^q)
```

Rubi [A] time = 0.335237, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.115$

$$\frac{2(ex)^{5/2}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{5}{4};-p,-q;-\frac{1}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{5e}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(3/2),x]
```

```
[Out] (2*(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(5/2)*AppellF1[-5/4, -p, -q,
 -1/4, -(b/(a*x^2)), -(d/(c*x^2))])/(5*e*(1 + b/(a*x^2))^p*(1 + d
/(c*x^2))^q)
```

Rubi in Sympy [A] time = 49.8174, size = 75, normalized size = 0.82

$$\frac{2\,(ex)^{\frac{5}{2}}\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q\operatorname{appellf}_1\left(-\frac{5}{4},-p,-q,-\frac{1}{4},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{5e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q*(e*x)**(3/2),x)
```

```
[Out] 2*(e*x)**(5/2)*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a +
 b/x**2)**p*(c + d/x**2)**q*appellf1(-5/4, -p, -q, -1/4, -b/(a*x*
*2), -d/(c*x**2))/(5*e)
```

Mathematica [B] time = 0.866296, size = 260, normalized size = 2.86

$$\frac{2bdx(ex)^{3/2}(4p+4q-9)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+\frac{5}{4};-p,-q\right.}{(4p+4q-5)\left(4x^2\left(adpF_1\left(-p-q+\frac{9}{4};1-p,-q;-p-q+\frac{13}{4};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{9}{4};-p,1-q;-p-q+\frac{13}{4};-\frac{a}{}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(3/2),x]
```

```
[Out] (2*b*d*(-9 + 4*p + 4*q)*(a + b/x^2)^p*(c + d/x^2)^q*x*(e*x)^(3/2)
*AppellF1[5/4 - p - q, -p, -q, 9/4 - p - q, -((a*x^2)/b), -((c*x^
2)/d)])/((-5 + 4*p + 4*q)*(b*d*(9 - 4*p - 4*q)*AppellF1[5/4 - p -
 q, -p, -q, 9/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 4*x^2*(a*d
*p*AppellF1[9/4 - p - q, 1 - p, -q, 13/4 - p - q, -((a*x^2)/b), -
((c*x^2)/d)] + b*c*q*AppellF1[9/4 - p - q, -p, 1 - q, 13/4 - p -
```

```
q, -((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.037, size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q (ex)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q*(e*x)^(3/2),x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q*(e*x)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (ex)^{\frac{3}{2}} \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^(3/2)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="maxima")

[Out] integrate((e*x)^(3/2)*(a + b/x^2)^p*(c + d/x^2)^q, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{ex}ex\left(\frac{ax^2+b}{x^2}\right)^p\left(\frac{cx^2+d}{x^2}\right)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^(3/2)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="fricas")

[Out] integral(sqrt(e*x)*e*x*((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q, x
)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q*(e*x)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (ex)^{\frac{3}{2}} \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^(3/2)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="giac")

[Out] integrate((e*x)^(3/2)*(a + b/x^2)^p*(c + d/x^2)^q, x)
```

3.829 $\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q \sqrt{ex}\,dx$

Optimal. Leaf size=91

$$\frac{2(ex)^{3/2}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{3}{4};-p,-q;\frac{1}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3e}$$

```
[Out] (2*(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(3/2)*AppellF1[-3/4, -p, -q,
 1/4, -(b/(a*x^2)), -(d/(c*x^2))])/(3*e*(1 + b/(a*x^2))^p*(1 + d/
(c*x^2))^q)
```

Rubi [A] time = 0.330364, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$\frac{2(ex)^{3/2}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{3}{4};-p,-q;\frac{1}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3e}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b/x^2)^p*(c + d/x^2)^q*Sqrt[e*x],x]
```

```
[Out] (2*(a + b/x^2)^p*(c + d/x^2)^q*(e*x)^(3/2)*AppellF1[-3/4, -p, -q,
 1/4, -(b/(a*x^2)), -(d/(c*x^2))])/(3*e*(1 + b/(a*x^2))^p*(1 + d/
(c*x^2))^q)
```

Rubi in Sympy [A] time = 50.0432, size = 73, normalized size = 0.8

$$\frac{2\,(ex)^{\frac{3}{2}}\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf}_1\left(-\frac{3}{4},-p,-q,\frac{1}{4},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q*(e*x)**(1/2),x)
```

```
[Out] 2*(e*x)**(3/2)*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a +
 b/x**2)**p*(c + d/x**2)**q*appellf1(-3/4, -p, -q, 1/4, -b/(a*x**
2), -d/(c*x**2))/(3*e)
```

Mathematica [B] time = 0.887772, size = 260, normalized size = 2.86

$$\frac{2bdx\sqrt{ex}(4p+4q-7)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+\frac{3}{4};-p,-q;\right.}{(4p+4q-3)\left(4x^2\left(adpF_1\left(-p-q+\frac{7}{4};1-p,-q;-p-q+\frac{11}{4};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{7}{4};-p,1-q;-p-q+\frac{11}{4};-\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + b/x^2)^p*(c + d/x^2)^q*Sqrt[e*x],x]
```

```
[Out] (2*b*d*(-7 + 4*p + 4*q)*(a + b/x^2)^p*(c + d/x^2)^q*x*Sqrt[e*x]*A
ppellF1[3/4 - p - q, -p, -q, 7/4 - p - q, -((a*x^2)/b), -((c*x^2)
/d)])/((-3 + 4*p + 4*q)*(b*d*(7 - 4*p - 4*q)*AppellF1[3/4 - p - q
, -p, -q, 7/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 4*x^2*(a*d*p
*AppellF1[7/4 - p - q, 1 - p, -q, 11/4 - p - q, -((a*x^2)/b), -((
c*x^2)/d)] + b*c*q*AppellF1[7/4 - p - q, -p, 1 - q, 11/4 - p - q,
```

```
-((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.036, size = 0, normalized size = 0.

$$\int \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q \sqrt{ex}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q*(e*x)^(1/2),x)

[Out] int((a+b/x^2)^p*(c+d/x^2)^q*(e*x)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ex}\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(e*x)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="maxima")

[Out] integrate(sqrt(e*x)*(a + b/x^2)^p*(c + d/x^2)^q, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{ex}\left(\frac{ax^2+b}{x^2}\right)^p \left(\frac{cx^2+d}{x^2}\right)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(e*x)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="fricas")

[Out] integral(sqrt(e*x)*((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q*(e*x)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ex}\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(e*x)*(a + b/x^2)^p*(c + d/x^2)^q,x, algorithm="giac")
```

```
[Out] integrate(sqrt(e*x)*(a + b/x^2)^p*(c + d/x^2)^q, x)
```

3.830 $\int \frac{\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q}{\sqrt{ex}}\,dx$

Optimal. Leaf size=89

$$\frac{2\sqrt{ex}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{1}{4};-p,-q;\frac{3}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{e}$$

```
[Out] (2*(a + b/x^2)^p*(c + d/x^2)^q*Sqrt[e*x]*AppellF1[-1/4, -p, -q, 3
/4, -(b/(a*x^2)), -(d/(c*x^2))])/(e*(1 + b/(a*x^2))^p*(1 + d/(c*x
^2))^q)
```

Rubi [A] time = 0.324556, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.115$

$$\frac{2\sqrt{ex}\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(-\frac{1}{4};-p,-q;\frac{3}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{e}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)^p*(c + d/x^2)^q)/Sqrt[e*x],x]
```

```
[Out] (2*(a + b/x^2)^p*(c + d/x^2)^q*Sqrt[e*x]*AppellF1[-1/4, -p, -q, 3
/4, -(b/(a*x^2)), -(d/(c*x^2))])/(e*(1 + b/(a*x^2))^p*(1 + d/(c*x
^2))^q)
```

Rubi in Sympy [A] time = 49.9559, size = 71, normalized size = 0.8

$$\frac{2\sqrt{ex}\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf_1}\left(-\frac{1}{4},-p,-q,\frac{3}{4},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q/(e*x)**(1/2),x)
```

```
[Out] 2*sqrt(e*x)*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/
x**2)**p*(c + d/x**2)**q*appellf1(-1/4, -p, -q, 3/4, -b/(a*x**2),
 -d/(c*x**2))/e
```

Mathematica [B] time = 0.810978, size = 260, normalized size = 2.92

$$\frac{2bdx(4p+4q-5)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q+\frac{1}{4};-p,-q;-\right.}{\sqrt{ex}(4p+4q-1)\left(4x^2\left(adpF_1\left(-p-q+\frac{5}{4};1-p,-q;-p-q+\frac{9}{4};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{5}{4};-p,1-q;-p-q+\frac{9}{4};-\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b/x^2)^p*(c + d/x^2)^q)/Sqrt[e*x],x]
```

```
[Out] (2*b*d*(-5 + 4*p + 4*q)*(a + b/x^2)^p*(c + d/x^2)^q*x*AppellF1[1/
4 - p - q, -p, -q, 5/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/((-1
 + 4*p + 4*q)*Sqrt[e*x]*(b*d*(5 - 4*p - 4*q)*AppellF1[1/4 - p - q
, -p, -q, 5/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 4*x^2*(a*d*p
*AppellF1[5/4 - p - q, 1 - p, -q, 9/4 - p - q, -((a*x^2)/b), -((c
*x^2)/d)] + b*c*q*AppellF1[5/4 - p - q, -p, 1 - q, 9/4 - p - q, -
```

```
((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.037, size = 0, normalized size = 0.

$$\int 1 \left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q \frac{1}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q/(e*x)^(1/2),x)
```

```
[Out] int((a+b/x^2)^p*(c+d/x^2)^q/(e*x)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/sqrt(e*x),x, algorithm="maxima")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/sqrt(e*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(\frac{ax^2+b}{x^2}\right)^p \left(\frac{cx^2+d}{x^2}\right)^q}{\sqrt{ex}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/sqrt(e*x),x, algorithm="fricas")
```

```
[Out] integral(((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q/sqrt(e*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q/(e*x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q}{\sqrt{ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/sqrt(e*x),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/sqrt(e*x), x)
```

3.831 $\int \frac{\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q}{(ex)^{3/2}}\,dx$

Optimal. Leaf size=89

$$-\frac{2\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(\frac{1}{4};-p,-q;\frac{5}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{e\sqrt{ex}}$$

```
[Out] (-2*(a + b/x^2)^p*(c + d/x^2)^q*AppellF1[1/4, -p, -q, 5/4, -(b/(a
*x^2)), -(d/(c*x^2))])/(e*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q*Sqr
t[e*x])
```

Rubi [A] time = 0.23494, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$-\frac{2\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(\frac{1}{4};-p,-q;\frac{5}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{e\sqrt{ex}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)^p*(c + d/x^2)^q)/(e*x)^(3/2),x]
```

```
[Out] (-2*(a + b/x^2)^p*(c + d/x^2)^q*AppellF1[1/4, -p, -q, 5/4, -(b/(a
*x^2)), -(d/(c*x^2))])/(e*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q*Sqr
t[e*x])
```

Rubi in Sympy [A] time = 57.8935, size = 71, normalized size = 0.8

$$-\frac{2\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf_1}\left(\frac{1}{4},-p,-q,\frac{5}{4},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{e\sqrt{ex}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q/(e*x)**(3/2),x)
```

```
[Out] -2*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/x**2)**p*
(c + d/x**2)**q*appellf1(1/4, -p, -q, 5/4, -b/(a*x**2), -d/(c*x**
2))/(e*sqrt(e*x))
```

Mathematica [B] time = 0.803002, size = 260, normalized size = 2.92

$$\frac{2bdx(4p+4q-3)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q-\frac{1}{4};-p,-q;\right.}{(ex)^{3/2}(4p+4q+1)\left(4x^2\left(adpF_1\left(-p-q+\frac{3}{4};1-p,-q;-p-q+\frac{7}{4};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{3}{4};-p,1-q;-p-q+\frac{7}{4}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b/x^2)^p*(c + d/x^2)^q)/(e*x)^(3/2),x]
```

```
[Out] (2*b*d*(-3 + 4*p + 4*q)*(a + b/x^2)^p*(c + d/x^2)^q*x*AppellF1[-1
/4 - p - q, -p, -q, 3/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/((1
 + 4*p + 4*q)*(e*x)^(3/2)*(b*d*(3 - 4*p - 4*q)*AppellF1[-1/4 - p
- q, -p, -q, 3/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 4*x^2*(a*
d*p*AppellF1[3/4 - p - q, 1 - p, -q, 7/4 - p - q, -((a*x^2)/b), -
```

```
((c*x^2)/d)] + b*c*q*AppellF1[3/4 - p - q, -p, 1 - q, 7/4 - p - q
, -((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.038, size = 0, normalized size = 0.

$$\int 1\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q(ex)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q/(e*x)^(3/2),x)
```

```
[Out] int((a+b/x^2)^p*(c+d/x^2)^q/(e*x)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(\frac{ax^2+b}{x^2}\right)^p\left(\frac{cx^2+d}{x^2}\right)^q}{\sqrt{ex}ex}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q/(sqrt(e*x)*e*x),
 x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q/(e*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q}{(ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(3/2), x)
```

3.832 $\int \frac{\left(a+\frac{b}{x^2}\right)^p \left(c+\frac{d}{x^2}\right)^q}{(ex)^{5/2}}\,dx$

Optimal. Leaf size=91

$$-\frac{2\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(\frac{3}{4};-p,-q;\frac{7}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3e(ex)^{3/2}}$$

```
[Out] (-2*(a + b/x^2)^p*(c + d/x^2)^q*AppellF1[3/4, -p, -q, 7/4, -(b/(a
*x^2)), -(d/(c*x^2))])/(3*e*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q*(
e*x)^(3/2))
```

Rubi [A] time = 0.344689, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115

$$-\frac{2\left(a+\frac{b}{x^2}\right)^p\left(\frac{b}{ax^2}+1\right)^{-p}\left(c+\frac{d}{x^2}\right)^q\left(\frac{d}{cx^2}+1\right)^{-q}F_1\left(\frac{3}{4};-p,-q;\frac{7}{4};-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3e(ex)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b/x^2)^p*(c + d/x^2)^q)/(e*x)^(5/2),x]
```

```
[Out] (-2*(a + b/x^2)^p*(c + d/x^2)^q*AppellF1[3/4, -p, -q, 7/4, -(b/(a
*x^2)), -(d/(c*x^2))])/(3*e*(1 + b/(a*x^2))^p*(1 + d/(c*x^2))^q*(
e*x)^(3/2))
```

Rubi in Sympy [A] time = 50.274, size = 73, normalized size = 0.8

$$-\frac{2\left(1+\frac{b}{ax^2}\right)^{-p}\left(1+\frac{d}{cx^2}\right)^{-q}\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q \operatorname{appellf_1}\left(\frac{3}{4},-p,-q,\frac{7}{4},-\frac{b}{ax^2},-\frac{d}{cx^2}\right)}{3e\,(ex)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b/x**2)**p*(c+d/x**2)**q/(e*x)**(5/2),x)
```

```
[Out] -2*(1 + b/(a*x**2))**(-p)*(1 + d/(c*x**2))**(-q)*(a + b/x**2)**p*
(c + d/x**2)**q*appellf1(3/4, -p, -q, 7/4, -b/(a*x**2), -d/(c*x**
2))/(3*e*(e*x)**(3/2))
```

Mathematica [B] time = 0.824265, size = 260, normalized size = 2.86

$$\frac{2bdx(4p+4q-1)\left(a+\frac{b}{x^2}\right)^p\left(c+\frac{d}{x^2}\right)^q F_1\left(-p-q-\frac{3}{4};-p,-q;\right.}{(ex)^{5/2}(4p+4q+3)\left(4x^2\left(adpF_1\left(-p-q+\frac{1}{4};1-p,-q;-p-q+\frac{5}{4};-\frac{ax^2}{b},-\frac{cx^2}{d}\right)+bcqF_1\left(-p-q+\frac{1}{4};-p,1-q;-p-q+\frac{5}{4}\right.\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b/x^2)^p*(c + d/x^2)^q)/(e*x)^(5/2),x]
```

```
[Out] (2*b*d*(-1 + 4*p + 4*q)*(a + b/x^2)^p*(c + d/x^2)^q*x*AppellF1[-3
/4 - p - q, -p, -q, 1/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)])/((3
 + 4*p + 4*q)*(e*x)^(5/2)*(b*d*(1 - 4*p - 4*q)*AppellF1[-3/4 - p
- q, -p, -q, 1/4 - p - q, -((a*x^2)/b), -((c*x^2)/d)] + 4*x^2*(a*
d*p*AppellF1[1/4 - p - q, 1 - p, -q, 5/4 - p - q, -((a*x^2)/b), -
```

```
((c*x^2)/d)] + b*c*q*AppellF1[1/4 - p - q, -p, 1 - q, 5/4 - p - q
, -((a*x^2)/b), -((c*x^2)/d)])))
```

Maple [F] time = 0.037, size = 0, normalized size = 0.

$$\int 1\left(a+\frac{b}{x^{2}}\right)^{p}\left(c+\frac{d}{x^{2}}\right)^{q}(ex)^{-\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b/x^2)^p*(c+d/x^2)^q/(e*x)^(5/2),x)
```

```
[Out] int((a+b/x^2)^p*(c+d/x^2)^q/(e*x)^(5/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^{2}}\right)^{p}\left(c+\frac{d}{x^{2}}\right)^{q}}{(ex)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(5/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\operatorname{integral}\left(\frac{\left(\frac{ax^{2}+b}{x^{2}}\right)^{p}\left(\frac{cx^{2}+d}{x^{2}}\right)^{q}}{\sqrt{ex}e^{2}x^{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(5/2),x, algorithm="fricas")
```

```
[Out] integral(((a*x^2 + b)/x^2)^p*((c*x^2 + d)/x^2)^q/(sqrt(e*x)*e^2*x
^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b/x**2)**p*(c+d/x**2)**q/(e*x)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a+\frac{b}{x^{2}}\right)^{p}\left(c+\frac{d}{x^{2}}\right)^{q}}{(ex)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((a + b/x^2)^p*(c + d/x^2)^q/(e*x)^(5/2), x)
```

3.833 $\int \sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{5/2}\,dx$

Optimal. Leaf size=135

$$\frac{1}{4}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{7/2}-\frac{1}{24}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{5/2}-\frac{5}{96}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}-\frac{5}{64}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-\frac{5}{64}\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] (-5*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/64 - (5*Sqrt[-1
 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/96 - (Sqrt[-1 + Sqrt[x]]*S
qrt[1 + Sqrt[x]]*x^(5/2))/24 + (Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[
x]]*x^(7/2))/4 - (5*ArcCosh[Sqrt[x]])/64
```

Rubi [A] time = 0.196234, antiderivative size = 135, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{1}{4}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{7/2}-\frac{1}{24}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{5/2}-\frac{5}{96}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}-\frac{5}{64}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-\frac{5}{64}\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(5/2),x]
```

```
[Out] (-5*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/64 - (5*Sqrt[-1
 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/96 - (Sqrt[-1 + Sqrt[x]]*S
qrt[1 + Sqrt[x]]*x^(5/2))/24 + (Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[
x]]*x^(7/2))/4 - (5*ArcCosh[Sqrt[x]])/64
```

Rubi in Sympy [A] time = 19.7215, size = 121, normalized size = 0.9

$$\frac{x^{\frac{7}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{4}-\frac{x^{\frac{5}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{24}-\frac{5x^{\frac{3}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{96}-\frac{5\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{64}-\frac{5\operatorname{acosh}\left(\sqrt{x}\right)}{64}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(5/2)*(-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2),x)
```

```
[Out] x**(7/2)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/4 - x**(5/2)*sqrt(sq
rt(x) - 1)*sqrt(sqrt(x) + 1)/24 - 5*x**(3/2)*sqrt(sqrt(x) - 1)*sq
rt(sqrt(x) + 1)/96 - 5*sqrt(x)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1
)/64 - 5*acosh(sqrt(x))/64
```

Mathematica [A] time = 0.0679254, size = 80, normalized size = 0.59

$$\frac{1}{192}\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}\left(48x^3-8x^2-10x-15\right)-15\log\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+\sqrt{x}\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(5/2),x]
```

```
[Out] (Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x]*(-15 - 10*x - 8*x^2
 + 48*x^3) - 15*Log[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]] + Sqrt[x
```

```
]])/192
```

Maple [A] time = 0.013, size = 75, normalized size = 0.6

$$-\frac{1}{192}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\left(-48\,x^{7/2}\sqrt{-1+x}+8\,x^{5/2}\sqrt{-1+x}+10\,x^{3/2}\sqrt{-1+x}+15\,\sqrt{x}\sqrt{-1+x}+15\,\ln\left(\sqrt{x}+\sqrt{-1+x}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2),x)
```

```
[Out] -1/192*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(-48*x^(7/2)*(-1+x)^(
1/2)+8*x^(5/2)*(-1+x)^(1/2)+10*x^(3/2)*(-1+x)^(1/2)+15*x^(1/2)*(-
1+x)^(1/2)+15*ln(x^(1/2)+(-1+x)^(1/2)))/(-1+x)^(1/2)
```

Maxima [A] time = 1.36581, size = 77, normalized size = 0.57

$$\frac{1}{4}\,(x-1)^{\frac{3}{2}}x^{\frac{5}{2}}+\frac{5}{24}\,(x-1)^{\frac{3}{2}}x^{\frac{3}{2}}+\frac{5}{32}\,(x-1)^{\frac{3}{2}}\sqrt{x}+\frac{5}{64}\,\sqrt{x-1}\sqrt{x}-\frac{5}{64}\,\log\left(2\,\sqrt{x-1}+2\,\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="maxima")
```

```
[Out] 1/4*(x - 1)^(3/2)*x^(5/2) + 5/24*(x - 1)^(3/2)*x^(3/2) + 5/32*(x
- 1)^(3/2)*sqrt(x) + 5/64*sqrt(x - 1)*sqrt(x) - 5/64*log(2*sqrt(x
 - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.218427, size = 315, normalized size = 2.33

$$-\frac{98304\,x^{8}-262144\,x^{7}+229376\,x^{6}-81920\,x^{5}+43136\,x^{4}-37120\,x^{3}-8\left(12288\,x^{7}-26624\,x^{6}+16896\,x^{5}-4352\,x^{4}+414}{307}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="fricas")
```

```
[Out] -1/3072*(98304*x^8 - 262144*x^7 + 229376*x^6 - 81920*x^5 + 43136*
x^4 - 37120*x^3 - 8*(12288*x^7 - 26624*x^6 + 16896*x^5 - 4352*x^4
 + 4144*x^3 - 2760*x^2 + 350*x + 29)*sqrt(x)*sqrt(sqrt(x) + 1)*sq
rt(sqrt(x) - 1) + 10400*x^2 - 120*(128*x^4 - 256*x^3 - 8*(16*x^3
- 24*x^2 + 10*x - 1)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)
+ 160*x^2 - 32*x + 1)*log(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x
) - 1) - 2*x + 1) - 32*x - 59)/(128*x^4 - 256*x^3 - 8*(16*x^3 - 2
4*x^2 + 10*x - 1)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) + 1
60*x^2 - 32*x + 1)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)*(-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(5/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.834 $\int \sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{3/2}\,dx$

Optimal. Leaf size=104

$$\frac{1}{3}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{5/2}-\frac{1}{12}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}-\frac{1}{8}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-\frac{1}{8}\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] -(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/8 - (Sqrt[-1 + Sq
rt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/12 + (Sqrt[-1 + Sqrt[x]]*Sqrt[1
 + Sqrt[x]]*x^(5/2))/3 - ArcCosh[Sqrt[x]]/8
```

Rubi [A] time = 0.148321, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{1}{3}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{5/2}-\frac{1}{12}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}-\frac{1}{8}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-\frac{1}{8}\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2),x]
```

```
[Out] -(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/8 - (Sqrt[-1 + Sq
rt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/12 + (Sqrt[-1 + Sqrt[x]]*Sqrt[1
 + Sqrt[x]]*x^(5/2))/3 - ArcCosh[Sqrt[x]]/8
```

Rubi in Sympy [A] time = 17.0903, size = 88, normalized size = 0.85

$$\frac{x^{\frac{5}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{3}-\frac{x^{\frac{3}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{12}-\frac{\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{8}-\frac{\operatorname{acosh}\left(\sqrt{x}\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(3/2)*(-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2),x)
```

```
[Out] x**(5/2)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/3 - x**(3/2)*sqrt(sq
rt(x) - 1)*sqrt(sqrt(x) + 1)/12 - sqrt(x)*sqrt(sqrt(x) - 1)*sqrt(
sqrt(x) + 1)/8 - acosh(sqrt(x))/8
```

Mathematica [A] time = 0.051077, size = 75, normalized size = 0.72

$$\frac{1}{24}\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}\left(8x^2-2x-3\right)-3\log\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+\sqrt{x}\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2),x]
```

```
[Out] (Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x]*(-3 - 2*x + 8*x^2)
- 3*Log[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]] + Sqrt[x]])/24
```

Maple [A] time = 0.009, size = 65, normalized size = 0.6

$$-\frac{1}{24}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\left(-8\,x^{5/2}\sqrt{-1+x}+2\,x^{3/2}\sqrt{-1+x}+3\,\sqrt{x}\sqrt{-1+x}+3\,\ln\left(\sqrt{x}+\sqrt{-1+x}\right)\right)\frac{1}{\sqrt{-1+x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2),x)
```

```
[Out] -1/24*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(-8*x^(5/2)*(-1+x)^(1/
2)+2*x^(3/2)*(-1+x)^(1/2)+3*x^(1/2)*(-1+x)^(1/2)+3*ln(x^(1/2)+(-1
+x)^(1/2)))/(-1+x)^(1/2)
```

Maxima [A] time = 1.37465, size = 63, normalized size = 0.61

$$\frac{1}{3}(x-1)^{\frac{3}{2}}x^{\frac{3}{2}}+\frac{1}{4}(x-1)^{\frac{3}{2}}\sqrt{x}+\frac{1}{8}\sqrt{x-1}\sqrt{x}-\frac{1}{8}\log\left(2\sqrt{x-1}+2\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="maxima")
```

```
[Out] 1/3*(x - 1)^(3/2)*x^(3/2) + 1/4*(x - 1)^(3/2)*sqrt(x) + 1/8*sqrt(
x - 1)*sqrt(x) - 1/8*log(2*sqrt(x - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.21535, size = 261, normalized size = 2.51

$$-\frac{2048\,x^{6}-4608\,x^{5}+2688\,x^{4}+384\,x^{3}-2\left(1024\,x^{5}-1792\,x^{4}+576\,x^{3}+320\,x^{2}-128\,x-3\right)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-576\,x^{2}}{192\left(32\,x^{3}-2\left(16\,x^{2}-16\,x+3\right)\sqrt{x}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="fricas")
```

```
[Out] -1/192*(2048*x^6 - 4608*x^5 + 2688*x^4 + 384*x^3 - 2*(1024*x^5 -
1792*x^4 + 576*x^3 + 320*x^2 - 128*x - 3)*sqrt(x)*sqrt(sqrt(x) +
1)*sqrt(sqrt(x) - 1) - 576*x^2 - 12*(32*x^3 - 2*(16*x^2 - 16*x +
3)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 48*x^2 + 18*x -
1)*log(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1) +
 54*x + 5)/(32*x^3 - 2*(16*x^2 - 16*x + 3)*sqrt(x)*sqrt(sqrt(x) +
 1)*sqrt(sqrt(x) - 1) - 48*x^2 + 18*x - 1)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^{\frac{3}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)*(-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2),x)
```

```
[Out] Integral(x**(3/2)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.835 $\int \sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\sqrt{x}\,dx$

Optimal. Leaf size=73

$$\frac{1}{2}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}-\frac{1}{4}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-\frac{1}{4}\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] -(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/4 + (Sqrt[-1 + Sq
rt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/2 - ArcCosh[Sqrt[x]]/4
```

Rubi [A] time = 0.107583, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{1}{2}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}-\frac{1}{4}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-\frac{1}{4}\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x],x]
```

```
[Out] -(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/4 + (Sqrt[-1 + Sq
rt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/2 - ArcCosh[Sqrt[x]]/4
```

Rubi in Sympy [A] time = 15.5511, size = 61, normalized size = 0.84

$$\frac{x^{\frac{3}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{2}-\frac{\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{4}-\frac{\operatorname{acosh}\left(\sqrt{x}\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(1/2)*(-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2),x)
```

```
[Out] x**(3/2)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/2 - sqrt(x)*sqrt(sqr
t(x) - 1)*sqrt(sqrt(x) + 1)/4 - acosh(sqrt(x))/4
```

Mathematica [A] time = 0.0447519, size = 70, normalized size = 0.96

$$\frac{1}{4}\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}(2x-1)-\log\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+\sqrt{x}\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x],x]
```

```
[Out] (Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x]*(-1 + 2*x) - Log[Sq
rt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]] + Sqrt[x]])/4
```

Maple [A] time = 0.008, size = 52, normalized size = 0.7

$$-\frac{1}{4}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\left(-2\,x^{3/2}\sqrt{-1+x}+\sqrt{x}\sqrt{-1+x}+\ln\left(\sqrt{x}+\sqrt{-1+x}\right)\right)\frac{1}{\sqrt{-1+x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1/2)*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2),x)
```

```
[Out] -1/4*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(-2*x^(3/2)*(-1+x)^(1/2
)+x^(1/2)*(-1+x)^(1/2)+ln(x^(1/2)+(-1+x)^(1/2)))/(-1+x)^(1/2)
```

Maxima [A] time = 1.36469, size = 50, normalized size = 0.68

$$\frac{1}{2}(x-1)^{\frac{3}{2}}\sqrt{x}+\frac{1}{4}\sqrt{x-1}\sqrt{x}-\frac{1}{4}\log\left(2\sqrt{x-1}+2\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="maxima")
```

```
[Out] 1/2*(x - 1)^(3/2)*sqrt(x) + 1/4*sqrt(x - 1)*sqrt(x) - 1/4*log(2*s
qrt(x - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.217703, size = 207, normalized size = 2.84

$$\frac{128\,x^4-256\,x^3-4\left(32\,x^3-48\,x^2+18\,x-1\right)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}+152\,x^2+4\left(4\,(2\,x-1)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-8\,x^2+8\right.}{32\left(4\,(2\,x-1)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-8\,x^2+8\,x-1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="fricas")
```

```
[Out] 1/32*(128*x^4 - 256*x^3 - 4*(32*x^3 - 48*x^2 + 18*x - 1)*sqrt(x)*
sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) + 152*x^2 + 4*(4*(2*x - 1)*sq
rt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 8*x^2 + 8*x - 1)*log(
2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1) - 24*x -
 1)/(4*(2*x - 1)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 8*
x^2 + 8*x - 1)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(1/2)*(-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2),x)
```

```
[Out] Integral(sqrt(x)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.836 $\int \frac{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}{\sqrt{x}}\,dx$

Optimal. Leaf size=37

$$\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x] - ArcCosh[Sqrt[x]]
```

Rubi [A] time = 0.0734748, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107

$$\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/Sqrt[x],x]

[Out] Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x] - ArcCosh[Sqrt[x]]
```

Rubi in Sympy [A] time = 9.39673, size = 31, normalized size = 0.84

$$\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}-\operatorname{acosh}\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(1/2),x)

[Out] sqrt(x)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1) - acosh(sqrt(x))
```

Mathematica [A] time = 0.0293943, size = 49, normalized size = 1.32

$$\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}-2\sinh^{-1}\left(\frac{\sqrt{\sqrt{x}-1}}{\sqrt{2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/Sqrt[x],x]

[Out] Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x] - 2*ArcSinh[Sqrt[-1
+ Sqrt[x]]/Sqrt[2]]
```

Maple [B] time = 0.008, size = 72, normalized size = 2.

$$\sqrt{-1+\sqrt{x}}\left(1+\sqrt{x}\right)^{\frac{3}{2}}-\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}-1\sqrt{\left(1+\sqrt{x}\right)\left(-1+\sqrt{x}\right)}\ln\left(\sqrt{x}+\sqrt{-1+x}\right)\frac{1}{\sqrt{-1+\sqrt{x}}}\frac{1}{\sqrt{1+\sqrt{x}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)/x^(1/2),x)
```

```
[Out] (-1+x^(1/2))^(1/2)*(1+x^(1/2))^(3/2)-(-1+x^(1/2))^(1/2)*(1+x^(1/2
))^(1/2)-((1+x^(1/2))*(-1+x^(1/2)))^(1/2)/(1+x^(1/2))^(1/2)/(-1+x
^(1/2))^(1/2)*ln(x^(1/2)+(-1+x)^(1/2))
```

Maxima [A] time = 1.37652, size = 35, normalized size = 0.95

$$\sqrt{x-1}\sqrt{x}-\log\left(2\sqrt{x-1}+2\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/sqrt(x),x, algorithm="maxima")
```

```
[Out] sqrt(x - 1)*sqrt(x) - log(2*sqrt(x - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.214157, size = 153, normalized size = 4.14

$$-\frac{2\,(4\,x-1)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-8\,x^2-2\left(2\,\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-2\,x+1\right)\log\left(2\,\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-2\,x+1\right)+6\,x}{4\left(2\,\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-2\,x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/sqrt(x),x, algorithm="fricas")
```

```
[Out] -1/4*(2*(4*x - 1)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 8
*x^2 - 2*(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1
)*log(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1) +
6*x + 1)/(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1
)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{\sqrt{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(1/2),x)
```

```
[Out] Integral(sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/sqrt(x), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/sqrt(x),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.837 $\int \frac{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}{x^{3/2}}\,dx$

Optimal. Leaf size=67

$$\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{\sqrt{x}}-2\sqrt{\sqrt{x}-1}\sqrt{x}\sqrt{\sqrt{x}+1}+2\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/Sqrt[x] - 2*Sqrt[-1
+ Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x] + 2*ArcCosh[Sqrt[x]]
```

Rubi [A] time = 0.106215, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{\sqrt{x}}-2\sqrt{\sqrt{x}-1}\sqrt{x}\sqrt{\sqrt{x}+1}+2\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(3/2),x]
```

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/Sqrt[x] - 2*Sqrt[-1
+ Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x] + 2*ArcCosh[Sqrt[x]]
```

Rubi in Sympy [A] time = 12.2306, size = 61, normalized size = 0.91

$$-2\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+2\,\mathrm{acosh}\left(\sqrt{x}\right)+\frac{2\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(3/2),x)
```

```
[Out] -2*sqrt(x)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1) + 2*acosh(sqrt(x))
 + 2*(sqrt(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/sqrt(x)
```

Mathematica [A] time = 0.0268853, size = 62, normalized size = 0.93

$$2\log\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+\sqrt{x}\right)-\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(3/2),x]
```

```
[Out] (-2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/Sqrt[x] + 2*Log[Sqrt[-1
 + Sqrt[x]]*Sqrt[1 + Sqrt[x]] + Sqrt[x]]
```

Maple [A] time = 0.006, size = 47, normalized size = 0.7

$$2\,\frac{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\left(\ln\left(\sqrt{x}+\sqrt{-1+x}\right)\sqrt{x}-\sqrt{-1+x}\right)}{\sqrt{x}\sqrt{-1+x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)/x^(3/2),x)
```

```
[Out] 2*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(ln(x^(1/2)+(-1+x)^(1/2))*
x^(1/2)-(-1+x)^(1/2))/x^(1/2)/(-1+x)^(1/2)
```

Maxima [A] time = 1.53973, size = 36, normalized size = 0.54

$$-\frac{2\sqrt{x-1}}{\sqrt{x}} + 2\log\left(2\sqrt{x-1} + 2\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(3/2),x, algorithm="maxima")
```

```
[Out] -2*sqrt(x - 1)/sqrt(x) + 2*log(2*sqrt(x - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.212356, size = 103, normalized size = 1.54

$$-\frac{\left(\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1} - x\right)\log\left(2\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1} - 2x + 1\right) - 2}{\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1} - x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(3/2),x, algorithm="fricas")
```

```
[Out] -((sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - x)*log(2*sqrt(x)
*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1) - 2)/(sqrt(x)*sqr
t(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{x^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(3/2),x)
```

```
[Out] Integral(sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/x**(3/2), x)
```

GIAC/XCAS [A] time = 0.338125, size = 65, normalized size = 0.97

$$-\frac{16}{\left(\sqrt{\sqrt{x}+1} - \sqrt{\sqrt{x}-1}\right)^4 + 4} - \ln\left(\left(\sqrt{\sqrt{x}+1} - \sqrt{\sqrt{x}-1}\right)^4\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(3/2),x, algorithm="giac")
```

```
[Out] -16/((sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 4) - ln((sqrt(sq
rt(x) + 1) - sqrt(sqrt(x) - 1))^4)
```

3.838 $\int \frac{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}{x^{5/2}}\,dx$

Optimal. Leaf size=31

$$\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{3x^{3/2}}$$

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(3*x^(3/2))
```

Rubi [A] time = 0.0353549, antiderivative size = 31, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036

$$\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{3x^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(5/2),x]
```

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(3*x^(3/2))
```

Rubi in Sympy [A] time = 4.33842, size = 27, normalized size = 0.87

$$\frac{2\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{3x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(5/2),x)
```

```
[Out] 2*(sqrt(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(3*x**(3/2))
```

Mathematica [A] time = 0.0186333, size = 34, normalized size = 1.1

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}(x-1)}{3x^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(5/2),x]
```

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*(-1 + x))/(3*x^(3/2))
```

Maple [A] time = 0.006, size = 23, normalized size = 0.7

$$\frac{-2+2\,x}{3}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)/x^(5/2),x)
```

```
[Out] 2/3*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(-1+x)/x^(3/2)
```

Maxima [A] time = 1.52182, size = 14, normalized size = 0.45

$$\frac{2 (x-1)^{\frac{3}{2}}}{3 x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(5/2),x, algorithm="maxima")
```

```
[Out] 2/3*(x - 1)^(3/2)/x^(3/2)
```

Fricas [A] time = 0.215258, size = 104, normalized size = 3.35

$$-\frac{2 \left(3 (2 x-1) \sqrt{x} \sqrt{\sqrt{x}+1} \sqrt{\sqrt{x}-1}-6 x^{2}+6 x-1\right)}{3 \left(4 x^{3}-\left(4 x^{2}-x\right) \sqrt{x} \sqrt{\sqrt{x}+1} \sqrt{\sqrt{x}-1}-3 x^{2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(5/2),x, algorithm="fricas")
```

```
[Out] -2/3*(3*(2*x - 1)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 6
*x^2 + 6*x - 1)/(4*x^3 - (4*x^2 - x)*sqrt(x)*sqrt(sqrt(x) + 1)*sq
rt(sqrt(x) - 1) - 3*x^2)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{\sqrt{x}-1} \sqrt{\sqrt{x}+1}}{x^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(5/2),x)
```

```
[Out] Integral(sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/x**(5/2), x)
```

GIAC/XCAS [A] time = 0.213755, size = 65, normalized size = 2.1

$$\frac{16 \left(3 \left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{8}+16\right)}{3 \left(\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+4\right)^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(5/2),x, algorithm="giac")
```

```
[Out] 16/3*(3*(sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^8 + 16)/((sqrt(sq
rt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 4)^3
```

3.839 $\int \frac{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}{x^{7/2}} \, dx$

Optimal. Leaf size=63

$$\frac{4\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{15x^{3/2}}+\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{5x^{5/2}}$$

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(5*x^(5/2)) + (4*(-1
 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(15*x^(3/2))
```

Rubi [A] time = 0.0680236, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071

$$\frac{4\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{15x^{3/2}}+\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{5x^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(7/2),x]
```

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(5*x^(5/2)) + (4*(-1
 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(15*x^(3/2))
```

Rubi in Sympy [A] time = 7.22809, size = 56, normalized size = 0.89

$$\frac{4\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{15x^{\frac{3}{2}}}+\frac{2\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{5x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(7/2),x)
```

```
[Out] 4*(sqrt(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(15*x**(3/2)) + 2*(sq
rt(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(5*x**(5/2))
```

Mathematica [A] time = 0.0195522, size = 39, normalized size = 0.62

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\left(2x^2+x-3\right)}{15x^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(7/2),x]
```

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*(-3 + x + 2*x^2))/(15*x^(
5/2))
```

Maple [A] time = 0.008, size = 28, normalized size = 0.4

$$\frac{(-2+2\,x)(2\,x+3)}{15}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)/x^(7/2),x)

[Out] 2/15*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(-1+x)*(2*x+3)/x^(5/2)
```

Maxima [A] time = 1.52121, size = 28, normalized size = 0.44

$$\frac{4\,(x-1)^{\frac{3}{2}}}{15\,x^{\frac{3}{2}}}+\frac{2\,(x-1)^{\frac{3}{2}}}{5\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(7/2),x, algorithm="maxima")

[Out] 4/15*(x - 1)^(3/2)/x^(3/2) + 2/5*(x - 1)^(3/2)/x^(5/2)
```

Fricas [A] time = 0.213221, size = 131, normalized size = 2.08

$$\frac{2\left(60\,x^3-5\left(12\,x^2-13\,x+3\right)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-95\,x^2+40\,x-3\right)}{15\left(16\,x^5-20\,x^4+5\,x^3-(16\,x^4-12\,x^3+x^2)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(7/2),x, algorithm="fricas")

[Out] 2/15*(60*x^3 - 5*(12*x^2 - 13*x + 3)*sqrt(x)*sqrt(sqrt(x) + 1)*sq
rt(sqrt(x) - 1) - 95*x^2 + 40*x - 3)/(16*x^5 - 20*x^4 + 5*x^3 - (
16*x^4 - 12*x^3 + x^2)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1
))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(7/2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.219618, size = 122, normalized size = 1.94

$$\frac{128\left(15\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{12}-20\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{8}+80\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+64\right)}{15\left(\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+4\right)^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(7/2),x, algorithm="giac")

[Out] 128/15*(15*(sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^12 - 20*(sqrt(
sqrt(x) + 1) - sqrt(sqrt(x) - 1))^8 + 80*(sqrt(sqrt(x) + 1) - sqr
t(sqrt(x) - 1))^4 + 64)/((sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^
4 + 4)^5
```

3.840 $\int \frac{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}{x^{9/2}}\,dx$

Optimal. Leaf size=94

$$\frac{16\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{105x^{3/2}}+\frac{8\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{35x^{5/2}}+\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{7x^{7/2}}$$

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(7*x^(7/2)) + (8*(-1
 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(35*x^(5/2)) + (16*(-1 + S
qrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(105*x^(3/2))
```

Rubi [A] time = 0.101299, antiderivative size = 94, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071

$$\frac{16\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{105x^{3/2}}+\frac{8\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{35x^{5/2}}+\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{7x^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(9/2),x]
```

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(7*x^(7/2)) + (8*(-1
 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(35*x^(5/2)) + (16*(-1 + S
qrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(105*x^(3/2))
```

Rubi in Sympy [A] time = 9.61658, size = 85, normalized size = 0.9

$$\frac{16\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{105x^{\frac{3}{2}}}+\frac{8\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{35x^{\frac{5}{2}}}+\frac{2\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{7x^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(9/2),x)
```

```
[Out] 16*(sqrt(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(105*x**(3/2)) + 8*(
sqrt(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(35*x**(5/2)) + 2*(sqrt(
x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(7*x**(7/2))
```

Mathematica [A] time = 0.0224798, size = 46, normalized size = 0.49

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\left(8x^3+4x^2+3x-15\right)}{105x^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(9/2),x]
```

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*(-15 + 3*x + 4*x^2 + 8*x^
3))/(105*x^(7/2))
```

Maple [A] time = 0.012, size = 33, normalized size = 0.4

$$\frac{(-2+2\,x)\left(8\,x^2+12\,x+15\right)}{105}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{-\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)/x^(9/2),x)
```

```
[Out] 2/105*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(-1+x)*(8*x^2+12*x+15)
/x^(7/2)
```

Maxima [A] time = 1.51427, size = 42, normalized size = 0.45

$$\frac{16\,(x-1)^{\frac{3}{2}}}{105\,x^{\frac{3}{2}}}+\frac{8\,(x-1)^{\frac{3}{2}}}{35\,x^{\frac{5}{2}}}+\frac{2\,(x-1)^{\frac{3}{2}}}{7\,x^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(9/2),x, algorithm="maxima")
```

```
[Out] 16/105*(x - 1)^(3/2)/x^(3/2) + 8/35*(x - 1)^(3/2)/x^(5/2) + 2/7*(
x - 1)^(3/2)/x^(7/2)
```

Fricas [A] time = 0.213274, size = 161, normalized size = 1.71

$$\frac{2\left(1120\,x^4-2380\,x^3-7\left(160\,x^3-260\,x^2+123\,x-15\right)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}+1631\,x^2-378\,x+15\right)}{105\left(64\,x^7-112\,x^6+56\,x^5-7\,x^4-(64\,x^6-80\,x^5+24\,x^4-x^3)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(9/2),x, algorithm="fricas")
```

```
[Out] 2/105*(1120*x^4 - 2380*x^3 - 7*(160*x^3 - 260*x^2 + 123*x - 15)*s
qrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) + 1631*x^2 - 378*x + 1
5)/(64*x^7 - 112*x^6 + 56*x^5 - 7*x^4 - (64*x^6 - 80*x^5 + 24*x^4
 - x^3)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223258, size = 150, normalized size = 1.6

$$\frac{4096\left(35\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{16}-70\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{12}+168\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{8}+224\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-\right.\right.}{105\left(\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+4\right)^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(9/2),x, algorithm="giac")
```

```
[Out] 4096/105*(35*(sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^16 - 70*(sqr
t(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^12 + 168*(sqrt(sqrt(x) + 1) -
 sqrt(sqrt(x) - 1))^8 + 224*(sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1
))^4 + 128)/((sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 4)^7
```

3.841 $\int \frac{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}{x^{11/2}}\,dx$

Optimal. Leaf size=125

$$\frac{32\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{315x^{3/2}}+\frac{16\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{105x^{5/2}}+\frac{4\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{21x^{7/2}}+\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{9x^{9/2}}$$

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(9*x^(9/2)) + (4*(-1
 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(21*x^(7/2)) + (16*(-1 + S
qrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(105*x^(5/2)) + (32*(-1 + Sqrt
[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(315*x^(3/2))
```

Rubi [A] time = 0.136567, antiderivative size = 125, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071

$$\frac{32\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{315x^{3/2}}+\frac{16\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{105x^{5/2}}+\frac{4\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{21x^{7/2}}+\frac{2\left(\sqrt{x}-1\right)^{3/2}\left(\sqrt{x}+1\right)^{3/2}}{9x^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(11/2),x]
```

```
[Out] (2*(-1 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(9*x^(9/2)) + (4*(-1
 + Sqrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(21*x^(7/2)) + (16*(-1 + S
qrt[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(105*x^(5/2)) + (32*(-1 + Sqrt
[x])^(3/2)*(1 + Sqrt[x])^(3/2))/(315*x^(3/2))
```

Rubi in Sympy [A] time = 12.3617, size = 114, normalized size = 0.91

$$\frac{32\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{315x^{\frac{3}{2}}}+\frac{16\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{105x^{\frac{5}{2}}}+\frac{4\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{21x^{\frac{7}{2}}}+\frac{2\left(\sqrt{x}-1\right)^{\frac{3}{2}}\left(\sqrt{x}+1\right)^{\frac{3}{2}}}{9x^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(11/2),x)
```

```
[Out] 32*(sqrt(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(315*x**(3/2)) + 16*
(sqrt(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(105*x**(5/2)) + 4*(sqr
t(x) - 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(21*x**(7/2)) + 2*(sqrt(x)
- 1)**(3/2)*(sqrt(x) + 1)**(3/2)/(9*x**(9/2))
```

Mathematica [A] time = 0.0242314, size = 51, normalized size = 0.41

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\left(16x^4+8x^3+6x^2+5x-35\right)}{315x^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/x^(11/2),x]
```

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*(-35 + 5*x + 6*x^2 + 8*x^
3 + 16*x^4))/(315*x^(9/2))
```

Maple [A] time = 0.019, size = 38, normalized size = 0.3

$$\frac{(-2+2x)\left(16x^{3}+24x^{2}+30x+35\right)}{315}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)/x^(11/2),x)
```

```
[Out] 2/315*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(-1+x)*(16*x^3+24*x^2+
30*x+35)/x^(9/2)
```

Maxima [A] time = 1.58064, size = 55, normalized size = 0.44

$$\frac{32(x-1)^{\frac{3}{2}}}{315x^{\frac{3}{2}}}+\frac{16(x-1)^{\frac{3}{2}}}{105x^{\frac{5}{2}}}+\frac{4(x-1)^{\frac{3}{2}}}{21x^{\frac{7}{2}}}+\frac{2(x-1)^{\frac{3}{2}}}{9x^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(11/2),x, algorithm="maxima")
```

```
[Out] 32/315*(x - 1)^(3/2)/x^(3/2) + 16/105*(x - 1)^(3/2)/x^(5/2) + 4/2
1*(x - 1)^(3/2)/x^(7/2) + 2/9*(x - 1)^(3/2)/x^(9/2)
```

Fricas [A] time = 0.21033, size = 185, normalized size = 1.48

$$\frac{2\left(10080x^{5}-26712x^{4}+25242x^{3}-3\left(3360x^{4}-7224x^{3}+5222x^{2}-1415x+105\right)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-9999x^{2}+1440\right.}{315\left(256x^{9}-576x^{8}+432x^{7}-120x^{6}+9x^{5}-(256x^{8}-448x^{7}+240x^{6}-40x^{5}+x^{4})\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(11/2),x, algorithm="fricas")
```

```
[Out] 2/315*(10080*x^5 - 26712*x^4 + 25242*x^3 - 3*(3360*x^4 - 7224*x^3
 + 5222*x^2 - 1415*x + 105)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x
) - 1) - 9999*x^2 + 1440*x - 35)/(256*x^9 - 576*x^8 + 432*x^7 - 1
20*x^6 + 9*x^5 - (256*x^8 - 448*x^7 + 240*x^6 - 40*x^5 + x^4)*sqr
t(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-1+x**(1/2))**(1/2)*(1+x**(1/2))**(1/2)/x**(11/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.228976, size = 178, normalized size = 1.42

$$\frac{16384\left(315\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{20}-756\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{16}+1344\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{12}+2304\left(\sqrt{\sqrt{x}+1}-\right.\right.}{315\left(\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+4\right)^{9}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)/x^(11/2),x, algorithm="giac")
```

```
[Out] 16384/315*(315*(sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^20 - 756*(
sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^16 + 1344*(sqrt(sqrt(x) +
1) - sqrt(sqrt(x) - 1))^12 + 2304*(sqrt(sqrt(x) + 1) - sqrt(sqrt(
x) - 1))^8 + 2304*(sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 102
4)/((sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 4)^9
```

3.842 $\int \frac{x^{5/2}}{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}\,dx$

Optimal. Leaf size=104

$$\frac{1}{3}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{5/2}+\frac{5}{12}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}+\frac{5}{8}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}+\frac{5}{8}\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] (5*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/8 + (5*Sqrt[-1 +
 Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/12 + (Sqrt[-1 + Sqrt[x]]*Sqr
t[1 + Sqrt[x]]*x^(5/2))/3 + (5*ArcCosh[Sqrt[x]])/8
```

Rubi [A] time = 0.149613, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107

$$\frac{1}{3}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{5/2}+\frac{5}{12}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}+\frac{5}{8}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}+\frac{5}{8}\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[x^(5/2)/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]),x]
```

```
[Out] (5*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/8 + (5*Sqrt[-1 +
 Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/12 + (Sqrt[-1 + Sqrt[x]]*Sqr
t[1 + Sqrt[x]]*x^(5/2))/3 + (5*ArcCosh[Sqrt[x]])/8
```

Rubi in Sympy [A] time = 16.0636, size = 94, normalized size = 0.9

$$\frac{x^{\frac{5}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{3}+\frac{5x^{\frac{3}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{12}+\frac{5\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{8}+\frac{5\,\mathrm{acosh}\left(\sqrt{x}\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] x**(5/2)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/3 + 5*x**(3/2)*sqrt(
sqrt(x) - 1)*sqrt(sqrt(x) + 1)/12 + 5*sqrt(x)*sqrt(sqrt(x) - 1)*s
qrt(sqrt(x) + 1)/8 + 5*acosh(sqrt(x))/8
```

Mathematica [A] time = 0.0471159, size = 76, normalized size = 0.73

$$\frac{1}{24}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}\left(8x^2+10x+15\right)+\frac{5}{8}\log\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(5/2)/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]),x]
```

```
[Out] (Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x]*(15 + 10*x + 8*x^2)
)/24 + (5*Log[Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]] + Sqrt[x]])/8
```

Maple [A] time = 0.014, size = 65, normalized size = 0.6

$$\frac{1}{24}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\left(8\,x^{5/2}\sqrt{-1+x}+10\,x^{3/2}\sqrt{-1+x}+15\,\sqrt{x}\sqrt{-1+x}+15\,\ln\left(\sqrt{x}+\sqrt{-1+x}\right)\right)\frac{1}{\sqrt{-1+x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)/(-1+x^(1/2))^(1/2)/(1+x^(1/2))^(1/2),x)
```

```
[Out] 1/24*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(8*x^(5/2)*(-1+x)^(1/2)
+10*x^(3/2)*(-1+x)^(1/2)+15*x^(1/2)*(-1+x)^(1/2)+15*ln(x^(1/2)+(-
1+x)^(1/2)))/(-1+x)^(1/2)
```

Maxima [A] time = 1.42741, size = 63, normalized size = 0.61

$$\frac{1}{3}\sqrt{x-1}x^{\frac{5}{2}}+\frac{5}{12}\sqrt{x-1}x^{\frac{3}{2}}+\frac{5}{8}\sqrt{x-1}\sqrt{x}+\frac{5}{8}\log\left(2\sqrt{x-1}+2\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(5/2)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="maxima")
```

```
[Out] 1/3*sqrt(x - 1)*x^(5/2) + 5/12*sqrt(x - 1)*x^(3/2) + 5/8*sqrt(x -
 1)*sqrt(x) + 5/8*log(2*sqrt(x - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.213126, size = 261, normalized size = 2.51

$$-\frac{2048\,x^{6}-1536\,x^{5}+1152\,x^{4}-3840\,x^{3}-2\left(1024\,x^{5}-256\,x^{4}+576\,x^{3}-1600\,x^{2}+448\,x+51\right)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}+2304\cdots}{192\left(32\,x^{3}-2\left(16\,x^{2}-16\,x+3\right)\cdots\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(5/2)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="fricas")
```

```
[Out] -1/192*(2048*x^6 - 1536*x^5 + 1152*x^4 - 3840*x^3 - 2*(1024*x^5 -
 256*x^4 + 576*x^3 - 1600*x^2 + 448*x + 51)*sqrt(x)*sqrt(sqrt(x)
+ 1)*sqrt(sqrt(x) - 1) + 2304*x^2 + 60*(32*x^3 - 2*(16*x^2 - 16*x
 + 3)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 48*x^2 + 18*x
 - 1)*log(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1
) - 54*x - 37)/(32*x^3 - 2*(16*x^2 - 16*x + 3)*sqrt(x)*sqrt(sqrt(
x) + 1)*sqrt(sqrt(x) - 1) - 48*x^2 + 18*x - 1)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(5/2)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.843 $\int \frac{x^{3/2}}{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}\,dx$

Optimal. Leaf size=73

$$\frac{1}{2}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}+\frac{3}{4}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}+\frac{3}{4}\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] (3*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/4 + (Sqrt[-1 + S
qrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/2 + (3*ArcCosh[Sqrt[x]])/4
```

Rubi [A] time = 0.112956, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107

$$\frac{1}{2}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}x^{3/2}+\frac{3}{4}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}+\frac{3}{4}\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[x^(3/2)/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]),x]
```

```
[Out] (3*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x])/4 + (Sqrt[-1 + S
qrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2))/2 + (3*ArcCosh[Sqrt[x]])/4
```

Rubi in Sympy [A] time = 13.133, size = 65, normalized size = 0.89

$$\frac{x^{\frac{3}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{2}+\frac{3\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{4}+\frac{3\operatorname{acosh}\left(\sqrt{x}\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] x**(3/2)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/2 + 3*sqrt(x)*sqrt(s
qrt(x) - 1)*sqrt(sqrt(x) + 1)/4 + 3*acosh(sqrt(x))/4
```

Mathematica [A] time = 0.0461284, size = 70, normalized size = 0.96

$$\frac{1}{4}\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}(2x+3)+3\log\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+\sqrt{x}\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(3/2)/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]),x]
```

```
[Out] (Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x]*(3 + 2*x) + 3*Log[S
qrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]] + Sqrt[x]])/4
```

Maple [A] time = 0.014, size = 55, normalized size = 0.8

$$\frac{1}{4}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\left(2\,x^{3/2}\sqrt{-1+x}+3\,\sqrt{x}\sqrt{-1+x}+3\,\ln\left(\sqrt{x}+\sqrt{-1+x}\right)\right)\frac{1}{\sqrt{-1+x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)/(-1+x^(1/2))^(1/2)/(1+x^(1/2))^(1/2),x)
```

```
[Out] 1/4*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(2*x^(3/2)*(-1+x)^(1/2)+
3*x^(1/2)*(-1+x)^(1/2)+3*ln(x^(1/2)+(-1+x)^(1/2)))/(-1+x)^(1/2)
```

Maxima [A] time = 1.37467, size = 50, normalized size = 0.68

$$\frac{1}{2}\sqrt{x-1}x^{\frac{3}{2}}+\frac{3}{4}\sqrt{x-1}\sqrt{x}+\frac{3}{4}\log\left(2\sqrt{x-1}+2\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3/2)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="maxima")
```

```
[Out] 1/2*sqrt(x - 1)*x^(3/2) + 3/4*sqrt(x - 1)*sqrt(x) + 3/4*log(2*sqr
t(x - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.214932, size = 200, normalized size = 2.74

$$\frac{128\,x^4-4\left(32\,x^3+16\,x^2-30\,x-1\right)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-168\,x^2-12\left(4\,(2\,x-1)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-8\,x^2+8\,x-1\right)\,\mathrm{l}}{32\left(4\,(2\,x-1)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-8\,x^2+8\,x-1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3/2)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="fricas")
```

```
[Out] 1/32*(128*x^4 - 4*(32*x^3 + 16*x^2 - 30*x - 1)*sqrt(x)*sqrt(sqrt(
x) + 1)*sqrt(sqrt(x) - 1) - 168*x^2 - 12*(4*(2*x - 1)*sqrt(x)*sqr
t(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 8*x^2 + 8*x - 1)*log(2*sqrt(x)
*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1) + 40*x + 7)/(4*(2
*x - 1)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 8*x^2 + 8*x
 - 1)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{3}{2}}}{\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] Integral(x**(3/2)/(sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3/2)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.844 $\int \frac{\sqrt{x}}{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}\,dx$

Optimal. Leaf size=35

$$\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}+\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x] + ArcCosh[Sqrt[x]]
```

Rubi [A] time = 0.0747282, antiderivative size = 35, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107

$$\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}+\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x]/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]),x]
```

```
[Out] Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x] + ArcCosh[Sqrt[x]]
```

Rubi in Sympy [A] time = 10.1108, size = 31, normalized size = 0.89

$$\sqrt{x}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+\operatorname{acosh}\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(1/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] sqrt(x)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1) + acosh(sqrt(x))
```

Mathematica [A] time = 0.0223921, size = 59, normalized size = 1.69

$$\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\sqrt{x}+\log\left(\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}+\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x]/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]),x]
```

```
[Out] Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x] + Log[Sqrt[-1 + Sqrt
[x]]*Sqrt[1 + Sqrt[x]] + Sqrt[x]]
```

Maple [A] time = 0.013, size = 41, normalized size = 1.2

$$1\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\left(\sqrt{x}\sqrt{-1+x}+\ln\left(\sqrt{x}+\sqrt{-1+x}\right)\right)\frac{1}{\sqrt{-1+x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1/2)/(-1+x^(1/2))^(1/2)/(1+x^(1/2))^(1/2),x)
```

```
[Out] (-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(x^(1/2)*(-1+x)^(1/2)+ln(x^(
1/2)+(-1+x)^(1/2)))/(-1+x)^(1/2)
```

Maxima [A] time = 1.39534, size = 32, normalized size = 0.91

$$\sqrt{x-1}\sqrt{x}+\log\left(2\sqrt{x-1}+2\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(x)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="maxima")
```

```
[Out] sqrt(x - 1)*sqrt(x) + log(2*sqrt(x - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.220266, size = 153, normalized size = 4.37

$$-\frac{2\,(4\,x-1)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-8\,x^2+2\left(2\,\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-2\,x+1\right)\log\left(2\,\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-2\,x+1\right)+6\,x}{4\left(2\,\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-2\,x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(x)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="fricas")
```

```
[Out] -1/4*(2*(4*x - 1)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 8
*x^2 + 2*(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1
)*log(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1) +
6*x + 1)/(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1
)
```

Sympy [A] time = 8.50282, size = 83, normalized size = 2.37

$$\frac{G_{6,6}^{6,2}\left(\begin{matrix} -\frac{3}{4}, -\frac{1}{4} & -\frac{1}{2}, -\frac{1}{2}, 0, 1 \\ -1, -\frac{3}{4}, -\frac{1}{2}, -\frac{1}{4}, 0, 0 & \end{matrix} \middle| {\frac{1}{x}} \right)}{2\pi^{\frac{3}{2}}}-\frac{i G_{6,6}^{2,6}\left(\begin{matrix} -\frac{3}{2}, -\frac{5}{4}, -1, -\frac{3}{4}, -\frac{1}{2}, 1 & \\ -\frac{5}{4}, -\frac{3}{4} & -\frac{3}{2}, -1, -1, 0 \end{matrix} \middle| {\frac{e^{2i\pi}}{x}} \right)}{2\pi^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**(1/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] meijerg(((-3/4, -1/4), (-1/2, -1/2, 0, 1)), ((-1, -3/4, -1/2, -1/
4, 0, 0), ()), 1/x)/(2*pi**(3/2)) - I*meijerg(((-3/2, -5/4, -1, -
3/4, -1/2, 1), ()), ((-5/4, -3/4), (-3/2, -1, -1, 0)), exp_polar(
2*I*pi)/x)/(2*pi**(3/2))
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(x)/(sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.845 $\int \frac{1}{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}\sqrt{x}}\,dx$

Optimal. Leaf size=8

$$2\cosh^{-1}\left(\sqrt{x}\right)$$

```
[Out] 2*ArcCosh[Sqrt[x]]
```

Rubi [A] time = 0.0425341, antiderivative size = 8, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071

$$2\cosh^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x]),x]
```

```
[Out] 2*ArcCosh[Sqrt[x]]
```

Rubi in Sympy [A] time = 6.00859, size = 7, normalized size = 0.88

$$2\operatorname{acosh}\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**(1/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] 2*acosh(sqrt(x))
```

Mathematica [B] time = 0.014149, size = 20, normalized size = 2.5

$$4\sinh^{-1}\left(\frac{\sqrt{\sqrt{x}-1}}{\sqrt{2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*Sqrt[x]),x]
```

```
[Out] 4*ArcSinh[Sqrt[-1 + Sqrt[x]]/Sqrt[2]]
```

Maple [B] time = 0.006, size = 40, normalized size = 5.

$$2\,\frac{\sqrt{\left(1+\sqrt{x}\right)\left(-1+\sqrt{x}\right)}\ln\left(\sqrt{x}+\sqrt{-1+x}\right)}{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(1/2)/(-1+x^(1/2))^(1/2)/(1+x^(1/2))^(1/2),x)
```

```
[Out] 2*((1+x^(1/2))*(-1+x^(1/2)))^(1/2)/(1+x^(1/2))^(1/2)/(-1+x^(1/2))
^(1/2)*ln(x^(1/2)+(-1+x)^(1/2))
```

Maxima [A] time = 1.40053, size = 22, normalized size = 2.75

$$2 \log \left(2 \sqrt{x-1}+2 \sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="maxima")
```

```
[Out] 2*log(2*sqrt(x - 1) + 2*sqrt(x))
```

Fricas [A] time = 0.216603, size = 36, normalized size = 4.5

$$-\log \left(2 \sqrt{x} \sqrt{\sqrt{x}+1} \sqrt{\sqrt{x}-1}-2 x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="fricas")
```

```
[Out] -log(2*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 2*x + 1)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x} \sqrt{\sqrt{x}-1} \sqrt{\sqrt{x}+1}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**(1/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] Integral(1/(sqrt(x)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.846 $\int \frac{1}{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{3/2}}\,dx$

Optimal. Leaf size=29

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{\sqrt{x}}$$

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/Sqrt[x]
```

Rubi [A] time = 0.0384616, antiderivative size = 29, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2)),x]

[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/Sqrt[x]
```

Rubi in Sympy [A] time = 4.44281, size = 26, normalized size = 0.9

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(3/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)

[Out] 2*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/sqrt(x)
```

Mathematica [A] time = 0.0205941, size = 29, normalized size = 1.

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(3/2)),x]

[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/Sqrt[x]
```

Maple [A] time = 0.012, size = 20, normalized size = 0.7

$$2\,\frac{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(3/2)/(-1+x^(1/2))^(1/2)/(1+x^(1/2))^(1/2),x)
```

```
[Out] 2*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)/x^(1/2)
```

Maxima [A] time = 1.53163, size = 14, normalized size = 0.48

$$\frac{2\sqrt{x-1}}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(3/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="maxima")
```

```
[Out] 2*sqrt(x - 1)/sqrt(x)
```

Fricas [A] time = 0.212085, size = 35, normalized size = 1.21

$$-\frac{2}{\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(3/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="fricas")
```

```
[Out] -2/(sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{\frac{3}{2}}\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(3/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] Integral(1/(x**(3/2)*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)), x)
```

GIAC/XCAS [A] time = 0.208807, size = 34, normalized size = 1.17

$$\frac{16}{\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^4+4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(3/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="giac")
```

```
[Out] 16/((sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 4)
```

3.847 $\int \frac{1}{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{5/2}}\,dx$

Optimal. Leaf size=63

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{3x^{3/2}}+\frac{4\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{3\sqrt{x}}$$

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/(3*x^(3/2)) + (4*Sqrt[-1
 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/(3*Sqrt[x])
```

Rubi [A] time = 0.0746418, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{3x^{3/2}}+\frac{4\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{3\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(5/2)),x]
```

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/(3*x^(3/2)) + (4*Sqrt[-1
 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/(3*Sqrt[x])
```

Rubi in Sympy [A] time = 7.07239, size = 56, normalized size = 0.89

$$\frac{4\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{3\sqrt{x}}+\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{3x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(5/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] 4*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/(3*sqrt(x)) + 2*sqrt(sqrt(x
) - 1)*sqrt(sqrt(x) + 1)/(3*x**(3/2))
```

Mathematica [A] time = 0.024967, size = 36, normalized size = 0.57

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}(2x+1)}{3x^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(5/2)),x]
```

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*(1 + 2*x))/(3*x^(3/2))
```

Maple [A] time = 0.013, size = 25, normalized size = 0.4

$$\frac{2+4x}{3}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(5/2)/(-1+x^(1/2))^(1/2)/(1+x^(1/2))^(1/2),x)
```

```
[Out] 2/3*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(1+2*x)/x^(3/2)
```

Maxima [A] time = 1.52125, size = 28, normalized size = 0.44

$$\frac{4\sqrt{x-1}}{3\sqrt{x}} + \frac{2\sqrt{x-1}}{3x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(5/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="maxima")
```

```
[Out] 4/3*sqrt(x - 1)/sqrt(x) + 2/3*sqrt(x - 1)/x^(3/2)
```

Fricas [A] time = 0.211382, size = 90, normalized size = 1.43

$$-\frac{2\left(3\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-3x+1\right)}{3\left(4x^{3}-(4x^{2}-x)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-3x^{2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(5/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="fricas")
```

```
[Out] -2/3*(3*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) - 3*x + 1)/(4
*x^3 - (4*x^2 - x)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) -
3*x^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(5/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.213209, size = 65, normalized size = 1.03

$$\frac{128\left(3\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+4\right)}{3\left(\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+4\right)^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(5/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="giac")
```

```
[Out] 128/3*(3*(sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 4)/((sqrt(sq
rt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 4)^3
```

3.848 $\int \frac{1}{\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{7/2}}\,dx$

Optimal. Leaf size=94

$$\frac{8\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{15x^{3/2}}+\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{5x^{5/2}}+\frac{16\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{15\sqrt{x}}$$

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/(5*x^(5/2)) + (8*Sqrt[-1
 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/(15*x^(3/2)) + (16*Sqrt[-1 + Sqrt[
x]]*Sqrt[1 + Sqrt[x]])/(15*Sqrt[x])
```

Rubi [A] time = 0.112758, antiderivative size = 94, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071

$$\frac{8\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{15x^{3/2}}+\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{5x^{5/2}}+\frac{16\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{15\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(7/2)),x]
```

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/(5*x^(5/2)) + (8*Sqrt[-1
 + Sqrt[x]]*Sqrt[1 + Sqrt[x]])/(15*x^(3/2)) + (16*Sqrt[-1 + Sqrt[
x]]*Sqrt[1 + Sqrt[x]])/(15*Sqrt[x])
```

Rubi in Sympy [A] time = 9.86444, size = 85, normalized size = 0.9

$$\frac{16\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{15\sqrt{x}}+\frac{8\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{15x^{\frac{3}{2}}}+\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}}{5x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(7/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] 16*sqrt(sqrt(x) - 1)*sqrt(sqrt(x) + 1)/(15*sqrt(x)) + 8*sqrt(sqrt
(x) - 1)*sqrt(sqrt(x) + 1)/(15*x**(3/2)) + 2*sqrt(sqrt(x) - 1)*sq
rt(sqrt(x) + 1)/(5*x**(5/2))
```

Mathematica [A] time = 0.0277777, size = 41, normalized size = 0.44

$$\frac{2\sqrt{\sqrt{x}-1}\sqrt{\sqrt{x}+1}\left(8x^2+4x+3\right)}{15x^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*x^(7/2)),x]
```

```
[Out] (2*Sqrt[-1 + Sqrt[x]]*Sqrt[1 + Sqrt[x]]*(3 + 4*x + 8*x^2))/(15*x^
(5/2))
```

Maple [A] time = 0.013, size = 30, normalized size = 0.3

$$\frac{16\,x^2+8\,x+6}{15}\sqrt{-1+\sqrt{x}}\sqrt{1+\sqrt{x}}x^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(7/2)/(-1+x^(1/2))^(1/2)/(1+x^(1/2))^(1/2),x)
```

```
[Out] 2/15*(-1+x^(1/2))^(1/2)*(1+x^(1/2))^(1/2)*(8*x^2+4*x+3)/x^(5/2)
```

Maxima [A] time = 1.52279, size = 42, normalized size = 0.45

$$\frac{16\sqrt{x-1}}{15\sqrt{x}} + \frac{8\sqrt{x-1}}{15\,x^{\frac{3}{2}}} + \frac{2\sqrt{x-1}}{5\,x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(7/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="maxima")
```

```
[Out] 16/15*sqrt(x - 1)/sqrt(x) + 8/15*sqrt(x - 1)/x^(3/2) + 2/5*sqrt(x
 - 1)/x^(5/2)
```

Fricas [A] time = 0.212773, size = 117, normalized size = 1.24

$$-\frac{2\left(5\,(8\,x-3)\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}-40\,x^{2}+35\,x-3\right)}{15\left(16\,x^{5}-20\,x^{4}+5\,x^{3}-(16\,x^{4}-12\,x^{3}+x^{2})\sqrt{x}\sqrt{\sqrt{x}+1}\sqrt{\sqrt{x}-1}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(7/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="fricas")
```

```
[Out] -2/15*(5*(8*x - 3)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1) -
40*x^2 + 35*x - 3)/(16*x^5 - 20*x^4 + 5*x^3 - (16*x^4 - 12*x^3 +
x^2)*sqrt(x)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(7/2)/(-1+x**(1/2))**(1/2)/(1+x**(1/2))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.220188, size = 93, normalized size = 0.99

$$\frac{4096\left(5\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{8}+10\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+8\right)}{15\left(\left(\sqrt{\sqrt{x}+1}-\sqrt{\sqrt{x}-1}\right)^{4}+4\right)^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(x^(7/2)*sqrt(sqrt(x) + 1)*sqrt(sqrt(x) - 1)),x, algorithm="giac")
```

```
[Out] 4096/15*(5*(sqrt(sqrt(x) + 1) - sqrt(sqrt(x) - 1))^8 + 10*(sqrt(s
qrt(x) + 1) - sqrt(sqrt(x) - 1))^4 + 8)/((sqrt(sqrt(x) + 1) - sqr
t(sqrt(x) - 1))^4 + 4)^5
```

3.849 $\int x^2(-a+bx^n)^p(a+bx^n)^p\,dx$

Optimal. Leaf size=78

$$\frac{1}{3}x^3(bx^n-a)^p(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}{}_2F_1\left(\frac{3}{2n},-p;1+\frac{3}{2n};\frac{b^2x^{2n}}{a^2}\right)$$

```
[Out] (x^3*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[3/(2*n), -p,
1 + 3/(2*n), (b^2*x^(2*n))/a^2])/(3*(1 - (b^2*x^(2*n))/a^2)^p)
```

Rubi [A] time = 0.120972, antiderivative size = 78, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{1}{3}x^3(bx^n-a)^p(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}{}_2F_1\left(\frac{3}{2n},-p;1+\frac{3}{2n};\frac{b^2x^{2n}}{a^2}\right)$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(-a + b*x^n)^p*(a + b*x^n)^p,x]
```

```
[Out] (x^3*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[3/(2*n), -p,
1 + 3/(2*n), (b^2*x^(2*n))/a^2])/(3*(1 - (b^2*x^(2*n))/a^2)^p)
```

Rubi in Sympy [A] time = 21.3161, size = 60, normalized size = 0.77

$$\frac{x^3\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}(-a+bx^n)^p(a+bx^n)^p\,{}_2F_1\left(\begin{matrix}-p,\frac{3}{2n}\\ \frac{n+\frac{3}{2}}{n}\end{matrix}\middle|\frac{b^2x^{2n}}{a^2}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**2*(-a+b*x**n)**p*(a+b*x**n)**p,x)
```

```
[Out] x**3*(1 - b**2*x**(2*n)/a**2)**(-p)*(-a + b*x**n)**p*(a + b*x**n)
**p*hyper((-p, 3/(2*n)), ((n + 3/2)/n,), b**2*x**(2*n)/a**2)/3
```

Mathematica [A] time = 0.153832, size = 78, normalized size = 1.

$$\frac{1}{3}x^3(bx^n-a)^p(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}{}_2F_1\left(\frac{3}{2n},-p;1+\frac{3}{2n};\frac{b^2x^{2n}}{a^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(-a + b*x^n)^p*(a + b*x^n)^p,x]
```

```
[Out] (x^3*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[3/(2*n), -p,
1 + 3/(2*n), (b^2*x^(2*n))/a^2])/(3*(1 - (b^2*x^(2*n))/a^2)^p)
```

Maple [F] time = 0.217, size = 0, normalized size = 0.

$$\int x^2(bx^n-a)^p(a+bx^n)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^n-a)^p*(a+b*x^n)^p,x)

[Out] int(x^2*(b*x^n-a)^p*(a+b*x^n)^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + a)^p (bx^n - a)^p x^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p*x^2,x, algorithm="maxima")

[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p*x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bx^n + a)^p (bx^n - a)^p x^2, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p*x^2,x, algorithm="fricas")

[Out] integral((b*x^n + a)^p*(b*x^n - a)^p*x^2, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(-a+b*x**n)**p*(a+b*x**n)**p,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + a)^p (bx^n - a)^p x^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p*x^2,x, algorithm="giac")

[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p*x^2, x)
```

3.850 $\int x(-a+bx^n)^p(a+bx^n)^p\,dx$

Optimal. Leaf size=70

$$\frac{1}{2}x^2(bx^n-a)^p(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}{}_2F_1\left(\frac{1}{n},-p;1+\frac{1}{n};\frac{b^2x^{2n}}{a^2}\right)$$

```
[Out] (x^2*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[n^(-1), -p, 1
 + n^(-1), (b^2*x^(2*n))/a^2])/(2*(1 - (b^2*x^(2*n))/a^2)^p)
```

Rubi [A] time = 0.0952596, antiderivative size = 70, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{1}{2}x^2(bx^n-a)^p(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}{}_2F_1\left(\frac{1}{n},-p;1+\frac{1}{n};\frac{b^2x^{2n}}{a^2}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[x*(-a + b*x^n)^p*(a + b*x^n)^p,x]
```

```
[Out] (x^2*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[n^(-1), -p, 1
 + n^(-1), (b^2*x^(2*n))/a^2])/(2*(1 - (b^2*x^(2*n))/a^2)^p)
```

Rubi in Sympy [A] time = 18.2524, size = 56, normalized size = 0.8

$$\frac{x^2\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}(-a+bx^n)^p(a+bx^n)^p\,{}_2F_1\left(\begin{matrix}-p,\frac{1}{n}\\1+\frac{1}{n}\end{matrix}\middle|\frac{b^2x^{2n}}{a^2}\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(-a+b*x**n)**p*(a+b*x**n)**p,x)
```

```
[Out] x**2*(1 - b**2*x**(2*n)/a**2)**(-p)*(-a + b*x**n)**p*(a + b*x**n)
**p*hyper((-p, 1/n), (1 + 1/n,), b**2*x**(2*n)/a**2)/2
```

Mathematica [A] time = 0.0986373, size = 70, normalized size = 1.

$$\frac{1}{2}x^2(bx^n-a)^p(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}{}_2F_1\left(\frac{1}{n},-p;1+\frac{1}{n};\frac{b^2x^{2n}}{a^2}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(-a + b*x^n)^p*(a + b*x^n)^p,x]
```

```
[Out] (x^2*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[n^(-1), -p, 1
 + n^(-1), (b^2*x^(2*n))/a^2])/(2*(1 - (b^2*x^(2*n))/a^2)^p)
```

Maple [F] time = 0.22, size = 0, normalized size = 0.

$$\int x(bx^n-a)^p(a+bx^n)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^n-a)^p*(a+b*x^n)^p,x)

[Out] int(x*(b*x^n-a)^p*(a+b*x^n)^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n+a)^p(bx^n-a)^p x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p*x,x, algorithm="maxima")

[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p*x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bx^n+a)^p(bx^n-a)^p x, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p*x,x, algorithm="fricas")

[Out] integral((b*x^n + a)^p*(b*x^n - a)^p*x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\left(-a+bx^n\right)^p\left(a+bx^n\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(-a+b*x**n)**p*(a+b*x**n)**p,x)

[Out] Integral(x*(-a + b*x**n)**p*(a + b*x**n)**p, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n+a)^p(bx^n-a)^p x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p*x,x, algorithm="giac")

[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p*x, x)
```

3.851 $\int (-a+bx^n)^p (a+bx^n)^p \, dx$

Optimal. Leaf size=73

$$x (bx^n-a)^p (a+bx^n)^p \left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p} {}_2F_1\left(\frac{1}{2n},-p;\frac{1}{2}\left(2+\frac{1}{n}\right);\frac{b^2x^{2n}}{a^2}\right)$$

```
[Out] (x*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[1/(2*n), -p, (2
 + n^(-1))/2, (b^2*x^(2*n))/a^2])/(1 - (b^2*x^(2*n))/a^2)^p
```

Rubi [A] time = 0.0742409, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$x (bx^n-a)^p (a+bx^n)^p \left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p} {}_2F_1\left(\frac{1}{2n},-p;\frac{1}{2}\left(2+\frac{1}{n}\right);\frac{b^2x^{2n}}{a^2}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(-a + b*x^n)^p*(a + b*x^n)^p,x]
```

```
[Out] (x*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[1/(2*n), -p, (2
 + n^(-1))/2, (b^2*x^(2*n))/a^2])/(1 - (b^2*x^(2*n))/a^2)^p
```

Rubi in Sympy [A] time = 24.6225, size = 56, normalized size = 0.77

$$x \left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p} (-a+bx^n)^p (a+bx^n)^p {}_2F_1\left(\begin{matrix} -p, \frac{1}{2n} \\ \frac{n+\frac{1}{2}}{n} \end{matrix}\middle| \frac{b^2x^{2n}}{a^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-a+b*x**n)**p*(a+b*x**n)**p,x)
```

```
[Out] x*(1 - b**2*x**(2*n)/a**2)**(-p)*(-a + b*x**n)**p*(a + b*x**n)**p
*hyper((-p, 1/(2*n)), ((n + 1/2)/n,), b**2*x**(2*n)/a**2)
```

Mathematica [A] time = 0.0923308, size = 73, normalized size = 1.

$$x (bx^n-a)^p (a+bx^n)^p \left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p} {}_2F_1\left(\frac{1}{2n},-p;1+\frac{1}{2n};\frac{b^2x^{2n}}{a^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(-a + b*x^n)^p*(a + b*x^n)^p,x]
```

```
[Out] (x*(-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[1/(2*n), -p, 1
+ 1/(2*n), (b^2*x^(2*n))/a^2])/(1 - (b^2*x^(2*n))/a^2)^p
```

Maple [F] time = 0.204, size = 0, normalized size = 0.

$$\int (bx^n-a)^p (a+bx^n)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^n-a)^p*(a+b*x^n)^p,x)

[Out] int((b*x^n-a)^p*(a+b*x^n)^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + a)^p (bx^n - a)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p,x, algorithm="maxima")

[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bx^n + a)^p (bx^n - a)^p, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p,x, algorithm="fricas")

[Out] integral((b*x^n + a)^p*(b*x^n - a)^p, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int (-a + bx^n)^p \, (a + bx^n)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-a+b*x**n)**p*(a+b*x**n)**p,x)

[Out] Integral((-a + b*x**n)**p*(a + b*x**n)**p, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + a)^p (bx^n - a)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p,x, algorithm="giac")

[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p, x)
```

3.852 $\int \frac{(-a+bx^n)^p(a+bx^n)^p}{x}\,dx$

Optimal. Leaf size=72

$$-\frac{\left(a^2-b^2x^{2n}\right)(bx^n-a)^p(a+bx^n)^p\,{}_2F_1\left(1,p+1;p+2;1-\frac{b^2x^{2n}}{a^2}\right)}{2a^2n(p+1)}$$

```
[Out] -((-a + b*x^n)^p*(a + b*x^n)^p*(a^2 - b^2*x^(2*n))*Hypergeometric
2F1[1, 1 + p, 2 + p, 1 - (b^2*x^(2*n))/a^2])/(2*a^2*n*(1 + p))
```

Rubi [A] time = 0.179056, antiderivative size = 72, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{\left(a^2-b^2x^{2n}\right)(bx^n-a)^p(a+bx^n)^p\,{}_2F_1\left(1,p+1;p+2;1-\frac{b^2x^{2n}}{a^2}\right)}{2a^2n(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[((-a + b*x^n)^p*(a + b*x^n)^p)/x,x]
```

```
[Out] -((-a + b*x^n)^p*(a + b*x^n)^p*(a^2 - b^2*x^(2*n))*Hypergeometric
2F1[1, 1 + p, 2 + p, 1 - (b^2*x^(2*n))/a^2])/(2*a^2*n*(1 + p))
```

Rubi in Sympy [A] time = 23.5988, size = 73, normalized size = 1.01

$$\frac{(-a+bx^n)^p(a+bx^n)^p\left(-a^2+b^2x^{2n}\right)^{-p}\left(-a^2+b^2x^{2n}\right)^{p+1}{}_2F_1\left(\begin{matrix}1,p+1\\p+2\end{matrix}\middle|1-\frac{b^2x^{2n}}{a^2}\right)}{2a^2n\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((-a+b*x**n)**p*(a+b*x**n)**p/x,x)
```

```
[Out] (-a + b*x**n)**p*(a + b*x**n)**p*(-a**2 + b**2*x**(2*n))**(-p)*(-
a**2 + b**2*x**(2*n))**(p + 1)*hyper((1, p + 1), (p + 2,), 1 - b*
*2*x**(2*n)/a**2)/(2*a**2*n*(p + 1))
```

Mathematica [A] time = 0.110582, size = 73, normalized size = 1.01

$$\frac{\left(1-\frac{a^2x^{-2n}}{b^2}\right)^{-p}(bx^n-a)^p(a+bx^n)^p\,{}_2F_1\left(-p,-p;1-p;\frac{a^2x^{-2n}}{b^2}\right)}{2np}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((-a + b*x^n)^p*(a + b*x^n)^p)/x,x]
```

```
[Out] ((-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[-p, -p, 1 - p, a^
2/(b^2*x^(2*n))])/(2*n*p*(1 - a^2/(b^2*x^(2*n)))^p)
```

Maple [F] time = 0.218, size = 0, normalized size = 0.

$$\int \frac{(bx^n-a)^p(a+bx^n)^p}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^n-a)^p*(a+b*x^n)^p/x,x)
```

```
[Out] int((b*x^n-a)^p*(a+b*x^n)^p/x,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^p (bx^n - a)^p}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p/x,x, algorithm="maxima")
```

```
[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(bx^n + a)^p (bx^n - a)^p}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p/x,x, algorithm="fricas")
```

```
[Out] integral((b*x^n + a)^p*(b*x^n - a)^p/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(-a + bx^n)^p\,(a + bx^n)^p}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-a+b*x**n)**p*(a+b*x**n)**p/x,x)
```

```
[Out] Integral((-a + b*x**n)**p*(a + b*x**n)**p/x, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^p (bx^n - a)^p}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p/x,x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p/x, x)
```

3.853 $\int \frac{(-a+bx^n)^p(a+bx^n)^p}{x^2}\,dx$

Optimal. Leaf size=76

$$-\frac{(bx^n-a)^p\,(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}\,{}_2F_1\left(-\frac{1}{2n},-p;1-\frac{1}{2n};\frac{b^2x^{2n}}{a^2}\right)}{x}$$

```
[Out] -(((-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[-1/(2*n), -p, 1
 - 1/(2*n), (b^2*x^(2*n))/a^2])/(x*(1 - (b^2*x^(2*n))/a^2)^p))
```

Rubi [A] time = 0.117493, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{(bx^n-a)^p\,(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}\,{}_2F_1\left(-\frac{1}{2n},-p;1-\frac{1}{2n};\frac{b^2x^{2n}}{a^2}\right)}{x}$$

Antiderivative was successfully verified.

```
[In]  Int[((-a + b*x^n)^p*(a + b*x^n)^p)/x^2,x]
```

```
[Out] -(((-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[-1/(2*n), -p, 1
 - 1/(2*n), (b^2*x^(2*n))/a^2])/(x*(1 - (b^2*x^(2*n))/a^2)^p))
```

Rubi in Sympy [A] time = 21.2007, size = 60, normalized size = 0.79

$$-\frac{\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}(-a+bx^n)^p\,(a+bx^n)^p\,{}_2F_1\left(\begin{matrix}-p,-\frac{1}{2n}\\ \frac{n-\frac{1}{2}}{n}\end{matrix}\middle|\frac{b^2x^{2n}}{a^2}\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((-a+b*x**n)**p*(a+b*x**n)**p/x**2,x)
```

```
[Out] -(1 - b**2*x**(2*n)/a**2)**(-p)*(-a + b*x**n)**p*(a + b*x**n)**p*
hyper((-p, -1/(2*n)), ((n - 1/2)/n,), b**2*x**(2*n)/a**2)/x
```

Mathematica [A] time = 0.105017, size = 76, normalized size = 1.

$$-\frac{(bx^n-a)^p\,(a+bx^n)^p\left(1-\frac{b^2x^{2n}}{a^2}\right)^{-p}\,{}_2F_1\left(-\frac{1}{2n},-p;1-\frac{1}{2n};\frac{b^2x^{2n}}{a^2}\right)}{x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((-a + b*x^n)^p*(a + b*x^n)^p)/x^2,x]
```

```
[Out] -(((-a + b*x^n)^p*(a + b*x^n)^p*Hypergeometric2F1[-1/(2*n), -p, 1
 - 1/(2*n), (b^2*x^(2*n))/a^2])/(x*(1 - (b^2*x^(2*n))/a^2)^p))
```

Maple [F] time = 0.222, size = 0, normalized size = 0.

$$\int \frac{(bx^n-a)^p\,(a+bx^n)^p}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^n-a)^p*(a+b*x^n)^p/x^2,x)
```

```
[Out] int((b*x^n-a)^p*(a+b*x^n)^p/x^2,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^p (bx^n - a)^p}{x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p/x^2,x, algorithm="maxima")
```

```
[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p/x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(bx^n + a)^p (bx^n - a)^p}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p/x^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^n + a)^p*(b*x^n - a)^p/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(-a + bx^n)^p (a + bx^n)^p}{x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-a+b*x**n)**p*(a+b*x**n)**p/x**2,x)
```

```
[Out] Integral((-a + b*x**n)**p*(a + b*x**n)**p/x**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^p (bx^n - a)^p}{x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^p*(b*x^n - a)^p/x^2,x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^p*(b*x^n - a)^p/x^2, x)
```

3.854 $\int \frac{1+x^6}{x(1-x^6)}\,dx$

Optimal. Leaf size=15

$$\log(x)-\frac{1}{3}\log\left(1-x^6\right)$$

```
[Out] Log[x] - Log[1 - x^6]/3
```

Rubi [A] time = 0.0497734, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$\log(x)-\frac{1}{3}\log\left(1-x^6\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x^6)/(x*(1 - x^6)),x]

[Out] Log[x] - Log[1 - x^6]/3
```

Rubi in Sympy [A] time = 7.85375, size = 14, normalized size = 0.93

$$\frac{\log\left(x^6\right)}{6}-\frac{\log\left(-x^6+1\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**6+1)/x/(-x**6+1),x)

[Out] log(x**6)/6 - log(-x**6 + 1)/3
```

Mathematica [A] time = 0.00962285, size = 15, normalized size = 1.

$$\log(x)-\frac{1}{3}\log\left(1-x^6\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x^6)/(x*(1 - x^6)),x]

[Out] Log[x] - Log[1 - x^6]/3
```

Maple [B] time = 0.014, size = 36, normalized size = 2.4

$$\ln(x)-\frac{\ln\left(x^2+x+1\right)}{3}-\frac{\ln(-1+x)}{3}-\frac{\ln\left(x^2-x+1\right)}{3}-\frac{\ln(1+x)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^6+1)/x/(-x^6+1),x)

[Out] ln(x)-1/3*ln(x^2+x+1)-1/3*ln(-1+x)-1/3*ln(x^2-x+1)-1/3*ln(1+x)
```

Maxima [A] time = 1.41852, size = 20, normalized size = 1.33

$$-\frac{1}{3}\log\left(x^6-1\right)+\frac{1}{6}\log\left(x^6\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(x^6 + 1)/((x^6 - 1)*x),x, algorithm="maxima")
```

```
[Out] -1/3*log(x^6 - 1) + 1/6*log(x^6)
```

Fricas [A] time = 0.217254, size = 15, normalized size = 1.

$$-\frac{1}{3}\log\left(x^6-1\right)+\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(x^6 + 1)/((x^6 - 1)*x),x, algorithm="fricas")
```

```
[Out] -1/3*log(x^6 - 1) + log(x)
```

Sympy [A] time = 0.127994, size = 10, normalized size = 0.67

$$\log\left(x\right)-\frac{\log\left(x^6-1\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**6+1)/x/(-x**6+1),x)
```

```
[Out] log(x) - log(x**6 - 1)/3
```

GIAC/XCAS [A] time = 0.210549, size = 22, normalized size = 1.47

$$\frac{1}{6}\ln\left(x^6\right)-\frac{1}{3}\ln\left(\left|x^6-1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(x^6 + 1)/((x^6 - 1)*x),x, algorithm="giac")
```

```
[Out] 1/6*ln(x^6) - 1/3*ln(abs(x^6 - 1))
```

3.855 $\int (ex)^m (a+bx^n)^p (a(1+m)+b(1+m+n+np)x^n)\, dx$

Optimal. Leaf size=22

$$\frac{(ex)^{m+1} (a+bx^n)^{p+1}}{e}$$

```
[Out] ((e*x)^(1 + m)*(a + b*x^n)^(1 + p))/e
```

Rubi [A] time = 0.0601766, antiderivative size = 22, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.03

$$\frac{(ex)^{m+1} (a+bx^n)^{p+1}}{e}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m*(a + b*x^n)^p*(a*(1 + m) + b*(1 + m + n + n*p)*x^n),x]
```

```
[Out] ((e*x)^(1 + m)*(a + b*x^n)^(1 + p))/e
```

Rubi in Sympy [A] time = 8.50469, size = 17, normalized size = 0.77

$$\frac{(ex)^{m+1} (a+bx^n)^{p+1}}{e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x)**m*(a+b*x**n)**p*(a*(1+m)+b*(n*p+m+n+1)*x**n),x)
```

```
[Out] (e*x)**(m + 1)*(a + b*x**n)**(p + 1)/e
```

Mathematica [A] time = 0.0939755, size = 18, normalized size = 0.82

$$x(ex)^m (a+bx^n)^{p+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*(a + b*x^n)^p*(a*(1 + m) + b*(1 + m + n + n*p)*x^n),x]
```

```
[Out] x*(e*x)^m*(a + b*x^n)^(1 + p)
```

Maple [F] time = 0.103, size = 0, normalized size = 0.

$$\int (ex)^m (a+bx^n)^p (a(1+m)+b(np+m+n+1)x^n)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m*(a+b*x^n)^p*(a*(1+m)+b*(n*p+m+n+1)*x^n),x)
```

```
[Out] int((e*x)^m*(a+b*x^n)^p*(a*(1+m)+b*(n*p+m+n+1)*x^n),x)
```

Maxima [A] time = 15.9588, size = 49, normalized size = 2.23

$$\left(ae^m x x^m + be^m x e^{(m\log(x)+n\log(x))}\right)(bx^n + a)^p$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((n*p + m + n + 1)*b*x^n + a*(m + 1))*(b*x^n + a)^p*(e*x)^m,x, algorithm
```

```
[Out] (a*e^m*x*x^m + b*e^m*x*e^(m*log(x) + n*log(x)))*(b*x^n + a)^p
```

Fricas [A] time = 0.235327, size = 54, normalized size = 2.45

$$\left(bxx^n e^{(m\log(e)+m\log(x))} + axe^{(m\log(e)+m\log(x))}\right)(bx^n + a)^p$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((n*p + m + n + 1)*b*x^n + a*(m + 1))*(b*x^n + a)^p*(e*x)^m,x, algorithm
```

```
[Out] (b*x*x^n*e^(m*log(e) + m*log(x)) + a*x*e^(m*log(e) + m*log(x)))*(
b*x^n + a)^p
```

Sympy [A] time = 15.7014, size = 39, normalized size = 1.77

$$ae^m x x^m (a + bx^n)^p + be^m x x^m x^n (a + bx^n)^p$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m*(a+b*x**n)**p*(a*(1+m)+b*(n*p+m+n+1)*x**n),x)
```

```
[Out] a*e**m*x*x**m*(a + b*x**n)**p + b*e**m*x*x**m*x**n*(a + b*x**n)**
p
```

GIAC/XCAS [A] time = 0.220194, size = 66, normalized size = 3.

$$bxe^{\left(p\ln\left(be^{(n\ln(x))}+a\right)+m\ln(x)+n\ln(x)+m\right)} + axe^{\left(p\ln\left(be^{(n\ln(x))}+a\right)+m\ln(x)+m\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((n*p + m + n + 1)*b*x^n + a*(m + 1))*(b*x^n + a)^p*(e*x)^m,x, algorithm
```

```
[Out] b*x*e^(p*ln(b*e^(n*ln(x)) + a) + m*ln(x) + n*ln(x) + m) + a*x*e^(
p*ln(b*e^(n*ln(x)) + a) + m*ln(x) + m)
```

3.856 $\int \frac{(ex)^m}{(a+bx^n)(c+dx^n)} dx$

Optimal. Leaf size=114

$$\frac{b(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{bx^n}{a}\right)}{ae(m+1)(bc-ad)}-\frac{d(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{dx^n}{c}\right)}{ce(m+1)(bc-ad)}$$

```
[Out] (b*(e*x)^(1 + m)*Hypergeometric2F1[1, (1 + m)/n, (1 + m + n)/n, -
((b*x^n)/a)])/(a*(b*c - a*d)*e*(1 + m)) - (d*(e*x)^(1 + m)*Hyperg
eometric2F1[1, (1 + m)/n, (1 + m + n)/n, -((d*x^n)/c)])/(c*(b*c -
 a*d)*e*(1 + m))
```

Rubi [A] time = 0.177392, antiderivative size = 114, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{b(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{bx^n}{a}\right)}{ae(m+1)(bc-ad)}-\frac{d(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{dx^n}{c}\right)}{ce(m+1)(bc-ad)}$$

Antiderivative was successfully verified.

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

```
[Out] (b*(e*x)^(1 + m)*Hypergeometric2F1[1, (1 + m)/n, (1 + m + n)/n, -
((b*x^n)/a)])/(a*(b*c - a*d)*e*(1 + m)) - (d*(e*x)^(1 + m)*Hyperg
eometric2F1[1, (1 + m)/n, (1 + m + n)/n, -((d*x^n)/c)])/(c*(b*c -
 a*d)*e*(1 + m))
```

Rubi in Sympy [A] time = 23.8722, size = 80, normalized size = 0.7

$$\frac{d\,(ex)^{m+1}\,{}_2F_1\left(\begin{matrix}1,\frac{m+1}{n}\\\frac{m+n+1}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{ce\,(m+1)\,(ad-bc)}-\frac{b\,(ex)^{m+1}\,{}_2F_1\left(\begin{matrix}1,\frac{m+1}{n}\\\frac{m+n+1}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{ae\,(m+1)\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] d*(e*x)**(m + 1)*hyper((1, (m + 1)/n), ((m + n + 1)/n,), -d*x**n/
c)/(c*e*(m + 1)*(a*d - b*c)) - b*(e*x)**(m + 1)*hyper((1, (m + 1)
/n), ((m + n + 1)/n,), -b*x**n/a)/(a*e*(m + 1)*(a*d - b*c))
```

Mathematica [A] time = 0.109462, size = 88, normalized size = 0.77

$$\frac{x(ex)^m\left(ad\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{dx^n}{c}\right)-bc\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{bx^n}{a}\right)\right)}{ac(m+1)(ad-bc)}$$

Antiderivative was successfully verified.

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

```
[Out] (x*(e*x)^m*(-(b*c*Hypergeometric2F1[1, (1 + m)/n, (1 + m + n)/n,
-((b*x^n)/a)]) + a*d*Hypergeometric2F1[1, (1 + m)/n, (1 + m + n)/
n, -((d*x^n)/c)]))/(a*c*(-(b*c) + a*d)*(1 + m))
```

Maple [F] time = 0.093, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(a+bx^n)(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x)^m/(a+b*x^n)/(c+d*x^n),x)

[Out] int((e*x)^m/(a+b*x^n)/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^n + a)*(d*x^n + c)),x, algorithm="maxima")

[Out] integrate((e*x)^m/((b*x^n + a)*(d*x^n + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{bdx^{2n}+ac+(bc+ad)x^n},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^n + a)*(d*x^n + c)),x, algorithm="fricas")

[Out] integral((e*x)^m/(b*d*x^(2*n) + a*c + (b*c + a*d)*x^n), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(a+bx^n)(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)**m/(a+b*x**n)/(c+d*x**n),x)

[Out] Integral((e*x)**m/((a + b*x**n)*(c + d*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^n + a)*(d*x^n + c)),x, algorithm="giac")

[Out] integrate((e*x)^m/((b*x^n + a)*(d*x^n + c)), x)
```

3.857 $\int \frac{x^2}{(a+bx^n)(c+dx^n)}\,dx$

Optimal. Leaf size=89

$$\frac{bx^3\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{bx^n}{a}\right)}{3a(bc-ad)}-\frac{dx^3\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{dx^n}{c}\right)}{3c(bc-ad)}$$

```
[Out] (b*x^3*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((b*x^n)/a)])/(3*a*(
b*c - a*d)) - (d*x^3*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((d*x^
n)/c)])/(3*c*(b*c - a*d))
```

Rubi [A] time = 0.143644, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{bx^3\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{bx^n}{a}\right)}{3a(bc-ad)}-\frac{dx^3\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{dx^n}{c}\right)}{3c(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^n)*(c + d*x^n)),x]
```

```
[Out] (b*x^3*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((b*x^n)/a)])/(3*a*(
b*c - a*d)) - (d*x^3*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((d*x^
n)/c)])/(3*c*(b*c - a*d))
```

Rubi in Sympy [A] time = 18.8848, size = 60, normalized size = 0.67

$$\frac{dx^3{}_2F_1\left(\begin{matrix}1,\frac{3}{n}\\\frac{n+3}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{3c\,(ad-bc)}-\frac{bx^3{}_2F_1\left(\begin{matrix}1,\frac{3}{n}\\\frac{n+3}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{3a\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] d*x**3*hyper((1, 3/n), ((n + 3)/n,), -d*x**n/c)/(3*c*(a*d - b*c))
 - b*x**3*hyper((1, 3/n), ((n + 3)/n,), -b*x**n/a)/(3*a*(a*d - b*
c))
```

Mathematica [A] time = 0.0879739, size = 78, normalized size = 0.88

$$\frac{bcx^3\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{bx^n}{a}\right)-adx^3\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{dx^n}{c}\right)}{3abc^2-3a^2cd}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^n)*(c + d*x^n)),x]
```

```
[Out] (b*c*x^3*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((b*x^n)/a)] - a*d
*x^3*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((d*x^n)/c)])/(3*a*b*c
^2 - 3*a^2*c*d)
```

Maple [F] time = 0.101, size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+bx^n)(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(a+b*x^n)/(c+d*x^n),x)
```

```
[Out] int(x^2/(a+b*x^n)/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^n + a)*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^2/((b*x^n + a)*(d*x^n + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{bdx^{2n}+ac+(bc+ad)x^n},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^n + a)*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] integral(x^2/(b*d*x^(2*n) + a*c + (b*c + a*d)*x^n), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+bx^n)(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] Integral(x**2/((a + b*x**n)*(c + d*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^n + a)*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^2/((b*x^n + a)*(d*x^n + c)), x)
```

3.858 $\int \frac{x}{(a+bx^n)(c+dx^n)}\,dx$

Optimal. Leaf size=89

$$\frac{bx^2\,{}_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{bx^n}{a}\right)}{2a(bc-ad)}-\frac{dx^2\,{}_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{dx^n}{c}\right)}{2c(bc-ad)}$$

```
[Out] (b*x^2*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((b*x^n)/a)])/(2*a*(
b*c - a*d)) - (d*x^2*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((d*x^
n)/c)])/(2*c*(b*c - a*d))
```

Rubi [A] time = 0.111108, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{bx^2\,{}_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{bx^n}{a}\right)}{2a(bc-ad)}-\frac{dx^2\,{}_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{dx^n}{c}\right)}{2c(bc-ad)}$$

Antiderivative was successfully verified.

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

```
[Out] (b*x^2*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((b*x^n)/a)])/(2*a*(
b*c - a*d)) - (d*x^2*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((d*x^
n)/c)])/(2*c*(b*c - a*d))
```

Rubi in Sympy [A] time = 15.6535, size = 60, normalized size = 0.67

$$\frac{dx^2{}_2F_1\left(\begin{matrix}1,\frac{2}{n}\\\frac{n+2}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{2c\,(ad-bc)}-\frac{bx^2{}_2F_1\left(\begin{matrix}1,\frac{2}{n}\\\frac{n+2}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{2a\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] d*x**2*hyper((1, 2/n), ((n + 2)/n,), -d*x**n/c)/(2*c*(a*d - b*c))
 - b*x**2*hyper((1, 2/n), ((n + 2)/n,), -b*x**n/a)/(2*a*(a*d - b*
c))
```

Mathematica [A] time = 0.0802597, size = 78, normalized size = 0.88

$$\frac{bcx^2\,{}_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{bx^n}{a}\right)-adx^2\,{}_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{dx^n}{c}\right)}{2abc^2-2a^2cd}$$

Antiderivative was successfully verified.

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

```
[Out] (b*c*x^2*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((b*x^n)/a)] - a*d
*x^2*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((d*x^n)/c)])/(2*a*b*c
^2 - 2*a^2*c*d)
```

Maple [F] time = 0.098, size = 0, normalized size = 0.

$$\int \frac{x}{(a+bx^n)(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(a+b*x^n)/(c+d*x^n),x)
```

```
[Out] int(x/(a+b*x^n)/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^n + a)*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] integrate(x/((b*x^n + a)*(d*x^n + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{bdx^{2n}+ac+(bc+ad)x^n},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^n + a)*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] integral(x/(b*d*x^(2*n) + a*c + (b*c + a*d)*x^n), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(a+bx^n)(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] Integral(x/((a + b*x**n)*(c + d*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^n + a)*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x/((b*x^n + a)*(d*x^n + c)), x)
```

3.859 $\int \frac{1}{(a+bx^n)(c+dx^n)}\,dx$

Optimal. Leaf size=72

$$\frac{bx\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{bx^n}{a}\right)}{a(bc-ad)}-\frac{dx\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{dx^n}{c}\right)}{c(bc-ad)}$$

```
[Out] (b*x*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((b*x^n)/a)])/(a*(
b*c - a*d)) - (d*x*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((d*
x^n)/c)])/(c*(b*c - a*d))
```

Rubi [A] time = 0.0740079, antiderivative size = 72, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{bx\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{bx^n}{a}\right)}{a(bc-ad)}-\frac{dx\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{dx^n}{c}\right)}{c(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((a + b*x^n)*(c + d*x^n)),x]
```

```
[Out] (b*x*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((b*x^n)/a)])/(a*(
b*c - a*d)) - (d*x*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((d*
x^n)/c)])/(c*(b*c - a*d))
```

Rubi in Sympy [A] time = 12.2614, size = 53, normalized size = 0.74

$$\frac{dx{}_2F_1\left(\begin{matrix}1,\frac{1}{n}\\1+\frac{1}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{c\,(ad-bc)}-\frac{bx{}_2F_1\left(\begin{matrix}1,\frac{1}{n}\\1+\frac{1}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{a\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] d*x*hyper((1, 1/n), (1 + 1/n,), -d*x**n/c)/(c*(a*d - b*c)) - b*x*
hyper((1, 1/n), (1 + 1/n,), -b*x**n/a)/(a*(a*d - b*c))
```

Mathematica [A] time = 0.0531418, size = 64, normalized size = 0.89

$$\frac{x\left(ad\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{dx^n}{c}\right)-bc\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{bx^n}{a}\right)\right)}{ac(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/((a + b*x^n)*(c + d*x^n)),x]
```

```
[Out] (x*(-(b*c*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((b*x^n)/a)])
 + a*d*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((d*x^n)/c)]))/(
a*c*(-(b*c) + a*d))
```

Maple [F] time = 0.001, size = 0, normalized size = 0.

$$\int \frac{1}{(a+bx^n)(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a+b*x^n)/(c+d*x^n),x)

[Out] int(1/(a+b*x^n)/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)),x, algorithm="maxima")

[Out] integrate(1/((b*x^n + a)*(d*x^n + c)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{bdx^{2n}+ac+(bc+ad)x^n},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)),x, algorithm="fricas")

[Out] integral(1/(b*d*x^(2*n) + a*c + (b*c + a*d)*x^n), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(a+bx^n)(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a+b*x**n)/(c+d*x**n),x)

[Out] Integral(1/((a + b*x**n)*(c + d*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)),x, algorithm="giac")

[Out] integrate(1/((b*x^n + a)*(d*x^n + c)), x)
```

3.860 $\int \frac{1}{x(a+bx^n)(c+dx^n)}\,dx$

Optimal. Leaf size=63

$$-\frac{b\log(a+bx^n)}{an(bc-ad)}+\frac{d\log(c+dx^n)}{cn(bc-ad)}+\frac{\log(x)}{ac}$$

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

Rubi [A] time = 0.18569, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{b\log(a+bx^n)}{an(bc-ad)}+\frac{d\log(c+dx^n)}{cn(bc-ad)}+\frac{\log(x)}{ac}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^n)*(c + d*x^n)),x]
```

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

Rubi in Sympy [A] time = 27.2799, size = 49, normalized size = 0.78

$$-\frac{d\log(c+dx^n)}{cn\,(ad-bc)}+\frac{b\log(a+bx^n)}{an\,(ad-bc)}+\frac{\log(x^n)}{acn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] -d*log(c + d*x**n)/(c*n*(a*d - b*c)) + b*log(a + b*x**n)/(a*n*(a*
d - b*c)) + log(x**n)/(a*c*n)
```

Mathematica [A] time = 0.0858214, size = 56, normalized size = 0.89

$$\frac{-bc\log(a+bx^n)+ad\log(c+dx^n)-adn\log(x)+bcn\log(x)}{abc^2n-a^2cdn}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a + b*x^n)*(c + d*x^n)),x]
```

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

Maple [A] time = 0.015, size = 69, normalized size = 1.1

$$\frac{\ln(x^n)}{anc}+\frac{b\ln(a+bx^n)}{an\,(ad-bc)}-\frac{d\ln(c+dx^n)}{nc\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(a+b*x^n)/(c+d*x^n),x)
```

```
[Out] 1/n/a/c*ln(x^n)+1/n*b/a/(a*d-b*c)*ln(a+b*x^n)-1/n*d/c/(a*d-b*c)*l
n(c+d*x^n)
```

Maxima [A] time = 1.38794, size = 93, normalized size = 1.48

$$-\frac{b\log\left(\frac{bx^n+a}{b}\right)}{abcn-a^2dn}+\frac{d\log\left(\frac{dx^n+c}{d}\right)}{bc^2n-acdn}+\frac{\log(x)}{ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x),x, algorithm="maxima")
```

```
[Out] -b*log((b*x^n + a)/b)/(a*b*c*n - a^2*d*n) + d*log((d*x^n + c)/d)/
(b*c^2*n - a*c*d*n) + log(x)/(a*c)
```

Fricas [A] time = 0.241621, size = 78, normalized size = 1.24

$$-\frac{bc\log(bx^n+a)-ad\log(dx^n+c)-(bc-ad)n\log(x)}{(abc^2-a^2cd)n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x),x, algorithm="fricas")
```

```
[Out] -(b*c*log(b*x^n + a) - a*d*log(d*x^n + c) - (b*c - a*d)*n*log(x))
/((a*b*c^2 - a^2*c*d)*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{(bx^n+a)(dx^n+c)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^n + a)*(d*x^n + c)*x), x)
```

3.861 $\int \frac{1}{x^2(a+bx^n)(c+dx^n)}\,dx$

Optimal. Leaf size=90

$$\frac{d\,{}_2F_1\left(1,-\frac{1}{n};-\frac{1-n}{n};-\frac{dx^n}{c}\right)}{cx(bc-ad)}-\frac{b\,{}_2F_1\left(1,-\frac{1}{n};-\frac{1-n}{n};-\frac{bx^n}{a}\right)}{ax(bc-ad)}$$

```
[Out] -((b*Hypergeometric2F1[1, -n^(-1), -((1 - n)/n), -((b*x^n)/a)])/(
a*(b*c - a*d)*x)) + (d*Hypergeometric2F1[1, -n^(-1), -((1 - n)/n)
, -((d*x^n)/c)])/(c*(b*c - a*d)*x)
```

Rubi [A] time = 0.136407, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{d\,{}_2F_1\left(1,-\frac{1}{n};-\frac{1-n}{n};-\frac{dx^n}{c}\right)}{cx(bc-ad)}-\frac{b\,{}_2F_1\left(1,-\frac{1}{n};-\frac{1-n}{n};-\frac{bx^n}{a}\right)}{ax(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^n)*(c + d*x^n)),x]
```

```
[Out] -((b*Hypergeometric2F1[1, -n^(-1), -((1 - n)/n), -((b*x^n)/a)])/(
a*(b*c - a*d)*x)) + (d*Hypergeometric2F1[1, -n^(-1), -((1 - n)/n)
, -((d*x^n)/c)])/(c*(b*c - a*d)*x)
```

Rubi in Sympy [A] time = 18.8438, size = 56, normalized size = 0.62

$$-\frac{d{}_2F_1\left(\begin{matrix}1,-\frac{1}{n}\\\frac{n-1}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{cx\,(ad-bc)}+\frac{b{}_2F_1\left(\begin{matrix}1,-\frac{1}{n}\\\frac{n-1}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{ax\,(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] -d*hyper((1, -1/n), ((n - 1)/n,), -d*x**n/c)/(c*x*(a*d - b*c)) +
b*hyper((1, -1/n), ((n - 1)/n,), -b*x**n/a)/(a*x*(a*d - b*c))
```

Mathematica [A] time = 0.0839834, size = 74, normalized size = 0.82

$$\frac{bc\,{}_2F_1\left(1,-\frac{1}{n};\frac{n-1}{n};-\frac{bx^n}{a}\right)-ad\,{}_2F_1\left(1,-\frac{1}{n};\frac{n-1}{n};-\frac{dx^n}{c}\right)}{acx(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(a + b*x^n)*(c + d*x^n)),x]
```

```
[Out] (b*c*Hypergeometric2F1[1, -n^(-1), (-1 + n)/n, -((b*x^n)/a)] - a*
d*Hypergeometric2F1[1, -n^(-1), (-1 + n)/n, -((d*x^n)/c)])/(a*c*(
-(b*c) + a*d)*x)
```

Maple [F] time = 0.102, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 (a + bx^n) (c + dx^n)} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(a+b*x^n)/(c+d*x^n),x)
```

```
[Out] int(1/x^2/(a+b*x^n)/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n + a)(dx^n + c)x^2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^n + a)*(d*x^n + c)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{bdx^2x^{2\,n} + (bc + ad)x^2x^n + acx^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/(b*d*x^2*x^(2*n) + (b*c + a*d)*x^2*x^n + a*c*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 (a + bx^n) (c + dx^n)} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] Integral(1/(x**2*(a + b*x**n)*(c + d*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n + a)(dx^n + c)x^2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^n + a)*(d*x^n + c)*x^2), x)
```

3.862 $\int \frac{1}{x^3(a+bx^n)(c+dx^n)}\,dx$

Optimal. Leaf size=95

$$\frac{d\,{}_2F_1\left(1,-\frac{2}{n};-\frac{2-n}{n};-\frac{dx^n}{c}\right)}{2cx^2(bc-ad)}-\frac{b\,{}_2F_1\left(1,-\frac{2}{n};-\frac{2-n}{n};-\frac{bx^n}{a}\right)}{2ax^2(bc-ad)}$$

```
[Out] -(b*Hypergeometric2F1[1, -2/n, -((2 - n)/n), -((b*x^n)/a)])/(2*a*
(b*c - a*d)*x^2) + (d*Hypergeometric2F1[1, -2/n, -((2 - n)/n), -(
(d*x^n)/c)])/(2*c*(b*c - a*d)*x^2)
```

Rubi [A] time = 0.134278, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{d\,{}_2F_1\left(1,-\frac{2}{n};-\frac{2-n}{n};-\frac{dx^n}{c}\right)}{2cx^2(bc-ad)}-\frac{b\,{}_2F_1\left(1,-\frac{2}{n};-\frac{2-n}{n};-\frac{bx^n}{a}\right)}{2ax^2(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^n)*(c + d*x^n)),x]
```

```
[Out] -(b*Hypergeometric2F1[1, -2/n, -((2 - n)/n), -((b*x^n)/a)])/(2*a*
(b*c - a*d)*x^2) + (d*Hypergeometric2F1[1, -2/n, -((2 - n)/n), -(
(d*x^n)/c)])/(2*c*(b*c - a*d)*x^2)
```

Rubi in Sympy [A] time = 18.9581, size = 63, normalized size = 0.66

$$-\frac{d{}_2F_1\left(\begin{matrix}1,-\frac{2}{n}\\ \frac{n-2}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{2cx^2\left(ad-bc\right)}+\frac{b{}_2F_1\left(\begin{matrix}1,-\frac{2}{n}\\ \frac{n-2}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{2ax^2\left(ad-bc\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] -d*hyper((1, -2/n), ((n - 2)/n,), -d*x**n/c)/(2*c*x**2*(a*d - b*c
)) + b*hyper((1, -2/n), ((n - 2)/n,), -b*x**n/a)/(2*a*x**2*(a*d -
 b*c))
```

Mathematica [A] time = 0.0835613, size = 77, normalized size = 0.81

$$\frac{bc\,{}_2F_1\left(1,-\frac{2}{n};\frac{n-2}{n};-\frac{bx^n}{a}\right)-ad\,{}_2F_1\left(1,-\frac{2}{n};\frac{n-2}{n};-\frac{dx^n}{c}\right)}{2acx^2(ad-bc)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(a + b*x^n)*(c + d*x^n)),x]
```

```
[Out] (b*c*Hypergeometric2F1[1, -2/n, (-2 + n)/n, -((b*x^n)/a)] - a*d*H
ypergeometric2F1[1, -2/n, (-2 + n)/n, -((d*x^n)/c)])/(2*a*c*(-(b*
c) + a*d)*x^2)
```

Maple [F] time = 0.108, size = 0, normalized size = 0.

$$\int \frac{1}{x^3 (a + bx^n) (c + dx^n)} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(a+b*x^n)/(c+d*x^n),x)

[Out] int(1/x^3/(a+b*x^n)/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n + a)(dx^n + c)x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x^3),x, algorithm="maxima")

[Out] integrate(1/((b*x^n + a)*(d*x^n + c)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{bdx^3x^{2n} + (bc + ad)x^3x^n + acx^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x^3),x, algorithm="fricas")

[Out] integral(1/(b*d*x^3*x^(2*n) + (b*c + a*d)*x^3*x^n + a*c*x^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3 (a + bx^n) (c + dx^n)} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(a+b*x**n)/(c+d*x**n),x)

[Out] Integral(1/(x**3*(a + b*x**n)*(c + d*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n + a)(dx^n + c)x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)*(d*x^n + c)*x^3),x, algorithm="giac")

[Out] integrate(1/((b*x^n + a)*(d*x^n + c)*x^3), x)
```

3.863 $\int \frac{(ex)^m}{(a+bx^n)^2(c+dx^n)}\,dx$

Optimal. Leaf size=175

$$\frac{b(ex)^{m+1}(ad(m-2n+1)-bc(m-n+1))\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{bx^n}{a}\right)}{a^2e(m+1)n(bc-ad)^2}+\frac{d^2(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{dx^n}{c}\right)}{ce(m+1)(bc-ad)^2}+\frac{b(ex)^{m+1}}{aen(bc-ad)\,(a+bx^n)}$$

```
[Out] (b*(e*x)^(1 + m))/(a*(b*c - a*d)*e*n*(a + b*x^n)) + (b*(a*d*(1 +
m - 2*n) - b*c*(1 + m - n))*(e*x)^(1 + m)*Hypergeometric2F1[1, (1
 + m)/n, (1 + m + n)/n, -((b*x^n)/a)])/(a^2*(b*c - a*d)^2*e*(1 +
m)*n) + (d^2*(e*x)^(1 + m)*Hypergeometric2F1[1, (1 + m)/n, (1 + m
 + n)/n, -((d*x^n)/c)])/(c*(b*c - a*d)^2*e*(1 + m))
```

Rubi [A] time = 0.755487, antiderivative size = 175, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$\frac{b(ex)^{m+1}(ad(m-2n+1)-bc(m-n+1))\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{bx^n}{a}\right)}{a^2e(m+1)n(bc-ad)^2}+\frac{d^2(ex)^{m+1}\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{dx^n}{c}\right)}{ce(m+1)(bc-ad)^2}+\frac{b(ex)^{m+1}}{aen(bc-ad)\,(a+bx^n)}$$

Antiderivative was successfully verified.

```
[In]  Int[(e*x)^m/((a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (b*(e*x)^(1 + m))/(a*(b*c - a*d)*e*n*(a + b*x^n)) + (b*(a*d*(1 +
m - 2*n) - b*c*(1 + m - n))*(e*x)^(1 + m)*Hypergeometric2F1[1, (1
 + m)/n, (1 + m + n)/n, -((b*x^n)/a)])/(a^2*(b*c - a*d)^2*e*(1 +
m)*n) + (d^2*(e*x)^(1 + m)*Hypergeometric2F1[1, (1 + m)/n, (1 + m
 + n)/n, -((d*x^n)/c)])/(c*(b*c - a*d)^2*e*(1 + m))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x)**m/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.337391, size = 141, normalized size = 0.81

$$\frac{x(ex)^m\left(\frac{b^2c-abd}{a^2n+abnx^n}+\frac{b(ad(m-2n+1)-bc(m-n+1))\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{bx^n}{a}\right)}{a^2(m+1)n}+\frac{d^2\,{}_2F_1\left(1,\frac{m+1}{n};\frac{m+n+1}{n};-\frac{dx^n}{c}\right)}{cm+c}\right)}{(bc-ad)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(e*x)^m/((a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (x*(e*x)^m*((b^2*c - a*b*d)/(a^2*n + a*b*n*x^n) + (b*(a*d*(1 + m
- 2*n) - b*c*(1 + m - n))*Hypergeometric2F1[1, (1 + m)/n, (1 + m
+ n)/n, -((b*x^n)/a)])/(a^2*(1 + m)*n) + (d^2*Hypergeometric2F1[1
, (1 + m)/n, (1 + m + n)/n, -((d*x^n)/c)])/(c + c*m)))/(b*c - a*d
)^2
```

Maple [F] time = 0.11, size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(a+bx^n)^2 (c+dx^n)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] int((e*x)^m/(a+b*x^n)^2/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$d^2e^m\int \frac{x^m}{b^2c^3 - 2\,abc^2d + a^2cd^2 + (b^2c^2d - 2\,abcd^2 + a^2d^3)x^n}\, dx + \frac{be^m x x^m}{a^2bcn - a^3dn + (ab^2cn - a^2bdn)x^n}$$
$$- \left(b^2ce^m(m-n+1) - abde^m(m-2\,n+1)\right)\int \frac{x^m}{a^2b^2c^2n - 2\,a^3bcdn + a^4d^2n + (ab^3c^2n - 2\,a^2b^2cdn + a^3bd^2n)x^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] d^2*e^m*integrate(x^m/(b^2*c^3 - 2*a*b*c^2*d + a^2*c*d^2 + (b^2*c
^2*d - 2*a*b*c*d^2 + a^2*d^3)*x^n), x) + b*e^m*x*x^m/(a^2*b*c*n -
 a^3*d*n + (a*b^2*c*n - a^2*b*d*n)*x^n) - (b^2*c*e^m*(m - n + 1)
- a*b*d*e^m*(m - 2*n + 1))*integrate(x^m/(a^2*b^2*c^2*n - 2*a^3*b
*c*d*n + a^4*d^2*n + (a*b^3*c^2*n - 2*a^2*b^2*c*d*n + a^3*b*d^2*n
)*x^n), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(ex)^m}{b^2dx^{3\,n} + a^2c + (b^2c + 2\,abd)x^{2\,n} + (2\,abc + a^2d)x^n}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] integral((e*x)^m/(b^2*d*x^(3*n) + a^2*c + (b^2*c + 2*a*b*d)*x^(2*
n) + (2*a*b*c + a^2*d)*x^n), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(a+bx^n)^2 (c+dx^n)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Integral((e*x)**m/((a + b*x**n)**2*(c + d*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(ex)^m}{(bx^n + a)^2(dx^n + c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x)^m/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/((b*x^n + a)^2*(d*x^n + c)), x)
```

3.864 $\int \frac{x^2}{(a+bx^n)^2(c+dx^n)}\,dx$

Optimal. Leaf size=142

$$\frac{bx^3(ad(3-2n)-bc(3-n))\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{bx^n}{a}\right)}{3a^2n(bc-ad)^2}+\frac{d^2x^3\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{dx^n}{c}\right)}{3c(bc-ad)^2}+\frac{bx^3}{an(bc-ad)(a+bx^n)}$$

```
[Out] (b*x^3)/(a*(b*c - a*d)*n*(a + b*x^n)) + (b*(a*d*(3 - 2*n) - b*c*(
3 - n))*x^3*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((b*x^n)/a)])/(
3*a^2*(b*c - a*d)^2*n) + (d^2*x^3*Hypergeometric2F1[1, 3/n, (3 +
n)/n, -((d*x^n)/c)])/(3*c*(b*c - a*d)^2)
```

Rubi [A] time = 0.607216, antiderivative size = 142, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$\frac{bx^3(ad(3-2n)-bc(3-n))\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{bx^n}{a}\right)}{3a^2n(bc-ad)^2}+\frac{d^2x^3\,{}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{dx^n}{c}\right)}{3c(bc-ad)^2}+\frac{bx^3}{an(bc-ad)(a+bx^n)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/((a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (b*x^3)/(a*(b*c - a*d)*n*(a + b*x^n)) + (b*(a*d*(3 - 2*n) - b*c*(
3 - n))*x^3*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((b*x^n)/a)])/(
3*a^2*(b*c - a*d)^2*n) + (d^2*x^3*Hypergeometric2F1[1, 3/n, (3 +
n)/n, -((d*x^n)/c)])/(3*c*(b*c - a*d)^2)
```

Rubi in Sympy [A] time = 160.394, size = 218, normalized size = 1.54

$$-\frac{bx^3}{an\left(a+bx^n\right)\left(ad-bc\right)}+\frac{bd^2x^{n+3}\left(-n+3\right){}_2F_1\left(\begin{matrix}1,\frac{n+3}{n}\\2+\frac{3}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{acn\left(n+3\right)\left(ad-bc\right)^2}+\frac{dx^3\left(adn-bcn+3bc\right){}_2F_1\left(\begin{matrix}1,\frac{3}{n}\\\frac{n+3}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{3acn\left(ad-bc\right)^2}-\frac{b^2dx^{n+3}\left(-n+3\right){}_2F_1\left(\begin{matrix}1,\frac{n+3}{n}\\2+\frac{3}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{a^2n\left(n+3\right)\left(ad-bc\right)^2}-\frac{bx^3\left(adn-bcn+3bc\right){}_2F_1\left(\begin{matrix}1,\frac{3}{n}\\\frac{n+3}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{3a^2n\left(ad-bc\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] -b*x**3/(a*n*(a + b*x**n)*(a*d - b*c)) + b*d**2*x**(n + 3)*(-n +
3)*hyper((1, (n + 3)/n), (2 + 3/n,), -d*x**n/c)/(a*c*n*(n + 3)*(a
*d - b*c)**2) + d*x**3*(a*d*n - b*c*n + 3*b*c)*hyper((1, 3/n), ((
n + 3)/n,), -d*x**n/c)/(3*a*c*n*(a*d - b*c)**2) - b**2*d*x**(n +
3)*(-n + 3)*hyper((1, (n + 3)/n), (2 + 3/n,), -b*x**n/a)/(a**2*n*
(n + 3)*(a*d - b*c)**2) - b*x**3*(a*d*n - b*c*n + 3*b*c)*hyper((1
, 3/n), ((n + 3)/n,), -b*x**n/a)/(3*a**2*n*(a*d - b*c)**2)
```

Mathematica [A] time = 0.292353, size = 135, normalized size = 0.95

$$\frac{x^3\left(a\left(ad^2n\left(a+bx^n\right){}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{dx^n}{c}\right)+3bc(bc-ad)\right)+bc\left(a+bx^n\right)\left(ad(3-2n)+bc(n-3)\right){}_2F_1\left(1,\frac{3}{n};\frac{n+3}{n};-\frac{bx^n}{a}\right)\right)}{3a^2cn(bc-ad)^2\left(a+bx^n\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/((a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (x^3*(b*c*(a*d*(3 - 2*n) + b*c*(-3 + n))*(a + b*x^n)*Hypergeometr
ic2F1[1, 3/n, (3 + n)/n, -((b*x^n)/a)] + a*(3*b*c*(b*c - a*d) + a
*d^2*n*(a + b*x^n)*Hypergeometric2F1[1, 3/n, (3 + n)/n, -((d*x^n)
/c)])))/(3*a^2*c*(b*c - a*d)^2*n*(a + b*x^n))
```

Maple [F] time = 0.186, size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+bx^n)^2(c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] int(x^2/(a+b*x^n)^2/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{bx^3}{a^2bcn-a^3dn+(ab^2cn-a^2bdn)x^n}+d^2\int \frac{x^2}{b^2c^3-2\,abc^2d+a^2cd^2+(b^2c^2d-2\,abcd^2+a^2d^3)x^n}\,dx - \left(abd(2\,n-3)-b^2c(n-3)\right)\int \frac{x^2}{a^2b^2c^2n-2\,a^3bcdn+a^4d^2n+(ab^3c^2n-2\,a^2b^2cdn+a^3bd^2n)x^n}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] b*x^3/(a^2*b*c*n - a^3*d*n + (a*b^2*c*n - a^2*b*d*n)*x^n) + d^2*i
ntegrate(x^2/(b^2*c^3 - 2*a*b*c^2*d + a^2*c*d^2 + (b^2*c^2*d - 2*
a*b*c*d^2 + a^2*d^3)*x^n), x) - (a*b*d*(2*n - 3) - b^2*c*(n - 3))
*integrate(x^2/(a^2*b^2*c^2*n - 2*a^3*b*c*d*n + a^4*d^2*n + (a*b^
3*c^2*n - 2*a^2*b^2*c*d*n + a^3*b*d^2*n)*x^n), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{b^2dx^{3\,n}+a^2c+(b^2c+2\,abd)x^{2\,n}+(2\,abc+a^2d)x^n},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] integral(x^2/(b^2*d*x^(3*n) + a^2*c + (b^2*c + 2*a*b*d)*x^(2*n) +
 (2*a*b*c + a^2*d)*x^n), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(bx^n + a)^2(dx^n + c)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^2/((b*x^n + a)^2*(d*x^n + c)), x)
```

3.865 $\int \frac{x}{(a+bx^n)^2(c+dx^n)}\,dx$

Optimal. Leaf size=143

$$\frac{bx^2(2ad(1-n)-bc(2-n))\,_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{bx^n}{a}\right)}{2a^2n(bc-ad)^2}+\frac{d^2x^2\,_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{dx^n}{c}\right)}{2c(bc-ad)^2}+\frac{bx^2}{an(bc-ad)\,(a+bx^n)}$$

```
[Out] (b*x^2)/(a*(b*c - a*d)*n*(a + b*x^n)) + (b*(2*a*d*(1 - n) - b*c*(
2 - n))*x^2*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((b*x^n)/a)])/(
2*a^2*(b*c - a*d)^2*n) + (d^2*x^2*Hypergeometric2F1[1, 2/n, (2 +
n)/n, -((d*x^n)/c)])/(2*c*(b*c - a*d)^2)
```

Rubi [A] time = 0.494396, antiderivative size = 143, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$\frac{bx^2(2ad(1-n)-bc(2-n))\,_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{bx^n}{a}\right)}{2a^2n(bc-ad)^2}+\frac{d^2x^2\,_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{dx^n}{c}\right)}{2c(bc-ad)^2}+\frac{bx^2}{an(bc-ad)\,(a+bx^n)}$$

Antiderivative was successfully verified.

```
[In]  Int[x/((a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (b*x^2)/(a*(b*c - a*d)*n*(a + b*x^n)) + (b*(2*a*d*(1 - n) - b*c*(
2 - n))*x^2*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((b*x^n)/a)])/(
2*a^2*(b*c - a*d)^2*n) + (d^2*x^2*Hypergeometric2F1[1, 2/n, (2 +
n)/n, -((d*x^n)/c)])/(2*c*(b*c - a*d)^2)
```

Rubi in Sympy [A] time = 145.688, size = 218, normalized size = 1.52

$$-\frac{bx^2}{an\,(a+bx^n)\,(ad-bc)}+\frac{bd^2x^{n+2}\,(-n+2)\,_2F_1\left(\begin{matrix}1,\frac{n+2}{n}\\2+\frac{2}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{acn\,(n+2)\,(ad-bc)^2}+\frac{dx^2\,(adn-bcn+2bc)\,_2F_1\left(\begin{matrix}1,\frac{2}{n}\\\frac{n+2}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{2acn\,(ad-bc)^2}-\frac{b^2dx^{n+2}\,(-n+2)\,_2F_1\left(\begin{matrix}1,\frac{n+2}{n}\\2+\frac{2}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{a^2n\,(n+2)\,(ad-bc)^2}-\frac{bx^2\,(adn-bcn+2bc)\,_2F_1\left(\begin{matrix}1,\frac{2}{n}\\\frac{n+2}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{2a^2n\,(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] -b*x**2/(a*n*(a + b*x**n)*(a*d - b*c)) + b*d**2*x**(n + 2)*(-n +
2)*hyper((1, (n + 2)/n), (2 + 2/n,), -d*x**n/c)/(a*c*n*(n + 2)*(a
*d - b*c)**2) + d*x**2*(a*d*n - b*c*n + 2*b*c)*hyper((1, 2/n), ((
n + 2)/n,), -d*x**n/c)/(2*a*c*n*(a*d - b*c)**2) - b**2*d*x**(n +
2)*(-n + 2)*hyper((1, (n + 2)/n), (2 + 2/n,), -b*x**n/a)/(a**2*n*
(n + 2)*(a*d - b*c)**2) - b*x**2*(a*d*n - b*c*n + 2*b*c)*hyper((1
, 2/n), ((n + 2)/n,), -b*x**n/a)/(2*a**2*n*(a*d - b*c)**2)
```

Mathematica [A] time = 0.273947, size = 134, normalized size = 0.94

$$\frac{x^2\left(a\left(ad^2n\,(a+bx^n)\,_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{dx^n}{c}\right)+2bc(bc-ad)\right)+bc\,(a+bx^n)\,(bc(n-2)-2ad(n-1))\,_2F_1\left(1,\frac{2}{n};\frac{n+2}{n};-\frac{bx^n}{a}\right)\right)}{2a^2cn(bc-ad)^2\,(a+bx^n)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/((a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (x^2*(b*c*(b*c*(-2 + n) - 2*a*d*(-1 + n))*(a + b*x^n)*Hypergeomet
ric2F1[1, 2/n, (2 + n)/n, -((b*x^n)/a)] + a*(2*b*c*(b*c - a*d) +
a*d^2*n*(a + b*x^n)*Hypergeometric2F1[1, 2/n, (2 + n)/n, -((d*x^n
)/c)])))/(2*a^2*c*(b*c - a*d)^2*n*(a + b*x^n))
```

Maple [F] time = 0.163, size = 0, normalized size = 0.

$$\int \frac{x}{\left(a+b x^{n}\right)^{2}\left(c+d x^{n}\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] int(x/(a+b*x^n)^2/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$d^{2} \int \frac{x}{b^{2} c^{3}-2\, a b c^{2} d+a^{2} c d^{2}+\left(b^{2} c^{2} d-2\, a b c d^{2}+a^{2} d^{3}\right) x^{n}}\, dx+\frac{b x^{2}}{a^{2} b c n-a^{3} d n+\left(a b^{2} c n-a^{2} b d n\right) x^{n}} - \left(2\, a b d(n-1)-b^{2} c(n-2)\right) \int \frac{x}{a^{2} b^{2} c^{2} n-2\, a^{3} b c d n+a^{4} d^{2} n+\left(a b^{3} c^{2} n-2\, a^{2} b^{2} c d n+a^{3} b d^{2} n\right) x^{n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] d^2*integrate(x/(b^2*c^3 - 2*a*b*c^2*d + a^2*c*d^2 + (b^2*c^2*d -
 2*a*b*c*d^2 + a^2*d^3)*x^n), x) + b*x^2/(a^2*b*c*n - a^3*d*n + (
a*b^2*c*n - a^2*b*d*n)*x^n) - (2*a*b*d*(n - 1) - b^2*c*(n - 2))*i
ntegrate(x/(a^2*b^2*c^2*n - 2*a^3*b*c*d*n + a^4*d^2*n + (a*b^3*c^
2*n - 2*a^2*b^2*c*d*n + a^3*b*d^2*n)*x^n), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{b^{2} d x^{3\, n}+a^{2} c+\left(b^{2} c+2\, a b d\right) x^{2\, n}+\left(2\, a b c+a^{2} d\right) x^{n}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] integral(x/(b^2*d*x^(3*n) + a^2*c + (b^2*c + 2*a*b*d)*x^(2*n) + (
2*a*b*c + a^2*d)*x^n), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(bx^n + a)^2(dx^n + c)} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x/((b*x^n + a)^2*(d*x^n + c)), x)
```

3.866 $\int \frac{1}{(a+bx^n)^2(c+dx^n)} dx$

Optimal. Leaf size=122

$$\frac{bx(ad(1-2n)-bc(1-n))\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{bx^n}{a}\right)}{a^2n(bc-ad)^2}+\frac{d^2x\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{dx^n}{c}\right)}{c(bc-ad)^2}+\frac{bx}{an(bc-ad)(a+bx^n)}$$

```
[Out] (b*x)/(a*(b*c - a*d)*n*(a + b*x^n)) + (b*(a*d*(1 - 2*n) - b*c*(1
- n))*x*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((b*x^n)/a)])/(
a^2*(b*c - a*d)^2*n) + (d^2*x*Hypergeometric2F1[1, n^(-1), 1 + n^
(-1), -((d*x^n)/c)])/(c*(b*c - a*d)^2)
```

Rubi [A] time = 0.341763, antiderivative size = 122, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$\frac{bx(ad(1-2n)-bc(1-n))\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{bx^n}{a}\right)}{a^2n(bc-ad)^2}+\frac{d^2x\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{dx^n}{c}\right)}{c(bc-ad)^2}+\frac{bx}{an(bc-ad)(a+bx^n)}$$

Antiderivative was successfully verified.

```
[In] Int[1/((a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (b*x)/(a*(b*c - a*d)*n*(a + b*x^n)) + (b*(a*d*(1 - 2*n) - b*c*(1
- n))*x*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((b*x^n)/a)])/(
a^2*(b*c - a*d)^2*n) + (d^2*x*Hypergeometric2F1[1, n^(-1), 1 + n^
(-1), -((d*x^n)/c)])/(c*(b*c - a*d)^2)
```

Rubi in Sympy [A] time = 53.7515, size = 100, normalized size = 0.82

$$\frac{d^2x{}_2F_1\left(\begin{matrix}1,\frac{1}{n}\\1+\frac{1}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{c\,(ad-bc)^2}-\frac{bx}{an\,(a+bx^n)\,(ad-bc)}+\frac{bx\,(-2adn+ad+bcn-bc)\,{}_2F_1\left(\begin{matrix}1,\frac{1}{n}\\1+\frac{1}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{a^2n\,(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] d**2*x*hyper((1, 1/n), (1 + 1/n,), -d*x**n/c)/(c*(a*d - b*c)**2)
- b*x/(a*n*(a + b*x**n)*(a*d - b*c)) + b*x*(-2*a*d*n + a*d + b*c*
n - b*c)*hyper((1, 1/n), (1 + 1/n,), -b*x**n/a)/(a**2*n*(a*d - b*
c)**2)
```

Mathematica [A] time = 0.272287, size = 108, normalized size = 0.89

$$\frac{x\left(\frac{b^2c-abd}{a^2n+abnx^n}+\frac{b(ad(1-2n)+bc(n-1))\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{bx^n}{a}\right)}{a^2n}+\frac{d^2\,{}_2F_1\left(1,\frac{1}{n};1+\frac{1}{n};-\frac{dx^n}{c}\right)}{c}\right)}{(bc-ad)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/((a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (x*((b^2*c - a*b*d)/(a^2*n + a*b*n*x^n) + (b*(a*d*(1 - 2*n) + b*c
*(-1 + n))*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((b*x^n)/a)]
```

```
)/(a^2*n) + (d^2*Hypergeometric2F1[1, n^(-1), 1 + n^(-1), -((d*x^
n)/c)])/c))/(b*c - a*d)^2
```

Maple [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(a+bx^n)^2 (c+dx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] int(1/(a+b*x^n)^2/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$d^2 \int \frac{1}{b^2c^3 - 2\,abc^2d + a^2cd^2 + (b^2c^2d - 2\,abcd^2 + a^2d^3)x^n}\,dx - \left(abd(2\,n-1) - b^2c(n-1)\right)\int \frac{1}{a^2b^2c^2n - 2\,a^3bcdn + a^4d^2n + (ab^3c^2n - 2\,a^2b^2cdn + a^3bd^2n)x^n}\,dx + \frac{bx}{a^2bcn - a^3dn + (ab^2cn - a^2bdn)x^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] d^2*integrate(1/(b^2*c^3 - 2*a*b*c^2*d + a^2*c*d^2 + (b^2*c^2*d -
 2*a*b*c*d^2 + a^2*d^3)*x^n), x) - (a*b*d*(2*n - 1) - b^2*c*(n -
1))*integrate(1/(a^2*b^2*c^2*n - 2*a^3*b*c*d*n + a^4*d^2*n + (a*b
^3*c^2*n - 2*a^2*b^2*c*d*n + a^3*b*d^2*n)*x^n), x) + b*x/(a^2*b*c
*n - a^3*d*n + (a*b^2*c*n - a^2*b*d*n)*x^n)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{b^2dx^{3\,n} + a^2c + (b^2c + 2\,abd)x^{2\,n} + (2\,abc + a^2d)x^n}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] integral(1/(b^2*d*x^(3*n) + a^2*c + (b^2*c + 2*a*b*d)*x^(2*n) + (
2*a*b*c + a^2*d)*x^n), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n + a)^2(dx^n + c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^n + a)^2*(d*x^n + c)), x)
```

3.867 $\int \frac{1}{x(a+bx^n)^2(c+dx^n)}\,dx$

Optimal. Leaf size=101

$$-\frac{b(bc-2ad)\log(a+bx^n)}{a^2n(bc-ad)^2}+\frac{\log(x)}{a^2c}-\frac{d^2\log(c+dx^n)}{cn(bc-ad)^2}+\frac{b}{an(bc-ad)(a+bx^n)}$$

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

Rubi [A] time = 0.280936, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$-\frac{b(bc-2ad)\log(a+bx^n)}{a^2n(bc-ad)^2}+\frac{\log(x)}{a^2c}-\frac{d^2\log(c+dx^n)}{cn(bc-ad)^2}+\frac{b}{an(bc-ad)(a+bx^n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a + b*x^n)^2*(c + d*x^n)),x]
```

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

Rubi in Sympy [A] time = 41.3055, size = 85, normalized size = 0.84

$$-\frac{d^2\log(c+dx^n)}{cn(ad-bc)^2}-\frac{b}{an(a+bx^n)(ad-bc)}+\frac{b(2ad-bc)\log(a+bx^n)}{a^2n(ad-bc)^2}+\frac{\log(x^n)}{a^2cn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] -d**2*log(c + d*x**n)/(c*n*(a*d - b*c)**2) - b/(a*n*(a + b*x**n)*
(a*d - b*c)) + b*(2*a*d - b*c)*log(a + b*x**n)/(a**2*n*(a*d - b*c
)**2) + log(x**n)/(a**2*c*n)
```

Mathematica [A] time = 0.454578, size = 96, normalized size = 0.95

$$\frac{\frac{bc(2ad-bc)(a+bx^n)\log(a+bx^n)-a\left(ad^2(a+bx^n)\log(c+dx^n)+bc(ad-bc)\right)}{n(bc-ad)^2(a+bx^n)}+\log(x)}{a^2c}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a + b*x^n)^2*(c + d*x^n)),x]
```

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

Maple [A] time = 0.018, size = 131, normalized size = 1.3

$$\frac{\ln(x^n)}{a^2nc}-\frac{b}{an(ad-bc)(a+bx^n)}+2\frac{b\ln(a+bx^n)d}{n(ad-bc)^2a}-\frac{b^2\ln(a+bx^n)c}{n(ad-bc)^2a^2}-\frac{d^2\ln(c+dx^n)}{nc(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] 1/n/a^2/c*ln(x^n)-1/n*b/a/(a*d-b*c)/(a+b*x^n)+2/n*b/(a*d-b*c)^2/a
*ln(a+b*x^n)*d-1/n*b^2/(a*d-b*c)^2/a^2*ln(a+b*x^n)*c-1/n*d^2/c/(a
*d-b*c)^2*ln(c+d*x^n)
```

Maxima [A] time = 1.3978, size = 204, normalized size = 2.02

$$-\frac{d^2\log\left(\frac{dx^n+c}{d}\right)}{b^2c^3n-2\,abc^2dn+a^2cd^2n}-\frac{\left(b^2c-2\,abd\right)\log\left(\frac{bx^n+a}{b}\right)}{a^2b^2c^2n-2\,a^3bcdn+a^4d^2n}+\frac{b}{a^2bcn-a^3dn+(ab^2cn-a^2bdn)x^n}+\frac{\log(x)}{a^2c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)*x),x, algorithm="maxima")
```

```
[Out] -d^2*log((d*x^n + c)/d)/(b^2*c^3*n - 2*a*b*c^2*d*n + a^2*c*d^2*n)
 - (b^2*c - 2*a*b*d)*log((b*x^n + a)/b)/(a^2*b^2*c^2*n - 2*a^3*b*
c*d*n + a^4*d^2*n) + b/(a^2*b*c*n - a^3*d*n + (a*b^2*c*n - a^2*b*
d*n)*x^n) + log(x)/(a^2*c)
```

Fricas [A] time = 0.251201, size = 302, normalized size = 2.99

$$\frac{ab^2c^2-a^2bcd+\left(b^3c^2-2\,ab^2cd+a^2bd^2\right)nx^n\log(x)+\left(ab^2c^2-2\,a^2bcd+a^3d^2\right)n\log(x)-\left(ab^2c^2-2\,a^2bcd+\left(b^3c^2-2\,ab\right.\right.}{(a^2b^3c^3-2\,a^3b^2c^2d+a^4bcd^2)nx^n+(a^3b^2c^3-2\,a^4bc^2d+a^5cd^2)n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)*x),x, algorithm="fricas")
```

```
[Out] (a*b^2*c^2 - a^2*b*c*d + (b^3*c^2 - 2*a*b^2*c*d + a^2*b*d^2)*n*x^
n*log(x) + (a*b^2*c^2 - 2*a^2*b*c*d + a^3*d^2)*n*log(x) - (a*b^2*
c^2 - 2*a^2*b*c*d + (b^3*c^2 - 2*a*b^2*c*d)*x^n)*log(b*x^n + a) -
 (a^2*b*d^2*x^n + a^3*d^2)*log(d*x^n + c))/((a^2*b^3*c^3 - 2*a^3*
b^2*c^2*d + a^4*b*c*d^2)*n*x^n + (a^3*b^2*c^3 - 2*a^4*b*c^2*d + a
^5*c*d^2)*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n+a)^2(dx^n+c)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)*x),x, algorithm="giac")

[Out] integrate(1/((b*x^n + a)^2*(d*x^n + c)*x), x)
```

3.868 $\int \frac{1}{x^2(a+bx^n)^2(c+dx^n)}\,dx$

Optimal. Leaf size=142

$$-\frac{b(bc(n+1)-ad(2n+1))\,{}_2F_1\left(1,-\frac{1}{n};-\frac{1-n}{n};-\frac{bx^n}{a}\right)}{a^2nx(bc-ad)^2}-\frac{d^2\,{}_2F_1\left(1,-\frac{1}{n};-\frac{1-n}{n};-\frac{dx^n}{c}\right)}{cx(bc-ad)^2}+\frac{b}{anx(bc-ad)\left(a+bx^n\right)}$$

```
[Out] b/(a*(b*c - a*d)*n*x*(a + b*x^n)) - (b*(b*c*(1 + n) - a*d*(1 + 2*
n))*Hypergeometric2F1[1, -n^(-1), -((1 - n)/n), -((b*x^n)/a)])/(a
^2*(b*c - a*d)^2*n*x) - (d^2*Hypergeometric2F1[1, -n^(-1), -((1 -
 n)/n), -((d*x^n)/c)])/(c*(b*c - a*d)^2*x)
```

Rubi [A] time = 0.606682, antiderivative size = 142, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{b(bc(n+1)-ad(2n+1))\,{}_2F_1\left(1,-\frac{1}{n};-\frac{1-n}{n};-\frac{bx^n}{a}\right)}{a^2nx(bc-ad)^2}-\frac{d^2\,{}_2F_1\left(1,-\frac{1}{n};-\frac{1-n}{n};-\frac{dx^n}{c}\right)}{cx(bc-ad)^2}+\frac{b}{anx(bc-ad)\left(a+bx^n\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] b/(a*(b*c - a*d)*n*x*(a + b*x^n)) - (b*(b*c*(1 + n) - a*d*(1 + 2*
n))*Hypergeometric2F1[1, -n^(-1), -((1 - n)/n), -((b*x^n)/a)])/(a
^2*(b*c - a*d)^2*n*x) - (d^2*Hypergeometric2F1[1, -n^(-1), -((1 -
 n)/n), -((d*x^n)/c)])/(c*(b*c - a*d)^2*x)
```

Rubi in Sympy [A] time = 154.167, size = 206, normalized size = 1.45

$$-\frac{b}{anx\left(a+bx^n\right)\left(ad-bc\right)}+\frac{bd^2x^{n-1}\left(n+1\right){}_2F_1\left(\begin{matrix}1,\frac{n-1}{n}\\2-\frac{1}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{acn\left(-n+1\right)\left(ad-bc\right)^2}-\frac{d\left(adn-bc\left(n+1\right)\right){}_2F_1\left(\begin{matrix}1,-\frac{1}{n}\\\frac{n-1}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{acnx\left(ad-bc\right)^2}-\frac{b^2dx^{n-1}\left(n+1\right){}_2F_1\left(\begin{matrix}1,\frac{n-1}{n}\\2-\frac{1}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{a^2n\left(-n+1\right)\left(ad-bc\right)^2}+\frac{b\left(adn-bc\left(n+1\right)\right){}_2F_1\left(\begin{matrix}1,-\frac{1}{n}\\\frac{n-1}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{a^2nx\left(ad-bc\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] -b/(a*n*x*(a + b*x**n)*(a*d - b*c)) + b*d**2*x**(n - 1)*(n + 1)*h
yper((1, (n - 1)/n), (2 - 1/n,), -d*x**n/c)/(a*c*n*(-n + 1)*(a*d
- b*c)**2) - d*(a*d*n - b*c*(n + 1))*hyper((1, -1/n), ((n - 1)/n,
), -d*x**n/c)/(a*c*n*x*(a*d - b*c)**2) - b**2*d*x**(n - 1)*(n + 1
)*hyper((1, (n - 1)/n), (2 - 1/n,), -b*x**n/a)/(a**2*n*(-n + 1)*(
a*d - b*c)**2) + b*(a*d*n - b*c*(n + 1))*hyper((1, -1/n), ((n - 1
)/n,), -b*x**n/a)/(a**2*n*x*(a*d - b*c)**2)
```

Mathematica [A] time = 0.271876, size = 133, normalized size = 0.94

$$\frac{bc\left(a+bx^n\right)(ad(2n+1)-bc(n+1))\,{}_2F_1\left(1,-\frac{1}{n};\frac{n-1}{n};-\frac{bx^n}{a}\right)-a\left(ad^2n\left(a+bx^n\right)\,{}_2F_1\left(1,-\frac{1}{n};\frac{n-1}{n};-\frac{dx^n}{c}\right)+bc(ad-bc)\right)}{a^2cnx(bc-ad)^2\left(a+bx^n\right)}$$

Antiderivative was successfully verified.

```
[In]   Integrate[1/(x^2*(a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (b*c*(-(b*c*(1 + n)) + a*d*(1 + 2*n))*(a + b*x^n)*Hypergeometric2
F1[1, -n^(-1), (-1 + n)/n, -((b*x^n)/a)] - a*(b*c*(-(b*c) + a*d)
+ a*d^2*n*(a + b*x^n)*Hypergeometric2F1[1, -n^(-1), (-1 + n)/n, -
((d*x^n)/c)]))/(a^2*c*(b*c - a*d)^2*n*x*(a + b*x^n))
```

Maple [F]   time = 0.192, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \left(a+b x^{n}\right)^{2} \left(c+d x^{n}\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^2/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] int(1/x^2/(a+b*x^n)^2/(c+d*x^n),x)
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

$$d^{2} \int \frac{1}{(b^{2} c^{2} d - 2\, a b c d^{2} + a^{2} d^{3}) x^{2} x^{n} + (b^{2} c^{3} - 2\, a b c^{2} d + a^{2} c d^{2}) x^{2}}\, dx - \left(a b d (2\, n + 1) - b^{2} c (n + 1)\right) \int \frac{1}{(a b^{3} c^{2} n - 2\, a^{2} b^{2} c d n + a^{3} b d^{2} n) x^{2} x^{n} + (a^{2} b^{2} c^{2} n - 2\, a^{3} b c d n + a^{4} d^{2} n) x^{2}}\, dx + \frac{b}{(a b^{2} c n - a^{2} b d n) x x^{n} + (a^{2} b c n - a^{3} d n) x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((b*x^n + a)^2*(d*x^n + c)*x^2),x, algorithm="maxima")
```

```
[Out] d^2*integrate(1/((b^2*c^2*d - 2*a*b*c*d^2 + a^2*d^3)*x^2*x^n + (b
^2*c^3 - 2*a*b*c^2*d + a^2*c*d^2)*x^2), x) - (a*b*d*(2*n + 1) - b
^2*c*(n + 1))*integrate(1/((a*b^3*c^2*n - 2*a^2*b^2*c*d*n + a^3*b
*d^2*n)*x^2*x^n + (a^2*b^2*c^2*n - 2*a^3*b*c*d*n + a^4*d^2*n)*x^2
), x) + b/((a*b^2*c*n - a^2*b*d*n)*x*x^n + (a^2*b*c*n - a^3*d*n)*
x)
```

Fricas [F]   time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{b^{2} d x^{2} x^{3\, n} + a^{2} c x^{2} + (b^{2} c + 2\, a b d) x^{2} x^{2\, n} + (2\, a b c + a^{2} d) x^{2} x^{n}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((b*x^n + a)^2*(d*x^n + c)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/(b^2*d*x^2*x^(3*n) + a^2*c*x^2 + (b^2*c + 2*a*b*d)*x^2
*x^(2*n) + (2*a*b*c + a^2*d)*x^2*x^n), x)
```

Sympy [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \left(a+b x^{n}\right)^{2} \left(c+d x^{n}\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Integral(1/(x**2*(a + b*x**n)**2*(c + d*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n + a)^2 (dx^n + c)x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^n + a)^2*(d*x^n + c)*x^2), x)
```

3.869 $\int \frac{1}{x^3(a+bx^n)^2(c+dx^n)}\,dx$

Optimal. Leaf size=145

$$\frac{b(2ad(n+1)-bc(n+2))\,{}_2F_1\left(1,-\frac{2}{n};-\frac{2-n}{n};-\frac{bx^n}{a}\right)}{2a^2nx^2(bc-ad)^2}-\frac{d^2\,{}_2F_1\left(1,-\frac{2}{n};-\frac{2-n}{n};-\frac{dx^n}{c}\right)}{2cx^2(bc-ad)^2}+\frac{b}{anx^2(bc-ad)(a+bx^n)}$$

```
[Out] b/(a*(b*c - a*d)*n*x^2*(a + b*x^n)) + (b*(2*a*d*(1 + n) - b*c*(2
+ n))*Hypergeometric2F1[1, -2/n, -((2 - n)/n), -((b*x^n)/a)])/(2*
a^2*(b*c - a*d)^2*n*x^2) - (d^2*Hypergeometric2F1[1, -2/n, -((2 -
 n)/n), -((d*x^n)/c)])/(2*c*(b*c - a*d)^2*x^2)
```

Rubi [A] time = 0.589429, antiderivative size = 145, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{b(2ad(n+1)-bc(n+2))\,{}_2F_1\left(1,-\frac{2}{n};-\frac{2-n}{n};-\frac{bx^n}{a}\right)}{2a^2nx^2(bc-ad)^2}-\frac{d^2\,{}_2F_1\left(1,-\frac{2}{n};-\frac{2-n}{n};-\frac{dx^n}{c}\right)}{2cx^2(bc-ad)^2}+\frac{b}{anx^2(bc-ad)(a+bx^n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] b/(a*(b*c - a*d)*n*x^2*(a + b*x^n)) + (b*(2*a*d*(1 + n) - b*c*(2
+ n))*Hypergeometric2F1[1, -2/n, -((2 - n)/n), -((b*x^n)/a)])/(2*
a^2*(b*c - a*d)^2*n*x^2) - (d^2*Hypergeometric2F1[1, -2/n, -((2 -
 n)/n), -((d*x^n)/c)])/(2*c*(b*c - a*d)^2*x^2)
```

Rubi in Sympy [A] time = 156.965, size = 214, normalized size = 1.48

$$-\frac{b}{anx^2\,(a+bx^n)\,(ad-bc)}+\frac{bd^2x^{n-2}\,(n+2)\,{}_2F_1\left(\begin{matrix}1,\frac{n-2}{n}\\2-\frac{2}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{acn\,(-n+2)\,(ad-bc)^2}-\frac{d\,(adn-bc\,(n+2))\,{}_2F_1\left(\begin{matrix}1,-\frac{2}{n}\\\frac{n-2}{n}\end{matrix}\middle|-\frac{dx^n}{c}\right)}{2acnx^2\,(ad-bc)^2}-\frac{b^2dx^{n-2}\,(n+2)\,{}_2F_1\left(\begin{matrix}1,\frac{n-2}{n}\\2-\frac{2}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{a^2n\,(-n+2)\,(ad-bc)^2}+\frac{b\,(adn-bc\,(n+2))\,{}_2F_1\left(\begin{matrix}1,-\frac{2}{n}\\\frac{n-2}{n}\end{matrix}\middle|-\frac{bx^n}{a}\right)}{2a^2nx^2\,(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] -b/(a*n*x**2*(a + b*x**n)*(a*d - b*c)) + b*d**2*x**(n - 2)*(n + 2
)*hyper((1, (n - 2)/n), (2 - 2/n,), -d*x**n/c)/(a*c*n*(-n + 2)*(a
*d - b*c)**2) - d*(a*d*n - b*c*(n + 2))*hyper((1, -2/n), ((n - 2)
/n,), -d*x**n/c)/(2*a*c*n*x**2*(a*d - b*c)**2) - b**2*d*x**(n - 2
)*(n + 2)*hyper((1, (n - 2)/n), (2 - 2/n,), -b*x**n/a)/(a**2*n*(-
n + 2)*(a*d - b*c)**2) + b*(a*d*n - b*c*(n + 2))*hyper((1, -2/n),
 ((n - 2)/n,), -b*x**n/a)/(2*a**2*n*x**2*(a*d - b*c)**2)
```

Mathematica [A] time = 0.275758, size = 136, normalized size = 0.94

$$\frac{bc\,(a+bx^n)\,(2ad(n+1)-bc(n+2))\,{}_2F_1\left(1,-\frac{2}{n};\frac{n-2}{n};-\frac{bx^n}{a}\right)-a\left(ad^2n\,(a+bx^n)\,{}_2F_1\left(1,-\frac{2}{n};\frac{n-2}{n};-\frac{dx^n}{c}\right)+2bc(ad-bc)\right)}{2a^2cnx^2(bc-ad)^2\,(a+bx^n)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(a + b*x^n)^2*(c + d*x^n)),x]
```

```
[Out] (b*c*(2*a*d*(1 + n) - b*c*(2 + n))*(a + b*x^n)*Hypergeometric2F1[
1, -2/n, (-2 + n)/n, -((b*x^n)/a)] - a*(2*b*c*(-(b*c) + a*d) + a*
d^2*n*(a + b*x^n)*Hypergeometric2F1[1, -2/n, (-2 + n)/n, -((d*x^n
)/c)]))/(2*a^2*c*(b*c - a*d)^2*n*x^2*(a + b*x^n))
```

Maple [F] time = 0.165, size = 0, normalized size = 0.

$$\int \frac{1}{x^{3} \left(a+b x^{n}\right)^{2} \left(c+d x^{n}\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] int(1/x^3/(a+b*x^n)^2/(c+d*x^n),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$d^{2} \int \frac{1}{{\left(b^{2} c^{2} d - 2\, a b c d^{2} + a^{2} d^{3}\right)} x^{3} x^{n} + {\left(b^{2} c^{3} - 2\, a b c^{2} d + a^{2} c d^{2}\right)} x^{3}}\, dx + {\left(b^{2} c {\left(n + 2\right)} - 2\, a b d {\left(n + 1\right)}\right)} \int \frac{1}{{\left(a b^{3} c^{2} n - 2\, a^{2} b^{2} c d n + a^{3} b d^{2} n\right)} x^{3} x^{n} + {\left(a^{2} b^{2} c^{2} n - 2\, a^{3} b c d n + a^{4} d^{2} n\right)} x^{3}}\, dx + \frac{b}{{\left(a b^{2} c n - a^{2} b d n\right)} x^{2} x^{n} + {\left(a^{2} b c n - a^{3} d n\right)} x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)*x^3),x, algorithm="maxima")
```

```
[Out] d^2*integrate(1/((b^2*c^2*d - 2*a*b*c*d^2 + a^2*d^3)*x^3*x^n + (b
^2*c^3 - 2*a*b*c^2*d + a^2*c*d^2)*x^3), x) + (b^2*c*(n + 2) - 2*a
*b*d*(n + 1))*integrate(1/((a*b^3*c^2*n - 2*a^2*b^2*c*d*n + a^3*b
*d^2*n)*x^3*x^n + (a^2*b^2*c^2*n - 2*a^3*b*c*d*n + a^4*d^2*n)*x^3
), x) + b/((a*b^2*c*n - a^2*b*d*n)*x^2*x^n + (a^2*b*c*n - a^3*d*n
)*x^2)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$${\rm integral}\left(\frac{1}{b^{2} d x^{3} x^{3 \, n} + a^{2} c x^{3} + {\left(b^{2} c + 2 \, a b d\right)} x^{3} x^{2 \, n} + {\left(2 \, a b c + a^{2} d\right)} x^{3} x^{n}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/(b^2*d*x^3*x^(3*n) + a^2*c*x^3 + (b^2*c + 2*a*b*d)*x^3
*x^(2*n) + (2*a*b*c + a^2*d)*x^3*x^n), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n + a)^2 (dx^n + c)x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^2*(d*x^n + c)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^n + a)^2*(d*x^n + c)*x^3), x)
```

3.870 $\int \frac{x^{-1+2n}(a+bx^n)^3}{c+dx^n}\,dx$

Optimal. Leaf size=130

$$\frac{bx^{2n}\left(3a^2d^2-3abcd+b^2c^2\right)}{2d^3n}-\frac{b^2x^{3n}(bc-3ad)}{3d^2n}+\frac{c(bc-ad)^3\log\left(c+dx^n\right)}{d^5n}-\frac{x^n(bc-ad)^3}{d^4n}+\frac{b^3x^{4n}}{4dn}$$

```
[Out] -(((b*c - a*d)^3*x^n)/(d^4*n)) + (b*(b^2*c^2 - 3*a*b*c*d + 3*a^2*
d^2)*x^(2*n))/(2*d^3*n) - (b^2*(b*c - 3*a*d)*x^(3*n))/(3*d^2*n) +
 (b^3*x^(4*n))/(4*d*n) + (c*(b*c - a*d)^3*Log[c + d*x^n])/(d^5*n)
```

Rubi [A] time = 0.336232, antiderivative size = 130, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{bx^{2n}\left(3a^2d^2-3abcd+b^2c^2\right)}{2d^3n}-\frac{b^2x^{3n}(bc-3ad)}{3d^2n}+\frac{c(bc-ad)^3\log\left(c+dx^n\right)}{d^5n}-\frac{x^n(bc-ad)^3}{d^4n}+\frac{b^3x^{4n}}{4dn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 2*n)*(a + b*x^n)^3)/(c + d*x^n),x]
```

```
[Out] -(((b*c - a*d)^3*x^n)/(d^4*n)) + (b*(b^2*c^2 - 3*a*b*c*d + 3*a^2*
d^2)*x^(2*n))/(2*d^3*n) - (b^2*(b*c - 3*a*d)*x^(3*n))/(3*d^2*n) +
 (b^3*x^(4*n))/(4*d*n) + (c*(b*c - a*d)^3*Log[c + d*x^n])/(d^5*n)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{b^3x^{4n}}{4dn}+\frac{b^2x^{3n}\left(3ad-bc\right)}{3d^2n}+\frac{b\left(3a^2d^2-3abcd+b^2c^2\right)\int^{x^n}x\,dx}{d^3n}-\frac{c\left(ad-bc\right)^3\log\left(c+dx^n\right)}{d^5n}+\frac{\left(ad-bc\right)^3\int^{x^n}\frac{1}{d^4}\,dx}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)*(a+b*x**n)**3/(c+d*x**n),x)
```

```
[Out] b**3*x**(4*n)/(4*d*n) + b**2*x**(3*n)*(3*a*d - b*c)/(3*d**2*n) +
b*(3*a**2*d**2 - 3*a*b*c*d + b**2*c**2)*Integral(x, (x, x**n))/(d
**3*n) - c*(a*d - b*c)**3*log(c + d*x**n)/(d**5*n) + (a*d - b*c)*
*3*Integral(d**(-4), (x, x**n))/n
```

Mathematica [A] time = 0.21763, size = 134, normalized size = 1.03

$$\frac{dx^n\left(12a^3d^3+18a^2bd^2\left(dx^n-2c\right)+6ab^2d\left(6c^2-3cdx^n+2d^2x^{2n}\right)+b^3\left(-12c^3+6c^2dx^n-4cd^2x^{2n}+3d^3x^{3n}\right)\right)+12c(bc-}{12d^5n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 2*n)*(a + b*x^n)^3)/(c + d*x^n),x]
```

```
[Out] (d*x^n*(12*a^3*d^3 + 18*a^2*b*d^2*(-2*c + d*x^n) + 6*a*b^2*d*(6*c
^2 - 3*c*d*x^n + 2*d^2*x^(2*n)) + b^3*(-12*c^3 + 6*c^2*d*x^n - 4*
c*d^2*x^(2*n) + 3*d^3*x^(3*n))) + 12*c*(b*c - a*d)^3*Log[c + d*x^
n])/(12*d^5*n)
```

Maple [B] time = 0.041, size = 284, normalized size = 2.2

$$\frac{e^{n\ln(x)}a^3}{dn}-3\frac{e^{n\ln(x)}a^2cb}{d^2n}+3\frac{e^{n\ln(x)}ac^2b^2}{d^3n}-\frac{e^{n\ln(x)}c^3b^3}{d^4n}+\frac{b^3\left(e^{n\ln(x)}\right)^4}{4dn}+\frac{3b\left(e^{n\ln(x)}\right)^2a^2}{2dn}-\frac{3b^2\left(e^{n\ln(x)}\right)^2ca}{2d^2n}+\frac{b^3\left(e^{n\ln(x)}\right)^2c^2}{2d^3n}+\frac{b^2\left(e^{n\ln(x)}\right)^3a}{dn}-\frac{\left(e^{n\ln(x)}\right)^3b^3c}{3d^2n}-\frac{c\ln\left(c+de^{n\ln(x)}\right)a^3}{d^2n}+3\frac{c^2\ln\left(c+de^{n\ln(x)}\right)a^2b}{d^3n}-3\frac{c^3\ln\left(c+de^{n\ln(x)}\right)ab^2}{d^4n}+\frac{c^4\ln\left(c+de^{n\ln(x)}\right)b^3}{d^5n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)*(a+b*x^n)^3/(c+d*x^n),x)
```

```
[Out] 1/d/n*exp(n*ln(x))*a^3-3/d^2/n*exp(n*ln(x))*a^2*c*b+3/d^3/n*exp(n
*ln(x))*a*c^2*b^2-1/d^4/n*exp(n*ln(x))*c^3*b^3+1/4*b^3/d/n*exp(n*
ln(x))^4+3/2*b/d/n*exp(n*ln(x))^2*a^2-3/2*b^2/d^2/n*exp(n*ln(x))^
2*c*a+1/2*b^3/d^3/n*exp(n*ln(x))^2*c^2+b^2/d/n*exp(n*ln(x))^3*a-1
/3*b^3/d^2/n*exp(n*ln(x))^3*c-c/d^2/n*ln(c+d*exp(n*ln(x)))*a^3+3*
c^2/d^3/n*ln(c+d*exp(n*ln(x)))*a^2*b-3*c^3/d^4/n*ln(c+d*exp(n*ln(
x)))*a*b^2+c^4/d^5/n*ln(c+d*exp(n*ln(x)))*b^3
```

Maxima [A] time = 1.42483, size = 312, normalized size = 2.4

$$a^3\left(\frac{x^n}{dn}-\frac{c\log\left(\frac{dx^n+c}{d}\right)}{d^2n}\right)+\frac{1}{12}b^3\left(\frac{12c^4\log\left(\frac{dx^n+c}{d}\right)}{d^5n}+\frac{3d^3x^{4n}-4cd^2x^{3n}+6c^2dx^{2n}-12c^3x^n}{d^4n}\right)-\frac{1}{2}ab^2\left(\frac{6c^3\log\left(\frac{dx^n+c}{d}\right)}{d^4n}-\frac{2d^2x^{3n}-3cdx^{2n}+6c^2x^n}{d^3n}\right)+\frac{3}{2}a^2b\left(\frac{2c^2\log\left(\frac{dx^n+c}{d}\right)}{d^3n}+\frac{dx^{2n}-2cx^n}{d^2n}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^3*x^(2*n - 1)/(d*x^n + c),x, algorithm="maxima")
```

```
[Out] a^3*(x^n/(d*n) - c*log((d*x^n + c)/d)/(d^2*n)) + 1/12*b^3*(12*c^4
*log((d*x^n + c)/d)/(d^5*n) + (3*d^3*x^(4*n) - 4*c*d^2*x^(3*n) +
6*c^2*d*x^(2*n) - 12*c^3*x^n)/(d^4*n)) - 1/2*a*b^2*(6*c^3*log((d*
x^n + c)/d)/(d^4*n) - (2*d^2*x^(3*n) - 3*c*d*x^(2*n) + 6*c^2*x^n)
/(d^3*n)) + 3/2*a^2*b*(2*c^2*log((d*x^n + c)/d)/(d^3*n) + (d*x^(2
*n) - 2*c*x^n)/(d^2*n))
```

Fricas [A] time = 0.236106, size = 239, normalized size = 1.84

$$\frac{3b^3d^4x^{4n}-4\left(b^3cd^3-3ab^2d^4\right)x^{3n}+6\left(b^3c^2d^2-3ab^2cd^3+3a^2bd^4\right)x^{2n}-12\left(b^3c^3d-3ab^2c^2d^2+3a^2bcd^3-a^3d^4\right)x^n+}{12d^5n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^3*x^(2*n - 1)/(d*x^n + c),x, algorithm="fricas")
```

```
[Out] 1/12*(3*b^3*d^4*x^(4*n) - 4*(b^3*c*d^3 - 3*a*b^2*d^4)*x^(3*n) + 6
*(b^3*c^2*d^2 - 3*a*b^2*c*d^3 + 3*a^2*b*d^4)*x^(2*n) - 12*(b^3*c^
3*d - 3*a*b^2*c^2*d^2 + 3*a^2*b*c*d^3 - a^3*d^4)*x^n + 12*(b^3*c^
4 - 3*a*b^2*c^3*d + 3*a^2*b*c^2*d^2 - a^3*c*d^3)*log(d*x^n + c))/
(d^5*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)*(a+b*x**n)**3/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^3 x^{2\,n-1}}{dx^n + c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^3*x^(2*n - 1)/(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^3*x^(2*n - 1)/(d*x^n + c), x)
```

3.871 $\int \frac{x^{-1+2n}(a+bx^n)^2}{c+dx^n}\,dx$

Optimal. Leaf size=90

$$-\frac{c(bc-ad)^2\log(c+dx^n)}{d^4n}+\frac{x^n(bc-ad)^2}{d^3n}-\frac{bx^{2n}(bc-2ad)}{2d^2n}+\frac{b^2x^{3n}}{3dn}$$

```
[Out] ((b*c - a*d)^2*x^n)/(d^3*n) - (b*(b*c - 2*a*d)*x^(2*n))/(2*d^2*n)
 + (b^2*x^(3*n))/(3*d*n) - (c*(b*c - a*d)^2*Log[c + d*x^n])/(d^4*
n)
```

Rubi [A] time = 0.232734, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$-\frac{c(bc-ad)^2\log(c+dx^n)}{d^4n}+\frac{x^n(bc-ad)^2}{d^3n}-\frac{bx^{2n}(bc-2ad)}{2d^2n}+\frac{b^2x^{3n}}{3dn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 2*n)*(a + b*x^n)^2)/(c + d*x^n),x]
```

```
[Out] ((b*c - a*d)^2*x^n)/(d^3*n) - (b*(b*c - 2*a*d)*x^(2*n))/(2*d^2*n)
 + (b^2*x^(3*n))/(3*d*n) - (c*(b*c - a*d)^2*Log[c + d*x^n])/(d^4*
n)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{b^2x^{3n}}{3dn}+\frac{b\,(2ad-bc)\int^{x^n}x\,dx}{d^2n}-\frac{c\,(ad-bc)^2\log(c+dx^n)}{d^4n}+\frac{(ad-bc)^2\int^{x^n}\frac{1}{d^3}\,dx}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)*(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] b**2*x**(3*n)/(3*d*n) + b*(2*a*d - b*c)*Integral(x, (x, x**n))/(d
**2*n) - c*(a*d - b*c)**2*log(c + d*x**n)/(d**4*n) + (a*d - b*c)*
*2*Integral(d**(-3), (x, x**n))/n
```

Mathematica [A] time = 0.134348, size = 87, normalized size = 0.97

$$\frac{dx^n\left(6a^2d^2+6abd\,(dx^n-2c)+b^2\left(6c^2-3cdx^n+2d^2x^{2n}\right)\right)-6c(bc-ad)^2\log(c+dx^n)}{6d^4n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 2*n)*(a + b*x^n)^2)/(c + d*x^n),x]
```

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

Maple [A] time = 0.038, size = 173, normalized size = 1.9

$$\frac{e^{n\ln(x)}a^2}{dn}-2\frac{ce^{n\ln(x)}ab}{d^2n}+\frac{b^2e^{n\ln(x)}c^2}{d^3n}+\frac{b^2\left(e^{n\ln(x)}\right)^3}{3\,dn}+\frac{b\left(e^{n\ln(x)}\right)^2a}{dn}-\frac{b^2\left(e^{n\ln(x)}\right)^2c}{2\,d^2n}-\frac{c\ln\left(c+de^{n\ln(x)}\right)a^2}{d^2n}+2\frac{c^2\ln\left(c+de^{n\ln(x)}\right)ab}{d^3n}-\frac{c^3\ln\left(c+de^{n\ln(x)}\right)b^2}{d^4n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(-1+2*n)*(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] 1/d/n*exp(n*ln(x))*a^2-2/d^2/n*exp(n*ln(x))*c*a*b+1/d^3/n*exp(n*l
n(x))*b^2*c^2+1/3*b^2/d/n*exp(n*ln(x))^3+b/d/n*exp(n*ln(x))^2*a-1
/2*b^2/d^2/n*exp(n*ln(x))^2*c-c/d^2/n*ln(c+d*exp(n*ln(x)))*a^2+2*
c^2/d^3/n*ln(c+d*exp(n*ln(x)))*a*b-c^3/d^4/n*ln(c+d*exp(n*ln(x)))
*b^2
```

Maxima [A] time = 1.4019, size = 203, normalized size = 2.26

$$a^2\left(\frac{x^n}{dn}-\frac{c\log\left(\frac{dx^n+c}{d}\right)}{d^2n}\right)-\frac{1}{6}\,b^2\left(\frac{6\,c^3\log\left(\frac{dx^n+c}{d}\right)}{d^4n}-\frac{2\,d^2x^{3\,n}-3\,cdx^{2\,n}+6\,c^2x^n}{d^3n}\right)+ab\left(\frac{2\,c^2\log\left(\frac{dx^n+c}{d}\right)}{d^3n}+\frac{dx^{2\,n}-2\,cx^n}{d^2n}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^2*x^(2*n - 1)/(d*x^n + c),x, algorithm="maxima")
```

```
[Out] a^2*(x^n/(d*n) - c*log((d*x^n + c)/d)/(d^2*n)) - 1/6*b^2*(6*c^3*l
og((d*x^n + c)/d)/(d^4*n) - (2*d^2*x^(3*n) - 3*c*d*x^(2*n) + 6*c^
2*x^n)/(d^3*n)) + a*b*(2*c^2*log((d*x^n + c)/d)/(d^3*n) + (d*x^(2
*n) - 2*c*x^n)/(d^2*n))
```

Fricas [A] time = 0.233482, size = 146, normalized size = 1.62

$$\frac{2\,b^2d^3x^{3\,n}-3\left(b^2cd^2-2\,abd^3\right)x^{2\,n}+6\left(b^2c^2d-2\,abcd^2+a^2d^3\right)x^n-6\left(b^2c^3-2\,abc^2d+a^2cd^2\right)\log\left(dx^n+c\right)}{6\,d^4n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^2*x^(2*n - 1)/(d*x^n + c),x, algorithm="fricas")
```

```
[Out] 1/6*(2*b^2*d^3*x^(3*n) - 3*(b^2*c*d^2 - 2*a*b*d^3)*x^(2*n) + 6*(b
^2*c^2*d - 2*a*b*c*d^2 + a^2*d^3)*x^n - 6*(b^2*c^3 - 2*a*b*c^2*d
+ a^2*c*d^2)*log(d*x^n + c))/(d^4*n)
```

Sympy [A] time = 144.008, size = 202, normalized size = 2.24

$$\begin{cases}\frac{(a+b)^2\log(x)}{c} & \text{for } d=0\wedge n=0\\ \frac{\frac{a^2x^{2n}}{2n}+\frac{2abx^{3n}}{3n}+\frac{b^2x^{4n}}{4n}}{c} & \text{for } d=0\\ \frac{(a+b)^2\log(x)}{c+d} & \text{for } n=0\\ -\frac{a^2c\log\left(\frac{c}{d}+x^n\right)}{d^2n}+\frac{a^2x^n}{dn}+\frac{2abc^2\log\left(\frac{c}{d}+x^n\right)}{d^3n}-\frac{2abcx^n}{d^2n}+\frac{abx^{2n}}{dn}-\frac{b^2c^3\log\left(\frac{c}{d}+x^n\right)}{d^4n}+\frac{b^2c^2x^n}{d^3n}-\frac{b^2cx^{2n}}{2d^2n}+\frac{b^2x^{3n}}{3dn} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)*(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Piecewise(((a + b)**2*log(x)/c, Eq(d, 0) & Eq(n, 0)), ((a**2*x**(
2*n)/(2*n) + 2*a*b*x**(3*n)/(3*n) + b**2*x**(4*n)/(4*n))/c, Eq(d,
 0)), ((a + b)**2*log(x)/(c + d), Eq(n, 0)), (-a**2*c*log(c/d + x
**n)/(d**2*n) + a**2*x**n/(d*n) + 2*a*b*c**2*log(c/d + x**n)/(d**
3*n) - 2*a*b*c*x**n/(d**2*n) + a*b*x**(2*n)/(d*n) - b**2*c**3*log
(c/d + x**n)/(d**4*n) + b**2*c**2*x**n/(d**3*n) - b**2*c*x**(2*n)
/(2*d**2*n) + b**2*x**(3*n)/(3*d*n), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^2 x^{2\,n-1}}{dx^n + c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^2*x^(2*n - 1)/(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^2*x^(2*n - 1)/(d*x^n + c), x)
```

3.872 $\int \frac{x^{-1+2n}(a+bx^n)}{c+dx^n}\,dx$

Optimal. Leaf size=60

$$\frac{c(bc-ad)\log(c+dx^n)}{d^3n}-\frac{x^n(bc-ad)}{d^2n}+\frac{bx^{2n}}{2dn}$$

```
[Out] -(((b*c - a*d)*x^n)/(d^2*n)) + (b*x^(2*n))/(2*d*n) + (c*(b*c - a*
d)*Log[c + d*x^n])/(d^3*n)
```

Rubi [A] time = 0.153049, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$\frac{c(bc-ad)\log(c+dx^n)}{d^3n}-\frac{x^n(bc-ad)}{d^2n}+\frac{bx^{2n}}{2dn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 2*n)*(a + b*x^n))/(c + d*x^n),x]
```

```
[Out] -(((b*c - a*d)*x^n)/(d^2*n)) + (b*x^(2*n))/(2*d*n) + (c*(b*c - a*
d)*Log[c + d*x^n])/(d^3*n)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{b\int^{x^n} x\,dx}{dn}-\frac{c\,(ad-bc)\log(c+dx^n)}{d^3n}+\frac{(ad-bc)\int^{x^n}\frac{1}{d^2}\,dx}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)*(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] b*Integral(x, (x, x**n))/(d*n) - c*(a*d - b*c)*log(c + d*x**n)/(d
**3*n) + (a*d - b*c)*Integral(d**(-2), (x, x**n))/n
```

Mathematica [A] time = 0.0664064, size = 50, normalized size = 0.83

$$\frac{dx^n(2ad-2bc+bdx^n)+2c(bc-ad)\log(c+dx^n)}{2d^3n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 2*n)*(a + b*x^n))/(c + d*x^n),x]
```

```
[Out] (d*x^n*(-2*b*c + 2*a*d + b*d*x^n) + 2*c*(b*c - a*d)*Log[c + d*x^n
])/(2*d^3*n)
```

Maple [A] time = 0.03, size = 87, normalized size = 1.5

$$\frac{e^{n\ln(x)}a}{dn}-\frac{be^{n\ln(x)}c}{d^2n}+\frac{b\left(e^{n\ln(x)}\right)^2}{2\,dn}-\frac{c\ln\left(c+de^{n\ln(x)}\right)a}{d^2n}+\frac{c^2\ln\left(c+de^{n\ln(x)}\right)b}{d^3n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)*(a+b*x^n)/(c+d*x^n),x)
```

```
[Out] 1/d/n*exp(n*ln(x))*a-1/d^2/n*exp(n*ln(x))*b*c+1/2*b/d/n*exp(n*ln(
x))^2-c/d^2/n*ln(c+d*exp(n*ln(x)))*a+c^2/d^3/n*ln(c+d*exp(n*ln(x)
))*b
```

Maxima [A] time = 1.39146, size = 112, normalized size = 1.87

$$a\left(\frac{x^n}{dn} - \frac{c\log\left(\frac{dx^n+c}{d}\right)}{d^2n}\right) + \frac{1}{2}b\left(\frac{2c^2\log\left(\frac{dx^n+c}{d}\right)}{d^3n} + \frac{dx^{2n} - 2cx^n}{d^2n}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)*x^(2*n - 1)/(d*x^n + c),x, algorithm="maxima")
```

```
[Out] a*(x^n/(d*n) - c*log((d*x^n + c)/d)/(d^2*n)) + 1/2*b*(2*c^2*log((
d*x^n + c)/d)/(d^3*n) + (d*x^(2*n) - 2*c*x^n)/(d^2*n))
```

Fricas [A] time = 0.233288, size = 76, normalized size = 1.27

$$\frac{bd^2x^{2n} - 2\left(bcd - ad^2\right)x^n + 2\left(bc^2 - acd\right)\log\left(dx^n + c\right)}{2d^3n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)*x^(2*n - 1)/(d*x^n + c),x, algorithm="fricas")
```

```
[Out] 1/2*(b*d^2*x^(2*n) - 2*(b*c*d - a*d^2)*x^n + 2*(b*c^2 - a*c*d)*lo
g(d*x^n + c))/(d^3*n)
```

Sympy [A] time = 53.3224, size = 105, normalized size = 1.75

$$\begin{cases} \frac{(a+b)\log(x)}{c} & \text{for}\: d = 0 \wedge n = 0 \\ \frac{\frac{ax^{2n}}{2n} + \frac{bx^{3n}}{3n}}{c} & \text{for}\: d = 0 \\ \frac{(a+b)\log(x)}{c+d} & \text{for}\: n = 0 \\ -\frac{ac\log\left(\frac{c}{d}+x^n\right)}{d^2n} + \frac{ax^n}{dn} + \frac{bc^2\log\left(\frac{c}{d}+x^n\right)}{d^3n} - \frac{bcx^n}{d^2n} + \frac{bx^{2n}}{2dn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)*(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] Piecewise(((a + b)*log(x)/c, Eq(d, 0) & Eq(n, 0)), ((a*x**(2*n)/(
2*n) + b*x**(3*n)/(3*n))/c, Eq(d, 0)), ((a + b)*log(x)/(c + d), E
q(n, 0)), (-a*c*log(c/d + x**n)/(d**2*n) + a*x**n/(d*n) + b*c**2*
log(c/d + x**n)/(d**3*n) - b*c*x**n/(d**2*n) + b*x**(2*n)/(2*d*n)
, True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)x^{2n-1}}{dx^n + c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)*x^(2*n - 1)/(d*x^n + c),x, algorithm="giac")

[Out] integrate((b*x^n + a)*x^(2*n - 1)/(d*x^n + c), x)
```

3.873 $\int \frac{x^{-1+2n}}{(a+bx^n)(c+dx^n)}\,dx$

Optimal. Leaf size=54

$$\frac{c\log(c+dx^n)}{dn(bc-ad)}-\frac{a\log(a+bx^n)}{bn(bc-ad)}$$

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

Rubi [A] time = 0.162708, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{c\log(c+dx^n)}{dn(bc-ad)}-\frac{a\log(a+bx^n)}{bn(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 2*n)/((a + b*x^n)*(c + d*x^n)),x]
```

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

Rubi in Sympy [A] time = 20.8847, size = 39, normalized size = 0.72

$$\frac{a\log(a+bx^n)}{bn(ad-bc)}-\frac{c\log(c+dx^n)}{dn(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] a*log(a + b*x**n)/(b*n*(a*d - b*c)) - c*log(c + d*x**n)/(d*n*(a*d
 - b*c))
```

Mathematica [A] time = 0.0851206, size = 44, normalized size = 0.81

$$-\frac{ad\log(a+bx^n)-bc\log(c+dx^n)}{b^2cdn-abd^2n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 2*n)/((a + b*x^n)*(c + d*x^n)),x]
```

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

Maple [A] time = 0.033, size = 59, normalized size = 1.1

$$\frac{a\ln\left(a+be^{n\ln(x)}\right)}{(ad-bc)bn}-\frac{c\ln\left(c+de^{n\ln(x)}\right)}{dn(ad-bc)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)/(a+b*x^n)/(c+d*x^n),x)
```

```
[Out] a/(a*d-b*c)/b/n*ln(a+b*exp(n*ln(x)))-c/d/n/(a*d-b*c)*ln(c+d*exp(n
*ln(x)))
```

Maxima [A] time = 1.38846, size = 81, normalized size = 1.5

$$-\frac{a\log\left(\frac{bx^n+a}{b}\right)}{b^2cn-abdn}+\frac{c\log\left(\frac{dx^n+c}{d}\right)}{bcdn-ad^2n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/((b*x^n + a)*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] -a*log((b*x^n + a)/b)/(b^2*c*n - a*b*d*n) + c*log((d*x^n + c)/d)/
(b*c*d*n - a*d^2*n)
```

Fricas [A] time = 0.235242, size = 61, normalized size = 1.13

$$-\frac{ad\log\left(bx^n+a\right)-bc\log\left(dx^n+c\right)}{(b^2cd-abd^2)n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/((b*x^n + a)*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] -(a*d*log(b*x^n + a) - b*c*log(d*x^n + c))/((b^2*c*d - a*b*d^2)*n
)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] Exception raised: NotImplementedError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2n-1}}{(bx^n+a)(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/((b*x^n + a)*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(2*n - 1)/((b*x^n + a)*(d*x^n + c)), x)
```

3.874 $\int \frac{x^{-1+2n}}{(a+bx^n)^2(c+dx^n)}\,dx$

Optimal. Leaf size=75

$$\frac{a}{bn(bc-ad)(a+bx^n)}+\frac{c\log(a+bx^n)}{n(bc-ad)^2}-\frac{c\log(c+dx^n)}{n(bc-ad)^2}$$

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

Rubi [A] time = 0.18436, antiderivative size = 75, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{a}{bn(bc-ad)(a+bx^n)}+\frac{c\log(a+bx^n)}{n(bc-ad)^2}-\frac{c\log(c+dx^n)}{n(bc-ad)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 2*n)/((a + b*x^n)^2*(c + d*x^n)),x]
```

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

Rubi in Sympy [A] time = 24.6123, size = 58, normalized size = 0.77

$$-\frac{a}{bn(a+bx^n)(ad-bc)}+\frac{c\log(a+bx^n)}{n(ad-bc)^2}-\frac{c\log(c+dx^n)}{n(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] -a/(b*n*(a + b*x**n)*(a*d - b*c)) + c*log(a + b*x**n)/(n*(a*d - b
*c)**2) - c*log(c + d*x**n)/(n*(a*d - b*c)**2)
```

Mathematica [A] time = 0.121836, size = 75, normalized size = 1.

$$\frac{a}{bn(bc-ad)(a+bx^n)}+\frac{c\log(a+bx^n)}{n(bc-ad)^2}-\frac{c\log(c+dx^n)}{n(bc-ad)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 2*n)/((a + b*x^n)^2*(c + d*x^n)),x]
```

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

Maple [A] time = 0.048, size = 109, normalized size = 1.5

$$\frac{e^{n\ln(x)}}{(ad-bc)\,n\left(a+be^{n\ln(x)}\right)}+\frac{c\ln\left(a+be^{n\ln(x)}\right)}{n\left(a^2d^2-2\,cabd+b^2c^2\right)}-\frac{c\ln\left(c+de^{n\ln(x)}\right)}{n\left(a^2d^2-2\,cabd+b^2c^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] 1/(a*d-b*c)/n*exp(n*ln(x))/(a+b*exp(n*ln(x)))+c/n/(a^2*d^2-2*a*b*
c*d+b^2*c^2)*ln(a+b*exp(n*ln(x)))-c/n/(a^2*d^2-2*a*b*c*d+b^2*c^2)
*ln(c+d*exp(n*ln(x)))
```

Maxima [A] time = 1.47418, size = 163, normalized size = 2.17

$$\frac{c\log\left(\frac{bx^n+a}{b}\right)}{b^2c^2n-2\,abcdn+a^2d^2n}-\frac{c\log\left(\frac{dx^n+c}{d}\right)}{b^2c^2n-2\,abcdn+a^2d^2n}+\frac{a}{ab^2cn-a^2bdn+(b^3cn-ab^2dn)x^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] c*log((b*x^n + a)/b)/(b^2*c^2*n - 2*a*b*c*d*n + a^2*d^2*n) - c*lo
g((d*x^n + c)/d)/(b^2*c^2*n - 2*a*b*c*d*n + a^2*d^2*n) + a/(a*b^2
*c*n - a^2*b*d*n + (b^3*c*n - a*b^2*d*n)*x^n)
```

Fricas [A] time = 0.234974, size = 162, normalized size = 2.16

$$\frac{abc-a^2d+\left(b^2cx^n+abc\right)\log\left(bx^n+a\right)-\left(b^2cx^n+abc\right)\log\left(dx^n+c\right)}{(b^4c^2-2\,ab^3cd+a^2b^2d^2)nx^n+(ab^3c^2-2\,a^2b^2cd+a^3bd^2)n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] (a*b*c - a^2*d + (b^2*c*x^n + a*b*c)*log(b*x^n + a) - (b^2*c*x^n
+ a*b*c)*log(d*x^n + c))/((b^4*c^2 - 2*a*b^3*c*d + a^2*b^2*d^2)*n
*x^n + (a*b^3*c^2 - 2*a^2*b^2*c*d + a^3*b*d^2)*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^{2\,n-1}}{(bx^n+a)^2(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(2*n - 1)/((b*x^n + a)^2*(d*x^n + c)), x)
```

3.875 $\int \frac{x^{-1+2n}}{(a+bx^n)^3(c+dx^n)}\,dx$

Optimal. Leaf size=105

$$\frac{a}{2bn(bc-ad)(a+bx^n)^2}-\frac{c}{n(bc-ad)^2(a+bx^n)}-\frac{cd\log(a+bx^n)}{n(bc-ad)^3}+\frac{cd\log(c+dx^n)}{n(bc-ad)^3}$$

```
[Out] a/(2*b*(b*c - a*d)*n*(a + b*x^n)^2) - c/((b*c - a*d)^2*n*(a + b*x
^n)) - (c*d*Log[a + b*x^n])/((b*c - a*d)^3*n) + (c*d*Log[c + d*x^
n])/((b*c - a*d)^3*n)
```

Rubi [A] time = 0.240954, antiderivative size = 105, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{a}{2bn(bc-ad)(a+bx^n)^2}-\frac{c}{n(bc-ad)^2(a+bx^n)}-\frac{cd\log(a+bx^n)}{n(bc-ad)^3}+\frac{cd\log(c+dx^n)}{n(bc-ad)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 2*n)/((a + b*x^n)^3*(c + d*x^n)),x]
```

```
[Out] a/(2*b*(b*c - a*d)*n*(a + b*x^n)^2) - c/((b*c - a*d)^2*n*(a + b*x
^n)) - (c*d*Log[a + b*x^n])/((b*c - a*d)^3*n) + (c*d*Log[c + d*x^
n])/((b*c - a*d)^3*n)
```

Rubi in Sympy [A] time = 32.5667, size = 83, normalized size = 0.79

$$-\frac{a}{2bn(a+bx^n)^2(ad-bc)}+\frac{cd\log(a+bx^n)}{n(ad-bc)^3}-\frac{cd\log(c+dx^n)}{n(ad-bc)^3}-\frac{c}{n(a+bx^n)(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)/(a+b*x**n)**3/(c+d*x**n),x)
```

```
[Out] -a/(2*b*n*(a + b*x**n)**2*(a*d - b*c)) + c*d*log(a + b*x**n)/(n*(
a*d - b*c)**3) - c*d*log(c + d*x**n)/(n*(a*d - b*c)**3) - c/(n*(a
 + b*x**n)*(a*d - b*c)**2)
```

Mathematica [A] time = 0.195277, size = 102, normalized size = 0.97

$$\frac{(ad-bc)\left(a^2d+abc+2b^2cx^n\right)-2bcd(a+bx^n)^2\log(a+bx^n)+2bcd(a+bx^n)^2\log(c+dx^n)}{2bn(bc-ad)^3(a+bx^n)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 2*n)/((a + b*x^n)^3*(c + d*x^n)),x]
```

```
[Out] ((-(b*c) + a*d)*(a*b*c + a^2*d + 2*b^2*c*x^n) - 2*b*c*d*(a + b*x^
n)^2*Log[a + b*x^n] + 2*b*c*d*(a + b*x^n)^2*Log[c + d*x^n])/(2*b*
(b*c - a*d)^3*n*(a + b*x^n)^2)
```

Maple [A] time = 0.085, size = 203, normalized size = 1.9

$$\frac{1}{\left(a+b\,{\mathrm e}^{n\ln\left(x\right)}\right)^{2}}\left(-\frac{bc\,{\mathrm e}^{n\ln\left(x\right)}}{\left(a^{2}d^{2}-2\,cabd+b^{2}c^{2}\right)n}+\frac{a\left(-adb-b^{2}c\right)}{\left(2\,a^{2}d^{2}-4\,cabd+2\,b^{2}c^{2}\right)b^{2}n}\right)+\frac{cd\ln\left(a+b\,{\mathrm e}^{n\ln\left(x\right)}\right)}{n\left(a^{3}d^{3}-3\,a^{2}cd^{2}b+3\,ac^{2}db^{2}-c^{3}b^{3}\right)}-\frac{cd\ln\left(c+d\,{\mathrm e}^{n\ln\left(x\right)}\right)}{n\left(a^{3}d^{3}-3\,a^{2}cd^{2}b+3\,ac^{2}db^{2}-c^{3}b^{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)/(a+b*x^n)^3/(c+d*x^n),x)
```

```
[Out] (-b*c/(a^2*d^2-2*a*b*c*d+b^2*c^2)/n*exp(n*ln(x))+1/2*a*(-a*b*d-b^
2*c)/(a^2*d^2-2*a*b*c*d+b^2*c^2)/b^2/n)/(a+b*exp(n*ln(x)))^2+c*d/
n/(a^3*d^3-3*a^2*b*c*d^2+3*a*b^2*c^2*d-b^3*c^3)*ln(a+b*exp(n*ln(x
)))-c*d/n/(a^3*d^3-3*a^2*b*c*d^2+3*a*b^2*c^2*d-b^3*c^3)*ln(c+d*ex
p(n*ln(x)))
```

Maxima [A] time = 1.41719, size = 328, normalized size = 3.12

$$-\frac{cd\log\left(\frac{bx^{n}+a}{b}\right)}{b^{3}c^{3}n-3\,ab^{2}c^{2}dn+3\,a^{2}bcd^{2}n-a^{3}d^{3}n}+\frac{cd\log\left(\frac{dx^{n}+c}{d}\right)}{b^{3}c^{3}n-3\,ab^{2}c^{2}dn+3\,a^{2}bcd^{2}n-a^{3}d^{3}n}-\frac{2\,b^{2}cx^{n}+abc+a^{2}d}{2\left(a^{2}b^{3}c^{2}n-2\,a^{3}b^{2}cdn+a^{4}bd^{2}n+(b^{5}c^{2}n-2\,ab^{4}cdn+a^{2}b^{3}d^{2}n)x^{2\,n}+2\,(ab^{4}c^{2}n-2\,a^{2}b^{3}cdn+a^{3}b^{2}d^{2}n)x^{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(2*n - 1)/((b*x^n + a)^3*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] -c*d*log((b*x^n + a)/b)/(b^3*c^3*n - 3*a*b^2*c^2*d*n + 3*a^2*b*c*
d^2*n - a^3*d^3*n) + c*d*log((d*x^n + c)/d)/(b^3*c^3*n - 3*a*b^2*
c^2*d*n + 3*a^2*b*c*d^2*n - a^3*d^3*n) - 1/2*(2*b^2*c*x^n + a*b*c
 + a^2*d)/(a^2*b^3*c^2*n - 2*a^3*b^2*c*d*n + a^4*b*d^2*n + (b^5*c
^2*n - 2*a*b^4*c*d*n + a^2*b^3*d^2*n)*x^(2*n) + 2*(a*b^4*c^2*n -
2*a^2*b^3*c*d*n + a^3*b^2*d^2*n)*x^n)
```

Fricas [A] time = 0.241559, size = 360, normalized size = 3.43

$$-\frac{ab^{2}c^{2}-a^{3}d^{2}+2\left(b^{3}c^{2}-ab^{2}cd\right)x^{n}+2\left(b^{3}cdx^{2\,n}+2\,ab^{2}cdx^{n}+a^{2}bcd\right)\log\left(bx^{n}+a\right)-2\left(b^{3}cdx^{2\,n}+2\,ab^{2}cdx^{n}+a^{2}bc\cdots\right.}{2\left((b^{6}c^{3}-3\,ab^{5}c^{2}d+3\,a^{2}b^{4}cd^{2}-a^{3}b^{3}d^{3})nx^{2\,n}+2\,(ab^{5}c^{3}-3\,a^{2}b^{4}c^{2}d+3\,a^{3}b^{3}cd^{2}-a^{4}b^{2}d^{3})nx^{n}+(a^{2}b^{4}c^{3}-3\,a^{3}b^{3}c^{2}d+3\cdots\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(2*n - 1)/((b*x^n + a)^3*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] -1/2*(a*b^2*c^2 - a^3*d^2 + 2*(b^3*c^2 - a*b^2*c*d)*x^n + 2*(b^3*
c*d*x^(2*n) + 2*a*b^2*c*d*x^n + a^2*b*c*d)*log(b*x^n + a) - 2*(b^
3*c*d*x^(2*n) + 2*a*b^2*c*d*x^n + a^2*b*c*d)*log(d*x^n + c))/((b^
6*c^3 - 3*a*b^5*c^2*d + 3*a^2*b^4*c*d^2 - a^3*b^3*d^3)*n*x^(2*n)
+ 2*(a*b^5*c^3 - 3*a^2*b^4*c^2*d + 3*a^3*b^3*c*d^2 - a^4*b^2*d^3)
*n*x^n + (a^2*b^4*c^3 - 3*a^3*b^3*c^2*d + 3*a^4*b^2*c*d^2 - a^5*b
*d^3)*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)/(a+b*x**n)**3/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2n-1}}{(bx^n + a)^3 (dx^n + c)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/((b*x^n + a)^3*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(2*n - 1)/((b*x^n + a)^3*(d*x^n + c)), x)
```

3.876 $\int \frac{x^{-1+3n}(a+bx^n)^3}{c+dx^n}\,dx$

Optimal. Leaf size=158

$$\frac{bx^{3n}\left(3a^2d^2-3abcd+b^2c^2\right)}{3d^3n}-\frac{b^2x^{4n}(bc-3ad)}{4d^2n}-\frac{c^2(bc-ad)^3\log\left(c+dx^n\right)}{d^6n}+\frac{cx^n(bc-ad)^3}{d^5n}-\frac{x^{2n}(bc-ad)^3}{2d^4n}+\frac{b^3x^{5n}}{5dn}$$

```
[Out] (c*(b*c - a*d)^3*x^n)/(d^5*n) - ((b*c - a*d)^3*x^(2*n))/(2*d^4*n)
 + (b*(b^2*c^2 - 3*a*b*c*d + 3*a^2*d^2)*x^(3*n))/(3*d^3*n) - (b^2
*(b*c - 3*a*d)*x^(4*n))/(4*d^2*n) + (b^3*x^(5*n))/(5*d*n) - (c^2*
(b*c - a*d)^3*Log[c + d*x^n])/(d^6*n)
```

Rubi [A] time = 0.396969, antiderivative size = 158, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{bx^{3n}\left(3a^2d^2-3abcd+b^2c^2\right)}{3d^3n}-\frac{b^2x^{4n}(bc-3ad)}{4d^2n}-\frac{c^2(bc-ad)^3\log\left(c+dx^n\right)}{d^6n}+\frac{cx^n(bc-ad)^3}{d^5n}-\frac{x^{2n}(bc-ad)^3}{2d^4n}+\frac{b^3x^{5n}}{5dn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 3*n)*(a + b*x^n)^3)/(c + d*x^n),x]
```

```
[Out] (c*(b*c - a*d)^3*x^n)/(d^5*n) - ((b*c - a*d)^3*x^(2*n))/(2*d^4*n)
 + (b*(b^2*c^2 - 3*a*b*c*d + 3*a^2*d^2)*x^(3*n))/(3*d^3*n) - (b^2
*(b*c - 3*a*d)*x^(4*n))/(4*d^2*n) + (b^3*x^(5*n))/(5*d*n) - (c^2*
(b*c - a*d)^3*Log[c + d*x^n])/(d^6*n)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{b^3x^{5n}}{5dn}+\frac{b^2x^{4n}\left(3ad-bc\right)}{4d^2n}+\frac{bx^{3n}\left(3a^2d^2-3abcd+b^2c^2\right)}{3d^3n}+\frac{c^2\left(ad-bc\right)^3\log\left(c+dx^n\right)}{d^6n}+\frac{\left(ad-bc\right)^3\int^{x^n}x\,dx}{d^4n}-\frac{\left(ad-bc\right)^3\int^{x^n}c\,dx}{d^5n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)*(a+b*x**n)**3/(c+d*x**n),x)
```

```
[Out] b**3*x**(5*n)/(5*d*n) + b**2*x**(4*n)*(3*a*d - b*c)/(4*d**2*n) +
b*x**(3*n)*(3*a**2*d**2 - 3*a*b*c*d + b**2*c**2)/(3*d**3*n) + c**
2*(a*d - b*c)**3*log(c + d*x**n)/(d**6*n) + (a*d - b*c)**3*Integr
al(x, (x, x**n))/(d**4*n) - (a*d - b*c)**3*Integral(c, (x, x**n))
/(d**5*n)
```

Mathematica [A] time = 0.34676, size = 138, normalized size = 0.87

$$\frac{20bd^3x^{3n}\left(3a^2d^2-3abcd+b^2c^2\right)-15b^2d^4x^{4n}(bc-3ad)-60c^2(bc-ad)^3\log\left(c+dx^n\right)+30d^2x^{2n}(ad-bc)^3+60cdx^n(bc-}{60d^6n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 3*n)*(a + b*x^n)^3)/(c + d*x^n),x]
```

```
[Out] (60*c*d*(b*c - a*d)^3*x^n + 30*d^2*(-(b*c) + a*d)^3*x^(2*n) + 20*
b*d^3*(b^2*c^2 - 3*a*b*c*d + 3*a^2*d^2)*x^(3*n) - 15*b^2*d^4*(b*c
 - 3*a*d)*x^(4*n) + 12*b^3*d^5*x^(5*n) - 60*c^2*(b*c - a*d)^3*Log
[c + d*x^n])/(60*d^6*n)
```

Maple [B] time = 0.048, size = 342, normalized size = 2.2

$$\frac{b^3 (x^n)^5}{5\,dn}+\frac{3\,b^2 (x^n)^4 a}{4\,dn}-\frac{b^3 (x^n)^4 c}{4\,d^2n}+\frac{b\,(x^n)^3 a^2}{dn}-\frac{b^2 (x^n)^3 ca}{d^2n}+\frac{b^3 (x^n)^3 c^2}{3\,d^3n}+\frac{(x^n)^2 a^3}{2\,dn} -\frac{3\,(x^n)^2 a^2cb}{2\,d^2n}+\frac{3\,(x^n)^2 ac^2b^2}{2\,d^3n}-\frac{(x^n)^2 c^3b^3}{2\,d^4n}-\frac{cx^na^3}{d^2n}+3\,\frac{c^2x^na^2b}{d^3n}-3\,\frac{c^3x^nab^2}{d^4n}+\frac{c^4x^nb^3}{d^5n} +\frac{c^2a^3}{d^3n}\ln\left(x^n+\frac{c}{d}\right)-3\,\frac{a^2c^3b}{d^4n}\ln\left(x^n+\frac{c}{d}\right)+3\,\frac{c^4ab^2}{d^5n}\ln\left(x^n+\frac{c}{d}\right)-\frac{b^3c^5}{d^6n}\ln\left(x^n+\frac{c}{d}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)*(a+b*x^n)^3/(c+d*x^n),x)
```

```
[Out] 1/5*b^3/d/n*(x^n)^5+3/4*b^2/d/n*(x^n)^4*a-1/4*b^3/d^2/n*(x^n)^4*c
+b/d/n*(x^n)^3*a^2-b^2/d^2/n*(x^n)^3*c*a+1/3*b^3/d^3/n*(x^n)^3*c^
2+1/2/d/n*(x^n)^2*a^3-3/2/d^2/n*(x^n)^2*a^2*c*b+3/2/d^3/n*(x^n)^2
*a*c^2*b^2-1/2/d^4/n*(x^n)^2*c^3*b^3-c/d^2/n*x^n*a^3+3*c^2/d^3/n*
x^n*a^2*b-3*c^3/d^4/n*x^n*a*b^2+c^4/d^5/n*x^n*b^3+c^2/d^3/n*ln(x^
n+c/d)*a^3-3*c^3/d^4/n*ln(x^n+c/d)*a^2*b+3*c^4/d^5/n*ln(x^n+c/d)*
a*b^2-c^5/d^6/n*ln(x^n+c/d)*b^3
```

Maxima [A] time = 1.40493, size = 386, normalized size = 2.44

$$-\frac{1}{60}\,b^3\left(\frac{60\,c^5\log\left(\frac{dx^n+c}{d}\right)}{d^6n}-\frac{12\,d^4x^{5\,n}-15\,cd^3x^{4\,n}+20\,c^2d^2x^{3\,n}-30\,c^3dx^{2\,n}+60\,c^4x^n}{d^5n}\right) +\frac{1}{4}\,ab^2\left(\frac{12\,c^4\log\left(\frac{dx^n+c}{d}\right)}{d^5n}+\frac{3\,d^3x^{4\,n}-4\,cd^2x^{3\,n}+6\,c^2dx^{2\,n}-12\,c^3x^n}{d^4n}\right) -\frac{1}{2}\,a^2b\left(\frac{6\,c^3\log\left(\frac{dx^n+c}{d}\right)}{d^4n}-\frac{2\,d^2x^{3\,n}-3\,cdx^{2\,n}+6\,c^2x^n}{d^3n}\right)+\frac{1}{2}\,a^3\left(\frac{2\,c^2\log\left(\frac{dx^n+c}{d}\right)}{d^3n}+\frac{dx^{2\,n}-2\,cx^n}{d^2n}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^3*x^(3*n - 1)/(d*x^n + c),x, algorithm="maxima")
```

```
[Out] -1/60*b^3*(60*c^5*log((d*x^n + c)/d)/(d^6*n) - (12*d^4*x^(5*n) -
15*c*d^3*x^(4*n) + 20*c^2*d^2*x^(3*n) - 30*c^3*d*x^(2*n) + 60*c^4
*x^n)/(d^5*n)) + 1/4*a*b^2*(12*c^4*log((d*x^n + c)/d)/(d^5*n) + (
3*d^3*x^(4*n) - 4*c*d^2*x^(3*n) + 6*c^2*d*x^(2*n) - 12*c^3*x^n)/(
d^4*n)) - 1/2*a^2*b*(6*c^3*log((d*x^n + c)/d)/(d^4*n) - (2*d^2*x^
(3*n) - 3*c*d*x^(2*n) + 6*c^2*x^n)/(d^3*n)) + 1/2*a^3*(2*c^2*log(
(d*x^n + c)/d)/(d^3*n) + (d*x^(2*n) - 2*c*x^n)/(d^2*n))
```

Fricas [A] time = 0.236929, size = 311, normalized size = 1.97

$$\frac{12\,b^3d^5x^{5\,n}-15\,\left(b^3cd^4-3\,ab^2d^5\right)x^{4\,n}+20\,\left(b^3c^2d^3-3\,ab^2cd^4+3\,a^2bd^5\right)x^{3\,n}-30\,\left(b^3c^3d^2-3\,ab^2c^2d^3+3\,a^2bcd^4-a^3d^5\right)}{60\,d^6n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^3*x^(3*n - 1)/(d*x^n + c),x, algorithm="fricas")
```

```
[Out] 1/60*(12*b^3*d^5*x^(5*n) - 15*(b^3*c*d^4 - 3*a*b^2*d^5)*x^(4*n) +
 20*(b^3*c^2*d^3 - 3*a*b^2*c*d^4 + 3*a^2*b*d^5)*x^(3*n) - 30*(b^3
*c^3*d^2 - 3*a*b^2*c^2*d^3 + 3*a^2*b*c*d^4 - a^3*d^5)*x^(2*n) + 6
0*(b^3*c^4*d - 3*a*b^2*c^3*d^2 + 3*a^2*b*c^2*d^3 - a^3*c*d^4)*x^n
 - 60*(b^3*c^5 - 3*a*b^2*c^4*d + 3*a^2*b*c^3*d^2 - a^3*c^2*d^3)*l
og(d*x^n + c))/(d^6*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)*(a+b*x**n)**3/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^3 x^{3\,n-1}}{dx^n + c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^3*x^(3*n - 1)/(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^3*x^(3*n - 1)/(d*x^n + c), x)
```

3.877 $\int \frac{x^{-1+3n}(a+bx^n)^2}{c+dx^n} \, dx$

Optimal. Leaf size=118

$$\frac{c^2(bc-ad)^2\log(c+dx^n)}{d^5n}-\frac{cx^n(bc-ad)^2}{d^4n}+\frac{x^{2n}(bc-ad)^2}{2d^3n}-\frac{bx^{3n}(bc-2ad)}{3d^2n}+\frac{b^2x^{4n}}{4dn}$$

```
[Out] -((c*(b*c - a*d)^2*x^n)/(d^4*n)) + ((b*c - a*d)^2*x^(2*n))/(2*d^3
*n) - (b*(b*c - 2*a*d)*x^(3*n))/(3*d^2*n) + (b^2*x^(4*n))/(4*d*n)
 + (c^2*(b*c - a*d)^2*Log[c + d*x^n])/(d^5*n)
```

Rubi [A] time = 0.303166, antiderivative size = 118, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$\frac{c^2(bc-ad)^2\log(c+dx^n)}{d^5n}-\frac{cx^n(bc-ad)^2}{d^4n}+\frac{x^{2n}(bc-ad)^2}{2d^3n}-\frac{bx^{3n}(bc-2ad)}{3d^2n}+\frac{b^2x^{4n}}{4dn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 3*n)*(a + b*x^n)^2)/(c + d*x^n),x]
```

```
[Out] -((c*(b*c - a*d)^2*x^n)/(d^4*n)) + ((b*c - a*d)^2*x^(2*n))/(2*d^3
*n) - (b*(b*c - 2*a*d)*x^(3*n))/(3*d^2*n) + (b^2*x^(4*n))/(4*d*n)
 + (c^2*(b*c - a*d)^2*Log[c + d*x^n])/(d^5*n)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{b^2x^{4n}}{4dn}+\frac{bx^{3n}(2ad-bc)}{3d^2n}+\frac{c^2(ad-bc)^2\log(c+dx^n)}{d^5n}+\frac{(ad-bc)^2\int^{x^n} x\,dx}{d^3n}-\frac{(ad-bc)^2\int^{x^n} c\,dx}{d^4n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)*(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] b**2*x**(4*n)/(4*d*n) + b*x**(3*n)*(2*a*d - b*c)/(3*d**2*n) + c**
2*(a*d - b*c)**2*log(c + d*x**n)/(d**5*n) + (a*d - b*c)**2*Integr
al(x, (x, x**n))/(d**3*n) - (a*d - b*c)**2*Integral(c, (x, x**n))
/(d**4*n)
```

Mathematica [A] time = 0.181159, size = 125, normalized size = 1.06

$$\frac{dx^n\left(6a^2d^2(dx^n-2c)+4abd\left(6c^2-3cdx^n+2d^2x^{2n}\right)+b^2\left(-12c^3+6c^2dx^n-4cd^2x^{2n}+3d^3x^{3n}\right)\right)+12c^2(bc-ad)^2\log(c}{12d^5n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 3*n)*(a + b*x^n)^2)/(c + d*x^n),x]
```

```
[Out] (d*x^n*(6*a^2*d^2*(-2*c + d*x^n) + 4*a*b*d*(6*c^2 - 3*c*d*x^n + 2
*d^2*x^(2*n)) + b^2*(-12*c^3 + 6*c^2*d*x^n - 4*c*d^2*x^(2*n) + 3*
d^3*x^(3*n))) + 12*c^2*(b*c - a*d)^2*Log[c + d*x^n])/(12*d^5*n)
```

Maple [B] time = 0.04, size = 236, normalized size = 2.

$$\frac{b^{2} \left(\mathrm{e}^{n \ln(x)}\right)^{4}}{4 d n}+\frac{\left(\mathrm{e}^{n \ln(x)}\right)^{2} a^{2}}{2 d n}-\frac{\left(\mathrm{e}^{n \ln(x)}\right)^{2} c a b}{d^{2} n}+\frac{b^{2} \left(\mathrm{e}^{n \ln(x)}\right)^{2} c^{2}}{2 d^{3} n} +\frac{2 b \left(\mathrm{e}^{n \ln(x)}\right)^{3} a}{3 d n}-\frac{b^{2} \left(\mathrm{e}^{n \ln(x)}\right)^{3} c}{3 d^{2} n}-\frac{c \mathrm{e}^{n \ln(x)} a^{2}}{d^{2} n}+2 \frac{c^{2} \mathrm{e}^{n \ln(x)} a b}{d^{3} n}-\frac{c^{3} \mathrm{e}^{n \ln(x)} b^{2}}{d^{4} n} +\frac{c^{2} \ln\left(c+d \mathrm{e}^{n \ln(x)}\right) a^{2}}{d^{3} n}-2 \frac{c^{3} \ln\left(c+d \mathrm{e}^{n \ln(x)}\right) a b}{d^{4} n}+\frac{c^{4} \ln\left(c+d \mathrm{e}^{n \ln(x)}\right) b^{2}}{d^{5} n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)*(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] 1/4*b^2/d/n*exp(n*ln(x))^4+1/2/d/n*exp(n*ln(x))^2*a^2-1/d^2/n*exp
(n*ln(x))^2*c*a*b+1/2/d^3/n*exp(n*ln(x))^2*b^2*c^2+2/3*b/d/n*exp(
n*ln(x))^3*a-1/3*b^2/d^2/n*exp(n*ln(x))^3*c-c/d^2/n*exp(n*ln(x))*
a^2+2*c^2/d^3/n*exp(n*ln(x))*a*b-c^3/d^4/n*exp(n*ln(x))*b^2+c^2/d
^3/n*ln(c+d*exp(n*ln(x)))*a^2-2*c^3/d^4/n*ln(c+d*exp(n*ln(x)))*a*
b+c^4/d^5/n*ln(c+d*exp(n*ln(x)))*b^2
```

Maxima [A] time = 1.38964, size = 259, normalized size = 2.19

$$\frac{1}{12} b^{2} \left(\frac{12 c^{4} \log\left(\frac{d x^{n}+c}{d}\right)}{d^{5} n}+\frac{3 d^{3} x^{4 n}-4 c d^{2} x^{3 n}+6 c^{2} d x^{2 n}-12 c^{3} x^{n}}{d^{4} n}\right) -\frac{1}{3} a b \left(\frac{6 c^{3} \log\left(\frac{d x^{n}+c}{d}\right)}{d^{4} n}-\frac{2 d^{2} x^{3 n}-3 c d x^{2 n}+6 c^{2} x^{n}}{d^{3} n}\right)+\frac{1}{2} a^{2} \left(\frac{2 c^{2} \log\left(\frac{d x^{n}+c}{d}\right)}{d^{3} n}+\frac{d x^{2 n}-2 c x^{n}}{d^{2} n}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^2*x^(3*n - 1)/(d*x^n + c),x, algorithm="maxima")
```

```
[Out] 1/12*b^2*(12*c^4*log((d*x^n + c)/d)/(d^5*n) + (3*d^3*x^(4*n) - 4*
c*d^2*x^(3*n) + 6*c^2*d*x^(2*n) - 12*c^3*x^n)/(d^4*n)) - 1/3*a*b*
(6*c^3*log((d*x^n + c)/d)/(d^4*n) - (2*d^2*x^(3*n) - 3*c*d*x^(2*n
) + 6*c^2*x^n)/(d^3*n)) + 1/2*a^2*(2*c^2*log((d*x^n + c)/d)/(d^3*
n) + (d*x^(2*n) - 2*c*x^n)/(d^2*n))
```

Fricas [A] time = 0.235193, size = 197, normalized size = 1.67

$$\frac{3 b^{2} d^{4} x^{4 n}-4 \left(b^{2} c d^{3}-2 a b d^{4}\right) x^{3 n}+6 \left(b^{2} c^{2} d^{2}-2 a b c d^{3}+a^{2} d^{4}\right) x^{2 n}-12 \left(b^{2} c^{3} d-2 a b c^{2} d^{2}+a^{2} c d^{3}\right) x^{n}+12 \left(b^{2} c^{4}-2 a b c\right.}{12 d^{5} n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^2*x^(3*n - 1)/(d*x^n + c),x, algorithm="fricas")
```

```
[Out] 1/12*(3*b^2*d^4*x^(4*n) - 4*(b^2*c*d^3 - 2*a*b*d^4)*x^(3*n) + 6*(
b^2*c^2*d^2 - 2*a*b*c*d^3 + a^2*d^4)*x^(2*n) - 12*(b^2*c^3*d - 2*
a*b*c^2*d^2 + a^2*c*d^3)*x^n + 12*(b^2*c^4 - 2*a*b*c^3*d + a^2*c^
2*d^2)*log(d*x^n + c))/(d^5*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)*(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^2 x^{3\,n-1}}{dx^n + c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^2*x^(3*n - 1)/(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^2*x^(3*n - 1)/(d*x^n + c), x)
```

3.878 $\int \frac{x^{-1+3n}(a+bx^n)}{c+dx^n}\,dx$

Optimal. Leaf size=86

$$-\frac{c^2(bc-ad)\log(c+dx^n)}{d^4n}+\frac{cx^n(bc-ad)}{d^3n}-\frac{x^{2n}(bc-ad)}{2d^2n}+\frac{bx^{3n}}{3dn}$$

```
[Out] (c*(b*c - a*d)*x^n)/(d^3*n) - ((b*c - a*d)*x^(2*n))/(2*d^2*n) + (
b*x^(3*n))/(3*d*n) - (c^2*(b*c - a*d)*Log[c + d*x^n])/(d^4*n)
```

Rubi [A] time = 0.210023, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083

$$-\frac{c^2(bc-ad)\log(c+dx^n)}{d^4n}+\frac{cx^n(bc-ad)}{d^3n}-\frac{x^{2n}(bc-ad)}{2d^2n}+\frac{bx^{3n}}{3dn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 3*n)*(a + b*x^n))/(c + d*x^n),x]
```

```
[Out] (c*(b*c - a*d)*x^n)/(d^3*n) - ((b*c - a*d)*x^(2*n))/(2*d^2*n) + (
b*x^(3*n))/(3*d*n) - (c^2*(b*c - a*d)*Log[c + d*x^n])/(d^4*n)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{bx^{3n}}{3dn}+\frac{c^2(ad-bc)\log(c+dx^n)}{d^4n}+\frac{(ad-bc)\int^{x^n}x\,dx}{d^2n}-\frac{(ad-bc)\int^{x^n}c\,dx}{d^3n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)*(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] b*x**(3*n)/(3*d*n) + c**2*(a*d - b*c)*log(c + d*x**n)/(d**4*n) +
(a*d - b*c)*Integral(x, (x, x**n))/(d**2*n) - (a*d - b*c)*Integra
l(c, (x, x**n))/(d**3*n)
```

Mathematica [A] time = 0.101414, size = 76, normalized size = 0.88

$$\frac{dx^n\left(3ad(dx^n-2c)+b\left(6c^2-3cdx^n+2d^2x^{2n}\right)\right)+6c^2(ad-bc)\log(c+dx^n)}{6d^4n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 3*n)*(a + b*x^n))/(c + d*x^n),x]
```

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

Maple [A] time = 0.036, size = 125, normalized size = 1.5

$$\frac{b\left(e^{n\ln(x)}\right)^3}{3\,dn}+\frac{\left(e^{n\ln(x)}\right)^2a}{2\,dn}-\frac{\left(e^{n\ln(x)}\right)^2bc}{2\,d^2n}-\frac{ce^{n\ln(x)}a}{d^2n}+\frac{c^2e^{n\ln(x)}b}{d^3n}+\frac{c^2\ln\left(c+de^{n\ln(x)}\right)a}{d^3n}-\frac{c^3\ln\left(c+de^{n\ln(x)}\right)b}{d^4n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)*(a+b*x^n)/(c+d*x^n),x)
```

```
[Out] 1/3*b/d/n*exp(n*ln(x))^3+1/2/d/n*exp(n*ln(x))^2*a-1/2/d^2/n*exp(n
*ln(x))^2*b*c-c/d^2/n*exp(n*ln(x))*a+c^2/d^3/n*exp(n*ln(x))*b+c^2
/d^3/n*ln(c+d*exp(n*ln(x)))*a-c^3/d^4/n*ln(c+d*exp(n*ln(x)))*b
```

Maxima [A] time = 1.44172, size = 151, normalized size = 1.76

$$-\frac{1}{6}\,b\left(\frac{6\,c^3\log\left(\frac{dx^n+c}{d}\right)}{d^4n}-\frac{2\,d^2x^{3\,n}-3\,cdx^{2\,n}+6\,c^2x^n}{d^3n}\right)+\frac{1}{2}\,a\left(\frac{2\,c^2\log\left(\frac{dx^n+c}{d}\right)}{d^3n}+\frac{dx^{2\,n}-2\,cx^n}{d^2n}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)*x^(3*n - 1)/(d*x^n + c),x, algorithm="maxima")
```

```
[Out] -1/6*b*(6*c^3*log((d*x^n + c)/d)/(d^4*n) - (2*d^2*x^(3*n) - 3*c*d
*x^(2*n) + 6*c^2*x^n)/(d^3*n)) + 1/2*a*(2*c^2*log((d*x^n + c)/d)/
(d^3*n) + (d*x^(2*n) - 2*c*x^n)/(d^2*n))
```

Fricas [A] time = 0.232691, size = 111, normalized size = 1.29

$$\frac{2\,bd^3x^{3\,n}-3\left(bcd^2-ad^3\right)x^{2\,n}+6\left(bc^2d-acd^2\right)x^n-6\left(bc^3-ac^2d\right)\log\left(dx^n+c\right)}{6\,d^4n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)*x^(3*n - 1)/(d*x^n + c),x, algorithm="fricas")
```

```
[Out] 1/6*(2*b*d^3*x^(3*n) - 3*(b*c*d^2 - a*d^3)*x^(2*n) + 6*(b*c^2*d -
 a*c*d^2)*x^n - 6*(b*c^3 - a*c^2*d)*log(d*x^n + c))/(d^4*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)*(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{(bx^n+a)x^{3\,n-1}}{dx^n+c}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)*x^(3*n - 1)/(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)*x^(3*n - 1)/(d*x^n + c), x)
```

3.879 $\int \frac{x^{-1+3n}}{(a+bx^n)(c+dx^n)}\,dx$

Optimal. Leaf size=71

$$\frac{a^2\log\left(a+bx^n\right)}{b^2n(bc-ad)}-\frac{c^2\log\left(c+dx^n\right)}{d^2n(bc-ad)}+\frac{x^n}{bdn}$$

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

Rubi [A] time = 0.20127, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{a^2\log\left(a+bx^n\right)}{b^2n(bc-ad)}-\frac{c^2\log\left(c+dx^n\right)}{d^2n(bc-ad)}+\frac{x^n}{bdn}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 3*n)/((a + b*x^n)*(c + d*x^n)),x]
```

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

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^2\log\left(a+bx^n\right)}{b^2n\left(ad-bc\right)}+\frac{c^2\log\left(c+dx^n\right)}{d^2n\left(ad-bc\right)}+\frac{\int^{x^n}\frac{1}{b}\,dx}{dn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] -a**2*log(a + b*x**n)/(b**2*n*(a*d - b*c)) + c**2*log(c + d*x**n)
/(d**2*n*(a*d - b*c)) + Integral(1/b, (x, x**n))/(d*n)
```

Mathematica [A] time = 0.141041, size = 66, normalized size = 0.93

$$\frac{a^2d^2\log\left(a+bx^n\right)+b\left(dx^n(bc-ad)-bc^2\log\left(c+dx^n\right)\right)}{b^2d^2n(bc-ad)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 3*n)/((a + b*x^n)*(c + d*x^n)),x]
```

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

Maple [A] time = 0.04, size = 78, normalized size = 1.1

$$\frac{e^{n\ln(x)}}{bdn}+\frac{c^2\ln\left(c+de^{n\ln(x)}\right)}{d^2n\left(ad-bc\right)}-\frac{a^2\ln\left(a+be^{n\ln(x)}\right)}{\left(ad-bc\right)b^2n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)/(a+b*x^n)/(c+d*x^n),x)
```

```
[Out] 1/b/d/n*exp(n*ln(x))+c^2/d^2/n/(a*d-b*c)*ln(c+d*exp(n*ln(x)))-a^2
/(a*d-b*c)/b^2/n*ln(a+b*exp(n*ln(x)))
```

Maxima [A] time = 1.39822, size = 109, normalized size = 1.54

$$\frac{a^2 \log\left(\frac{bx^n+a}{b}\right)}{b^3cn - ab^2dn} - \frac{c^2 \log\left(\frac{dx^n+c}{d}\right)}{bcd^2n - ad^3n} + \frac{x^n}{bdn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3*n - 1)/((b*x^n + a)*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] a^2*log((b*x^n + a)/b)/(b^3*c*n - a*b^2*d*n) - c^2*log((d*x^n + c
)/d)/(b*c*d^2*n - a*d^3*n) + x^n/(b*d*n)
```

Fricas [A] time = 0.242614, size = 100, normalized size = 1.41

$$\frac{a^2d^2 \log\left(bx^n + a\right) - b^2c^2 \log\left(dx^n + c\right) + \left(b^2cd - abd^2\right)x^n}{(b^3cd^2 - ab^2d^3)n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3*n - 1)/((b*x^n + a)*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] (a^2*d^2*log(b*x^n + a) - b^2*c^2*log(d*x^n + c) + (b^2*c*d - a*b
*d^2)*x^n)/((b^3*c*d^2 - a*b^2*d^3)*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)/(a+b*x**n)/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{3n-1}}{(bx^n + a)(dx^n + c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3*n - 1)/((b*x^n + a)*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(3*n - 1)/((b*x^n + a)*(d*x^n + c)), x)
```

3.880 $\int \frac{x^{-1+3n}}{(a+bx^n)^2(c+dx^n)}\,dx$

Optimal. Leaf size=95

$$-\frac{a^2}{b^2n(bc-ad)\,(a+bx^n)}-\frac{a(2bc-ad)\log\left(a+bx^n\right)}{b^2n(bc-ad)^2}+\frac{c^2\log\left(c+dx^n\right)}{dn(bc-ad)^2}$$

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

Rubi [A] time = 0.253573, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$-\frac{a^2}{b^2n(bc-ad)\,(a+bx^n)}-\frac{a(2bc-ad)\log\left(a+bx^n\right)}{b^2n(bc-ad)^2}+\frac{c^2\log\left(c+dx^n\right)}{dn(bc-ad)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 3*n)/((a + b*x^n)^2*(c + d*x^n)),x]
```

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

Rubi in Sympy [A] time = 34.6333, size = 76, normalized size = 0.8

$$\frac{a^2}{b^2n\left(a+bx^n\right)(ad-bc)}+\frac{a\,(ad-2bc)\log\left(a+bx^n\right)}{b^2n\,(ad-bc)^2}+\frac{c^2\log\left(c+dx^n\right)}{dn\,(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] a**2/(b**2*n*(a + b*x**n)*(a*d - b*c)) + a*(a*d - 2*b*c)*log(a +
b*x**n)/(b**2*n*(a*d - b*c)**2) + c**2*log(c + d*x**n)/(d*n*(a*d
- b*c)**2)
```

Mathematica [A] time = 0.187446, size = 93, normalized size = 0.98

$$-\frac{a^2}{b^2n(bc-ad)\,(a+bx^n)}+\frac{a(ad-2bc)\log\left(a+bx^n\right)}{b^2n(bc-ad)^2}+\frac{c^2\log\left(c+dx^n\right)}{dn(ad-bc)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 3*n)/((a + b*x^n)^2*(c + d*x^n)),x]
```

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

Maple [A] time = 0.049, size = 163, normalized size = 1.7

$$\frac{a^2}{(ad-bc)\,b^2n\left(a+b\mathrm{e}^{n\ln(x)}\right)}+\frac{c^2\ln\left(c+d\mathrm{e}^{n\ln(x)}\right)}{dn\left(a^2d^2-2\,cabd+b^2c^2\right)}+\frac{a^2\ln\left(a+b\mathrm{e}^{n\ln(x)}\right)d}{b^2\left(a^2d^2-2\,cabd+b^2c^2\right)n}-2\,\frac{a\ln\left(a+b\mathrm{e}^{n\ln(x)}\right)c}{\left(a^2d^2-2\,cabd+b^2c^2\right)bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)/(a+b*x^n)^2/(c+d*x^n),x)
```

```
[Out] a^2/(a*d-b*c)/b^2/n/(a+b*exp(n*ln(x)))+c^2/d/n/(a^2*d^2-2*a*b*c*d
+b^2*c^2)*ln(c+d*exp(n*ln(x)))+a^2/(a^2*d^2-2*a*b*c*d+b^2*c^2)/b^
2/n*ln(a+b*exp(n*ln(x)))*d-2*a/(a^2*d^2-2*a*b*c*d+b^2*c^2)/b/n*ln
(a+b*exp(n*ln(x)))*c
```

Maxima [A] time = 1.41626, size = 198, normalized size = 2.08

$$\frac{c^2\log\left(\frac{dx^n+c}{d}\right)}{b^2c^2dn-2\,abcd^2n+a^2d^3n}-\frac{a^2}{ab^3cn-a^2b^2dn+(b^4cn-ab^3dn)x^n}-\frac{\left(2\,abc-a^2d\right)\log\left(\frac{bx^n+a}{b}\right)}{b^4c^2n-2\,ab^3cdn+a^2b^2d^2n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3*n - 1)/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] c^2*log((d*x^n + c)/d)/(b^2*c^2*d*n - 2*a*b*c*d^2*n + a^2*d^3*n)
- a^2/(a*b^3*c*n - a^2*b^2*d*n + (b^4*c*n - a*b^3*d*n)*x^n) - (2*
a*b*c - a^2*d)*log((b*x^n + a)/b)/(b^4*c^2*n - 2*a*b^3*c*d*n + a^
2*b^2*d^2*n)
```

Fricas [A] time = 0.245683, size = 224, normalized size = 2.36

$$-\frac{a^2bcd-a^3d^2+\left(2\,a^2bcd-a^3d^2+\left(2\,ab^2cd-a^2bd^2\right)x^n\right)\log\left(bx^n+a\right)-\left(b^3c^2x^n+ab^2c^2\right)\log\left(dx^n+c\right)}{(b^5c^2d-2\,ab^4cd^2+a^2b^3d^3)nx^n+(ab^4c^2d-2\,a^2b^3cd^2+a^3b^2d^3)n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3*n - 1)/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] -(a^2*b*c*d - a^3*d^2 + (2*a^2*b*c*d - a^3*d^2 + (2*a*b^2*c*d - a
^2*b*d^2)*x^n)*log(b*x^n + a) - (b^3*c^2*x^n + a*b^2*c^2)*log(d*x
^n + c))/((b^5*c^2*d - 2*a*b^4*c*d^2 + a^2*b^3*d^3)*n*x^n + (a*b^
4*c^2*d - 2*a^2*b^3*c*d^2 + a^3*b^2*d^3)*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)/(a+b*x**n)**2/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{3n-1}}{(bx^n+a)^2(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/((b*x^n + a)^2*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(3*n - 1)/((b*x^n + a)^2*(d*x^n + c)), x)
```

3.881 $\int \frac{x^{-1+3n}}{(a+bx^n)^3(c+dx^n)}\,dx$

Optimal. Leaf size=120

$$-\frac{a^2}{2b^2n(bc-ad)(a+bx^n)^2}+\frac{a(2bc-ad)}{b^2n(bc-ad)^2(a+bx^n)}+\frac{c^2\log(a+bx^n)}{n(bc-ad)^3}-\frac{c^2\log(c+dx^n)}{n(bc-ad)^3}$$

```
[Out] -a^2/(2*b^2*(b*c - a*d)*n*(a + b*x^n)^2) + (a*(2*b*c - a*d))/(b^2
*(b*c - a*d)^2*n*(a + b*x^n)) + (c^2*Log[a + b*x^n])/((b*c - a*d)
^3*n) - (c^2*Log[c + d*x^n])/((b*c - a*d)^3*n)
```

Rubi [A] time = 0.296202, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$-\frac{a^2}{2b^2n(bc-ad)(a+bx^n)^2}+\frac{a(2bc-ad)}{b^2n(bc-ad)^2(a+bx^n)}+\frac{c^2\log(a+bx^n)}{n(bc-ad)^3}-\frac{c^2\log(c+dx^n)}{n(bc-ad)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 3*n)/((a + b*x^n)^3*(c + d*x^n)),x]
```

```
[Out] -a^2/(2*b^2*(b*c - a*d)*n*(a + b*x^n)^2) + (a*(2*b*c - a*d))/(b^2
*(b*c - a*d)^2*n*(a + b*x^n)) + (c^2*Log[a + b*x^n])/((b*c - a*d)
^3*n) - (c^2*Log[c + d*x^n])/((b*c - a*d)^3*n)
```

Rubi in Sympy [A] time = 43.96, size = 99, normalized size = 0.82

$$\frac{a^2}{2b^2n(a+bx^n)^2(ad-bc)}-\frac{a(ad-2bc)}{b^2n(a+bx^n)(ad-bc)^2}-\frac{c^2\log(a+bx^n)}{n(ad-bc)^3}+\frac{c^2\log(c+dx^n)}{n(ad-bc)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)/(a+b*x**n)**3/(c+d*x**n),x)
```

```
[Out] a**2/(2*b**2*n*(a + b*x**n)**2*(a*d - b*c)) - a*(a*d - 2*b*c)/(b*
*2*n*(a + b*x**n)*(a*d - b*c)**2) - c**2*log(a + b*x**n)/(n*(a*d
- b*c)**3) + c**2*log(c + d*x**n)/(n*(a*d - b*c)**3)
```

Mathematica [A] time = 0.225513, size = 120, normalized size = 1.

$$-\frac{a^2}{2b^2n(bc-ad)(a+bx^n)^2}-\frac{a(ad-2bc)}{b^2n(bc-ad)^2(a+bx^n)}+\frac{c^2\log(a+bx^n)}{n(bc-ad)^3}-\frac{c^2\log(c+dx^n)}{n(bc-ad)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 3*n)/((a + b*x^n)^3*(c + d*x^n)),x]
```

```
[Out] -a^2/(2*b^2*(b*c - a*d)*n*(a + b*x^n)^2) - (a*(-2*b*c + a*d))/(b^
2*(b*c - a*d)^2*n*(a + b*x^n)) + (c^2*Log[a + b*x^n])/((b*c - a*d
)^3*n) - (c^2*Log[c + d*x^n])/((b*c - a*d)^3*n)
```

Maple [A] time = 0.086, size = 214, normalized size = 1.8

$$\frac{1}{\left(a+be^{n\ln(x)}\right)^{2}}\left(\frac{(-ad+2\,bc)\,ae^{n\ln(x)}}{nb\,(a^{2}d^{2}-2\,cabd+b^{2}c^{2})}+\frac{a^{2}\,(-ad+3\,bc)}{(2\,a^{2}d^{2}-4\,cabd+2\,b^{2}c^{2})\,b^{2}n}\right)+\frac{c^{2}\ln\left(c+de^{n\ln(x)}\right)}{n\,(a^{3}d^{3}-3\,a^{2}cd^{2}b+3\,ac^{2}db^{2}-c^{3}b^{3})}-\frac{c^{2}\ln\left(a+be^{n\ln(x)}\right)}{n\,(a^{3}d^{3}-3\,a^{2}cd^{2}b+3\,ac^{2}db^{2}-c^{3}b^{3})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(-1+3*n)/(a+b*x^n)^3/(c+d*x^n),x)
```

```
[Out] ((-a*d+2*b*c)*a/n/b/(a^2*d^2-2*a*b*c*d+b^2*c^2)*exp(n*ln(x))+1/2*
a^2*(-a*d+3*b*c)/(a^2*d^2-2*a*b*c*d+b^2*c^2)/b^2/n)/(a+b*exp(n*ln
(x)))^2+c^2/n/(a^3*d^3-3*a^2*b*c*d^2+3*a*b^2*c^2*d-b^3*c^3)*ln(c+
d*exp(n*ln(x)))-c^2/n/(a^3*d^3-3*a^2*b*c*d^2+3*a*b^2*c^2*d-b^3*c^
3)*ln(a+b*exp(n*ln(x)))
```

Maxima [A] time = 1.40517, size = 354, normalized size = 2.95

$$\frac{c^{2}\log\left(\frac{bx^{n}+a}{b}\right)}{b^{3}c^{3}n-3\,ab^{2}c^{2}dn+3\,a^{2}bcd^{2}n-a^{3}d^{3}n}-\frac{c^{2}\log\left(\frac{dx^{n}+c}{d}\right)}{b^{3}c^{3}n-3\,ab^{2}c^{2}dn+3\,a^{2}bcd^{2}n-a^{3}d^{3}n}+\frac{3\,a^{2}bc-a^{3}d+2\left(2\,ab^{2}c-a^{2}bd\right)x^{n}}{2\,(a^{2}b^{4}c^{2}n-2\,a^{3}b^{3}cdn+a^{4}b^{2}d^{2}n+(b^{6}c^{2}n-2\,ab^{5}cdn+a^{2}b^{4}d^{2}n)x^{2\,n}+2\,(ab^{5}c^{2}n-2\,a^{2}b^{4}cdn+a^{3}b^{3}d^{2}n)x^{n})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/((b*x^n + a)^3*(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] c^2*log((b*x^n + a)/b)/(b^3*c^3*n - 3*a*b^2*c^2*d*n + 3*a^2*b*c*d
^2*n - a^3*d^3*n) - c^2*log((d*x^n + c)/d)/(b^3*c^3*n - 3*a*b^2*c
^2*d*n + 3*a^2*b*c*d^2*n - a^3*d^3*n) + 1/2*(3*a^2*b*c - a^3*d +
2*(2*a*b^2*c - a^2*b*d)*x^n)/(a^2*b^4*c^2*n - 2*a^3*b^3*c*d*n + a
^4*b^2*d^2*n + (b^6*c^2*n - 2*a*b^5*c*d*n + a^2*b^4*d^2*n)*x^(2*n
) + 2*(a*b^5*c^2*n - 2*a^2*b^4*c*d*n + a^3*b^3*d^2*n)*x^n)
```

Fricas [A] time = 0.242588, size = 406, normalized size = 3.38

$$\frac{3\,a^{2}b^{2}c^{2}-4\,a^{3}bcd+a^{4}d^{2}+2\left(2\,ab^{3}c^{2}-3\,a^{2}b^{2}cd+a^{3}bd^{2}\right)x^{n}+2\left(b^{4}c^{2}x^{2\,n}+2\,ab^{3}c^{2}x^{n}+a^{2}b^{2}c^{2}\right)\log\left(bx^{n}+a\right)-2\left(b^{4}c^{2}x^{2}\right.}{2\,((b^{7}c^{3}-3\,ab^{6}c^{2}d+3\,a^{2}b^{5}cd^{2}-a^{3}b^{4}d^{3})nx^{2\,n}+2\,(ab^{6}c^{3}-3\,a^{2}b^{5}c^{2}d+3\,a^{3}b^{4}cd^{2}-a^{4}b^{3}d^{3})nx^{n}+(a^{2}b^{5}c^{3}-3\,a^{3}b^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/((b*x^n + a)^3*(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] 1/2*(3*a^2*b^2*c^2 - 4*a^3*b*c*d + a^4*d^2 + 2*(2*a*b^3*c^2 - 3*a
^2*b^2*c*d + a^3*b*d^2)*x^n + 2*(b^4*c^2*x^(2*n) + 2*a*b^3*c^2*x^
n + a^2*b^2*c^2)*log(b*x^n + a) - 2*(b^4*c^2*x^(2*n) + 2*a*b^3*c^
2*x^n + a^2*b^2*c^2)*log(d*x^n + c))/((b^7*c^3 - 3*a*b^6*c^2*d +
3*a^2*b^5*c*d^2 - a^3*b^4*d^3)*n*x^(2*n) + 2*(a*b^6*c^3 - 3*a^2*b
^5*c^2*d + 3*a^3*b^4*c*d^2 - a^4*b^3*d^3)*n*x^n + (a^2*b^5*c^3 -
3*a^3*b^4*c^2*d + 3*a^4*b^3*c*d^2 - a^5*b^2*d^3)*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)/(a+b*x**n)**3/(c+d*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{3\,n-1}}{(bx^n+a)^3(dx^n+c)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3*n - 1)/((b*x^n + a)^3*(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(3*n - 1)/((b*x^n + a)^3*(d*x^n + c)), x)
```

3.882 $\int x^{13}(b+cx)^{13}(b+2cx)\,dx$

Optimal. Leaf size=14

$$\frac{1}{14}x^{14}(b+cx)^{14}$$

```
[Out] (x^14*(b + c*x)^14)/14
```

Rubi [A] time = 0.016969, antiderivative size = 14, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$

$$\frac{1}{14}x^{14}(b+cx)^{14}$$

Antiderivative was successfully verified.

```
[In]  Int[x^13*(b + c*x)^13*(b + 2*c*x),x]
```

```
[Out] (x^14*(b + c*x)^14)/14
```

Rubi in Sympy [A] time = 4.37269, size = 10, normalized size = 0.71

$$\frac{x^{14}\left(b+cx\right)^{14}}{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**13*(c*x+b)**13*(2*c*x+b),x)
```

```
[Out] x**14*(b + c*x)**14/14
```

Mathematica [B] time = 0.00902768, size = 172, normalized size = 12.29

$$\frac{b^{14}x^{14}}{14}+b^{13}cx^{15}+\frac{13}{2}b^{12}c^2x^{16}+26b^{11}c^3x^{17}+\frac{143}{2}b^{10}c^4x^{18}+143b^9c^5x^{19}+\frac{429}{2}b^8c^6x^{20}+\frac{1716}{7}b^7c^7x^{21}+\frac{429}{2}b^6c^8x^{22}+143b^5c^9x^{23}+\frac{143}{2}b^4c^{10}x^{24}+26b^3c^{11}x^{25}+\frac{13}{2}b^2c^{12}x^{26}+bc^{13}x^{27}+\frac{c^{14}x^{28}}{14}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^13*(b + c*x)^13*(b + 2*c*x),x]
```

```
[Out] (b^14*x^14)/14 + b^13*c*x^15 + (13*b^12*c^2*x^16)/2 + 26*b^11*c^3
*x^17 + (143*b^10*c^4*x^18)/2 + 143*b^9*c^5*x^19 + (429*b^8*c^6*x
^20)/2 + (1716*b^7*c^7*x^21)/7 + (429*b^6*c^8*x^22)/2 + 143*b^5*c
^9*x^23 + (143*b^4*c^10*x^24)/2 + 26*b^3*c^11*x^25 + (13*b^2*c^12
*x^26)/2 + b*c^13*x^27 + (c^14*x^28)/14
```

Maple [B] time = 0.004, size = 155, normalized size = 11.1

$$\frac{c^{14}x^{28}}{14}+bc^{13}x^{27}+\frac{13\,b^2c^{12}x^{26}}{2}+26\,b^3c^{11}x^{25}+\frac{143\,b^4c^{10}x^{24}}{2}+143\,b^5c^9x^{23}+\frac{429\,b^6c^8x^{22}}{2}+\frac{1716\,b^7c^7x^{21}}{7}+\frac{429\,b^8c^6x^{20}}{2}+143\,b^9c^5x^{19}+\frac{143\,b^{10}c^4x^{18}}{2}+26\,b^{11}c^3x^{17}+\frac{13\,b^{12}c^2x^{16}}{2}+b^{13}cx^{15}+\frac{b^{14}x^{14}}{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^13*(c*x+b)^13*(2*c*x+b),x)
```

```
[Out] 1/14*c^14*x^28+b*c^13*x^27+13/2*b^2*c^12*x^26+26*b^3*c^11*x^25+14
3/2*b^4*c^10*x^24+143*b^5*c^9*x^23+429/2*b^6*c^8*x^22+1716/7*b^7*
c^7*x^21+429/2*b^8*c^6*x^20+143*b^9*c^5*x^19+143/2*b^10*c^4*x^18+
26*b^11*c^3*x^17+13/2*b^12*c^2*x^16+b^13*c*x^15+1/14*b^14*x^14
```

Maxima [A] time = 1.36941, size = 208, normalized size = 14.86

$$\frac{1}{14}\,c^{14}x^{28}+bc^{13}x^{27}+\frac{13}{2}\,b^{2}c^{12}x^{26}+26\,b^{3}c^{11}x^{25}+\frac{143}{2}\,b^{4}c^{10}x^{24}+143\,b^{5}c^{9}x^{23}+\frac{429}{2}\,b^{6}c^{8}x^{22}+\frac{1716}{7}\,b^{7}c^{7}x^{21}+\frac{429}{2}\,b^{8}c^{6}x^{20}+143\,b^{9}c^{5}x^{19}+\frac{143}{2}\,b^{10}c^{4}x^{18}+26\,b^{11}c^{3}x^{17}+\frac{13}{2}\,b^{12}c^{2}x^{16}+b^{13}cx^{15}+\frac{1}{14}\,b^{14}x^{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((2*c*x + b)*(c*x + b)^13*x^13,x, algorithm="maxima")
```

```
[Out] 1/14*c^14*x^28 + b*c^13*x^27 + 13/2*b^2*c^12*x^26 + 26*b^3*c^11*x
^25 + 143/2*b^4*c^10*x^24 + 143*b^5*c^9*x^23 + 429/2*b^6*c^8*x^22
 + 1716/7*b^7*c^7*x^21 + 429/2*b^8*c^6*x^20 + 143*b^9*c^5*x^19 +
143/2*b^10*c^4*x^18 + 26*b^11*c^3*x^17 + 13/2*b^12*c^2*x^16 + b^1
3*c*x^15 + 1/14*b^14*x^14
```

Fricas [A] time = 0.185686, size = 1, normalized size = 0.07

$$\frac{1}{14}x^{28}c^{14}+x^{27}c^{13}b+\frac{13}{2}x^{26}c^{12}b^{2}+26x^{25}c^{11}b^{3}+\frac{143}{2}x^{24}c^{10}b^{4}+143x^{23}c^{9}b^{5}+\frac{429}{2}x^{22}c^{8}b^{6}+\frac{1716}{7}x^{21}c^{7}b^{7}+\frac{429}{2}x^{20}c^{6}b^{8}+143x^{19}c^{5}b^{9}+\frac{143}{2}x^{18}c^{4}b^{10}+26x^{17}c^{3}b^{11}+\frac{13}{2}x^{16}c^{2}b^{12}+x^{15}cb^{13}+\frac{1}{14}x^{14}b^{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((2*c*x + b)*(c*x + b)^13*x^13,x, algorithm="fricas")
```

```
[Out] 1/14*x^28*c^14 + x^27*c^13*b + 13/2*x^26*c^12*b^2 + 26*x^25*c^11*
b^3 + 143/2*x^24*c^10*b^4 + 143*x^23*c^9*b^5 + 429/2*x^22*c^8*b^6
 + 1716/7*x^21*c^7*b^7 + 429/2*x^20*c^6*b^8 + 143*x^19*c^5*b^9 +
143/2*x^18*c^4*b^10 + 26*x^17*c^3*b^11 + 13/2*x^16*c^2*b^12 + x^1
5*c*b^13 + 1/14*x^14*b^14
```

Sympy [A] time = 0.1213, size = 175, normalized size = 12.5

$$\frac{b^{14}x^{14}}{14}+b^{13}cx^{15}+\frac{13b^{12}c^{2}x^{16}}{2}+26b^{11}c^{3}x^{17}+\frac{143b^{10}c^{4}x^{18}}{2}+143b^{9}c^{5}x^{19}+\frac{429b^{8}c^{6}x^{20}}{2}+\frac{1716b^{7}c^{7}x^{21}}{7}+\frac{429b^{6}c^{8}x^{22}}{2}+143b^{5}c^{9}x^{23}+\frac{143b^{4}c^{10}x^{24}}{2}+26b^{3}c^{11}x^{25}+\frac{13b^{2}c^{12}x^{26}}{2}+bc^{13}x^{27}+\frac{c^{14}x^{28}}{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**13*(c*x+b)**13*(2*c*x+b),x)
```

```
[Out] b**14*x**14/14 + b**13*c*x**15 + 13*b**12*c**2*x**16/2 + 26*b**11
*c**3*x**17 + 143*b**10*c**4*x**18/2 + 143*b**9*c**5*x**19 + 429*
b**8*c**6*x**20/2 + 1716*b**7*c**7*x**21/7 + 429*b**6*c**8*x**22/
```

```
2 + 143*b**5*c**9*x**23 + 143*b**4*c**10*x**24/2 + 26*b**3*c**11*
x**25 + 13*b**2*c**12*x**26/2 + b*c**13*x**27 + c**14*x**28/14
```

GIAC/XCAS [A] time = 0.208466, size = 208, normalized size = 14.86

$$\frac{1}{14}c^{14}x^{28} + bc^{13}x^{27} + \frac{13}{2}b^2c^{12}x^{26} + 26b^3c^{11}x^{25} + \frac{143}{2}b^4c^{10}x^{24} + 143b^5c^9x^{23} + \frac{429}{2}b^6c^8x^{22} + \frac{1716}{7}b^7c^7x^{21} + \frac{429}{2}b^8c^6x^{20} + 143b^9c^5x^{19} + \frac{143}{2}b^{10}c^4x^{18} + 26b^{11}c^3x^{17} + \frac{13}{2}b^{12}c^2x^{16} + b^{13}cx^{15} + \frac{1}{14}b^{14}x^{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)*(c*x + b)^13*x^13,x, algorithm="giac")
```

```
[Out] 1/14*c^14*x^28 + b*c^13*x^27 + 13/2*b^2*c^12*x^26 + 26*b^3*c^11*x
^25 + 143/2*b^4*c^10*x^24 + 143*b^5*c^9*x^23 + 429/2*b^6*c^8*x^22
 + 1716/7*b^7*c^7*x^21 + 429/2*b^8*c^6*x^20 + 143*b^9*c^5*x^19 +
143/2*b^10*c^4*x^18 + 26*b^11*c^3*x^17 + 13/2*b^12*c^2*x^16 + b^1
3*c*x^15 + 1/14*b^14*x^14
```

3.883 $\int x^{27} \left(b+cx^2\right)^{13} \left(b+2cx^2\right) \, dx$

Optimal. Leaf size=16

$$\frac{1}{28}x^{28}\left(b+cx^2\right)^{14}$$

```
[Out] (x^28*(b + c*x^2)^14)/28
```

Rubi [A] time = 0.0179366, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$

$$\frac{1}{28}x^{28}\left(b+cx^2\right)^{14}$$

Antiderivative was successfully verified.

```
[In]  Int[x^27*(b + c*x^2)^13*(b + 2*c*x^2),x]
```

```
[Out] (x^28*(b + c*x^2)^14)/28
```

Rubi in Sympy [A] time = 11.3217, size = 12, normalized size = 0.75

$$\frac{x^{28}\left(b+cx^2\right)^{14}}{28}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**27*(c*x**2+b)**13*(2*c*x**2+b),x)
```

```
[Out] x**28*(b + c*x**2)**14/28
```

Mathematica [B] time = 0.00967309, size = 182, normalized size = 11.38

$$\frac{b^{14}x^{28}}{28}+\frac{1}{2}b^{13}cx^{30}+\frac{13}{4}b^{12}c^2x^{32}+13b^{11}c^3x^{34}+\frac{143}{4}b^{10}c^4x^{36}+\frac{143}{2}b^9c^5x^{38}+\frac{429}{4}b^8c^6x^{40}+\frac{858}{7}b^7c^7x^{42}+\frac{429}{4}b^6c^8x^{44}+\frac{143}{2}b^5c^9x^{46}+\frac{143}{4}b^4c^{10}x^{48}+13b^3c^{11}x^{50}+\frac{13}{4}b^2c^{12}x^{52}+\frac{1}{2}bc^{13}x^{54}+\frac{c^{14}x^{56}}{28}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^27*(b + c*x^2)^13*(b + 2*c*x^2),x]
```

```
[Out] (b^14*x^28)/28 + (b^13*c*x^30)/2 + (13*b^12*c^2*x^32)/4 + 13*b^11
*c^3*x^34 + (143*b^10*c^4*x^36)/4 + (143*b^9*c^5*x^38)/2 + (429*b
^8*c^6*x^40)/4 + (858*b^7*c^7*x^42)/7 + (429*b^6*c^8*x^44)/4 + (1
43*b^5*c^9*x^46)/2 + (143*b^4*c^10*x^48)/4 + 13*b^3*c^11*x^50 + (
13*b^2*c^12*x^52)/4 + (b*c^13*x^54)/2 + (c^14*x^56)/28
```

Maple [B] time = 0.003, size = 157, normalized size = 9.8

$$\frac{c^{14}x^{56}}{28}+\frac{bc^{13}x^{54}}{2}+\frac{13\,b^2c^{12}x^{52}}{4}+13\,b^3c^{11}x^{50}+\frac{143\,b^4c^{10}x^{48}}{4}+\frac{143\,b^5c^9x^{46}}{2}+\frac{429\,b^6c^8x^{44}}{4}+\frac{858\,b^7c^7x^{42}}{7}+\frac{429\,b^8c^6x^{40}}{4}+\frac{143\,b^9c^5x^{38}}{2}+\frac{143\,b^{10}c^4x^{36}}{4}+13\,b^{11}c^3x^{34}+\frac{13\,b^{12}c^2x^{32}}{4}+\frac{b^{13}cx^{30}}{2}+\frac{b^{14}x^{28}}{28}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^27*(c*x^2+b)^13*(2*c*x^2+b),x)
```

```
[Out] 1/28*c^14*x^56+1/2*b*c^13*x^54+13/4*b^2*c^12*x^52+13*b^3*c^11*x^5
0+143/4*b^4*c^10*x^48+143/2*b^5*c^9*x^46+429/4*b^6*c^8*x^44+858/7
*b^7*c^7*x^42+429/4*b^8*c^6*x^40+143/2*b^9*c^5*x^38+143/4*b^10*c^
4*x^36+13*b^11*c^3*x^34+13/4*b^12*c^2*x^32+1/2*b^13*c*x^30+1/28*b
^14*x^28
```

Maxima [A] time = 1.37972, size = 211, normalized size = 13.19

$$\frac{1}{28}\,c^{14}x^{56} + \frac{1}{2}\,bc^{13}x^{54} + \frac{13}{4}\,b^{2}c^{12}x^{52} + 13\,b^{3}c^{11}x^{50} + \frac{143}{4}\,b^{4}c^{10}x^{48} + \frac{143}{2}\,b^{5}c^{9}x^{46} + \frac{429}{4}\,b^{6}c^{8}x^{44} + \frac{858}{7}\,b^{7}c^{7}x^{42} + \frac{429}{4}\,b^{8}c^{6}x^{40} + \frac{143}{2}\,b^{9}c^{5}x^{38} + \frac{143}{4}\,b^{10}c^{4}x^{36} + 13\,b^{11}c^{3}x^{34} + \frac{13}{4}\,b^{12}c^{2}x^{32} + \frac{1}{2}\,b^{13}cx^{30} + \frac{1}{28}\,b^{14}x^{28}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((2*c*x^2 + b)*(c*x^2 + b)^13*x^27,x, algorithm="maxima")
```

```
[Out] 1/28*c^14*x^56 + 1/2*b*c^13*x^54 + 13/4*b^2*c^12*x^52 + 13*b^3*c^
11*x^50 + 143/4*b^4*c^10*x^48 + 143/2*b^5*c^9*x^46 + 429/4*b^6*c^
8*x^44 + 858/7*b^7*c^7*x^42 + 429/4*b^8*c^6*x^40 + 143/2*b^9*c^5*
x^38 + 143/4*b^10*c^4*x^36 + 13*b^11*c^3*x^34 + 13/4*b^12*c^2*x^3
2 + 1/2*b^13*c*x^30 + 1/28*b^14*x^28
```

Fricas [A] time = 0.189784, size = 1, normalized size = 0.06

$$\frac{1}{28}x^{56}c^{14} + \frac{1}{2}x^{54}c^{13}b + \frac{13}{4}x^{52}c^{12}b^{2} + 13x^{50}c^{11}b^{3} + \frac{143}{4}x^{48}c^{10}b^{4} + \frac{143}{2}x^{46}c^{9}b^{5} + \frac{429}{4}x^{44}c^{8}b^{6} + \frac{858}{7}x^{42}c^{7}b^{7} + \frac{429}{4}x^{40}c^{6}b^{8} + \frac{143}{2}x^{38}c^{5}b^{9} + \frac{143}{4}x^{36}c^{4}b^{10} + 13x^{34}c^{3}b^{11} + \frac{13}{4}x^{32}c^{2}b^{12} + \frac{1}{2}x^{30}cb^{13} + \frac{1}{28}x^{28}b^{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((2*c*x^2 + b)*(c*x^2 + b)^13*x^27,x, algorithm="fricas")
```

```
[Out] 1/28*x^56*c^14 + 1/2*x^54*c^13*b + 13/4*x^52*c^12*b^2 + 13*x^50*c
^11*b^3 + 143/4*x^48*c^10*b^4 + 143/2*x^46*c^9*b^5 + 429/4*x^44*c
^8*b^6 + 858/7*x^42*c^7*b^7 + 429/4*x^40*c^6*b^8 + 143/2*x^38*c^5
*b^9 + 143/4*x^36*c^4*b^10 + 13*x^34*c^3*b^11 + 13/4*x^32*c^2*b^1
2 + 1/2*x^30*c*b^13 + 1/28*x^28*b^14
```

Sympy [A] time = 0.130842, size = 182, normalized size = 11.38

$$\frac{b^{14}x^{28}}{28} + \frac{b^{13}cx^{30}}{2} + \frac{13b^{12}c^{2}x^{32}}{4} + 13b^{11}c^{3}x^{34} + \frac{143b^{10}c^{4}x^{36}}{4} + \frac{143b^{9}c^{5}x^{38}}{2} + \frac{429b^{8}c^{6}x^{40}}{4} + \frac{858b^{7}c^{7}x^{42}}{7} + \frac{429b^{6}c^{8}x^{44}}{4} + \frac{143b^{5}c^{9}x^{46}}{2} + \frac{143b^{4}c^{10}x^{48}}{4} + 13b^{3}c^{11}x^{50} + \frac{13b^{2}c^{12}x^{52}}{4} + \frac{bc^{13}x^{54}}{2} + \frac{c^{14}x^{56}}{28}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**27*(c*x**2+b)**13*(2*c*x**2+b),x)
```

```
[Out] b**14*x**28/28 + b**13*c*x**30/2 + 13*b**12*c**2*x**32/4 + 13*b**
11*c**3*x**34 + 143*b**10*c**4*x**36/4 + 143*b**9*c**5*x**38/2 +
```

```
429*b**8*c**6*x**40/4 + 858*b**7*c**7*x**42/7 + 429*b**6*c**8*x**
44/4 + 143*b**5*c**9*x**46/2 + 143*b**4*c**10*x**48/4 + 13*b**3*c
**11*x**50 + 13*b**2*c**12*x**52/4 + b*c**13*x**54/2 + c**14*x**5
6/28
```

GIAC/XCAS [A] time = 0.208322, size = 211, normalized size = 13.19

$$\frac{1}{28}\,c^{14}x^{56} + \frac{1}{2}\,bc^{13}x^{54} + \frac{13}{4}\,b^2c^{12}x^{52} + 13\,b^3c^{11}x^{50} + \frac{143}{4}\,b^4c^{10}x^{48} + \frac{143}{2}\,b^5c^9x^{46} + \frac{429}{4}\,b^6c^8x^{44} + \frac{858}{7}\,b^7c^7x^{42} + \frac{429}{4}\,b^8c^6x^{40} + \frac{143}{2}\,b^9c^5x^{38} + \frac{143}{4}\,b^{10}c^4x^{36} + 13\,b^{11}c^3x^{34} + \frac{13}{4}\,b^{12}c^2x^{32} + \frac{1}{2}\,b^{13}cx^{30} + \frac{1}{28}\,b^{14}x^{28}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^2 + b)*(c*x^2 + b)^13*x^27,x, algorithm="giac")
```

```
[Out] 1/28*c^14*x^56 + 1/2*b*c^13*x^54 + 13/4*b^2*c^12*x^52 + 13*b^3*c^
11*x^50 + 143/4*b^4*c^10*x^48 + 143/2*b^5*c^9*x^46 + 429/4*b^6*c^
8*x^44 + 858/7*b^7*c^7*x^42 + 429/4*b^8*c^6*x^40 + 143/2*b^9*c^5*
x^38 + 143/4*b^10*c^4*x^36 + 13*b^11*c^3*x^34 + 13/4*b^12*c^2*x^3
2 + 1/2*b^13*c*x^30 + 1/28*b^14*x^28
```

3.884 $\int x^{41} \left(b+cx^3\right)^{13} \left(b+2cx^3\right) \, dx$

Optimal. Leaf size=16

$$\frac{1}{42}x^{42}\left(b+cx^3\right)^{14}$$

```
[Out] (x^42*(b + c*x^3)^14)/42
```

Rubi [A] time = 0.0178861, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$

$$\frac{1}{42}x^{42}\left(b+cx^3\right)^{14}$$

Antiderivative was successfully verified.

```
[In]  Int[x^41*(b + c*x^3)^13*(b + 2*c*x^3),x]
```

```
[Out] (x^42*(b + c*x^3)^14)/42
```

Rubi in Sympy [A] time = 10.7442, size = 12, normalized size = 0.75

$$\frac{x^{42}\left(b+cx^3\right)^{14}}{42}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**41*(c*x**3+b)**13*(2*c*x**3+b),x)
```

```
[Out] x**42*(b + c*x**3)**14/42
```

Mathematica [B] time = 0.0105319, size = 186, normalized size = 11.62

$$\frac{b^{14}x^{42}}{42}+\frac{1}{3}b^{13}cx^{45}+\frac{13}{6}b^{12}c^2x^{48}+\frac{26}{3}b^{11}c^3x^{51}+\frac{143}{6}b^{10}c^4x^{54}+\frac{143}{3}b^9c^5x^{57}+\frac{143}{2}b^8c^6x^{60}+\frac{572}{7}b^7c^7x^{63}+\frac{143}{2}b^6c^8x^{66}+\frac{143}{3}b^5c^9x^{69}+\frac{143}{6}b^4c^{10}x^{72}+\frac{26}{3}b^3c^{11}x^{75}+\frac{13}{6}b^2c^{12}x^{78}+\frac{1}{3}bc^{13}x^{81}+\frac{c^{14}x^{84}}{42}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^41*(b + c*x^3)^13*(b + 2*c*x^3),x]
```

```
[Out] (b^14*x^42)/42 + (b^13*c*x^45)/3 + (13*b^12*c^2*x^48)/6 + (26*b^1
1*c^3*x^51)/3 + (143*b^10*c^4*x^54)/6 + (143*b^9*c^5*x^57)/3 + (1
43*b^8*c^6*x^60)/2 + (572*b^7*c^7*x^63)/7 + (143*b^6*c^8*x^66)/2
+ (143*b^5*c^9*x^69)/3 + (143*b^4*c^10*x^72)/6 + (26*b^3*c^11*x^7
5)/3 + (13*b^2*c^12*x^78)/6 + (b*c^13*x^81)/3 + (c^14*x^84)/42
```

Maple [B] time = 0.001, size = 157, normalized size = 9.8

$$\frac{c^{14}x^{84}}{42}+\frac{bc^{13}x^{81}}{3}+\frac{13\,b^2c^{12}x^{78}}{6}+\frac{26\,b^3c^{11}x^{75}}{3}+\frac{143\,b^4c^{10}x^{72}}{6}+\frac{143\,b^5c^9x^{69}}{3}+\frac{143\,b^6c^8x^{66}}{2}+\frac{572\,b^7c^7x^{63}}{7}+\frac{143\,b^8c^6x^{60}}{2}+\frac{143\,b^9c^5x^{57}}{3}+\frac{143\,b^{10}c^4x^{54}}{6}+\frac{26\,b^{11}c^3x^{51}}{3}+\frac{13\,b^{12}c^2x^{48}}{6}+\frac{b^{13}cx^{45}}{3}+\frac{b^{14}x^{42}}{42}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^41*(c*x^3+b)^13*(2*c*x^3+b),x)
```

```
[Out] 1/42*c^14*x^84+1/3*b*c^13*x^81+13/6*b^2*c^12*x^78+26/3*b^3*c^11*x
^75+143/6*b^4*c^10*x^72+143/3*b^5*c^9*x^69+143/2*b^6*c^8*x^66+572
/7*b^7*c^7*x^63+143/2*b^8*c^6*x^60+143/3*b^9*c^5*x^57+143/6*b^10*
c^4*x^54+26/3*b^11*c^3*x^51+13/6*b^12*c^2*x^48+1/3*b^13*c*x^45+1/
42*b^14*x^42
```

Maxima [A] time = 1.38234, size = 211, normalized size = 13.19

$$\frac{1}{42}c^{14}x^{84}+\frac{1}{3}bc^{13}x^{81}+\frac{13}{6}b^2c^{12}x^{78}+\frac{26}{3}b^3c^{11}x^{75}+\frac{143}{6}b^4c^{10}x^{72}+\frac{143}{3}b^5c^9x^{69}+\frac{143}{2}b^6c^8x^{66}+\frac{572}{7}b^7c^7x^{63}+\frac{143}{2}b^8c^6x^{60}+\frac{143}{3}b^9c^5x^{57}+\frac{143}{6}b^{10}c^4x^{54}+\frac{26}{3}b^{11}c^3x^{51}+\frac{13}{6}b^{12}c^2x^{48}+\frac{1}{3}b^{13}cx^{45}+\frac{1}{42}b^{14}x^{42}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^3 + b)*(c*x^3 + b)^13*x^41,x, algorithm="maxima")
```

```
[Out] 1/42*c^14*x^84 + 1/3*b*c^13*x^81 + 13/6*b^2*c^12*x^78 + 26/3*b^3*
c^11*x^75 + 143/6*b^4*c^10*x^72 + 143/3*b^5*c^9*x^69 + 143/2*b^6*
c^8*x^66 + 572/7*b^7*c^7*x^63 + 143/2*b^8*c^6*x^60 + 143/3*b^9*c^
5*x^57 + 143/6*b^10*c^4*x^54 + 26/3*b^11*c^3*x^51 + 13/6*b^12*c^2
*x^48 + 1/3*b^13*c*x^45 + 1/42*b^14*x^42
```

Fricas [A] time = 0.186896, size = 1, normalized size = 0.06

$$\frac{1}{42}x^{84}c^{14}+\frac{1}{3}x^{81}c^{13}b+\frac{13}{6}x^{78}c^{12}b^2+\frac{26}{3}x^{75}c^{11}b^3+\frac{143}{6}x^{72}c^{10}b^4+\frac{143}{3}x^{69}c^9b^5+\frac{143}{2}x^{66}c^8b^6+\frac{572}{7}x^{63}c^7b^7+\frac{143}{2}x^{60}c^6b^8+\frac{143}{3}x^{57}c^5b^9+\frac{143}{6}x^{54}c^4b^{10}+\frac{26}{3}x^{51}c^3b^{11}+\frac{13}{6}x^{48}c^2b^{12}+\frac{1}{3}x^{45}cb^{13}+\frac{1}{42}x^{42}b^{14}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^3 + b)*(c*x^3 + b)^13*x^41,x, algorithm="fricas")
```

```
[Out] 1/42*x^84*c^14 + 1/3*x^81*c^13*b + 13/6*x^78*c^12*b^2 + 26/3*x^75
*c^11*b^3 + 143/6*x^72*c^10*b^4 + 143/3*x^69*c^9*b^5 + 143/2*x^66
*c^8*b^6 + 572/7*x^63*c^7*b^7 + 143/2*x^60*c^6*b^8 + 143/3*x^57*c
^5*b^9 + 143/6*x^54*c^4*b^10 + 26/3*x^51*c^3*b^11 + 13/6*x^48*c^2
*b^12 + 1/3*x^45*c*b^13 + 1/42*x^42*b^14
```

Sympy [A] time = 0.127502, size = 185, normalized size = 11.56

$$\frac{b^{14}x^{42}}{42}+\frac{b^{13}cx^{45}}{3}+\frac{13b^{12}c^2x^{48}}{6}+\frac{26b^{11}c^3x^{51}}{3}+\frac{143b^{10}c^4x^{54}}{6}+\frac{143b^9c^5x^{57}}{3}+\frac{143b^8c^6x^{60}}{2}+\frac{572b^7c^7x^{63}}{7}+\frac{143b^6c^8x^{66}}{2}+\frac{143b^5c^9x^{69}}{3}+\frac{143b^4c^{10}x^{72}}{6}+\frac{26b^3c^{11}x^{75}}{3}+\frac{13b^2c^{12}x^{78}}{6}+\frac{bc^{13}x^{81}}{3}+\frac{c^{14}x^{84}}{42}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**41*(c*x**3+b)**13*(2*c*x**3+b),x)
```

```
[Out] b**14*x**42/42 + b**13*c*x**45/3 + 13*b**12*c**2*x**48/6 + 26*b**
11*c**3*x**51/3 + 143*b**10*c**4*x**54/6 + 143*b**9*c**5*x**57/3
```

```
+ 143*b**8*c**6*x**60/2 + 572*b**7*c**7*x**63/7 + 143*b**6*c**8*x
**66/2 + 143*b**5*c**9*x**69/3 + 143*b**4*c**10*x**72/6 + 26*b**3
*c**11*x**75/3 + 13*b**2*c**12*x**78/6 + b*c**13*x**81/3 + c**14*
x**84/42
```

GIAC/XCAS [A] time = 0.208962, size = 211, normalized size = 13.19

$$\frac{1}{42}\,c^{14}x^{84}+\frac{1}{3}\,bc^{13}x^{81}+\frac{13}{6}\,b^{2}c^{12}x^{78}+\frac{26}{3}\,b^{3}c^{11}x^{75}+\frac{143}{6}\,b^{4}c^{10}x^{72}+\frac{143}{3}\,b^{5}c^{9}x^{69}+\frac{143}{2}\,b^{6}c^{8}x^{66}+\frac{572}{7}\,b^{7}c^{7}x^{63}+\frac{143}{2}\,b^{8}c^{6}x^{60}+\frac{143}{3}\,b^{9}c^{5}x^{57}+\frac{143}{6}\,b^{10}c^{4}x^{54}+\frac{26}{3}\,b^{11}c^{3}x^{51}+\frac{13}{6}\,b^{12}c^{2}x^{48}+\frac{1}{3}\,b^{13}cx^{45}+\frac{1}{42}\,b^{14}x^{42}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^3 + b)*(c*x^3 + b)^13*x^41,x, algorithm="giac")
```

```
[Out] 1/42*c^14*x^84 + 1/3*b*c^13*x^81 + 13/6*b^2*c^12*x^78 + 26/3*b^3*
c^11*x^75 + 143/6*b^4*c^10*x^72 + 143/3*b^5*c^9*x^69 + 143/2*b^6*
c^8*x^66 + 572/7*b^7*c^7*x^63 + 143/2*b^8*c^6*x^60 + 143/3*b^9*c^
5*x^57 + 143/6*b^10*c^4*x^54 + 26/3*b^11*c^3*x^51 + 13/6*b^12*c^2
*x^48 + 1/3*b^13*c*x^45 + 1/42*b^14*x^42
```

3.885 $\int x^{-1+14n} (b + cx^n)^{13} (b + 2cx^n)\, dx$

Optimal. Leaf size=21

$$\frac{x^{14n} (b + cx^n)^{14}}{14n}$$

```
[Out] (x^(14*n)*(b + c*x^n)^14)/(14*n)
```

Rubi [A] time = 0.0509615, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.08

$$\frac{x^{14n} (b + cx^n)^{14}}{14n}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 14*n)*(b + c*x^n)^13*(b + 2*c*x^n),x]
```

```
[Out] (x^(14*n)*(b + c*x^n)^14)/(14*n)
```

Rubi in Sympy [A] time = 9.39983, size = 15, normalized size = 0.71

$$\frac{x^{14n} (b + cx^n)^{14}}{14n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+14*n)*(b+c*x**n)**13*(b+2*c*x**n),x)
```

```
[Out] x**(14*n)*(b + c*x**n)**14/(14*n)
```

Mathematica [A] time = 0.0613228, size = 21, normalized size = 1.

$$\frac{x^{14n} (b + cx^n)^{14}}{14n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 14*n)*(b + c*x^n)^13*(b + 2*c*x^n),x]
```

```
[Out] (x^(14*n)*(b + c*x^n)^14)/(14*n)
```

Maple [B] time = 0.052, size = 230, normalized size = 11.

$$\frac{c^{14} (x^n)^{28}}{14\,n} + \frac{bc^{13} (x^n)^{27}}{n} + \frac{13\,b^2c^{12} (x^n)^{26}}{2\,n} + 26\,\frac{b^3c^{11} (x^n)^{25}}{n} + \frac{143\,b^4c^{10} (x^n)^{24}}{2\,n} + 143\,\frac{b^5c^9 (x^n)^{23}}{n} + \frac{429\,b^6c^8 (x^n)^{22}}{2\,n} + \frac{1716\,b^7c^7 (x^n)^{21}}{7\,n} + \frac{429\,b^8c^6 (x^n)^{20}}{2\,n} + 143\,\frac{b^9c^5 (x^n)^{19}}{n} + \frac{143\,b^{10}c^4 (x^n)^{18}}{2\,n} + 26\,\frac{b^{11}c^3 (x^n)^{17}}{n} + \frac{13\,b^{12}c^2 (x^n)^{16}}{2\,n} + \frac{b^{13}c (x^n)^{15}}{n} + \frac{b^{14} (x^n)^{14}}{14\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+14*n)*(b+c*x^n)^13*(b+2*c*x^n),x)
```

```
[Out] 1/14*c^14/n*(x^n)^28+b*c^13/n*(x^n)^27+13/2*b^2*c^12/n*(x^n)^26+2
6*b^3*c^11/n*(x^n)^25+143/2*b^4*c^10/n*(x^n)^24+143*b^5*c^9/n*(x^
n)^23+429/2*b^6*c^8/n*(x^n)^22+1716/7*b^7*c^7/n*(x^n)^21+429/2*b^
8*c^6/n*(x^n)^20+143*b^9*c^5/n*(x^n)^19+143/2*b^10*c^4/n*(x^n)^18
+26*b^11*c^3/n*(x^n)^17+13/2*b^12*c^2/n*(x^n)^16+b^13*c/n*(x^n)^1
5+1/14*b^14/n*(x^n)^14
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^n + b)*(c*x^n + b)^13*x^(14*n - 1),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.234059, size = 255, normalized size = 12.14

$$\frac{c^{14}x^{28\,n} + 14\,bc^{13}x^{27\,n} + 91\,b^2c^{12}x^{26\,n} + 364\,b^3c^{11}x^{25\,n} + 1001\,b^4c^{10}x^{24\,n} + 2002\,b^5c^9x^{23\,n} + 3003\,b^6c^8x^{22\,n} + 3432\,b^7c^7x^{21\,n} + \cdots}{14\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^n + b)*(c*x^n + b)^13*x^(14*n - 1),x, algorithm="fricas")
```

```
[Out] 1/14*(c^14*x^(28*n) + 14*b*c^13*x^(27*n) + 91*b^2*c^12*x^(26*n) +
 364*b^3*c^11*x^(25*n) + 1001*b^4*c^10*x^(24*n) + 2002*b^5*c^9*x^
(23*n) + 3003*b^6*c^8*x^(22*n) + 3432*b^7*c^7*x^(21*n) + 3003*b^8
*c^6*x^(20*n) + 2002*b^9*c^5*x^(19*n) + 1001*b^10*c^4*x^(18*n) +
364*b^11*c^3*x^(17*n) + 91*b^12*c^2*x^(16*n) + 14*b^13*c*x^(15*n)
 + b^14*x^(14*n))/n
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+14*n)*(b+c*x**n)**13*(b+2*c*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.288667, size = 275, normalized size = 13.1

$$\frac{c^{14}e^{(28\,n\ln(x))} + 14\,bc^{13}e^{(27\,n\ln(x))} + 91\,b^2c^{12}e^{(26\,n\ln(x))} + 364\,b^3c^{11}e^{(25\,n\ln(x))} + 1001\,b^4c^{10}e^{(24\,n\ln(x))} + 2002\,b^5c^9e^{(23\,n\ln(x))} + 3003\cdots}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^n + b)*(c*x^n + b)^13*x^(14*n - 1),x, algorithm="giac")
```

```
[Out] 1/14*(c^14*e^(28*n*ln(x)) + 14*b*c^13*e^(27*n*ln(x)) + 91*b^2*c^1
2*e^(26*n*ln(x)) + 364*b^3*c^11*e^(25*n*ln(x)) + 1001*b^4*c^10*e^
```

```
(24*n*ln(x)) + 2002*b^5*c^9*e^(23*n*ln(x)) + 3003*b^6*c^8*e^(22*n
*ln(x)) + 3432*b^7*c^7*e^(21*n*ln(x)) + 3003*b^8*c^6*e^(20*n*ln(x
)) + 2002*b^9*c^5*e^(19*n*ln(x)) + 1001*b^10*c^4*e^(18*n*ln(x)) +
 364*b^11*c^3*e^(17*n*ln(x)) + 91*b^12*c^2*e^(16*n*ln(x)) + 14*b^
13*c*e^(15*n*ln(x)) + b^14*e^(14*n*ln(x)))/n
```

3.886 $\int x^{-1+m} (a + bx^n)^{-1+p} (am + b(m + np)x^n)\, dx$

Optimal. Leaf size=13

$$x^m (a + bx^n)^p$$

```
[Out] x^m*(a + b*x^n)^p
```

Rubi [A] time = 0.0573118, antiderivative size = 13, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.032$

$$x^m (a + bx^n)^p$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + m)*(a + b*x^n)^(-1 + p)*(a*m + b*(m + n*p)*x^n),x]

[Out] x^m*(a + b*x^n)^p
```

Rubi in Sympy [A] time = 6.8081, size = 10, normalized size = 0.77

$$x^m (a + bx^n)^p$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(-1+m)*(a+b*x**n)**(-1+p)*(a*m+b*(n*p+m)*x**n),x)

[Out] x**m*(a + b*x**n)**p
```

Mathematica [A] time = 0.0774996, size = 13, normalized size = 1.

$$x^m (a + bx^n)^p$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + m)*(a + b*x^n)^(-1 + p)*(a*m + b*(m + n*p)*x^n),x]

[Out] x^m*(a + b*x^n)^p
```

Maple [F] time = 0.112, size = 0, normalized size = 0.

$$\int x^{-1+m} (a + bx^n)^{-1+p} (am + b(np + m)x^n)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+m)*(a+b*x^n)^(-1+p)*(a*m+b*(n*p+m)*x^n),x)

[Out] int(x^(-1+m)*(a+b*x^n)^(-1+p)*(a*m+b*(n*p+m)*x^n),x)
```

Maxima [A] time = 1.82283, size = 22, normalized size = 1.69

$$e^{(p\log(bx^n + a) + m\log(x))}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((n*p + m)*b*x^n + a*m)*(b*x^n + a)^(p - 1)*x^(m - 1),x, algorithm="maxi
```

```
[Out] e^(p*log(b*x^n + a) + m*log(x))
```

Fricas [A] time = 0.232569, size = 43, normalized size = 3.31

$$\left(bxx^{m-1}x^n + axx^{m-1}\right)(bx^n + a)^{p-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((n*p + m)*b*x^n + a*m)*(b*x^n + a)^(p - 1)*x^(m - 1),x, algorithm="fric
```

```
[Out] (b*x*x^(m - 1)*x^n + a*x*x^(m - 1))*(b*x^n + a)^(p - 1)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+m)*(a+b*x**n)**(-1+p)*(a*m+b*(n*p+m)*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221463, size = 107, normalized size = 8.23

$$bxe^{\left(p\ln\left(be^{(n\ln(x))}+a\right)+m\ln(x)+n\ln(x)-\ln\left(be^{(n\ln(x))}+a\right)-\ln(x)\right)} + axe^{\left(p\ln\left(be^{(n\ln(x))}+a\right)+m\ln(x)-\ln\left(be^{(n\ln(x))}+a\right)-\ln(x)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((n*p + m)*b*x^n + a*m)*(b*x^n + a)^(p - 1)*x^(m - 1),x, algorithm="giac
```

```
[Out] b*x*e^(p*ln(b*e^(n*ln(x)) + a) + m*ln(x) + n*ln(x) - ln(b*e^(n*ln
(x)) + a) - ln(x)) + a*x*e^(p*ln(b*e^(n*ln(x)) + a) + m*ln(x) - l
n(b*e^(n*ln(x)) + a) - ln(x))
```

3.887 $\int \frac{b+2cx}{x(b+cx)}\,dx$

Optimal. Leaf size=8

$$\log(x(b+cx))$$

```
[Out] Log[x*(b + c*x)]
```

Rubi [A] time = 0.0265935, antiderivative size = 9, normalized size of antiderivative = 1.12, number of steps used = 2, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059

$$\log(b+cx)+\log(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(b + 2*c*x)/(x*(b + c*x)),x]

[Out] Log[x] + Log[b + c*x]
```

Rubi in Sympy [A] time = 4.3167, size = 8, normalized size = 1.

$$\log(x)+\log(b+cx)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((2*c*x+b)/x/(c*x+b),x)

[Out] log(x) + log(b + c*x)
```

Mathematica [A] time = 0.00814933, size = 9, normalized size = 1.12

$$\log(b+cx)+\log(x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b + 2*c*x)/(x*(b + c*x)),x]

[Out] Log[x] + Log[b + c*x]
```

Maple [A] time = 0.002, size = 9, normalized size = 1.1

$$\ln(x(cx+b))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*c*x+b)/x/(c*x+b),x)

[Out] ln(x*(c*x+b))
```

Maxima [A] time = 1.40142, size = 12, normalized size = 1.5

$$\log(cx+b)+\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)/((c*x + b)*x),x, algorithm="maxima")

[Out] log(c*x + b) + log(x)
```

Fricas [A] time = 0.208297, size = 14, normalized size = 1.75

$$\log\left(cx^2 + bx\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)/((c*x + b)*x),x, algorithm="fricas")

[Out] log(c*x^2 + b*x)
```

Sympy [A] time = 0.560487, size = 8, normalized size = 1.

$$\log\left(bx + cx^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x+b)/x/(c*x+b),x)

[Out] log(b*x + c*x**2)
```

GIAC/XCAS [A] time = 0.206336, size = 15, normalized size = 1.88

$$\ln\left(|cx + b|\right) + \ln\left(|x|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)/((c*x + b)*x),x, algorithm="giac")

[Out] ln(abs(c*x + b)) + ln(abs(x))
```

3.888 $\int \frac{b+2cx^2}{x(b+cx^2)}\,dx$

Optimal. Leaf size=15

$$\frac{1}{2}\log\left(b+cx^2\right)+\log(x)$$

```
[Out] Log[x] + Log[b + c*x^2]/2
```

Rubi [A] time = 0.0598919, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{1}{2}\log\left(b+cx^2\right)+\log(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(b + 2*c*x^2)/(x*(b + c*x^2)),x]

[Out] Log[x] + Log[b + c*x^2]/2
```

Rubi in Sympy [A] time = 10.0293, size = 15, normalized size = 1.

$$\frac{\log\left(x^2\right)}{2}+\frac{\log\left(b+cx^2\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((2*c*x**2+b)/x/(c*x**2+b),x)

[Out] log(x**2)/2 + log(b + c*x**2)/2
```

Mathematica [A] time = 0.0117466, size = 15, normalized size = 1.

$$\frac{1}{2}\log\left(b+cx^2\right)+\log(x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b + 2*c*x^2)/(x*(b + c*x^2)),x]

[Out] Log[x] + Log[b + c*x^2]/2
```

Maple [A] time = 0.007, size = 14, normalized size = 0.9

$$\ln(x)+\frac{\ln\left(cx^2+b\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*c*x^2+b)/x/(c*x^2+b),x)

[Out] ln(x)+1/2*ln(c*x^2+b)
```

Maxima [A] time = 1.39064, size = 23, normalized size = 1.53

$$\frac{1}{2}\log\left(cx^2+b\right)+\frac{1}{2}\log\left(x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^2 + b)/((c*x^2 + b)*x),x, algorithm="maxima")
```

```
[Out] 1/2*log(c*x^2 + b) + 1/2*log(x^2)
```

Fricas [A] time = 0.211203, size = 18, normalized size = 1.2

$$\frac{1}{2}\log\left(cx^2+b\right)+\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^2 + b)/((c*x^2 + b)*x),x, algorithm="fricas")
```

```
[Out] 1/2*log(c*x^2 + b) + log(x)
```

Sympy [A] time = 0.61957, size = 12, normalized size = 0.8

$$\log\left(x\right)+\frac{\log\left(\frac{b}{c}+x^2\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x**2+b)/x/(c*x**2+b),x)
```

```
[Out] log(x) + log(b/c + x**2)/2
```

GIAC/XCAS [A] time = 0.210649, size = 24, normalized size = 1.6

$$\frac{1}{2}\ln\left(x^2\right)+\frac{1}{2}\ln\left(\left|cx^2+b\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^2 + b)/((c*x^2 + b)*x),x, algorithm="giac")
```

```
[Out] 1/2*ln(x^2) + 1/2*ln(abs(c*x^2 + b))
```

3.889 $\int \frac{b+2cx^3}{x(b+cx^3)}\,dx$

Optimal. Leaf size=15

$$\frac{1}{3}\log\left(b+cx^3\right)+\log(x)$$

```
[Out] Log[x] + Log[b + c*x^3]/3
```

Rubi [A] time = 0.0592244, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{1}{3}\log\left(b+cx^3\right)+\log(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(b + 2*c*x^3)/(x*(b + c*x^3)),x]

[Out] Log[x] + Log[b + c*x^3]/3
```

Rubi in Sympy [A] time = 9.38372, size = 15, normalized size = 1.

$$\frac{\log\left(x^3\right)}{3}+\frac{\log\left(b+cx^3\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((2*c*x**3+b)/x/(c*x**3+b),x)

[Out] log(x**3)/3 + log(b + c*x**3)/3
```

Mathematica [A] time = 0.011386, size = 15, normalized size = 1.

$$\frac{1}{3}\log\left(b+cx^3\right)+\log(x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b + 2*c*x^3)/(x*(b + c*x^3)),x]

[Out] Log[x] + Log[b + c*x^3]/3
```

Maple [A] time = 0.007, size = 14, normalized size = 0.9

$$\ln(x)+\frac{\ln\left(cx^3+b\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*c*x^3+b)/x/(c*x^3+b),x)

[Out] ln(x)+1/3*ln(c*x^3+b)
```

Maxima [A] time = 1.38991, size = 23, normalized size = 1.53

$$\frac{1}{3}\,\log\left(cx^{3}+b\right)+\frac{1}{3}\,\log\left(x^{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^3 + b)/((c*x^3 + b)*x),x, algorithm="maxima")
```

```
[Out] 1/3*log(c*x^3 + b) + 1/3*log(x^3)
```

Fricas [A] time = 0.207814, size = 18, normalized size = 1.2

$$\frac{1}{3}\,\log\left(cx^{3}+b\right)+\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^3 + b)/((c*x^3 + b)*x),x, algorithm="fricas")
```

```
[Out] 1/3*log(c*x^3 + b) + log(x)
```

Sympy [A] time = 0.652618, size = 12, normalized size = 0.8

$$\log\left(x\right)+\frac{\log\left(\frac{b}{c}+x^{3}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x**3+b)/x/(c*x**3+b),x)
```

```
[Out] log(x) + log(b/c + x**3)/3
```

GIAC/XCAS [A] time = 0.211204, size = 20, normalized size = 1.33

$$\frac{1}{3}\ln\left(\left|cx^{3}+b\right|\right)+\ln\left(\left|x\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^3 + b)/((c*x^3 + b)*x),x, algorithm="giac")
```

```
[Out] 1/3*ln(abs(c*x^3 + b)) + ln(abs(x))
```

3.890 $\int \frac{b+2cx^n}{x(b+cx^n)}\,dx$

Optimal. Leaf size=15

$$\frac{\log(b+cx^n)}{n}+\log(x)$$

```
[Out] Log[x] + Log[b + c*x^n]/n
```

Rubi [A] time = 0.0610835, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{\log(b+cx^n)}{n}+\log(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(b + 2*c*x^n)/(x*(b + c*x^n)),x]

[Out] Log[x] + Log[b + c*x^n]/n
```

Rubi in Sympy [A] time = 9.99522, size = 15, normalized size = 1.

$$\frac{\log(x^n)}{n}+\frac{\log(b+cx^n)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b+2*c*x**n)/x/(b+c*x**n),x)

[Out] log(x**n)/n + log(b + c*x**n)/n
```

Mathematica [A] time = 0.0222078, size = 15, normalized size = 1.

$$\frac{\log(b+cx^n)}{n}+\log(x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b + 2*c*x^n)/(x*(b + c*x^n)),x]

[Out] Log[x] + Log[b + c*x^n]/n
```

Maple [A] time = 0.003, size = 17, normalized size = 1.1

$$\frac{\ln(x^n(b+cx^n))}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b+2*c*x^n)/x/(b+c*x^n),x)

[Out] 1/n*ln(x^n*(b+c*x^n))
```

Maxima [A] time = 1.44198, size = 63, normalized size = 4.2

$$b\left(\frac{\log(x)}{b} - \frac{\log\left(\frac{cx^n+b}{c}\right)}{bn}\right) + \frac{2\log\left(\frac{cx^n+b}{c}\right)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^n + b)/((c*x^n + b)*x),x, algorithm="maxima")
```

```
[Out] b*(log(x)/b - log((c*x^n + b)/c)/(b*n)) + 2*log((c*x^n + b)/c)/n
```

Fricas [A] time = 0.232564, size = 23, normalized size = 1.53

$$\frac{n\log(x) + \log(cx^n + b)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^n + b)/((c*x^n + b)*x),x, algorithm="fricas")
```

```
[Out] (n*log(x) + log(c*x^n + b))/n
```

Sympy [A] time = 0.975108, size = 29, normalized size = 1.93

$$\begin{cases} \log(x) & \text{for } c = 0 \wedge n = 0 \\ \frac{(b+2c)\log(x)}{b+c} & \text{for } n = 0 \\ \log(x) & \text{for } c = 0 \\ \log(x) + \frac{\log\left(\frac{b}{c} + x^n\right)}{n} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b+2*c*x**n)/x/(b+c*x**n),x)
```

```
[Out] Piecewise((log(x), Eq(c, 0) & Eq(n, 0)), ((b + 2*c)*log(x)/(b + c
), Eq(n, 0)), (log(x), Eq(c, 0)), (log(x) + log(b/c + x**n)/n, Tr
ue))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{2\,cx^n + b}{(cx^n + b)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^n + b)/((c*x^n + b)*x),x, algorithm="giac")
```

```
[Out] integrate((2*c*x^n + b)/((c*x^n + b)*x), x)
```

3.891 $\int \frac{b+2cx}{x^8(b+cx)^8}\,dx$

Optimal. Leaf size=14

$$-\frac{1}{7x^7(b+cx)^7}$$

```
[Out] -1/(7*x^7*(b + c*x)^7)
```

Rubi [A] time = 0.0126864, antiderivative size = 14, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$

$$-\frac{1}{7x^7(b+cx)^7}$$

Antiderivative was successfully verified.

```
[In] Int[(b + 2*c*x)/(x^8*(b + c*x)^8),x]

[Out] -1/(7*x^7*(b + c*x)^7)
```

Rubi in Sympy [A] time = 3.5322, size = 14, normalized size = 1.

$$-\frac{1}{7x^7\left(b+cx\right)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((2*c*x+b)/x**8/(c*x+b)**8,x)

[Out] -1/(7*x**7*(b + c*x)**7)
```

Mathematica [A] time = 0.0373977, size = 14, normalized size = 1.

$$-\frac{1}{7x^7(b+cx)^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[(b + 2*c*x)/(x^8*(b + c*x)^8),x]

[Out] -1/(7*x^7*(b + c*x)^7)
```

Maple [B] time = 0.027, size = 177, normalized size = 12.6

$$-\frac{1}{7\,b^7x^7}-132\,\frac{c^6}{b^{13}x}+66\,\frac{c^5}{b^{12}x^2}-30\,\frac{c^4}{b^{11}x^3}+12\,\frac{c^3}{b^{10}x^4}-4\,\frac{c^2}{b^9x^5}+\frac{c}{b^8x^6}+132\,\frac{c^7}{b^{13}\,(cx+b)}+66\,\frac{c^7}{b^{12}\,(cx+b)^2}+30\,\frac{c^7}{b^{11}\,(cx+b)^3}+12\,\frac{c^7}{b^{10}\,(cx+b)^4}+4\,\frac{c^7}{b^9\,(cx+b)^5}+\frac{c^7}{b^8\,(cx+b)^6}+\frac{c^7}{7\,b^7\,(cx+b)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((2*c*x+b)/x^8/(c*x+b)^8,x)
```

```
[Out] -1/7/b^7/x^7-132/b^13*c^6/x+66/b^12*c^5/x^2-30/b^11*c^4/x^3+12/b^
10*c^3/x^4-4/b^9*c^2/x^5+1/b^8*c/x^6+132/b^13*c^7/(c*x+b)+66/b^12
*c^7/(c*x+b)^2+30/b^11*c^7/(c*x+b)^3+12/b^10*c^7/(c*x+b)^4+4/b^9*
c^7/(c*x+b)^5+c^7/b^8/(c*x+b)^6+1/7*c^7/b^7/(c*x+b)^7
```

Maxima [A] time = 1.4013, size = 109, normalized size = 7.79

$$-\frac{1}{7\,(c^7x^{14} + 7\,bc^6x^{13} + 21\,b^2c^5x^{12} + 35\,b^3c^4x^{11} + 35\,b^4c^3x^{10} + 21\,b^5c^2x^9 + 7\,b^6cx^8 + b^7x^7)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)/((c*x + b)^8*x^8),x, algorithm="maxima")
```

```
[Out] -1/7/(c^7*x^14 + 7*b*c^6*x^13 + 21*b^2*c^5*x^12 + 35*b^3*c^4*x^11
 + 35*b^4*c^3*x^10 + 21*b^5*c^2*x^9 + 7*b^6*c*x^8 + b^7*x^7)
```

Fricas [A] time = 0.215769, size = 109, normalized size = 7.79

$$-\frac{1}{7\,(c^7x^{14} + 7\,bc^6x^{13} + 21\,b^2c^5x^{12} + 35\,b^3c^4x^{11} + 35\,b^4c^3x^{10} + 21\,b^5c^2x^9 + 7\,b^6cx^8 + b^7x^7)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)/((c*x + b)^8*x^8),x, algorithm="fricas")
```

```
[Out] -1/7/(c^7*x^14 + 7*b*c^6*x^13 + 21*b^2*c^5*x^12 + 35*b^3*c^4*x^11
 + 35*b^4*c^3*x^10 + 21*b^5*c^2*x^9 + 7*b^6*c*x^8 + b^7*x^7)
```

Sympy [A] time = 8.91583, size = 87, normalized size = 6.21

$$-\frac{1}{7b^7x^7 + 49b^6cx^8 + 147b^5c^2x^9 + 245b^4c^3x^{10} + 245b^3c^4x^{11} + 147b^2c^5x^{12} + 49bc^6x^{13} + 7c^7x^{14}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x+b)/x**8/(c*x+b)**8,x)
```

```
[Out] -1/(7*b**7*x**7 + 49*b**6*c*x**8 + 147*b**5*c**2*x**9 + 245*b**4*
c**3*x**10 + 245*b**3*c**4*x**11 + 147*b**2*c**5*x**12 + 49*b*c**
6*x**13 + 7*c**7*x**14)
```

GIAC/XCAS [A] time = 0.205652, size = 18, normalized size = 1.29

$$-\frac{1}{7\,(cx^2 + bx)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)/((c*x + b)^8*x^8),x, algorithm="giac")
```

```
[Out] -1/7/(c*x^2 + b*x)^7
```

3.892 $\int \frac{b+2cx^2}{x^{15}(b+cx^2)^8}\,dx$

Optimal. Leaf size=16

$$-\frac{1}{14x^{14}\left(b+cx^2\right)^7}$$

```
[Out] -1/(14*x^14*(b + c*x^2)^7)
```

Rubi [A] time = 0.0134463, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$

$$-\frac{1}{14x^{14}\left(b+cx^2\right)^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(b + 2*c*x^2)/(x^15*(b + c*x^2)^8),x]

[Out] -1/(14*x^14*(b + c*x^2)^7)
```

Rubi in Sympy [A] time = 8.76833, size = 15, normalized size = 0.94

$$-\frac{1}{14x^{14}\left(b+cx^2\right)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((2*c*x**2+b)/x**15/(c*x**2+b)**8,x)

[Out] -1/(14*x**14*(b + c*x**2)**7)
```

Mathematica [A] time = 0.054071, size = 16, normalized size = 1.

$$-\frac{1}{14x^{14}\left(b+cx^2\right)^7}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b + 2*c*x^2)/(x^15*(b + c*x^2)^8),x]

[Out] -1/(14*x^14*(b + c*x^2)^7)
```

Maple [B] time = 0.027, size = 197, normalized size = 12.3

$$-\frac{1}{14\,b^7x^{14}}-66\,\frac{c^6}{b^{13}x^2}+33\,\frac{c^5}{b^{12}x^4}-15\,\frac{c^4}{b^{11}x^6}+6\,\frac{c^3}{b^{10}x^8}-2\,\frac{c^2}{b^9x^{10}}+\frac{c}{2\,b^8x^{12}}$$
$$-\frac{c^8}{2\,b^{13}}\left(-\frac{b^5}{c\left(cx^2+b\right)^6}-132\,\frac{1}{c\left(cx^2+b\right)}-30\,\frac{b^2}{c\left(cx^2+b\right)^3}-4\,\frac{b^4}{c\left(cx^2+b\right)^5}-12\,\frac{b^3}{c\left(cx^2+b\right)^4}-\frac{b^6}{7\,c\left(cx^2+b\right)^7}-66\,\frac{b}{c\left(cx^2+b\right)^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*c*x^2+b)/x^15/(c*x^2+b)^8,x)
```

```
[Out] -1/14/b^7/x^14-66/b^13*c^6/x^2+33/b^12*c^5/x^4-15/b^11*c^4/x^6+6/
b^10*c^3/x^8-2/b^9*c^2/x^10+1/2/b^8*c/x^12-1/2*c^8/b^13*(-b^5/c/(
c*x^2+b)^6-132/c/(c*x^2+b)-30*b^2/c/(c*x^2+b)^3-4*b^4/c/(c*x^2+b)
^5-12*b^3/c/(c*x^2+b)^4-1/7*b^6/c/(c*x^2+b)^7-66*b/c/(c*x^2+b)^2)
```

Maxima [A] time = 1.44375, size = 109, normalized size = 6.81

$$-\frac{1}{14\,(c^7x^{28} + 7\,bc^6x^{26} + 21\,b^2c^5x^{24} + 35\,b^3c^4x^{22} + 35\,b^4c^3x^{20} + 21\,b^5c^2x^{18} + 7\,b^6cx^{16} + b^7x^{14})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^2 + b)/((c*x^2 + b)^8*x^15),x, algorithm="maxima")
```

```
[Out] -1/14/(c^7*x^28 + 7*b*c^6*x^26 + 21*b^2*c^5*x^24 + 35*b^3*c^4*x^2
2 + 35*b^4*c^3*x^20 + 21*b^5*c^2*x^18 + 7*b^6*c*x^16 + b^7*x^14)
```

Fricas [A] time = 0.222377, size = 109, normalized size = 6.81

$$-\frac{1}{14\,(c^7x^{28} + 7\,bc^6x^{26} + 21\,b^2c^5x^{24} + 35\,b^3c^4x^{22} + 35\,b^4c^3x^{20} + 21\,b^5c^2x^{18} + 7\,b^6cx^{16} + b^7x^{14})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^2 + b)/((c*x^2 + b)^8*x^15),x, algorithm="fricas")
```

```
[Out] -1/14/(c^7*x^28 + 7*b*c^6*x^26 + 21*b^2*c^5*x^24 + 35*b^3*c^4*x^2
2 + 35*b^4*c^3*x^20 + 21*b^5*c^2*x^18 + 7*b^6*c*x^16 + b^7*x^14)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x**2+b)/x**15/(c*x**2+b)**8,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.209942, size = 20, normalized size = 1.25

$$-\frac{1}{14\,(cx^4 + bx^2)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^2 + b)/((c*x^2 + b)^8*x^15),x, algorithm="giac")
```

```
[Out] -1/14/(c*x^4 + b*x^2)^7
```

3.893 $\int \frac{b+2cx^3}{x^{22}(b+cx^3)^8}\,dx$

Optimal. Leaf size=16

$$-\frac{1}{21x^{21}\left(b+cx^3\right)^7}$$

```
[Out] -1/(21*x^21*(b + c*x^3)^7)
```

Rubi [A] time = 0.0130121, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$

$$-\frac{1}{21x^{21}\left(b+cx^3\right)^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(b + 2*c*x^3)/(x^22*(b + c*x^3)^8),x]

[Out] -1/(21*x^21*(b + c*x^3)^7)
```

Rubi in Sympy [A] time = 8.30256, size = 15, normalized size = 0.94

$$-\frac{1}{21x^{21}\left(b+cx^3\right)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((2*c*x**3+b)/x**22/(c*x**3+b)**8,x)

[Out] -1/(21*x**21*(b + c*x**3)**7)
```

Mathematica [A] time = 0.0643111, size = 16, normalized size = 1.

$$-\frac{1}{21x^{21}\left(b+cx^3\right)^7}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b + 2*c*x^3)/(x^22*(b + c*x^3)^8),x]

[Out] -1/(21*x^21*(b + c*x^3)^7)
```

Maple [B] time = 0.02, size = 197, normalized size = 12.3

$$-\frac{1}{21\,b^7x^{21}}-44\,\frac{c^6}{b^{13}x^3}+22\,\frac{c^5}{b^{12}x^6}-10\,\frac{c^4}{b^{11}x^9}+4\,\frac{c^3}{b^{10}x^{12}}-\frac{4\,c^2}{3\,b^9x^{15}}+\frac{c}{3\,b^8x^{18}}$$
$$-\frac{c^8}{3\,b^{13}}\left(-\frac{b^5}{c\,(cx^3+b)^6}-132\,\frac{1}{c\,(cx^3+b)}-30\,\frac{b^2}{c\,(cx^3+b)^3}-4\,\frac{b^4}{c\,(cx^3+b)^5}-12\,\frac{b^3}{c\,(cx^3+b)^4}-\frac{b^6}{7\,c\,(cx^3+b)^7}-66\,\frac{b}{c\,(cx^3+b)^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*c*x^3+b)/x^22/(c*x^3+b)^8,x)
```

```
[Out] -1/21/b^7/x^21-44/b^13*c^6/x^3+22/b^12*c^5/x^6-10/b^11*c^4/x^9+4/
b^10*c^3/x^12-4/3/b^9*c^2/x^15+1/3/b^8*c/x^18-1/3*c^8/b^13*(-b^5/
c/(c*x^3+b)^6-132/c/(c*x^3+b)-30*b^2/c/(c*x^3+b)^3-4*b^4/c/(c*x^3
+b)^5-12*b^3/c/(c*x^3+b)^4-1/7*b^6/c/(c*x^3+b)^7-66*b/c/(c*x^3+b)
^2)
```

Maxima [A] time = 1.39738, size = 109, normalized size = 6.81

$$-\frac{1}{21\left(c^{7}x^{42}+7\,bc^{6}x^{39}+21\,b^{2}c^{5}x^{36}+35\,b^{3}c^{4}x^{33}+35\,b^{4}c^{3}x^{30}+21\,b^{5}c^{2}x^{27}+7\,b^{6}cx^{24}+b^{7}x^{21}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^3 + b)/((c*x^3 + b)^8*x^22),x, algorithm="maxima")
```

```
[Out] -1/21/(c^7*x^42 + 7*b*c^6*x^39 + 21*b^2*c^5*x^36 + 35*b^3*c^4*x^3
3 + 35*b^4*c^3*x^30 + 21*b^5*c^2*x^27 + 7*b^6*c*x^24 + b^7*x^21)
```

Fricas [A] time = 0.222931, size = 109, normalized size = 6.81

$$-\frac{1}{21\left(c^{7}x^{42}+7\,bc^{6}x^{39}+21\,b^{2}c^{5}x^{36}+35\,b^{3}c^{4}x^{33}+35\,b^{4}c^{3}x^{30}+21\,b^{5}c^{2}x^{27}+7\,b^{6}cx^{24}+b^{7}x^{21}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^3 + b)/((c*x^3 + b)^8*x^22),x, algorithm="fricas")
```

```
[Out] -1/21/(c^7*x^42 + 7*b*c^6*x^39 + 21*b^2*c^5*x^36 + 35*b^3*c^4*x^3
3 + 35*b^4*c^3*x^30 + 21*b^5*c^2*x^27 + 7*b^6*c*x^24 + b^7*x^21)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x**3+b)/x**22/(c*x**3+b)**8,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.213522, size = 20, normalized size = 1.25

$$-\frac{1}{21\left(cx^{6}+bx^{3}\right)^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^3 + b)/((c*x^3 + b)^8*x^22),x, algorithm="giac")
```

```
[Out] -1/21/(c*x^6 + b*x^3)^7
```

3.894 $\int \frac{x^{-1-7n}(b+2cx^n)}{(b+cx^n)^8}\,dx$

Optimal. Leaf size=21

$$-\frac{x^{-7n}}{7n\,(b+cx^n)^7}$$

```
[Out] -1/(7*n*x^(7*n)*(b + c*x^n)^7)
```

Rubi [A] time = 0.0534276, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.08

$$-\frac{x^{-7n}}{7n\,(b+cx^n)^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 - 7*n)*(b + 2*c*x^n))/(b + c*x^n)^8,x]
```

```
[Out] -1/(7*n*x^(7*n)*(b + c*x^n)^7)
```

Rubi in Sympy [A] time = 8.51734, size = 19, normalized size = 0.9

$$-\frac{x^{-7n}}{7n\,(b+cx^n)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1-7*n)*(b+2*c*x**n)/(b+c*x**n)**8,x)
```

```
[Out] -x**(-7*n)/(7*n*(b + c*x**n)**7)
```

Mathematica [B] time = 0.0887114, size = 127, normalized size = 6.05

$$-\frac{x^{-7n}\left(b^{14}+1716b^7c^7x^{7n}+12012b^6c^8x^{8n}+36036b^5c^9x^{9n}+60060b^4c^{10}x^{10n}+60060b^3c^{11}x^{11n}+36036b^2c^{12}x^{12n}+12012bc\right.}{7b^{14}n\,(b+cx^n)^7}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 - 7*n)*(b + 2*c*x^n))/(b + c*x^n)^8,x]
```

```
[Out] -(b^14 + 1716*b^7*c^7*x^(7*n) + 12012*b^6*c^8*x^(8*n) + 36036*b^5
*c^9*x^(9*n) + 60060*b^4*c^10*x^(10*n) + 60060*b^3*c^11*x^(11*n)
+ 36036*b^2*c^12*x^(12*n) + 12012*b*c^13*x^(13*n) + 1716*c^14*x^(
14*n))/(7*b^14*n*x^(7*n)*(b + c*x^n)^7)
```

Maple [B] time = 0.082, size = 203, normalized size = 9.7

$$-132\,\frac{c^6}{b^{13}nx^n}+66\,\frac{c^5}{b^{12}n\,(x^n)^2}-30\,\frac{c^4}{b^{11}n\,(x^n)^3}+12\,\frac{c^3}{b^{10}n\,(x^n)^4}-4\,\frac{c^2}{b^9n\,(x^n)^5}+\frac{c}{b^8n\,(x^n)^6}-\frac{1}{7\,b^7n\,(x^n)^7}+\frac{c^7\left(924\,(x^n)^6c^6+6006\,bc^5(x^n)^5+16380\,b^2c^4(x^n)^4+24024\,b^3c^3(x^n)^3+20020\,b^4c^2(x^n)^2+9009\,b^5cx^n+1716\,b^6\right)}{7\,b^{13}n\,(b+cx^n)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1-7*n)*(b+2*c*x^n)/(b+c*x^n)^8,x)
```

```
[Out] -132/b^13*c^6/n/(x^n)+66/b^12*c^5/n/(x^n)^2-30/b^11*c^4/n/(x^n)^3
+12/b^10*c^3/n/(x^n)^4-4/b^9*c^2/n/(x^n)^5+1/b^8*c/n/(x^n)^6-1/7/
b^7/n/(x^n)^7+1/7*c^7*(924*(x^n)^6*c^6+6006*b*c^5*(x^n)^5+16380*b
^2*c^4*(x^n)^4+24024*b^3*c^3*(x^n)^3+20020*b^4*c^2*(x^n)^2+9009*b
^5*c*x^n+1716*b^6)/b^13/n/(b+c*x^n)^7
```

Maxima [A] time = 1.46681, size = 826, normalized size = 39.33

$$-\frac{1}{105} b \left(\frac{360360 c^{13} x^{13n} + 2342340 bc^{12} x^{12n} + 6426420 b^2 c^{11} x^{11n} + 9579570 b^3 c^{10} x^{10n} + 8270262 b^4 c^9 x^{9n} + 4018014 b^5 c^8 x^{8}}{b^{14} c^7 n x^{14n} + 7 b^{15} c^6 n x^{13n} + 21 b^{16} c^5 n x^{12n} + 35 b^{17} c^4 n}\right.$$

$$\left.+ \frac{1}{105} c \left(\frac{360360 c^{12} x^{12n} + 2342340 bc^{11} x^{11n} + 6426420 b^2 c^{10} x^{10n} + 9579570 b^3 c^9 x^{9n} + 8270262 b^4 c^8 x^{8n} + 4018014 b^5 c^7 x^{7n}}{b^{13} c^7 n x^{13n} + 7 b^{14} c^6 n x^{12n} + 21 b^{15} c^5 n x^{11n} + 35 b^{16} c^4 n x^{10n} + 3}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^n + b)*x^(-7*n - 1)/(c*x^n + b)^8,x, algorithm="maxima")
```

```
[Out] -1/105*b*((360360*c^13*x^(13*n) + 2342340*b*c^12*x^(12*n) + 64264
20*b^2*c^11*x^(11*n) + 9579570*b^3*c^10*x^(10*n) + 8270262*b^4*c^
9*x^(9*n) + 4018014*b^5*c^8*x^(8*n) + 934362*b^6*c^7*x^(7*n) + 45
045*b^7*c^6*x^(6*n) - 5005*b^8*c^5*x^(5*n) + 1001*b^9*c^4*x^(4*n)
 - 273*b^10*c^3*x^(3*n) + 91*b^11*c^2*x^(2*n) - 35*b^12*c*x^n + 1
5*b^13)/(b^14*c^7*n*x^(14*n) + 7*b^15*c^6*n*x^(13*n) + 21*b^16*c^
5*n*x^(12*n) + 35*b^17*c^4*n*x^(11*n) + 35*b^18*c^3*n*x^(10*n) +
21*b^19*c^2*n*x^(9*n) + 7*b^20*c*n*x^(8*n) + b^21*n*x^(7*n)) + 36
0360*c^7*log(x)/b^15 - 360360*c^7*log((c*x^n + b)/c)/(b^15*n)) +
1/105*c*((360360*c^12*x^(12*n) + 2342340*b*c^11*x^(11*n) + 642642
0*b^2*c^10*x^(10*n) + 9579570*b^3*c^9*x^(9*n) + 8270262*b^4*c^8*x
^(8*n) + 4018014*b^5*c^7*x^(7*n) + 934362*b^6*c^6*x^(6*n) + 45045
*b^7*c^5*x^(5*n) - 5005*b^8*c^4*x^(4*n) + 1001*b^9*c^3*x^(3*n) -
273*b^10*c^2*x^(2*n) + 91*b^11*c*x^n - 35*b^12)/(b^13*c^7*n*x^(13
*n) + 7*b^14*c^6*n*x^(12*n) + 21*b^15*c^5*n*x^(11*n) + 35*b^16*c^
4*n*x^(10*n) + 35*b^17*c^3*n*x^(9*n) + 21*b^18*c^2*n*x^(8*n) + 7*
b^19*c*n*x^(7*n) + b^20*n*x^(6*n)) + 360360*c^6*log(x)/b^14 - 360
360*c^6*log((c*x^n + b)/c)/(b^14*n))
```

Fricas [A] time = 0.273524, size = 142, normalized size = 6.76

$$-\frac{1}{7 \left(c^7 n x^{14n} + 7 bc^6 n x^{13n} + 21 b^2 c^5 n x^{12n} + 35 b^3 c^4 n x^{11n} + 35 b^4 c^3 n x^{10n} + 21 b^5 c^2 n x^{9n} + 7 b^6 c n x^{8n} + b^7 n x^{7n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x^n + b)*x^(-7*n - 1)/(c*x^n + b)^8,x, algorithm="fricas")
```

```
[Out] -1/7/(c^7*n*x^(14*n) + 7*b*c^6*n*x^(13*n) + 21*b^2*c^5*n*x^(12*n)
 + 35*b^3*c^4*n*x^(11*n) + 35*b^4*c^3*n*x^(10*n) + 21*b^5*c^2*n*x
^(9*n) + 7*b^6*c*n*x^(8*n) + b^7*n*x^(7*n))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1-7*n)*(b+2*c*x**n)/(b+c*x**n)**8,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(2\,cx^n + b)x^{-7\,n-1}}{(cx^n + b)^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^n + b)*x^(-7*n - 1)/(c*x^n + b)^8,x, algorithm="giac")
```

```
[Out] integrate((2*c*x^n + b)*x^(-7*n - 1)/(c*x^n + b)^8, x)
```

3.895 $\int \frac{x^{31}\sqrt{1+x^{16}}}{1-x^{16}}\,dx$

Optimal. Leaf size=52

$$-\frac{1}{24}\left(x^{16}+1\right)^{3/2}-\frac{\sqrt{x^{16}+1}}{8}+\frac{\tanh^{-1}\left(\frac{\sqrt{x^{16}+1}}{\sqrt{2}}\right)}{4\sqrt{2}}$$

```
[Out] -Sqrt[1 + x^16]/8 - (1 + x^16)^(3/2)/24 + ArcTanh[Sqrt[1 + x^16]/
Sqrt[2]]/(4*Sqrt[2])
```

Rubi [A] time = 0.0994686, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{1}{24}\left(x^{16}+1\right)^{3/2}-\frac{\sqrt{x^{16}+1}}{8}+\frac{\tanh^{-1}\left(\frac{\sqrt{x^{16}+1}}{\sqrt{2}}\right)}{4\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^31*Sqrt[1 + x^16])/(1 - x^16),x]
```

```
[Out] -Sqrt[1 + x^16]/8 - (1 + x^16)^(3/2)/24 + ArcTanh[Sqrt[1 + x^16]/
Sqrt[2]]/(4*Sqrt[2])
```

Rubi in Sympy [A] time = 10.1705, size = 42, normalized size = 0.81

$$-\frac{\left(x^{16}+1\right)^{\frac{3}{2}}}{24}-\frac{\sqrt{x^{16}+1}}{8}+\frac{\sqrt{2}\,\mathrm{atanh}\left(\frac{\sqrt{2}\sqrt{x^{16}+1}}{2}\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**31*(x**16+1)**(1/2)/(-x**16+1),x)
```

```
[Out] -(x**16 + 1)**(3/2)/24 - sqrt(x**16 + 1)/8 + sqrt(2)*atanh(sqrt(2
)*sqrt(x**16 + 1)/2)/8
```

Mathematica [A] time = 0.0403159, size = 44, normalized size = 0.85

$$\frac{1}{24}\left(3\sqrt{2}\tanh^{-1}\left(\frac{\sqrt{x^{16}+1}}{\sqrt{2}}\right)-\sqrt{x^{16}+1}\left(x^{16}+4\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^31*Sqrt[1 + x^16])/(1 - x^16),x]
```

```
[Out] (-(Sqrt[1 + x^16]*(4 + x^16)) + 3*Sqrt[2]*ArcTanh[Sqrt[1 + x^16]/
Sqrt[2]])/24
```

Maple [F] time = 0.168, size = 0, normalized size = 0.

$$\int \frac{x^{31}}{-x^{16}+1}\sqrt{x^{16}+1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^31*(x^16+1)^(1/2)/(-x^16+1),x)
```

```
[Out] int(x^31*(x^16+1)^(1/2)/(-x^16+1),x)
```

Maxima [A] time = 1.52646, size = 74, normalized size = 1.42

$$-\frac{1}{24}\left(x^{16}+1\right)^{\frac{3}{2}}-\frac{1}{16}\sqrt{2}\log\left(-\frac{2\left(\sqrt{2}-\sqrt{x^{16}+1}\right)}{2\sqrt{2}+2\sqrt{x^{16}+1}}\right)-\frac{1}{8}\sqrt{x^{16}+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(-sqrt(x^16 + 1)*x^31/(x^16 - 1),x, algorithm="maxima")
```

```
[Out] -1/24*(x^16 + 1)^(3/2) - 1/16*sqrt(2)*log(-2*(sqrt(2) - sqrt(x^16
 + 1))/((2*sqrt(2)) + 2*sqrt(x^16 + 1))) - 1/8*sqrt(x^16 + 1)
```

Fricas [A] time = 0.228864, size = 70, normalized size = 1.35

$$-\frac{1}{48}\sqrt{2}\left(\sqrt{2}\left(x^{16}+4\right)\sqrt{x^{16}+1}-3\log\left(\frac{\sqrt{2}\left(x^{16}+3\right)+4\sqrt{x^{16}+1}}{x^{16}-1}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(-sqrt(x^16 + 1)*x^31/(x^16 - 1),x, algorithm="fricas")
```

```
[Out] -1/48*sqrt(2)*(sqrt(2)*(x^16 + 4)*sqrt(x^16 + 1) - 3*log((sqrt(2)
*(x^16 + 3) + 4*sqrt(x^16 + 1))/(x^16 - 1)))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**31*(x**16+1)**(1/2)/(-x**16+1),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.211592, size = 76, normalized size = 1.46

$$-\frac{1}{24}\left(x^{16}+1\right)^{\frac{3}{2}}-\frac{1}{16}\sqrt{2}\ln\left(\frac{\left|-2\sqrt{2}+2\sqrt{x^{16}+1}\right|}{2\left(\sqrt{2}+\sqrt{x^{16}+1}\right)}\right)-\frac{1}{8}\sqrt{x^{16}+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(-sqrt(x^16 + 1)*x^31/(x^16 - 1),x, algorithm="giac")
```

```
[Out] -1/24*(x^16 + 1)^(3/2) - 1/16*sqrt(2)*ln(1/2*abs(-2*sqrt(2) + 2*s
qrt(x^16 + 1))/(sqrt(2) + sqrt(x^16 + 1))) - 1/8*sqrt(x^16 + 1)
```

3.896 $\int \frac{\sqrt{c+\frac{d}{x}}}{\sqrt{a+\frac{b}{x}}x} \, dx$

Optimal. Leaf size=93

$$\frac{2\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c}\sqrt{a+\frac{b}{x}}}{\sqrt{a}\sqrt{c+\frac{d}{x}}}\right)}{\sqrt{a}}-\frac{2\sqrt{d}\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+\frac{b}{x}}}{\sqrt{b}\sqrt{c+\frac{d}{x}}}\right)}{\sqrt{b}}$$

```
[Out] (2*Sqrt[c]*ArcTanh[(Sqrt[c]*Sqrt[a + b/x])/(Sqrt[a]*Sqrt[c + d/x]
)])/Sqrt[a] - (2*Sqrt[d]*ArcTanh[(Sqrt[d]*Sqrt[a + b/x])/(Sqrt[b]
*Sqrt[c + d/x])])/Sqrt[b]
```

Rubi [A] time = 0.304946, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192

$$\frac{2\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c}\sqrt{a+\frac{b}{x}}}{\sqrt{a}\sqrt{c+\frac{d}{x}}}\right)}{\sqrt{a}}-\frac{2\sqrt{d}\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+\frac{b}{x}}}{\sqrt{b}\sqrt{c+\frac{d}{x}}}\right)}{\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c + d/x]/(Sqrt[a + b/x]*x),x]
```

```
[Out] (2*Sqrt[c]*ArcTanh[(Sqrt[c]*Sqrt[a + b/x])/(Sqrt[a]*Sqrt[c + d/x]
)])/Sqrt[a] - (2*Sqrt[d]*ArcTanh[(Sqrt[d]*Sqrt[a + b/x])/(Sqrt[b]
*Sqrt[c + d/x])])/Sqrt[b]
```

Rubi in Sympy [A] time = 22.8151, size = 80, normalized size = 0.86

$$-\frac{2\sqrt{d}\,\mathrm{atanh}\left(\frac{\sqrt{b}\sqrt{c+\frac{d}{x}}}{\sqrt{d}\sqrt{a+\frac{b}{x}}}\right)}{\sqrt{b}}+\frac{2\sqrt{c}\,\mathrm{atanh}\left(\frac{\sqrt{c}\sqrt{a+\frac{b}{x}}}{\sqrt{a}\sqrt{c+\frac{d}{x}}}\right)}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c+d/x)**(1/2)/x/(a+b/x)**(1/2),x)
```

```
[Out] -2*sqrt(d)*atanh(sqrt(b)*sqrt(c + d/x)/(sqrt(d)*sqrt(a + b/x)))/s
qrt(b) + 2*sqrt(c)*atanh(sqrt(c)*sqrt(a + b/x)/(sqrt(a)*sqrt(c +
d/x)))/sqrt(a)
```

Mathematica [A] time = 0.242667, size = 134, normalized size = 1.44

$$-\frac{\sqrt{d}\log\left(2\sqrt{b}\sqrt{d}x\sqrt{a+\frac{b}{x}}\sqrt{c+\frac{d}{x}}+adx+bcx+2bd\right)}{\sqrt{b}}+\frac{\sqrt{c}\log\left(2\sqrt{a}\sqrt{c}x\sqrt{a+\frac{b}{x}}\sqrt{c+\frac{d}{x}}+a(2cx+d)+bc\right)}{\sqrt{a}}+\frac{\sqrt{d}\log(x)}{\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[c + d/x]/(Sqrt[a + b/x]*x),x]
```

```
[Out] (Sqrt[d]*Log[x])/Sqrt[b] - (Sqrt[d]*Log[2*b*d + b*c*x + a*d*x + 2
*Sqrt[b]*Sqrt[d]*Sqrt[a + b/x]*Sqrt[c + d/x]*x])/Sqrt[b] + (Sqrt[
c]*Log[b*c + 2*Sqrt[a]*Sqrt[c]*Sqrt[a + b/x]*Sqrt[c + d/x]*x + a*
(d + 2*c*x)])/Sqrt[a]
```

Maple [B] time = 0.048, size = 142, normalized size = 1.5

$$x\sqrt{\frac{ax+b}{x}}\sqrt{\frac{cx+d}{x}}\left(\ln\left(\frac{1}{2}\left(2\,acx+2\,\sqrt{(cx+d)\,(ax+b)}\sqrt{ac}+ad+bc\right)\frac{1}{\sqrt{ac}}\right)c\sqrt{bd}-\ln\left(\frac{1}{x}\left(adx+bcx+2\,\sqrt{bd}\sqrt{(cx+d)}\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c+d/x)^(1/2)/x/(a+b/x)^(1/2),x)
```

```
[Out] ((a*x+b)/x)^(1/2)*x*((c*x+d)/x)^(1/2)*(ln(1/2*(2*a*c*x+2*((c*x+d)
*(a*x+b))^(1/2)*(a*c)^(1/2)+a*d+b*c)/(a*c)^(1/2))*c*(b*d)^(1/2)-l
n((a*d*x+b*c*x+2*(b*d)^(1/2)*((c*x+d)*(a*x+b))^(1/2)+2*b*d)/x)*d*
(a*c)^(1/2))/((c*x+d)*(a*x+b))^(1/2)/(a*c)^(1/2)/(b*d)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c + d/x)/(sqrt(a + b/x)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.463091, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c + d/x)/(sqrt(a + b/x)*x),x, algorithm="fricas")
```

```
[Out] [1/2*sqrt(c/a)*log(-8*a^2*c^2*x^2 - b^2*c^2 - 6*a*b*c*d - a^2*d^2
 - 4*(2*a^2*c*x^2 + (a*b*c + a^2*d)*x)*sqrt(c/a)*sqrt((a*x + b)/x
)*sqrt((c*x + d)/x) - 8*(a*b*c^2 + a^2*c*d)*x) + 1/2*sqrt(d/b)*lo
g(-(8*b^2*d^2 + (b^2*c^2 + 6*a*b*c*d + a^2*d^2)*x^2 - 4*(2*b^2*d*
x + (b^2*c + a*b*d)*x^2)*sqrt(d/b)*sqrt((a*x + b)/x)*sqrt((c*x +
d)/x) + 8*(b^2*c*d + a*b*d^2)*x)/x^2), sqrt(-c/a)*arctan(2*c*x*sq
rt((a*x + b)/x)*sqrt((c*x + d)/x)/((2*a*c*x + b*c + a*d)*sqrt(-c/
a))) + 1/2*sqrt(d/b)*log(-(8*b^2*d^2 + (b^2*c^2 + 6*a*b*c*d + a^2
*d^2)*x^2 - 4*(2*b^2*d*x + (b^2*c + a*b*d)*x^2)*sqrt(d/b)*sqrt((a
*x + b)/x)*sqrt((c*x + d)/x) + 8*(b^2*c*d + a*b*d^2)*x)/x^2), sqr
t(-d/b)*arctan(1/2*(2*b*d + (b*c + a*d)*x)*sqrt(-d/b)/(d*x*sqrt((
a*x + b)/x)*sqrt((c*x + d)/x))) + 1/2*sqrt(c/a)*log(-8*a^2*c^2*x^
2 - b^2*c^2 - 6*a*b*c*d - a^2*d^2 - 4*(2*a^2*c*x^2 + (a*b*c + a^2
*d)*x)*sqrt(c/a)*sqrt((a*x + b)/x)*sqrt((c*x + d)/x) - 8*(a*b*c^2
 + a^2*c*d)*x), sqrt(-c/a)*arctan(2*c*x*sqrt((a*x + b)/x)*sqrt((c
*x + d)/x)/((2*a*c*x + b*c + a*d)*sqrt(-c/a))) + sqrt(-d/b)*arcta
n(1/2*(2*b*d + (b*c + a*d)*x)*sqrt(-d/b)/(d*x*sqrt((a*x + b)/x)*s
qrt((c*x + d)/x)))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+\frac{d}{x}}}{x\sqrt{a+\frac{b}{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c+d/x)**(1/2)/x/(a+b/x)**(1/2),x)
```

```
[Out] Integral(sqrt(c + d/x)/(x*sqrt(a + b/x)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{c+\frac{d}{x}}}{\sqrt{a+\frac{b}{x}}\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c + d/x)/(sqrt(a + b/x)*x),x, algorithm="giac")
```

```
[Out] integrate(sqrt(c + d/x)/(sqrt(a + b/x)*x), x)
```

3.897 $\int \frac{x^{-1+2n}(a+bx^n)^{5/2}}{\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=252

$$\frac{5(bc-ad)^3(ad+7bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{64b^{3/2}d^{9/2}n}-\frac{5(bc-ad)^2(ad+7bc)\sqrt{a+bx^n}\sqrt{c+dx^n}}{64bd^4n}+\frac{5(bc-ad)(ad+7bc)(a+bx^n)^{3/2}\sqrt{c+dx^n}}{96bd^3n}-\frac{(ad+7bc)(a+bx^n)^{5/2}\sqrt{c+dx^n}}{24bd^2n}+\frac{(a+bx^n)^{7/2}\sqrt{c+dx^n}}{4bdn}$$

```
[Out] (-5*(b*c - a*d)^2*(7*b*c + a*d)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/
(64*b*d^4*n) + (5*(b*c - a*d)*(7*b*c + a*d)*(a + b*x^n)^(3/2)*Sqr
t[c + d*x^n])/(96*b*d^3*n) - ((7*b*c + a*d)*(a + b*x^n)^(5/2)*Sqr
t[c + d*x^n])/(24*b*d^2*n) + ((a + b*x^n)^(7/2)*Sqrt[c + d*x^n])/
(4*b*d*n) + (5*(b*c - a*d)^3*(7*b*c + a*d)*ArcTanh[(Sqrt[d]*Sqrt[
a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(64*b^(3/2)*d^(9/2)*n)
```

Rubi [A] time = 0.601344, antiderivative size = 252, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$\frac{5(bc-ad)^3(ad+7bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{64b^{3/2}d^{9/2}n}-\frac{5(bc-ad)^2(ad+7bc)\sqrt{a+bx^n}\sqrt{c+dx^n}}{64bd^4n}+\frac{5(bc-ad)(ad+7bc)(a+bx^n)^{3/2}\sqrt{c+dx^n}}{96bd^3n}-\frac{(ad+7bc)(a+bx^n)^{5/2}\sqrt{c+dx^n}}{24bd^2n}+\frac{(a+bx^n)^{7/2}\sqrt{c+dx^n}}{4bdn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 2*n)*(a + b*x^n)^(5/2))/Sqrt[c + d*x^n],x]
```

```
[Out] (-5*(b*c - a*d)^2*(7*b*c + a*d)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/
(64*b*d^4*n) + (5*(b*c - a*d)*(7*b*c + a*d)*(a + b*x^n)^(3/2)*Sqr
t[c + d*x^n])/(96*b*d^3*n) - ((7*b*c + a*d)*(a + b*x^n)^(5/2)*Sqr
t[c + d*x^n])/(24*b*d^2*n) + ((a + b*x^n)^(7/2)*Sqrt[c + d*x^n])/
(4*b*d*n) + (5*(b*c - a*d)^3*(7*b*c + a*d)*ArcTanh[(Sqrt[d]*Sqrt[
a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(64*b^(3/2)*d^(9/2)*n)
```

Rubi in Sympy [A] time = 51.3209, size = 221, normalized size = 0.88

$$\frac{(a+bx^n)^{\frac{7}{2}}\sqrt{c+dx^n}}{4bdn}-\frac{(a+bx^n)^{\frac{5}{2}}\sqrt{c+dx^n}\,(ad+7bc)}{24bd^2n}-\frac{5\,(a+bx^n)^{\frac{3}{2}}\sqrt{c+dx^n}\,(ad-bc)\,(ad+7bc)}{96bd^3n}-\frac{5\sqrt{a+bx^n}\sqrt{c+dx^n}\,(ad-bc)^2\,(ad+7bc)}{64bd^4n}-\frac{5\,(ad-bc)^3\,(ad+7bc)\operatorname{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{64b^{\frac{3}{2}}d^{\frac{9}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)*(a+b*x**n)**(5/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] (a + b*x**n)**(7/2)*sqrt(c + d*x**n)/(4*b*d*n) - (a + b*x**n)**(5
/2)*sqrt(c + d*x**n)*(a*d + 7*b*c)/(24*b*d**2*n) - 5*(a + b*x**n)
**(3/2)*sqrt(c + d*x**n)*(a*d - b*c)*(a*d + 7*b*c)/(96*b*d**3*n)
- 5*sqrt(a + b*x**n)*sqrt(c + d*x**n)*(a*d - b*c)**2*(a*d + 7*b*c
)/(64*b*d**4*n) - 5*(a*d - b*c)**3*(a*d + 7*b*c)*atanh(sqrt(d)*sq
rt(a + b*x**n)/(sqrt(b)*sqrt(c + d*x**n)))/(64*b**(3/2)*d**(9/2)*
n)
```

Mathematica [A] time = 0.535317, size = 218, normalized size = 0.87

$$\frac{15(bc-ad)^3(ad+7bc)\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}+ad+bc+2bdx^n\right)-2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}\left(-15a^3d^3+a^2bd^2(\right.}{384b^{3/2}d^{9/2}n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 2*n)*(a + b*x^n)^(5/2))/Sqrt[c + d*x^n],x]
```

```
[Out] (-2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]*(-15*a^3*d^3
+ a^2*b*d^2*(191*c - 118*d*x^n) - a*b^2*d*(265*c^2 - 172*c*d*x^n
+ 136*d^2*x^(2*n)) + b^3*(105*c^3 - 70*c^2*d*x^n + 56*c*d^2*x^(2*
n) - 48*d^3*x^(3*n))) + 15*(b*c - a*d)^3*(7*b*c + a*d)*Log[b*c +
a*d + 2*b*d*x^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^
n]])/(384*b^(3/2)*d^(9/2)*n)
```

Maple [F] time = 0.09, size = 0, normalized size = 0.

$$\int x^{-1+2n}\left(a+bx^n\right)^{\frac{5}{2}}\frac{1}{\sqrt{c+dx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)*(a+b*x^n)^(5/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+2*n)*(a+b*x^n)^(5/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^(5/2)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.369511, size = 1, normalized size = 0.

$$\left[\frac{4\left(48\sqrt{bd}b^3d^3x^{3n}-8\left(7b^3cd^2-17ab^2d^3\right)\sqrt{bd}x^{2n}+2\left(35b^3c^2d-86ab^2cd^2+59a^2bd^3\right)\sqrt{bd}x^n-\left(105b^3c^3-265ab^2c^2\right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^(5/2)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="fricas")
```

```
[Out] [1/768*(4*(48*sqrt(b*d)*b^3*d^3*x^(3*n) - 8*(7*b^3*c*d^2 - 17*a*b
^2*d^3)*sqrt(b*d)*x^(2*n) + 2*(35*b^3*c^2*d - 86*a*b^2*c*d^2 + 59
*a^2*b*d^3)*sqrt(b*d)*x^n - (105*b^3*c^3 - 265*a*b^2*c^2*d + 191*
a^2*b*c*d^2 - 15*a^3*d^3)*sqrt(b*d))*sqrt(b*x^n + a)*sqrt(d*x^n +
 c) - 15*(7*b^4*c^4 - 20*a*b^3*c^3*d + 18*a^2*b^2*c^2*d^2 - 4*a^3
*b*c*d^3 - a^4*d^4)*log(8*sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b^2*c*d
+ a*b*d^2)*sqrt(b*d)*x^n - 4*(2*b^2*d^2*x^n + b^2*c*d + a*b*d^2)*
sqrt(b*x^n + a)*sqrt(d*x^n + c) + (b^2*c^2 + 6*a*b*c*d + a^2*d^2)
```

```
*sqrt(b*d)))/(sqrt(b*d)*b*d^4*n), 1/384*(2*(48*sqrt(-b*d)*b^3*d^3
*x^(3*n) - 8*(7*b^3*c*d^2 - 17*a*b^2*d^3)*sqrt(-b*d)*x^(2*n) + 2*
(35*b^3*c^2*d - 86*a*b^2*c*d^2 + 59*a^2*b*d^3)*sqrt(-b*d)*x^n - (
105*b^3*c^3 - 265*a*b^2*c^2*d + 191*a^2*b*c*d^2 - 15*a^3*d^3)*sqr
t(-b*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c) + 15*(7*b^4*c^4 - 20*a*b
^3*c^3*d + 18*a^2*b^2*c^2*d^2 - 4*a^3*b*c*d^3 - a^4*d^4)*arctan(1
/2*(2*sqrt(-b*d)*b*d*x^n + (b*c + a*d)*sqrt(-b*d))/(sqrt(b*x^n +
a)*sqrt(d*x^n + c)*b*d)))/(sqrt(-b*d)*b*d^4*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)*(a+b*x**n)**(5/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^{\frac{5}{2}} x^{2\,n-1}}{\sqrt{dx^n + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^(5/2)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^(5/2)*x^(2*n - 1)/sqrt(d*x^n + c), x)
```

3.898 $\int \frac{x^{-1+2n}(a+bx^n)^{3/2}}{\sqrt{c+dx^n}} dx$

Optimal. Leaf size=199

$$-\frac{(bc-ad)^2(ad+5bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{8b^{3/2}d^{7/2}n}+\frac{(bc-ad)(ad+5bc)\sqrt{a+bx^n}\sqrt{c+dx^n}}{8bd^3n}-\frac{(ad+5bc)(a+bx^n)^{3/2}\sqrt{c+dx^n}}{12bd^2n}+\frac{(a+bx^n)^{5/2}\sqrt{c+dx^n}}{3bdn}$$

```
[Out] ((b*c - a*d)*(5*b*c + a*d)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(8*b*
d^3*n) - ((5*b*c + a*d)*(a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(12*b*
d^2*n) + ((a + b*x^n)^(5/2)*Sqrt[c + d*x^n])/(3*b*d*n) - ((b*c -
a*d)^2*(5*b*c + a*d)*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*S
qrt[c + d*x^n])])/(8*b^(3/2)*d^(7/2)*n)
```

Rubi [A] time = 0.445682, antiderivative size = 199, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{(bc-ad)^2(ad+5bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{8b^{3/2}d^{7/2}n}+\frac{(bc-ad)(ad+5bc)\sqrt{a+bx^n}\sqrt{c+dx^n}}{8bd^3n}-\frac{(ad+5bc)(a+bx^n)^{3/2}\sqrt{c+dx^n}}{12bd^2n}+\frac{(a+bx^n)^{5/2}\sqrt{c+dx^n}}{3bdn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 2*n)*(a + b*x^n)^(3/2))/Sqrt[c + d*x^n],x]
```

```
[Out] ((b*c - a*d)*(5*b*c + a*d)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(8*b*
d^3*n) - ((5*b*c + a*d)*(a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(12*b*
d^2*n) + ((a + b*x^n)^(5/2)*Sqrt[c + d*x^n])/(3*b*d*n) - ((b*c -
a*d)^2*(5*b*c + a*d)*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*S
qrt[c + d*x^n])])/(8*b^(3/2)*d^(7/2)*n)
```

Rubi in Sympy [A] time = 38.3812, size = 170, normalized size = 0.85

$$\frac{(a+bx^n)^{\frac{5}{2}}\sqrt{c+dx^n}}{3bdn}-\frac{(a+bx^n)^{\frac{3}{2}}\sqrt{c+dx^n}\,(ad+5bc)}{12bd^2n}-\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}\,(ad-bc)\,(ad+5bc)}{8bd^3n}-\frac{(ad-bc)^2\,(ad+5bc)\,\mathrm{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{8b^{\frac{3}{2}}d^{\frac{7}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)*(a+b*x**n)**(3/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] (a + b*x**n)**(5/2)*sqrt(c + d*x**n)/(3*b*d*n) - (a + b*x**n)**(3
/2)*sqrt(c + d*x**n)*(a*d + 5*b*c)/(12*b*d**2*n) - sqrt(a + b*x**
n)*sqrt(c + d*x**n)*(a*d - b*c)*(a*d + 5*b*c)/(8*b*d**3*n) - (a*d
 - b*c)**2*(a*d + 5*b*c)*atanh(sqrt(d)*sqrt(a + b*x**n)/(sqrt(b)*
sqrt(c + d*x**n)))/(8*b**(3/2)*d**(7/2)*n)
```

Mathematica [A] time = 0.341184, size = 172, normalized size = 0.86

$$\frac{2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}\left(3a^2d^2+2abd\left(7dx^n-11c\right)+b^2\left(15c^2-10cdx^n+8d^2x^{2n}\right)\right)-3(bc-ad)^2(ad+5bc)\log\left(2\sqrt{b}\sqrt{d}\right.}{48b^{3/2}d^{7/2}n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 2*n)*(a + b*x^n)^(3/2))/Sqrt[c + d*x^n],x]
```

```
[Out] (2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]*(3*a^2*d^2 + 2
*a*b*d*(-11*c + 7*d*x^n) + b^2*(15*c^2 - 10*c*d*x^n + 8*d^2*x^(2*
n))) - 3*(b*c - a*d)^2*(5*b*c + a*d)*Log[b*c + a*d + 2*b*d*x^n +
2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]])/(48*b^(3/2)*d
^(7/2)*n)
```

Maple [F] time = 0.085, size = 0, normalized size = 0.

$$\int x^{-1+2\,n}\,(a+bx^{n})^{\frac{3}{2}}\,\frac{1}{\sqrt{c+dx^{n}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)*(a+b*x^n)^(3/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+2*n)*(a+b*x^n)^(3/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(3/2)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.374091, size = 1, normalized size = 0.01

$$\left[\frac{4\left(8\,\sqrt{bd}b^{2}d^{2}x^{2\,n}-2\left(5\,b^{2}cd-7\,abd^{2}\right)\sqrt{bd}x^{n}+\left(15\,b^{2}c^{2}-22\,abcd+3\,a^{2}d^{2}\right)\sqrt{bd}\right)\sqrt{bx^{n}+a}\sqrt{dx^{n}+c}+3\left(5\,b^{3}c^{3}-9\,ab^{2}c\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(3/2)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="fricas")
```

```
[Out] [1/96*(4*(8*sqrt(b*d)*b^2*d^2*x^(2*n) - 2*(5*b^2*c*d - 7*a*b*d^2)
*sqrt(b*d)*x^n + (15*b^2*c^2 - 22*a*b*c*d + 3*a^2*d^2)*sqrt(b*d))
*sqrt(b*x^n + a)*sqrt(d*x^n + c) + 3*(5*b^3*c^3 - 9*a*b^2*c^2*d +
 3*a^2*b*c*d^2 + a^3*d^3)*log(8*sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b^
2*c*d + a*b*d^2)*sqrt(b*d)*x^n - 4*(2*b^2*d^2*x^n + b^2*c*d + a*b
*d^2)*sqrt(b*x^n + a)*sqrt(d*x^n + c) + (b^2*c^2 + 6*a*b*c*d + a^
2*d^2)*sqrt(b*d)))/(sqrt(b*d)*b*d^3*n), 1/48*(2*(8*sqrt(-b*d)*b^2
*d^2*x^(2*n) - 2*(5*b^2*c*d - 7*a*b*d^2)*sqrt(-b*d)*x^n + (15*b^2
*c^2 - 22*a*b*c*d + 3*a^2*d^2)*sqrt(-b*d))*sqrt(b*x^n + a)*sqrt(d
*x^n + c) - 3*(5*b^3*c^3 - 9*a*b^2*c^2*d + 3*a^2*b*c*d^2 + a^3*d^
3)*arctan(1/2*(2*sqrt(-b*d)*b*d*x^n + (b*c + a*d)*sqrt(-b*d))/(sq
rt(b*x^n + a)*sqrt(d*x^n + c)*b*d)))/(sqrt(-b*d)*b*d^3*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)*(a+b*x**n)**(3/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^{\frac{3}{2}} x^{2\,n-1}}{\sqrt{dx^n + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(3/2)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^(3/2)*x^(2*n - 1)/sqrt(d*x^n + c), x)
```

3.899 $\int \frac{x^{-1+2n}\sqrt{a+bx^n}}{\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=146

$$\frac{(bc-ad)(ad+3bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{4b^{3/2}d^{5/2}n}-\frac{(ad+3bc)\sqrt{a+bx^n}\sqrt{c+dx^n}}{4bd^2n}+\frac{(a+bx^n)^{3/2}\sqrt{c+dx^n}}{2bdn}$$

```
[Out] -((3*b*c + a*d)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(4*b*d^2*n) + ((
a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(2*b*d*n) + ((b*c - a*d)*(3*b*c
 + a*d)*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n
])])/(4*b^(3/2)*d^(5/2)*n)
```

Rubi [A] time = 0.335273, antiderivative size = 146, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{(bc-ad)(ad+3bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{4b^{3/2}d^{5/2}n}-\frac{(ad+3bc)\sqrt{a+bx^n}\sqrt{c+dx^n}}{4bd^2n}+\frac{(a+bx^n)^{3/2}\sqrt{c+dx^n}}{2bdn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 2*n)*Sqrt[a + b*x^n])/Sqrt[c + d*x^n],x]
```

```
[Out] -((3*b*c + a*d)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(4*b*d^2*n) + ((
a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(2*b*d*n) + ((b*c - a*d)*(3*b*c
 + a*d)*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n
])])/(4*b^(3/2)*d^(5/2)*n)
```

Rubi in Sympy [A] time = 28.4802, size = 124, normalized size = 0.85

$$\frac{(a+bx^n)^{\frac{3}{2}}\sqrt{c+dx^n}}{2bdn}-\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}\,(ad+3bc)}{4bd^2n}-\frac{(ad-bc)\,(ad+3bc)\,\mathrm{atanh}\left(\frac{\sqrt{b}\sqrt{c+dx^n}}{\sqrt{d}\sqrt{a+bx^n}}\right)}{4b^{\frac{3}{2}}d^{\frac{5}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)*(a+b*x**n)**(1/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] (a + b*x**n)**(3/2)*sqrt(c + d*x**n)/(2*b*d*n) - sqrt(a + b*x**n)
*sqrt(c + d*x**n)*(a*d + 3*b*c)/(4*b*d**2*n) - (a*d - b*c)*(a*d +
 3*b*c)*atanh(sqrt(b)*sqrt(c + d*x**n)/(sqrt(d)*sqrt(a + b*x**n))
)/(4*b**(3/2)*d**(5/2)*n)
```

Mathematica [A] time = 0.301757, size = 142, normalized size = 0.97

$$\frac{(bc-ad)(ad+3bc)\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}+ad+bc+2bdx^n\right)}{8b^{3/2}d^{5/2}n}+\sqrt{a+bx^n}\sqrt{c+dx^n}\left(\frac{x^n}{2dn}-\frac{3bc-ad}{4bd^2n}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 2*n)*Sqrt[a + b*x^n])/Sqrt[c + d*x^n],x]
```

```
[Out] Sqrt[a + b*x^n]*Sqrt[c + d*x^n]*(-(3*b*c - a*d)/(4*b*d^2*n) + x^n
/(2*d*n)) + ((b*c - a*d)*(3*b*c + a*d)*Log[b*c + a*d + 2*b*d*x^n
```

```
+ 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]])/(8*b^(3/2)*
d^(5/2)*n)
```

Maple [F] time = 0.085, size = 0, normalized size = 0.

$$\int x^{-1+2n}\sqrt{a+bx^n}\,\frac{1}{\sqrt{c+dx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)*(a+b*x^n)^(1/2)/(c+d*x^n)^(1/2),x)

[Out] int(x^(-1+2*n)*(a+b*x^n)^(1/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.311709, size = 1, normalized size = 0.01

$$\left[\frac{4\left(2\sqrt{bd}bdx^n-(3bc-ad)\sqrt{bd}\right)\sqrt{bx^n+a}\sqrt{dx^n+c}-\left(3b^2c^2-2abcd-a^2d^2\right)\log\left(8\sqrt{bd}b^2d^2x^{2n}+8\left(b^2cd+abd^2\right)\sqrt{bd}\right.}{16\sqrt{bd}bd^2n}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="fricas")

[Out] [1/16*(4*(2*sqrt(b*d)*b*d*x^n - (3*b*c - a*d)*sqrt(b*d))*sqrt(b*x
^n + a)*sqrt(d*x^n + c) - (3*b^2*c^2 - 2*a*b*c*d - a^2*d^2)*log(8
*sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b^2*c*d + a*b*d^2)*sqrt(b*d)*x^n
- 4*(2*b^2*d^2*x^n + b^2*c*d + a*b*d^2)*sqrt(b*x^n + a)*sqrt(d*x^
n + c) + (b^2*c^2 + 6*a*b*c*d + a^2*d^2)*sqrt(b*d)))/(sqrt(b*d)*b
*d^2*n), 1/8*(2*(2*sqrt(-b*d)*b*d*x^n - (3*b*c - a*d)*sqrt(-b*d))
*sqrt(b*x^n + a)*sqrt(d*x^n + c) + (3*b^2*c^2 - 2*a*b*c*d - a^2*d
^2)*arctan(1/2*(2*sqrt(-b*d)*b*d*x^n + (b*c + a*d)*sqrt(-b*d))/(s
qrt(b*x^n + a)*sqrt(d*x^n + c)*b*d)))/(sqrt(-b*d)*b*d^2*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)*(a+b*x**n)**(1/2)/(c+d*x**n)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^n + a}x^{2\,n-1}}{\sqrt{dx^n + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a)*x^(2*n - 1)/sqrt(d*x^n + c),x, algorithm="giac")

[Out] integrate(sqrt(b*x^n + a)*x^(2*n - 1)/sqrt(d*x^n + c), x)
```

3.900 $\int \frac{x^{-1+2n}}{\sqrt{a+bx^n}\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=89

$$\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}}{bdn}-\frac{(ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{3/2}d^{3/2}n}$$

```
[Out] (Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(b*d*n) - ((b*c + a*d)*ArcTanh[
(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(b^(3/2)*d^
(3/2)*n)
```

Rubi [A] time = 0.241543, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}}{bdn}-\frac{(ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{3/2}d^{3/2}n}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 2*n)/(Sqrt[a + b*x^n]*Sqrt[c + d*x^n]),x]
```

```
[Out] (Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(b*d*n) - ((b*c + a*d)*ArcTanh[
(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(b^(3/2)*d^
(3/2)*n)
```

Rubi in Sympy [A] time = 20.8427, size = 75, normalized size = 0.84

$$\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}}{bdn}-\frac{(ad+bc)\operatorname{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{\frac{3}{2}}d^{\frac{3}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)/(a+b*x**n)**(1/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] sqrt(a + b*x**n)*sqrt(c + d*x**n)/(b*d*n) - (a*d + b*c)*atanh(sqr
t(d)*sqrt(a + b*x**n)/(sqrt(b)*sqrt(c + d*x**n)))/(b**(3/2)*d**(3
/2)*n)
```

Mathematica [A] time = 0.159944, size = 106, normalized size = 1.19

$$\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}}{bdn}-\frac{(ad+bc)\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}+ad+bc+2bdx^n\right)}{2b^{3/2}d^{3/2}n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 2*n)/(Sqrt[a + b*x^n]*Sqrt[c + d*x^n]),x]
```

```
[Out] (Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(b*d*n) - ((b*c + a*d)*Log[b*c
+ a*d + 2*b*d*x^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*
x^n]])/(2*b^(3/2)*d^(3/2)*n)
```

Maple [F] time = 0.091, size = 0, normalized size = 0.

$$\int x^{-1+2n} \frac{1}{\sqrt{a+b x^{n}}}\frac{1}{\sqrt{c+d x^{n}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)/(a+b*x^n)^(1/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+2*n)/(a+b*x^n)^(1/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/(sqrt(b*x^n + a)*sqrt(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.313606, size = 1, normalized size = 0.01

$$\left[\frac{(bc+ad)\log\left(8\sqrt{bd}b^{2}d^{2}x^{2n}+8\left(b^{2}cd+abd^{2}\right)\sqrt{bd}x^{n}-4\left(2b^{2}d^{2}x^{n}+b^{2}cd+abd^{2}\right)\sqrt{bx^{n}+a}\sqrt{dx^{n}+c}+\left(b^{2}c^{2}+6abcd+\right.\right.}{4\sqrt{bd}bdn}\right.$$
$$\left.-\frac{(bc+ad)\arctan\left(\frac{2\sqrt{-bd}bdx^{n}+(bc+ad)\sqrt{-bd}}{2\sqrt{bx^{n}+a}\sqrt{dx^{n}+c}bd}\right)-2\sqrt{-bd}\sqrt{bx^{n}+a}\sqrt{dx^{n}+c}}{2\sqrt{-bd}bdn}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/(sqrt(b*x^n + a)*sqrt(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] [1/4*((b*c + a*d)*log(8*sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b^2*c*d +
a*b*d^2)*sqrt(b*d)*x^n - 4*(2*b^2*d^2*x^n + b^2*c*d + a*b*d^2)*sq
rt(b*x^n + a)*sqrt(d*x^n + c) + (b^2*c^2 + 6*a*b*c*d + a^2*d^2)*s
qrt(b*d)) + 4*sqrt(b*d)*sqrt(b*x^n + a)*sqrt(d*x^n + c))/(sqrt(b*
d)*b*d*n), -1/2*((b*c + a*d)*arctan(1/2*(2*sqrt(-b*d)*b*d*x^n + (
b*c + a*d)*sqrt(-b*d))/(sqrt(b*x^n + a)*sqrt(d*x^n + c)*b*d)) - 2
*sqrt(-b*d)*sqrt(b*x^n + a)*sqrt(d*x^n + c))/(sqrt(-b*d)*b*d*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)/(a+b*x**n)**(1/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2n-1}}{\sqrt{bx^{n}+a}\sqrt{dx^{n}+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(2*n - 1)/(sqrt(b*x^n + a)*sqrt(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(2*n - 1)/(sqrt(b*x^n + a)*sqrt(d*x^n + c)), x)
```

3.901 $\int \frac{x^{-1+2n}}{(a+bx^n)^{3/2}\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=91

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{3/2}\sqrt{d}n}+\frac{2a\sqrt{c+dx^n}}{bn(bc-ad)\sqrt{a+bx^n}}$$

```
[Out] (2*a*Sqrt[c + d*x^n])/(b*(b*c - a*d)*n*Sqrt[a + b*x^n]) + (2*ArcT
anh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(b^(3/2
)*Sqrt[d]*n)
```

Rubi [A] time = 0.238801, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{3/2}\sqrt{d}n}+\frac{2a\sqrt{c+dx^n}}{bn(bc-ad)\sqrt{a+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 2*n)/((a + b*x^n)^(3/2)*Sqrt[c + d*x^n]),x]
```

```
[Out] (2*a*Sqrt[c + d*x^n])/(b*(b*c - a*d)*n*Sqrt[a + b*x^n]) + (2*ArcT
anh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(b^(3/2
)*Sqrt[d]*n)
```

Rubi in Sympy [A] time = 20.0804, size = 78, normalized size = 0.86

$$-\frac{2a\sqrt{c+dx^n}}{bn\sqrt{a+bx^n}\,(ad-bc)}+\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{b}\sqrt{c+dx^n}}{\sqrt{d}\sqrt{a+bx^n}}\right)}{b^{\frac{3}{2}}\sqrt{d}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)/(a+b*x**n)**(3/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] -2*a*sqrt(c + d*x**n)/(b*n*sqrt(a + b*x**n)*(a*d - b*c)) + 2*atan
h(sqrt(b)*sqrt(c + d*x**n)/(sqrt(d)*sqrt(a + b*x**n)))/(b**(3/2)*
sqrt(d)*n)
```

Mathematica [A] time = 0.267048, size = 105, normalized size = 1.15

$$\frac{\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}+ad+bc+2bdx^n\right)}{b^{3/2}\sqrt{d}n}+\frac{2a\sqrt{c+dx^n}}{bn(bc-ad)\sqrt{a+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 2*n)/((a + b*x^n)^(3/2)*Sqrt[c + d*x^n]),x]
```

```
[Out] (2*a*Sqrt[c + d*x^n])/(b*(b*c - a*d)*n*Sqrt[a + b*x^n]) + Log[b*c
 + a*d + 2*b*d*x^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d
*x^n]]/(b^(3/2)*Sqrt[d]*n)
```

Maple [F] time = 0.088, size = 0, normalized size = 0.

$$\int x^{-1+2n} (a+bx^n)^{-\frac{3}{2}} \frac{1}{\sqrt{c+dx^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+2*n)/(a+b*x^n)^(3/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+2*n)/(a+b*x^n)^(3/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2n-1}}{(bx^n+a)^{\frac{3}{2}}\sqrt{dx^n+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(2*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^(2*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)), x)
```

Fricas [A] time = 0.375022, size = 1, normalized size = 0.01

$$\left[\frac{4\sqrt{bd}\sqrt{bx^n+a}\sqrt{dx^n+c}a + \left(abc - a^2d + \left(b^2c - abd\right)x^n\right)\log\left(8\sqrt{bd}b^2d^2x^{2n} + 8\left(b^2cd + abd^2\right)\sqrt{bd}x^n + 4\left(2b^2d^2x^n + b^2\right.\right.}{2\left((b^3c - ab^2d)\sqrt{bd}nx^n + (ab^2c - a^2bd)\sqrt{bd}n\right)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(2*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] [1/2*(4*sqrt(b*d)*sqrt(b*x^n + a)*sqrt(d*x^n + c)*a + (a*b*c - a^
2*d + (b^2*c - a*b*d)*x^n)*log(8*sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b
^2*c*d + a*b*d^2)*sqrt(b*d)*x^n + 4*(2*b^2*d^2*x^n + b^2*c*d + a*
b*d^2)*sqrt(b*x^n + a)*sqrt(d*x^n + c) + (b^2*c^2 + 6*a*b*c*d + a
^2*d^2)*sqrt(b*d)))/((b^3*c - a*b^2*d)*sqrt(b*d)*n*x^n + (a*b^2*c
 - a^2*b*d)*sqrt(b*d)*n), (2*sqrt(-b*d)*sqrt(b*x^n + a)*sqrt(d*x^
n + c)*a + (a*b*c - a^2*d + (b^2*c - a*b*d)*x^n)*arctan(1/2*(2*sq
rt(-b*d)*b*d*x^n + (b*c + a*d)*sqrt(-b*d))/(sqrt(b*x^n + a)*sqrt(
d*x^n + c)*b*d)))/((b^3*c - a*b^2*d)*sqrt(-b*d)*n*x^n + (a*b^2*c
- a^2*b*d)*sqrt(-b*d)*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+2*n)/(a+b*x**n)**(3/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2\,n-1}}{(bx^n+a)^{\frac{3}{2}}\sqrt{dx^n+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(2*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(2*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)), x)
```

3.902 $\int \frac{x^{-1+2n}}{(a+bx^n)^{5/2}\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=95

$$\frac{2a\sqrt{c+dx^n}}{3bn(bc-ad)\,(a+bx^n)^{3/2}}-\frac{2(3bc-ad)\sqrt{c+dx^n}}{3bn(bc-ad)^2\sqrt{a+bx^n}}$$

```
[Out] (2*a*Sqrt[c + d*x^n])/(3*b*(b*c - a*d)*n*(a + b*x^n)^(3/2)) - (2*
(3*b*c - a*d)*Sqrt[c + d*x^n])/(3*b*(b*c - a*d)^2*n*Sqrt[a + b*x^
n])
```

Rubi [A] time = 0.22541, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{2a\sqrt{c+dx^n}}{3bn(bc-ad)\,(a+bx^n)^{3/2}}-\frac{2(3bc-ad)\sqrt{c+dx^n}}{3bn(bc-ad)^2\sqrt{a+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 2*n)/((a + b*x^n)^(5/2)*Sqrt[c + d*x^n]),x]
```

```
[Out] (2*a*Sqrt[c + d*x^n])/(3*b*(b*c - a*d)*n*(a + b*x^n)^(3/2)) - (2*
(3*b*c - a*d)*Sqrt[c + d*x^n])/(3*b*(b*c - a*d)^2*n*Sqrt[a + b*x^
n])
```

Rubi in Sympy [A] time = 19.8986, size = 78, normalized size = 0.82

$$-\frac{2a\sqrt{c+dx^n}}{3bn\,(a+bx^n)^{\frac{3}{2}}\,(ad-bc)}+\frac{2\sqrt{c+dx^n}\,(ad-3bc)}{3bn\sqrt{a+bx^n}\,(ad-bc)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+2*n)/(a+b*x**n)**(5/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] -2*a*sqrt(c + d*x**n)/(3*b*n*(a + b*x**n)**(3/2)*(a*d - b*c)) + 2
*sqrt(c + d*x**n)*(a*d - 3*b*c)/(3*b*n*sqrt(a + b*x**n)*(a*d - b*
c)**2)
```

Mathematica [A] time = 0.154746, size = 57, normalized size = 0.6

$$\frac{2\sqrt{c+dx^n}\,(-2ac+adx^n-3bcx^n)}{3n(bc-ad)^2\,(a+bx^n)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 2*n)/((a + b*x^n)^(5/2)*Sqrt[c + d*x^n]),x]
```

```
[Out] (2*Sqrt[c + d*x^n]*(-2*a*c - 3*b*c*x^n + a*d*x^n))/(3*(b*c - a*d)
^2*n*(a + b*x^n)^(3/2))
```

Maple [F] time = 0.087, size = 0, normalized size = 0.

$$\int x^{-1+2\,n}\,(a+bx^n)^{-\frac{5}{2}}\frac{1}{\sqrt{c+dx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(-1+2*n)/(a+b*x^n)^(5/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+2*n)/(a+b*x^n)^(5/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2n-1}}{(bx^n+a)^{\frac{5}{2}}\sqrt{dx^n+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(2*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^(2*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)), x)
```

Fricas [A] time = 0.31698, size = 182, normalized size = 1.92

$$-\frac{2\,(2\,ac+(3\,bc-ad)x^n)\sqrt{bx^n+a}\sqrt{dx^n+c}}{3\,((b^4c^2-2\,ab^3cd+a^2b^2d^2)nx^{2\,n}+2\,(ab^3c^2-2\,a^2b^2cd+a^3bd^2)nx^n+(a^2b^2c^2-2\,a^3bcd+a^4d^2)n)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(2*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] -2/3*(2*a*c + (3*b*c - a*d)*x^n)*sqrt(b*x^n + a)*sqrt(d*x^n + c)/
((b^4*c^2 - 2*a*b^3*c*d + a^2*b^2*d^2)*n*x^(2*n) + 2*(a*b^3*c^2 -
 2*a^2*b^2*c*d + a^3*b*d^2)*n*x^n + (a^2*b^2*c^2 - 2*a^3*b*c*d +
a^4*d^2)*n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**(-1+2*n)/(a+b*x**n)**(5/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2n-1}}{(bx^n+a)^{\frac{5}{2}}\sqrt{dx^n+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(2*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(2*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)), x)
```

3.903 $\int \frac{x^{-1+3n}(a+bx^n)^{5/2}}{\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=358

$$\frac{(bc-ad)^2\left(3a^2d^2+14abcd+63b^2c^2\right)\sqrt{a+bx^n}\sqrt{c+dx^n}}{128b^2d^5n} - \frac{(bc-ad)\left(3a^2d^2+14abcd+63b^2c^2\right)(a+bx^n)^{3/2}\sqrt{c+dx^n}}{192b^2d^4n} + \frac{\left(3a^2d^2+14abcd+63b^2c^2\right)(a+bx^n)^{5/2}\sqrt{c+dx^n}}{240b^2d^3n} - \frac{(bc-ad)^3\left(3a^2d^2+14abcd+63b^2c^2\right)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{128b^{5/2}d^{11/2}n} - \frac{3(ad+3bc)(a+bx^n)^{7/2}\sqrt{c+dx^n}}{40b^2d^2n} + \frac{x^n(a+bx^n)^{7/2}\sqrt{c+dx^n}}{5bdn}$$

```
[Out] ((b*c - a*d)^2*(63*b^2*c^2 + 14*a*b*c*d + 3*a^2*d^2)*Sqrt[a + b*x
^n]*Sqrt[c + d*x^n])/(128*b^2*d^5*n) - ((b*c - a*d)*(63*b^2*c^2 +
 14*a*b*c*d + 3*a^2*d^2)*(a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(192*
b^2*d^4*n) + ((63*b^2*c^2 + 14*a*b*c*d + 3*a^2*d^2)*(a + b*x^n)^(
5/2)*Sqrt[c + d*x^n])/(240*b^2*d^3*n) - (3*(3*b*c + a*d)*(a + b*x
^n)^(7/2)*Sqrt[c + d*x^n])/(40*b^2*d^2*n) + (x^n*(a + b*x^n)^(7/2
)*Sqrt[c + d*x^n])/(5*b*d*n) - ((b*c - a*d)^3*(63*b^2*c^2 + 14*a*
b*c*d + 3*a^2*d^2)*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqr
t[c + d*x^n])])/(128*b^(5/2)*d^(11/2)*n)
```

Rubi [A] time = 1.00002, antiderivative size = 358, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{(bc-ad)^2\left(3a^2d^2+14abcd+63b^2c^2\right)\sqrt{a+bx^n}\sqrt{c+dx^n}}{128b^2d^5n} - \frac{(bc-ad)\left(3a^2d^2+14abcd+63b^2c^2\right)(a+bx^n)^{3/2}\sqrt{c+dx^n}}{192b^2d^4n} + \frac{\left(3a^2d^2+14abcd+63b^2c^2\right)(a+bx^n)^{5/2}\sqrt{c+dx^n}}{240b^2d^3n} - \frac{(bc-ad)^3\left(3a^2d^2+14abcd+63b^2c^2\right)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{128b^{5/2}d^{11/2}n} - \frac{3(ad+3bc)(a+bx^n)^{7/2}\sqrt{c+dx^n}}{40b^2d^2n} + \frac{x^n(a+bx^n)^{7/2}\sqrt{c+dx^n}}{5bdn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 3*n)*(a + b*x^n)^(5/2))/Sqrt[c + d*x^n],x]
```


```
[Out] ((b*c - a*d)^2*(63*b^2*c^2 + 14*a*b*c*d + 3*a^2*d^2)*Sqrt[a + b*x
^n]*Sqrt[c + d*x^n])/(128*b^2*d^5*n) - ((b*c - a*d)*(63*b^2*c^2 +
 14*a*b*c*d + 3*a^2*d^2)*(a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(192*
b^2*d^4*n) + ((63*b^2*c^2 + 14*a*b*c*d + 3*a^2*d^2)*(a + b*x^n)^(
5/2)*Sqrt[c + d*x^n])/(240*b^2*d^3*n) - (3*(3*b*c + a*d)*(a + b*x
^n)^(7/2)*Sqrt[c + d*x^n])/(40*b^2*d^2*n) + (x^n*(a + b*x^n)^(7/2
)*Sqrt[c + d*x^n])/(5*b*d*n) - ((b*c - a*d)^3*(63*b^2*c^2 + 14*a*
b*c*d + 3*a^2*d^2)*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqr
t[c + d*x^n])])/(128*b^(5/2)*d^(11/2)*n)
```

Rubi in Sympy [A] time = 81.248, size = 333, normalized size = 0.93

$$\frac{x^n (a+bx^n)^{\frac{7}{2}}\sqrt{c+dx^n}}{5bdn}-\frac{3(a+bx^n)^{\frac{7}{2}}\sqrt{c+dx^n}\,(ad+3bc)}{40b^2d^2n}+\frac{(a+bx^n)^{\frac{5}{2}}\sqrt{c+dx^n}\left(3a^2d^2+14abcd+63b^2c^2\right)}{240b^2d^3n}+\frac{(a+bx^n)^{\frac{3}{2}}\sqrt{c+dx^n}\,(ad-bc)\left(3a^2d^2+14abcd+63b^2c^2\right)}{192b^2d^4n}+\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}\,(ad-bc)^2\left(3a^2d^2+14abcd+63b^2c^2\right)}{128b^2d^5n}+\frac{(ad-bc)^3\left(3a^2d^2+14abcd+63b^2c^2\right)\operatorname{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{128b^{\frac{5}{2}}d^{\frac{11}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**(-1+3*n)*(a+b*x**n)**(5/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] x**n*(a + b*x**n)**(7/2)*sqrt(c + d*x**n)/(5*b*d*n) - 3*(a + b*x*
*n)**(7/2)*sqrt(c + d*x**n)*(a*d + 3*b*c)/(40*b**2*d**2*n) + (a +
 b*x**n)**(5/2)*sqrt(c + d*x**n)*(3*a**2*d**2 + 14*a*b*c*d + 63*b
**2*c**2)/(240*b**2*d**3*n) + (a + b*x**n)**(3/2)*sqrt(c + d*x**n
)*(a*d - b*c)*(3*a**2*d**2 + 14*a*b*c*d + 63*b**2*c**2)/(192*b**2
*d**4*n) + sqrt(a + b*x**n)*sqrt(c + d*x**n)*(a*d - b*c)**2*(3*a*
*2*d**2 + 14*a*b*c*d + 63*b**2*c**2)/(128*b**2*d**5*n) + (a*d - b
*c)**3*(3*a**2*d**2 + 14*a*b*c*d + 63*b**2*c**2)*atanh(sqrt(d)*sq
rt(a + b*x**n)/(sqrt(b)*sqrt(c + d*x**n)))/(128*b**(5/2)*d**(11/2
)*n)
```

Mathematica [A] time = 0.62574, size = 293, normalized size = 0.82

$$2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}\left(-45a^4d^4+30a^3bd^3\left(dx^n-3c\right)+2a^2b^2d^2\left(782c^2-481cdx^n+372d^2x^{2n}\right)+2ab^3d\left(-1155c^3+74\right.\right.$$

Antiderivative was successfully verified.

```
[In]   Integrate[(x^(-1 + 3*n)*(a + b*x^n)^(5/2))/Sqrt[c + d*x^n],x]
```

```
[Out] (2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]*(-45*a^4*d^4 +
 30*a^3*b*d^3*(-3*c + d*x^n) + 2*a^2*b^2*d^2*(782*c^2 - 481*c*d*x
^n + 372*d^2*x^(2*n)) + 2*a*b^3*d*(-1155*c^3 + 749*c^2*d*x^n - 59
2*c*d^2*x^(2*n) + 504*d^3*x^(3*n)) + b^4*(945*c^4 - 630*c^3*d*x^n
 + 504*c^2*d^2*x^(2*n) - 432*c*d^3*x^(3*n) + 384*d^4*x^(4*n))) -
15*(b*c - a*d)^3*(63*b^2*c^2 + 14*a*b*c*d + 3*a^2*d^2)*Log[b*c +
a*d + 2*b*d*x^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^
n]])/(3840*b^(5/2)*d^(11/2)*n)
```

Maple [F] time = 0.084, size = 0, normalized size = 0.

$$\int x^{-1+3\,n}\left(a+bx^n\right)^{\frac{5}{2}}\frac{1}{\sqrt{c+dx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(-1+3*n)*(a+b*x^n)^(5/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+3*n)*(a+b*x^n)^(5/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(5/2)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.38369, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(5/2)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="fricas")
```

```
[Out] [1/7680*(4*(384*sqrt(b*d)*b^4*d^4*x^(4*n) - 144*(3*b^4*c*d^3 - 7*
a*b^3*d^4)*sqrt(b*d)*x^(3*n) + 8*(63*b^4*c^2*d^2 - 148*a*b^3*c*d^
3 + 93*a^2*b^2*d^4)*sqrt(b*d)*x^(2*n) - 2*(315*b^4*c^3*d - 749*a*
b^3*c^2*d^2 + 481*a^2*b^2*c*d^3 - 15*a^3*b*d^4)*sqrt(b*d)*x^n + (
945*b^4*c^4 - 2310*a*b^3*c^3*d + 1564*a^2*b^2*c^2*d^2 - 90*a^3*b*
c*d^3 - 45*a^4*d^4)*sqrt(b*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c) -
15*(63*b^5*c^5 - 175*a*b^4*c^4*d + 150*a^2*b^3*c^3*d^2 - 30*a^3*b
^2*c^2*d^3 - 5*a^4*b*c*d^4 - 3*a^5*d^5)*log(8*sqrt(b*d)*b^2*d^2*x
^(2*n) + 8*(b^2*c*d + a*b*d^2)*sqrt(b*d)*x^n + 4*(2*b^2*d^2*x^n +
 b^2*c*d + a*b*d^2)*sqrt(b*x^n + a)*sqrt(d*x^n + c) + (b^2*c^2 +
6*a*b*c*d + a^2*d^2)*sqrt(b*d)))/(sqrt(b*d)*b^2*d^5*n), 1/3840*(2
*(384*sqrt(-b*d)*b^4*d^4*x^(4*n) - 144*(3*b^4*c*d^3 - 7*a*b^3*d^4
)*sqrt(-b*d)*x^(3*n) + 8*(63*b^4*c^2*d^2 - 148*a*b^3*c*d^3 + 93*a
^2*b^2*d^4)*sqrt(-b*d)*x^(2*n) - 2*(315*b^4*c^3*d - 749*a*b^3*c^2
*d^2 + 481*a^2*b^2*c*d^3 - 15*a^3*b*d^4)*sqrt(-b*d)*x^n + (945*b^
4*c^4 - 2310*a*b^3*c^3*d + 1564*a^2*b^2*c^2*d^2 - 90*a^3*b*c*d^3
- 45*a^4*d^4)*sqrt(-b*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c) - 15*(6
3*b^5*c^5 - 175*a*b^4*c^4*d + 150*a^2*b^3*c^3*d^2 - 30*a^3*b^2*c^
2*d^3 - 5*a^4*b*c*d^4 - 3*a^5*d^5)*arctan(1/2*(2*sqrt(-b*d)*b*d*x
^n + (b*c + a*d)*sqrt(-b*d))/(sqrt(b*x^n + a)*sqrt(d*x^n + c)*b*d
)))/(sqrt(-b*d)*b^2*d^5*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**(-1+3*n)*(a+b*x**n)**(5/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^{\frac{5}{2}} x^{3\,n-1}}{\sqrt{dx^n + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(5/2)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^(5/2)*x^(3*n - 1)/sqrt(d*x^n + c), x)
```

3.904 $\int \frac{x^{-1+3n}(a+bx^n)^{3/2}}{\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=291

$$-\frac{(bc-ad)\left(3a^2d^2+10abcd+35b^2c^2\right)\sqrt{a+bx^n}\sqrt{c+dx^n}}{64b^2d^4n}+\frac{\left(3a^2d^2+10abcd+35b^2c^2\right)(a+bx^n)^{3/2}\sqrt{c+dx^n}}{96b^2d^3n}+\frac{(bc-ad)^2\left(3a^2d^2+10abcd+35b^2c^2\right)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{64b^{5/2}d^{9/2}n}-\frac{(3ad+7bc)(a+bx^n)^{5/2}\sqrt{c+dx^n}}{24b^2d^2n}+\frac{x^n(a+bx^n)^{5/2}\sqrt{c+dx^n}}{4bdn}$$

```
[Out] -((b*c - a*d)*(35*b^2*c^2 + 10*a*b*c*d + 3*a^2*d^2)*Sqrt[a + b*x^
n]*Sqrt[c + d*x^n])/(64*b^2*d^4*n) + ((35*b^2*c^2 + 10*a*b*c*d +
3*a^2*d^2)*(a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(96*b^2*d^3*n) - ((
7*b*c + 3*a*d)*(a + b*x^n)^(5/2)*Sqrt[c + d*x^n])/(24*b^2*d^2*n)
+ (x^n*(a + b*x^n)^(5/2)*Sqrt[c + d*x^n])/(4*b*d*n) + ((b*c - a*d
)^2*(35*b^2*c^2 + 10*a*b*c*d + 3*a^2*d^2)*ArcTanh[(Sqrt[d]*Sqrt[a
 + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(64*b^(5/2)*d^(9/2)*n)
```

Rubi [A] time = 0.802315, antiderivative size = 291, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$-\frac{(bc-ad)\left(3a^2d^2+10abcd+35b^2c^2\right)\sqrt{a+bx^n}\sqrt{c+dx^n}}{64b^2d^4n}+\frac{\left(3a^2d^2+10abcd+35b^2c^2\right)(a+bx^n)^{3/2}\sqrt{c+dx^n}}{96b^2d^3n}+\frac{(bc-ad)^2\left(3a^2d^2+10abcd+35b^2c^2\right)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{64b^{5/2}d^{9/2}n}-\frac{(3ad+7bc)(a+bx^n)^{5/2}\sqrt{c+dx^n}}{24b^2d^2n}+\frac{x^n(a+bx^n)^{5/2}\sqrt{c+dx^n}}{4bdn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 3*n)*(a + b*x^n)^(3/2))/Sqrt[c + d*x^n],x]
```

```
[Out] -((b*c - a*d)*(35*b^2*c^2 + 10*a*b*c*d + 3*a^2*d^2)*Sqrt[a + b*x^
n]*Sqrt[c + d*x^n])/(64*b^2*d^4*n) + ((35*b^2*c^2 + 10*a*b*c*d +
3*a^2*d^2)*(a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(96*b^2*d^3*n) - ((
7*b*c + 3*a*d)*(a + b*x^n)^(5/2)*Sqrt[c + d*x^n])/(24*b^2*d^2*n)
+ (x^n*(a + b*x^n)^(5/2)*Sqrt[c + d*x^n])/(4*b*d*n) + ((b*c - a*d
)^2*(35*b^2*c^2 + 10*a*b*c*d + 3*a^2*d^2)*ArcTanh[(Sqrt[d]*Sqrt[a
 + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(64*b^(5/2)*d^(9/2)*n)
```

Rubi in Sympy [A] time = 59.3333, size = 269, normalized size = 0.92

$$\frac{x^n(a+bx^n)^{\frac{5}{2}}\sqrt{c+dx^n}}{4bdn}-\frac{(a+bx^n)^{\frac{5}{2}}\sqrt{c+dx^n}\,(3ad+7bc)}{24b^2d^2n}+\frac{(a+bx^n)^{\frac{3}{2}}\sqrt{c+dx^n}\left(3a^2d^2+10abcd+35b^2c^2\right)}{96b^2d^3n}+\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}\,(ad-bc)\left(3a^2d^2+10abcd+35b^2c^2\right)}{64b^2d^4n}+\frac{(ad-bc)^2\left(3a^2d^2+10abcd+35b^2c^2\right)\operatorname{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{64b^{\frac{5}{2}}d^{\frac{9}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)*(a+b*x**n)**(3/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] x**n*(a + b*x**n)**(5/2)*sqrt(c + d*x**n)/(4*b*d*n) - (a + b*x**n
)**(5/2)*sqrt(c + d*x**n)*(3*a*d + 7*b*c)/(24*b**2*d**2*n) + (a +
 b*x**n)**(3/2)*sqrt(c + d*x**n)*(3*a**2*d**2 + 10*a*b*c*d + 35*b
**2*c**2)/(96*b**2*d**3*n) + sqrt(a + b*x**n)*sqrt(c + d*x**n)*(a
*d - b*c)*(3*a**2*d**2 + 10*a*b*c*d + 35*b**2*c**2)/(64*b**2*d**4
*n) + (a*d - b*c)**2*(3*a**2*d**2 + 10*a*b*c*d + 35*b**2*c**2)*at
anh(sqrt(d)*sqrt(a + b*x**n)/(sqrt(b)*sqrt(c + d*x**n)))/(64*b**(
5/2)*d**(9/2)*n)
```

Mathematica [A] time = 0.455557, size = 234, normalized size = 0.8

$$\frac{3(bc-ad)^2\left(3a^2d^2+10abcd+35b^2c^2\right)\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}+ad+bc+2bdx^n\right)-2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}\left(9a\right.}{384b^{5/2}d^{9/2}n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 3*n)*(a + b*x^n)^(3/2))/Sqrt[c + d*x^n],x]
```

```
[Out] (-2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]*(9*a^3*d^3 +
3*a^2*b*d^2*(5*c - 2*d*x^n) - a*b^2*d*(145*c^2 - 92*c*d*x^n + 72*
d^2*x^(2*n)) + b^3*(105*c^3 - 70*c^2*d*x^n + 56*c*d^2*x^(2*n) - 4
8*d^3*x^(3*n))) + 3*(b*c - a*d)^2*(35*b^2*c^2 + 10*a*b*c*d + 3*a^
2*d^2)*Log[b*c + a*d + 2*b*d*x^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x
^n]*Sqrt[c + d*x^n]])/(384*b^(5/2)*d^(9/2)*n)
```

Maple [F] time = 0.086, size = 0, normalized size = 0.

$$\int x^{-1+3\,n}\left(a+bx^{n}\right)^{\frac{3}{2}}\frac{1}{\sqrt{c+dx^{n}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)*(a+b*x^n)^(3/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+3*n)*(a+b*x^n)^(3/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(3/2)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.357617, size = 1, normalized size = 0.

$$\left[\frac{4\left(48\sqrt{bd}b^{3}d^{3}x^{3\,n}-8\left(7\,b^{3}cd^{2}-9\,ab^{2}d^{3}\right)\sqrt{bd}x^{2\,n}+2\left(35\,b^{3}c^{2}d-46\,ab^{2}cd^{2}+3\,a^{2}bd^{3}\right)\sqrt{bd}x^{n}-\left(105\,b^{3}c^{3}-145\,ab^{2}c^{2}d+\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(3/2)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="fricas")
```

```
[Out] [1/768*(4*(48*sqrt(b*d)*b^3*d^3*x^(3*n) - 8*(7*b^3*c*d^2 - 9*a*b^
2*d^3)*sqrt(b*d)*x^(2*n) + 2*(35*b^3*c^2*d - 46*a*b^2*c*d^2 + 3*a
^2*b*d^3)*sqrt(b*d)*x^n - (105*b^3*c^3 - 145*a*b^2*c^2*d + 15*a^2
*b*c*d^2 + 9*a^3*d^3)*sqrt(b*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c)
+ 3*(35*b^4*c^4 - 60*a*b^3*c^3*d + 18*a^2*b^2*c^2*d^2 + 4*a^3*b*c
*d^3 + 3*a^4*d^4)*log(8*sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b^2*c*d +
a*b*d^2)*sqrt(b*d)*x^n + 4*(2*b^2*d^2*x^n + b^2*c*d + a*b*d^2)*sq
rt(b*x^n + a)*sqrt(d*x^n + c) + (b^2*c^2 + 6*a*b*c*d + a^2*d^2)*s
qrt(b*d)))/(sqrt(b*d)*b^2*d^4*n), 1/384*(2*(48*sqrt(-b*d)*b^3*d^3
*x^(3*n) - 8*(7*b^3*c*d^2 - 9*a*b^2*d^3)*sqrt(-b*d)*x^(2*n) + 2*(
35*b^3*c^2*d - 46*a*b^2*c*d^2 + 3*a^2*b*d^3)*sqrt(-b*d)*x^n - (10
5*b^3*c^3 - 145*a*b^2*c^2*d + 15*a^2*b*c*d^2 + 9*a^3*d^3)*sqrt(-b
*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c) + 3*(35*b^4*c^4 - 60*a*b^3*c
^3*d + 18*a^2*b^2*c^2*d^2 + 4*a^3*b*c*d^3 + 3*a^4*d^4)*arctan(1/2
*(2*sqrt(-b*d)*b*d*x^n + (b*c + a*d)*sqrt(-b*d))/(sqrt(b*x^n + a)
*sqrt(d*x^n + c)*b*d)))/(sqrt(-b*d)*b^2*d^4*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**(-1+3*n)*(a+b*x**n)**(3/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^n + a)^{\frac{3}{2}} x^{3\,n-1}}{\sqrt{dx^n + c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^n + a)^(3/2)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^(3/2)*x^(3*n - 1)/sqrt(d*x^n + c), x)
```

3.905 $\int \frac{x^{-1+3n}\sqrt{a+bx^n}}{\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=221

$$\frac{\left(a^2d^2+2abcd+5b^2c^2\right)\sqrt{a+bx^n}\sqrt{c+dx^n}}{8b^2d^3n}-\frac{(bc-ad)\left(a^2d^2+2abcd+5b^2c^2\right)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{8b^{5/2}d^{7/2}n}-\frac{(3ad+5bc)\left(a+bx^n\right)^{3/2}\sqrt{c+dx^n}}{12b^2d^2n}+\frac{x^n\left(a+bx^n\right)^{3/2}\sqrt{c+dx^n}}{3bdn}$$

```
[Out] ((5*b^2*c^2 + 2*a*b*c*d + a^2*d^2)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n
])/(8*b^2*d^3*n) - ((5*b*c + 3*a*d)*(a + b*x^n)^(3/2)*Sqrt[c + d*
x^n])/(12*b^2*d^2*n) + (x^n*(a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(3
*b*d*n) - ((b*c - a*d)*(5*b^2*c^2 + 2*a*b*c*d + a^2*d^2)*ArcTanh[
(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(8*b^(5/2)*
d^(7/2)*n)
```

Rubi [A] time = 0.617007, antiderivative size = 221, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{\left(a^2d^2+2abcd+5b^2c^2\right)\sqrt{a+bx^n}\sqrt{c+dx^n}}{8b^2d^3n}-\frac{(bc-ad)\left(a^2d^2+2abcd+5b^2c^2\right)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{8b^{5/2}d^{7/2}n}-\frac{(3ad+5bc)\left(a+bx^n\right)^{3/2}\sqrt{c+dx^n}}{12b^2d^2n}+\frac{x^n\left(a+bx^n\right)^{3/2}\sqrt{c+dx^n}}{3bdn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-1 + 3*n)*Sqrt[a + b*x^n])/Sqrt[c + d*x^n],x]
```

```
[Out] ((5*b^2*c^2 + 2*a*b*c*d + a^2*d^2)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n
])/(8*b^2*d^3*n) - ((5*b*c + 3*a*d)*(a + b*x^n)^(3/2)*Sqrt[c + d*
x^n])/(12*b^2*d^2*n) + (x^n*(a + b*x^n)^(3/2)*Sqrt[c + d*x^n])/(3
*b*d*n) - ((b*c - a*d)*(5*b^2*c^2 + 2*a*b*c*d + a^2*d^2)*ArcTanh[
(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(8*b^(5/2)*
d^(7/2)*n)
```

Rubi in Sympy [A] time = 41.9342, size = 201, normalized size = 0.91

$$\frac{x^n\left(a+bx^n\right)^{\frac{3}{2}}\sqrt{c+dx^n}}{3bdn}-\frac{\left(a+bx^n\right)^{\frac{3}{2}}\sqrt{c+dx^n}\,(3ad+5bc)}{12b^2d^2n}+\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}\left(a^2d^2+2abcd+5b^2c^2\right)}{8b^2d^3n}+\frac{(ad-bc)\left(a^2d^2+2abcd+5b^2c^2\right)\operatorname{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{8b^{\frac{5}{2}}d^{\frac{7}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)*(a+b*x**n)**(1/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] x**n*(a + b*x**n)**(3/2)*sqrt(c + d*x**n)/(3*b*d*n) - (a + b*x**n
)**(3/2)*sqrt(c + d*x**n)*(3*a*d + 5*b*c)/(12*b**2*d**2*n) + sqrt
(a + b*x**n)*sqrt(c + d*x**n)*(a**2*d**2 + 2*a*b*c*d + 5*b**2*c**
2)/(8*b**2*d**3*n) + (a*d - b*c)*(a**2*d**2 + 2*a*b*c*d + 5*b**2*
c**2)*atanh(sqrt(d)*sqrt(a + b*x**n)/(sqrt(b)*sqrt(c + d*x**n)))/
(8*b**(5/2)*d**(7/2)*n)
```

Mathematica [A] time = 0.347586, size = 183, normalized size = 0.83

$$\frac{2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}\left(-3a^2d^2+2abd\left(dx^n-2c\right)+b^2\left(15c^2-10cdx^n+8d^2x^{2n}\right)\right)-3(bc-ad)\left(a^2d^2+2abcd+5b^2c^2\right)}{48b^{5/2}d^{7/2}n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(-1 + 3*n)*Sqrt[a + b*x^n])/Sqrt[c + d*x^n],x]
```

```
[Out] (2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]*(-3*a^2*d^2 +
2*a*b*d*(-2*c + d*x^n) + b^2*(15*c^2 - 10*c*d*x^n + 8*d^2*x^(2*n)
)) - 3*(b*c - a*d)*(5*b^2*c^2 + 2*a*b*c*d + a^2*d^2)*Log[b*c + a*
d + 2*b*d*x^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]
])/(48*b^(5/2)*d^(7/2)*n)
```

Maple [F] time = 0.084, size = 0, normalized size = 0.

$$\int x^{-1+3n}\sqrt{a+bx^n}\frac{1}{\sqrt{c+dx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)*(a+b*x^n)^(1/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+3*n)*(a+b*x^n)^(1/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(b*x^n + a)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.321391, size = 1, normalized size = 0.

$$\left[\frac{4\left(8\sqrt{bd}b^2d^2x^{2n}-2\left(5b^2cd-abd^2\right)\sqrt{bd}x^n+\left(15b^2c^2-4abcd-3a^2d^2\right)\sqrt{bd}\right)\sqrt{bx^n+a}\sqrt{dx^n+c}-3\left(5b^3c^3-3ab^2c^2d\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(b*x^n + a)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="fricas")
```

```
[Out] [1/96*(4*(8*sqrt(b*d)*b^2*d^2*x^(2*n) - 2*(5*b^2*c*d - a*b*d^2)*s
qrt(b*d)*x^n + (15*b^2*c^2 - 4*a*b*c*d - 3*a^2*d^2)*sqrt(b*d))*sq
rt(b*x^n + a)*sqrt(d*x^n + c) - 3*(5*b^3*c^3 - 3*a*b^2*c^2*d - a^
2*b*c*d^2 - a^3*d^3)*log(8*sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b^2*c*d
 + a*b*d^2)*sqrt(b*d)*x^n + 4*(2*b^2*d^2*x^n + b^2*c*d + a*b*d^2)
*sqrt(b*x^n + a)*sqrt(d*x^n + c) + (b^2*c^2 + 6*a*b*c*d + a^2*d^2
)*sqrt(b*d)))/(sqrt(b*d)*b^2*d^3*n), 1/48*(2*(8*sqrt(-b*d)*b^2*d^
2*x^(2*n) - 2*(5*b^2*c*d - a*b*d^2)*sqrt(-b*d)*x^n + (15*b^2*c^2
- 4*a*b*c*d - 3*a^2*d^2)*sqrt(-b*d))*sqrt(b*x^n + a)*sqrt(d*x^n +
 c) - 3*(5*b^3*c^3 - 3*a*b^2*c^2*d - a^2*b*c*d^2 - a^3*d^3)*arcta
n(1/2*(2*sqrt(-b*d)*b*d*x^n + (b*c + a*d)*sqrt(-b*d))/(sqrt(b*x^n
 + a)*sqrt(d*x^n + c)*b*d)))/(sqrt(-b*d)*b^2*d^3*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)*(a+b*x**n)**(1/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^n + a}x^{3\,n-1}}{\sqrt{dx^n + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a)*x^(3*n - 1)/sqrt(d*x^n + c),x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^n + a)*x^(3*n - 1)/sqrt(d*x^n + c), x)
```

3.906 $\int \frac{x^{-1+3n}}{\sqrt{a+bx^n}\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=150

$$-\frac{\left(4abcd-3(ad+bc)^2\right)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{4b^{5/2}d^{5/2}n}-\frac{3(ad+bc)\sqrt{a+bx^n}\sqrt{c+dx^n}}{4b^2d^2n}+\frac{x^n\sqrt{a+bx^n}\sqrt{c+dx^n}}{2bdn}$$

```
[Out] (-3*(b*c + a*d)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(4*b^2*d^2*n) +
(x^n*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(2*b*d*n) - ((4*a*b*c*d - 3
*(b*c + a*d)^2)*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c
 + d*x^n])])/(4*b^(5/2)*d^(5/2)*n)
```

Rubi [A] time = 0.440354, antiderivative size = 150, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{\left(4abcd-3(ad+bc)^2\right)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{4b^{5/2}d^{5/2}n}-\frac{3(ad+bc)\sqrt{a+bx^n}\sqrt{c+dx^n}}{4b^2d^2n}+\frac{x^n\sqrt{a+bx^n}\sqrt{c+dx^n}}{2bdn}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 3*n)/(Sqrt[a + b*x^n]*Sqrt[c + d*x^n]),x]
```

```
[Out] (-3*(b*c + a*d)*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(4*b^2*d^2*n) +
(x^n*Sqrt[a + b*x^n]*Sqrt[c + d*x^n])/(2*b*d*n) - ((4*a*b*c*d - 3
*(b*c + a*d)^2)*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c
 + d*x^n])])/(4*b^(5/2)*d^(5/2)*n)
```

Rubi in Sympy [A] time = 32.2895, size = 131, normalized size = 0.87

$$\frac{x^n\sqrt{a+bx^n}\sqrt{c+dx^n}}{2bdn}-\frac{3\sqrt{a+bx^n}\sqrt{c+dx^n}\,(ad+bc)}{4b^2d^2n}-\frac{\left(abcd-\frac{3(ad+bc)^2}{4}\right)\operatorname{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{\frac{5}{2}}d^{\frac{5}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)/(a+b*x**n)**(1/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] x**n*sqrt(a + b*x**n)*sqrt(c + d*x**n)/(2*b*d*n) - 3*sqrt(a + b*x
**n)*sqrt(c + d*x**n)*(a*d + b*c)/(4*b**2*d**2*n) - (a*b*c*d - 3*
(a*d + b*c)**2/4)*atanh(sqrt(d)*sqrt(a + b*x**n)/(sqrt(b)*sqrt(c
+ d*x**n)))/(b**(5/2)*d**(5/2)*n)
```

Mathematica [A] time = 0.325203, size = 141, normalized size = 0.94

$$\frac{\left(3a^2d^2+2abcd+3b^2c^2\right)\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}+ad+bc+2bdx^n\right)+2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}\,(-3ad-3bc+2b}{8b^{5/2}d^{5/2}n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 3*n)/(Sqrt[a + b*x^n]*Sqrt[c + d*x^n]),x]
```

```
[Out] (2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]*(-3*b*c - 3*a*
d + 2*b*d*x^n) + (3*b^2*c^2 + 2*a*b*c*d + 3*a^2*d^2)*Log[b*c + a*
d + 2*b*d*x^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]
])/(8*b^(5/2)*d^(5/2)*n)
```

Maple [F] time = 0.083, size = 0, normalized size = 0.

$$\int x^{-1+3n} \frac{1}{\sqrt{a+bx^n}} \frac{1}{\sqrt{c+dx^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)/(a+b*x^n)^(1/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+3*n)/(a+b*x^n)^(1/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/(sqrt(b*x^n + a)*sqrt(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.362179, size = 1, normalized size = 0.01

$$\left[\frac{4\left(2\sqrt{bd}bdx^n - 3(bc+ad)\sqrt{bd}\right)\sqrt{bx^n+a}\sqrt{dx^n+c} + \left(3b^2c^2 + 2abcd + 3a^2d^2\right)\log\left(8\sqrt{bd}b^2d^2x^{2n} + 8\left(b^2cd + abd^2\right)\sqrt{bc\cdots}\right.}{16\sqrt{bd}b^2d^2n}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/(sqrt(b*x^n + a)*sqrt(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] [1/16*(4*(2*sqrt(b*d)*b*d*x^n - 3*(b*c + a*d)*sqrt(b*d))*sqrt(b*x
^n + a)*sqrt(d*x^n + c) + (3*b^2*c^2 + 2*a*b*c*d + 3*a^2*d^2)*log
(8*sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b^2*c*d + a*b*d^2)*sqrt(b*d)*x^
n + 4*(2*b^2*d^2*x^n + b^2*c*d + a*b*d^2)*sqrt(b*x^n + a)*sqrt(d*
x^n + c) + (b^2*c^2 + 6*a*b*c*d + a^2*d^2)*sqrt(b*d)))/(sqrt(b*d)
*b^2*d^2*n), 1/8*(2*(2*sqrt(-b*d)*b*d*x^n - 3*(b*c + a*d)*sqrt(-b
*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c) + (3*b^2*c^2 + 2*a*b*c*d + 3
*a^2*d^2)*arctan(1/2*(2*sqrt(-b*d)*b*d*x^n + (b*c + a*d)*sqrt(-b*
d))/(sqrt(b*x^n + a)*sqrt(d*x^n + c)*b*d)))/(sqrt(-b*d)*b^2*d^2*n
)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)/(a+b*x**n)**(1/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{3n-1}}{\sqrt{bx^n + a}\sqrt{dx^n + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/(sqrt(b*x^n + a)*sqrt(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(3*n - 1)/(sqrt(b*x^n + a)*sqrt(d*x^n + c)), x)
```

3.907 $\int \frac{x^{-1+3n}}{(a+bx^n)^{3/2}\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=133

$$-\frac{2a^2\sqrt{c+dx^n}}{b^2n(bc-ad)\sqrt{a+bx^n}}-\frac{(3ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{5/2}d^{3/2}n}+\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}}{b^2dn}$$

```
[Out] (-2*a^2*Sqrt[c + d*x^n])/(b^2*(b*c - a*d)*n*Sqrt[a + b*x^n]) + (S
qrt[a + b*x^n]*Sqrt[c + d*x^n])/(b^2*d*n) - ((b*c + 3*a*d)*ArcTan
h[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(b^(5/2)*
d^(3/2)*n)
```

Rubi [A] time = 0.452403, antiderivative size = 133, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{2a^2\sqrt{c+dx^n}}{b^2n(bc-ad)\sqrt{a+bx^n}}-\frac{(3ad+bc)\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{5/2}d^{3/2}n}+\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}}{b^2dn}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 3*n)/((a + b*x^n)^(3/2)*Sqrt[c + d*x^n]),x]
```

```
[Out] (-2*a^2*Sqrt[c + d*x^n])/(b^2*(b*c - a*d)*n*Sqrt[a + b*x^n]) + (S
qrt[a + b*x^n]*Sqrt[c + d*x^n])/(b^2*d*n) - ((b*c + 3*a*d)*ArcTan
h[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sqrt[c + d*x^n])])/(b^(5/2)*
d^(3/2)*n)
```

Rubi in Sympy [A] time = 34.6073, size = 116, normalized size = 0.87

$$\frac{2a^2\sqrt{c+dx^n}}{b^2n\sqrt{a+bx^n}\,(ad-bc)}+\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}}{b^2dn}-\frac{(3ad+bc)\,\mathrm{atanh}\left(\frac{\sqrt{b}\sqrt{c+dx^n}}{\sqrt{d}\sqrt{a+bx^n}}\right)}{b^{\frac{5}{2}}d^{\frac{3}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)/(a+b*x**n)**(3/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] 2*a**2*sqrt(c + d*x**n)/(b**2*n*sqrt(a + b*x**n)*(a*d - b*c)) + s
qrt(a + b*x**n)*sqrt(c + d*x**n)/(b**2*d*n) - (3*a*d + b*c)*atanh
(sqrt(b)*sqrt(c + d*x**n)/(sqrt(d)*sqrt(a + b*x**n)))/(b**(5/2)*d
**(3/2)*n)
```

Mathematica [A] time = 0.414949, size = 132, normalized size = 0.99

$$\frac{\sqrt{a+bx^n}\sqrt{c+dx^n}\left(\frac{2a^2}{(ad-bc)(a+bx^n)}+\frac{1}{d}\right)}{b^2n}-\frac{(3ad+bc)\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}+ad+bc+2bdx^n\right)}{2b^{5/2}d^{3/2}n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 3*n)/((a + b*x^n)^(3/2)*Sqrt[c + d*x^n]),x]
```

```
[Out] (Sqrt[a + b*x^n]*Sqrt[c + d*x^n]*(d^(-1) + (2*a^2)/((-(b*c) + a*d
)*(a + b*x^n))))/(b^2*n) - ((b*c + 3*a*d)*Log[b*c + a*d + 2*b*d*x
^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]])/(2*b^(5/
```

```
2)*d^(3/2)*n)
```

Maple [F] time = 0.085, size = 0, normalized size = 0.

$$\int x^{-1+3n}(a+bx^{n})^{-\frac{3}{2}}\frac{1}{\sqrt{c+dx^{n}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)/(a+b*x^n)^(3/2)/(c+d*x^n)^(1/2),x)
```

```
[Out] int(x^(-1+3*n)/(a+b*x^n)^(3/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{3n-1}}{(bx^{n}+a)^{\frac{3}{2}}\sqrt{dx^{n}+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)),x, algorithm="maxima")
```

```
[Out] integrate(x^(3*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)), x)
```

Fricas [A] time = 0.436908, size = 1, normalized size = 0.01

$$\left[\frac{4\left(\left(b^{2}c-abd\right)\sqrt{bd}x^{n}+\left(abc-3a^{2}d\right)\sqrt{bd}\right)\sqrt{bx^{n}+a}\sqrt{dx^{n}+c}+\left(ab^{2}c^{2}+2a^{2}bcd-3a^{3}d^{2}+\left(b^{3}c^{2}+2ab^{2}cd-3a^{2}bd^{2}\right)x^{n}\cdots}{4\left((b^{4}cd-ab^{3}d^{2})\sqrt{bd}n\cdots\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)),x, algorithm="fricas")
```

```
[Out] [1/4*(4*((b^2*c - a*b*d)*sqrt(b*d)*x^n + (a*b*c - 3*a^2*d)*sqrt(b
*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c) + (a*b^2*c^2 + 2*a^2*b*c*d -
 3*a^3*d^2 + (b^3*c^2 + 2*a*b^2*c*d - 3*a^2*b*d^2)*x^n)*log(8*sqr
t(b*d)*b^2*d^2*x^(2*n) + 8*(b^2*c*d + a*b*d^2)*sqrt(b*d)*x^n - 4*
(2*b^2*d^2*x^n + b^2*c*d + a*b*d^2)*sqrt(b*x^n + a)*sqrt(d*x^n +
c) + (b^2*c^2 + 6*a*b*c*d + a^2*d^2)*sqrt(b*d)))/((b^4*c*d - a*b^
3*d^2)*sqrt(b*d)*n*x^n + (a*b^3*c*d - a^2*b^2*d^2)*sqrt(b*d)*n),
1/2*(2*((b^2*c - a*b*d)*sqrt(-b*d)*x^n + (a*b*c - 3*a^2*d)*sqrt(-
b*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c) - (a*b^2*c^2 + 2*a^2*b*c*d
- 3*a^3*d^2 + (b^3*c^2 + 2*a*b^2*c*d - 3*a^2*b*d^2)*x^n)*arctan(1
/2*(2*sqrt(-b*d)*b*d*x^n + (b*c + a*d)*sqrt(-b*d))/(sqrt(b*x^n +
a)*sqrt(d*x^n + c)*b*d)))/((b^4*c*d - a*b^3*d^2)*sqrt(-b*d)*n*x^n
 + (a*b^3*c*d - a^2*b^2*d^2)*sqrt(-b*d)*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)/(a+b*x**n)**(3/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{3\,n-1}}{(bx^n+a)^{\frac{3}{2}}\sqrt{dx^n+c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(3*n - 1)/((b*x^n + a)^(3/2)*sqrt(d*x^n + c)), x)
```

3.908 $\int \frac{x^{-1+3n}}{(a+bx^n)^{5/2}\sqrt{c+dx^n}}\,dx$

Optimal. Leaf size=147

$$-\frac{2a^2\sqrt{c+dx^n}}{3b^2n(bc-ad)\left(a+bx^n\right)^{3/2}}+\frac{2\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{5/2}\sqrt{d}n}+\frac{4a(3bc-2ad)\sqrt{c+dx^n}}{3b^2n(bc-ad)^2\sqrt{a+bx^n}}$$

```
[Out] (-2*a^2*Sqrt[c + d*x^n])/(3*b^2*(b*c - a*d)*n*(a + b*x^n)^(3/2))
+ (4*a*(3*b*c - 2*a*d)*Sqrt[c + d*x^n])/(3*b^2*(b*c - a*d)^2*n*Sq
rt[a + b*x^n]) + (2*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sq
rt[c + d*x^n])])/(b^(5/2)*Sqrt[d]*n)
```

Rubi [A] time = 0.407181, antiderivative size = 147, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$-\frac{2a^2\sqrt{c+dx^n}}{3b^2n(bc-ad)\left(a+bx^n\right)^{3/2}}+\frac{2\tanh^{-1}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{5/2}\sqrt{d}n}+\frac{4a(3bc-2ad)\sqrt{c+dx^n}}{3b^2n(bc-ad)^2\sqrt{a+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 3*n)/((a + b*x^n)^(5/2)*Sqrt[c + d*x^n]),x]
```

```
[Out] (-2*a^2*Sqrt[c + d*x^n])/(3*b^2*(b*c - a*d)*n*(a + b*x^n)^(3/2))
+ (4*a*(3*b*c - 2*a*d)*Sqrt[c + d*x^n])/(3*b^2*(b*c - a*d)^2*n*Sq
rt[a + b*x^n]) + (2*ArcTanh[(Sqrt[d]*Sqrt[a + b*x^n])/(Sqrt[b]*Sq
rt[c + d*x^n])])/(b^(5/2)*Sqrt[d]*n)
```

Rubi in Sympy [A] time = 36.4581, size = 133, normalized size = 0.9

$$\frac{2a^2\sqrt{c+dx^n}}{3b^2n\left(a+bx^n\right)^{\frac{3}{2}}(ad-bc)}-\frac{4a\sqrt{c+dx^n}\,(2ad-3bc)}{3b^2n\sqrt{a+bx^n}\,(ad-bc)^2}+\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{d}\sqrt{a+bx^n}}{\sqrt{b}\sqrt{c+dx^n}}\right)}{b^{\frac{5}{2}}\sqrt{d}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+3*n)/(a+b*x**n)**(5/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] 2*a**2*sqrt(c + d*x**n)/(3*b**2*n*(a + b*x**n)**(3/2)*(a*d - b*c)
) - 4*a*sqrt(c + d*x**n)*(2*a*d - 3*b*c)/(3*b**2*n*sqrt(a + b*x**
n)*(a*d - b*c)**2) + 2*atanh(sqrt(d)*sqrt(a + b*x**n)/(sqrt(b)*sq
rt(c + d*x**n)))/(b**(5/2)*sqrt(d)*n)
```

Mathematica [A] time = 0.39106, size = 136, normalized size = 0.93

$$\frac{2a\sqrt{c+dx^n}\left(-3a^2d+ab\left(5c-4dx^n\right)+6b^2cx^n\right)}{3b^2n(bc-ad)^2\left(a+bx^n\right)^{3/2}}+\frac{\log\left(2\sqrt{b}\sqrt{d}\sqrt{a+bx^n}\sqrt{c+dx^n}+ad+bc+2bdx^n\right)}{b^{5/2}\sqrt{d}n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 3*n)/((a + b*x^n)^(5/2)*Sqrt[c + d*x^n]),x]
```

```
[Out] (2*a*Sqrt[c + d*x^n]*(-3*a^2*d + 6*b^2*c*x^n + a*b*(5*c - 4*d*x^n
)))/(3*b^2*(b*c - a*d)^2*n*(a + b*x^n)^(3/2)) + Log[b*c + a*d + 2
*b*d*x^n + 2*Sqrt[b]*Sqrt[d]*Sqrt[a + b*x^n]*Sqrt[c + d*x^n]]/(b^
```

```
(5/2)*Sqrt[d]*n)
```

Maple [F] time = 0.096, size = 0, normalized size = 0.

$$\int x^{-1+3n} (a+bx^n)^{-\frac{5}{2}} \frac{1}{\sqrt{c+dx^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+3*n)/(a+b*x^n)^(5/2)/(c+d*x^n)^(1/2),x)

[Out] int(x^(-1+3*n)/(a+b*x^n)^(5/2)/(c+d*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{3n-1}}{(bx^n+a)^{\frac{5}{2}}\sqrt{dx^n+c}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)),x, algorithm="maxima")

[Out] integrate(x^(3*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)), x)
```

Fricas [A] time = 0.47104, size = 1, normalized size = 0.01

$$\left[\frac{4\left(2\left(3ab^2c-2a^2bd\right)\sqrt{bd}x^n+\left(5a^2bc-3a^3d\right)\sqrt{bd}\right)\sqrt{bx^n+a}\sqrt{dx^n+c}+3\left(a^2b^2c^2-2a^3bcd+a^4d^2+\left(b^4c^2-2ab^3cd+\right.\right.}{6\left(\left(b^6c^2-2ab^5cd+a^2b^4d^2\right)\sqrt{bd}\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(3*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)),x, algorithm="fricas")

[Out] [1/6*(4*(2*(3*a*b^2*c - 2*a^2*b*d)*sqrt(b*d)*x^n + (5*a^2*b*c - 3
*a^3*d)*sqrt(b*d))*sqrt(b*x^n + a)*sqrt(d*x^n + c) + 3*(a^2*b^2*c
^2 - 2*a^3*b*c*d + a^4*d^2 + (b^4*c^2 - 2*a*b^3*c*d + a^2*b^2*d^2
)*x^(2*n) + 2*(a*b^3*c^2 - 2*a^2*b^2*c*d + a^3*b*d^2)*x^n)*log(8*
sqrt(b*d)*b^2*d^2*x^(2*n) + 8*(b^2*c*d + a*b*d^2)*sqrt(b*d)*x^n +
 4*(2*b^2*d^2*x^n + b^2*c*d + a*b*d^2)*sqrt(b*x^n + a)*sqrt(d*x^n
 + c) + (b^2*c^2 + 6*a*b*c*d + a^2*d^2)*sqrt(b*d)))/((b^6*c^2 - 2
*a*b^5*c*d + a^2*b^4*d^2)*sqrt(b*d)*n*x^(2*n) + 2*(a*b^5*c^2 - 2*
a^2*b^4*c*d + a^3*b^3*d^2)*sqrt(b*d)*n*x^n + (a^2*b^4*c^2 - 2*a^3
*b^3*c*d + a^4*b^2*d^2)*sqrt(b*d)*n), 1/3*(2*(2*(3*a*b^2*c - 2*a^
2*b*d)*sqrt(-b*d)*x^n + (5*a^2*b*c - 3*a^3*d)*sqrt(-b*d))*sqrt(b*
x^n + a)*sqrt(d*x^n + c) + 3*(a^2*b^2*c^2 - 2*a^3*b*c*d + a^4*d^2
 + (b^4*c^2 - 2*a*b^3*c*d + a^2*b^2*d^2)*x^(2*n) + 2*(a*b^3*c^2 -
 2*a^2*b^2*c*d + a^3*b*d^2)*x^n)*arctan(1/2*(2*sqrt(-b*d)*b*d*x^n
 + (b*c + a*d)*sqrt(-b*d))/(sqrt(b*x^n + a)*sqrt(d*x^n + c)*b*d))
)/((b^6*c^2 - 2*a*b^5*c*d + a^2*b^4*d^2)*sqrt(-b*d)*n*x^(2*n) + 2
*(a*b^5*c^2 - 2*a^2*b^4*c*d + a^3*b^3*d^2)*sqrt(-b*d)*n*x^n + (a^
2*b^4*c^2 - 2*a^3*b^3*c*d + a^4*b^2*d^2)*sqrt(-b*d)*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+3*n)/(a+b*x**n)**(5/2)/(c+d*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{3\,n-1}}{(bx^n + a)^{\frac{5}{2}}\sqrt{dx^n + c}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)),x, algorithm="giac")
```

```
[Out] integrate(x^(3*n - 1)/((b*x^n + a)^(5/2)*sqrt(d*x^n + c)), x)
```

3.909 $\int x^p(b+cx)^p(b+2cx)\,dx$

Optimal. Leaf size=20

$$\frac{x^{p+1}(b+cx)^{p+1}}{p+1}$$

```
[Out] (x^(1 + p)*(b + c*x)^(1 + p))/(1 + p)
```

Rubi [A] time = 0.0190531, antiderivative size = 20, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$

$$\frac{x^{p+1}(b+cx)^{p+1}}{p+1}$$

Antiderivative was successfully verified.

```
[In]  Int[x^p*(b + c*x)^p*(b + 2*c*x),x]

[Out] (x^(1 + p)*(b + c*x)^(1 + p))/(1 + p)
```

Rubi in Sympy [A] time = 3.73899, size = 15, normalized size = 0.75

$$\frac{x^{p+1}\left(b+cx\right)^{p+1}}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**p*(c*x+b)**p*(2*c*x+b),x)

[Out] x**(p + 1)*(b + c*x)**(p + 1)/(p + 1)
```

Mathematica [A] time = 0.0393934, size = 20, normalized size = 1.

$$\frac{x^{p+1}(b+cx)^{p+1}}{p+1}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^p*(b + c*x)^p*(b + 2*c*x),x]

[Out] (x^(1 + p)*(b + c*x)^(1 + p))/(1 + p)
```

Maple [A] time = 0.005, size = 21, normalized size = 1.1

$$\frac{x^{1+p}\left(cx+b\right)^{1+p}}{1+p}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^p*(c*x+b)^p*(2*c*x+b),x)

[Out] x^(1+p)*(c*x+b)^(1+p)/(1+p)
```

Maxima [A] time = 1.54331, size = 39, normalized size = 1.95

$$\frac{\left(cx^2 + bx\right)e^{(p\log(cx+b)+p\log(x))}}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)*(c*x + b)^p*x^p,x, algorithm="maxima")
```

```
[Out] (c*x^2 + b*x)*e^(p*log(c*x + b) + p*log(x))/(p + 1)
```

Fricas [A] time = 0.234496, size = 34, normalized size = 1.7

$$\frac{\left(cx^2 + bx\right)(cx+b)^p x^p}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)*(c*x + b)^p*x^p,x, algorithm="fricas")
```

```
[Out] (c*x^2 + b*x)*(c*x + b)^p*x^p/(p + 1)
```

Sympy [A] time = 5.20877, size = 46, normalized size = 2.3

$$\begin{cases} \frac{bxx^p(b+cx)^p}{p+1} + \frac{cx^2x^p(b+cx)^p}{p+1} & \text{for } p \neq -1 \\ \log(x) + \log\left(\frac{b}{c} + x\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**p*(c*x+b)**p*(2*c*x+b),x)
```

```
[Out] Piecewise((b*x*x**p*(b + c*x)**p/(p + 1) + c*x**2*x**p*(b + c*x)*
*p/(p + 1), Ne(p, -1)), (log(x) + log(b/c + x), True))
```

GIAC/XCAS [A] time = 0.212511, size = 58, normalized size = 2.9

$$\frac{cx^2e^{(p\ln(cx+b)+p\ln(x))} + bxe^{(p\ln(cx+b)+p\ln(x))}}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*c*x + b)*(c*x + b)^p*x^p,x, algorithm="giac")
```

```
[Out] (c*x^2*e^(p*ln(c*x + b) + p*ln(x)) + b*x*e^(p*ln(c*x + b) + p*ln(
x)))/(p + 1)
```

3.910 $\int x^{-1+2(1+p)}\left(b+cx^2\right)^p\left(b+2cx^2\right)\,dx$

Optimal. Leaf size=27

$$\frac{x^{2(p+1)}\left(b+cx^2\right)^{p+1}}{2(p+1)}$$

```
[Out] (x^(2*(1 + p))*(b + c*x^2)^(1 + p))/(2*(1 + p))
```

Rubi [A] time = 0.0210792, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.037

$$\frac{x^{2(p+1)}\left(b+cx^2\right)^{p+1}}{2(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 2*(1 + p))*(b + c*x^2)^p*(b + 2*c*x^2),x]
```

```
[Out] (x^(2*(1 + p))*(b + c*x^2)^(1 + p))/(2*(1 + p))
```

Rubi in Sympy [A] time = 6.80083, size = 20, normalized size = 0.74

$$\frac{x^{2p+2}\left(b+cx^2\right)^{p+1}}{2\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(1+2*p)*(c*x**2+b)**p*(2*c*x**2+b),x)
```

```
[Out] x**(2*p + 2)*(b + c*x**2)**(p + 1)/(2*(p + 1))
```

Mathematica [A] time = 0.0537443, size = 26, normalized size = 0.96

$$\frac{x^{2p+2}\left(b+cx^2\right)^{p+1}}{2p+2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 2*(1 + p))*(b + c*x^2)^p*(b + 2*c*x^2),x]
```

```
[Out] (x^(2 + 2*p)*(b + c*x^2)^(1 + p))/(2 + 2*p)
```

Maple [A] time = 0.005, size = 26, normalized size = 1.

$$\frac{x^{2\,p+2}\left(cx^2+b\right)^{1+p}}{2\,p+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1+2*p)*(c*x^2+b)^p*(2*c*x^2+b),x)
```

```
[Out] 1/2*x^(2*p+2)*(c*x^2+b)^(1+p)/(1+p)
```

Maxima [A] time = 1.57925, size = 47, normalized size = 1.74

$$\frac{\left(cx^4 + bx^2\right)e^{\left(p\log\left(cx^2+b\right)+2\,p\log\left(x\right)\right)}}{2\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^2 + b)*(c*x^2 + b)^p*x^(2*p + 1),x, algorithm="maxima")
```

```
[Out] 1/2*(c*x^4 + b*x^2)*e^(p*log(c*x^2 + b) + 2*p*log(x))/(p + 1)
```

Fricas [A] time = 0.234278, size = 43, normalized size = 1.59

$$\frac{\left(cx^3 + bx\right)\left(cx^2 + b\right)^p x^{2\,p+1}}{2\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^2 + b)*(c*x^2 + b)^p*x^(2*p + 1),x, algorithm="fricas")
```

```
[Out] 1/2*(c*x^3 + b*x)*(c*x^2 + b)^p*x^(2*p + 1)/(p + 1)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(1+2*p)*(c*x**2+b)**p*(2*c*x**2+b),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.216161, size = 73, normalized size = 2.7

$$\frac{cx^3 e^{\left(p\ln\left(cx^2+b\right)+2\,p\ln(x)+\ln(x)\right)} + bxe^{\left(p\ln\left(cx^2+b\right)+2\,p\ln(x)+\ln(x)\right)}}{2\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^2 + b)*(c*x^2 + b)^p*x^(2*p + 1),x, algorithm="giac")
```

```
[Out] 1/2*(c*x^3*e^(p*ln(c*x^2 + b) + 2*p*ln(x) + ln(x)) + b*x*e^(p*ln(
c*x^2 + b) + 2*p*ln(x) + ln(x)))/(p + 1)
```

3.911 $\int x^{-1+3(1+p)} \left(b+cx^3\right)^p \left(b+2cx^3\right)\,dx$

Optimal. Leaf size=27

$$\frac{x^{3(p+1)}\left(b+cx^3\right)^{p+1}}{3(p+1)}$$

```
[Out] (x^(3*(1 + p))*(b + c*x^3)^(1 + p))/(3*(1 + p))
```

Rubi [A] time = 0.0210987, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.037

$$\frac{x^{3(p+1)}\left(b+cx^3\right)^{p+1}}{3(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + 3*(1 + p))*(b + c*x^3)^p*(b + 2*c*x^3),x]
```

```
[Out] (x^(3*(1 + p))*(b + c*x^3)^(1 + p))/(3*(1 + p))
```

Rubi in Sympy [A] time = 6.07563, size = 20, normalized size = 0.74

$$\frac{x^{3p+3}\left(b+cx^3\right)^{p+1}}{3\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(2+3*p)*(c*x**3+b)**p*(2*c*x**3+b),x)
```

```
[Out] x**(3*p + 3)*(b + c*x**3)**(p + 1)/(3*(p + 1))
```

Mathematica [A] time = 0.051221, size = 26, normalized size = 0.96

$$\frac{x^{3p+3}\left(b+cx^3\right)^{p+1}}{3p+3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + 3*(1 + p))*(b + c*x^3)^p*(b + 2*c*x^3),x]
```

```
[Out] (x^(3 + 3*p)*(b + c*x^3)^(1 + p))/(3 + 3*p)
```

Maple [A] time = 0.006, size = 26, normalized size = 1.

$$\frac{x^{3+3\,p}\left(cx^3+b\right)^{1+p}}{3+3\,p}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(2+3*p)*(c*x^3+b)^p*(2*c*x^3+b),x)
```

```
[Out] 1/3*x^(3+3*p)*(c*x^3+b)^(1+p)/(1+p)
```

Maxima [A] time = 1.66652, size = 47, normalized size = 1.74

$$\frac{\left(cx^6 + bx^3\right)e^{\left(p\log\left(cx^3+b\right)+3\,p\log(x)\right)}}{3\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^3 + b)*(c*x^3 + b)^p*x^(3*p + 2),x, algorithm="maxima")
```

```
[Out] 1/3*(c*x^6 + b*x^3)*e^(p*log(c*x^3 + b) + 3*p*log(x))/(p + 1)
```

Fricas [A] time = 0.236144, size = 43, normalized size = 1.59

$$\frac{\left(cx^4 + bx\right)\left(cx^3 + b\right)^p x^{3\,p+2}}{3\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^3 + b)*(c*x^3 + b)^p*x^(3*p + 2),x, algorithm="fricas")
```

```
[Out] 1/3*(c*x^4 + b*x)*(c*x^3 + b)^p*x^(3*p + 2)/(p + 1)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(2+3*p)*(c*x**3+b)**p*(2*c*x**3+b),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.217729, size = 78, normalized size = 2.89

$$\frac{cx^4e^{\left(p\ln\left(cx^3+b\right)+3\,p\ln(x)+2\ln(x)\right)} + bxe^{\left(p\ln\left(cx^3+b\right)+3\,p\ln(x)+2\ln(x)\right)}}{3\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^3 + b)*(c*x^3 + b)^p*x^(3*p + 2),x, algorithm="giac")
```

```
[Out] 1/3*(c*x^4*e^(p*ln(c*x^3 + b) + 3*p*ln(x) + 2*ln(x)) + b*x*e^(p*l
n(c*x^3 + b) + 3*p*ln(x) + 2*ln(x)))/(p + 1)
```

3.912 $\int x^{-1+n(1+p)} (b + cx^n)^p (b + 2cx^n) \, dx$

Optimal. Leaf size=27

$$\frac{x^{n(p+1)} (b + cx^n)^{p+1}}{n(p + 1)}$$

```
[Out] (x^(n*(1 + p))*(b + c*x^n)^(1 + p))/(n*(1 + p))
```

Rubi [A] time = 0.0493801, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{x^{n(p+1)} (b + cx^n)^{p+1}}{n(p + 1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + n*(1 + p))*(b + c*x^n)^p*(b + 2*c*x^n),x]

[Out] (x^(n*(1 + p))*(b + c*x^n)^(1 + p))/(n*(1 + p))
```

Rubi in Sympy [A] time = 6.2432, size = 20, normalized size = 0.74

$$\frac{x^{n(p+1)} (b + cx^n)^{p+1}}{n (p + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+n*(1+p))*(b+c*x**n)**p*(b+2*c*x**n),x)

[Out] x**(n*(p + 1))*(b + c*x**n)**(p + 1)/(n*(p + 1))
```

Mathematica [A] time = 0.0935243, size = 26, normalized size = 0.96

$$\frac{x^{np+n} (b + cx^n)^{p+1}}{np + n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + n*(1 + p))*(b + c*x^n)^p*(b + 2*c*x^n),x]

[Out] (x^(n + n*p)*(b + c*x^n)^(1 + p))/(n + n*p)
```

Maple [F] time = 0.124, size = 0, normalized size = 0.

$$\int x^{-1+n(1+p)} (b + cx^n)^p (b + 2\,cx^n) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+n*(1+p))*(b+c*x^n)^p*(b+2*c*x^n),x)

[Out] int(x^(-1+n*(1+p))*(b+c*x^n)^p*(b+2*c*x^n),x)
```

Maxima [A] time = 1.87113, size = 53, normalized size = 1.96

$$\frac{\left(cx^{2n}+bx^{n}\right)e^{\left(np\log(x)+p\log(cx^{n}+b)\right)}}{n(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^n + b)*(c*x^n + b)^p*x^(n*(p + 1) - 1),x, algorithm="maxima")
```

```
[Out] (c*x^(2*n) + b*x^n)*e^(n*p*log(x) + p*log(c*x^n + b))/(n*(p + 1))
```

Fricas [A] time = 0.231182, size = 47, normalized size = 1.74

$$\frac{(cxx^{n}+bx)(cx^{n}+b)^{p}x^{np+n-1}}{np+n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^n + b)*(c*x^n + b)^p*x^(n*(p + 1) - 1),x, algorithm="fricas")
```

```
[Out] (c*x*x^n + b*x)*(c*x^n + b)^p*x^(n*p + n - 1)/(n*p + n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**(-1+n*(1+p))*(b+2*c*x**n)**p*(b+2*c*x**n),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.218784, size = 95, normalized size = 3.52

$$\frac{cxe^{\left(np\ln(x)+p\ln\left(ce^{(n\ln(x))}+b\right)+2\,n\ln(x)-\ln(x)\right)}+bxe^{\left(np\ln(x)+p\ln\left(ce^{(n\ln(x))}+b\right)+n\ln(x)-\ln(x)\right)}}{np+n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*x^n + b)*(c*x^n + b)^p*x^(n*(p + 1) - 1),x, algorithm="giac")
```

```
[Out] (c*x*e^(n*p*ln(x) + p*ln(c*e^(n*ln(x)) + b) + 2*n*ln(x) - ln(x))
+ b*x*e^(n*p*ln(x) + p*ln(c*e^(n*ln(x)) + b) + n*ln(x) - ln(x)))/
(n*p + n)
```

4 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Mathematica/Rubi followed by one for Maple. The following are links to the source code.

The following are the listing of the above functions.

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)
(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)

(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*         GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)

GradeAntiderivative[result_,optimal_] :=
  If[ExpnType[result]<=ExpnType[optimal],
    If[FreeQ[result,Complex] || Not[FreeQ[optimal,Complex]],
      If[LeafCount[result]<=2*LeafCount[optimal],
        "A",
      "B"],
    "C"],
  If[FreeQ[result,Integrate] && FreeQ[result,Int],
    "C",
  "F"]]

(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)
```

```
ExpnType[expn_] :=
  If[AtomQ[expn], 1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]
```

```
ElementaryFunctionQ[func_] :=
  MemberQ[{
        Exp,Log,
        Sin,Cos,Tan,Cot,Sec,Csc,
        ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
        Sinh,Cosh,Tanh,Coth,Sech,Csch,
        ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]

SpecialFunctionQ[func_] :=
  MemberQ[{
        Erf, Erfc, Erfi,
        FresnelS, FresnelC,
        ExpIntegralE, ExpIntegralEi, LogIntegral,
        SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
        Gamma, LogGamma, PolyGamma,
        Zeta, PolyLog, ProductLog,
        EllipticF, EllipticE, EllipticPi
},func]
HypergeometricFunctionQ[func_] := MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]
AppellFunctionQ[func_] := MemberQ[{AppellF1},func]
```

```
# File: GradeAntiderivative.mpl Original version thanks to Albert Rich emailed on 03/21/2017
#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
GradeAntiderivative := proc(result,optimal)
local leaf_count_result, leaf_count_optimal,ExpnType_result,ExpnType_optimal;

      leaf_count_result:=leafcount(result);
      #do NOT call ExpnType() if leaf size is too large. Recursion problem
      if leaf_count_result > 500000 then
          return "B";
      fi;

      leaf_count_optimal:=leafcount(optimal);

      ExpnType_result:=ExpnType(result);
      ExpnType_optimal:=ExpnType(optimal);
  #This check below actually is not needed, since I only call this grading only for
  #passed integrals. i.e. I check for "F" before calling this.

  if not type(result,freeof('int')) then
     return "F";
  end if;

  if ExpnType_result<=ExpnType_optimal then
      if is_contains_complex(result) then
         if is_contains_complex(optimal) then
            #both result and optimal complex
            if leaf_count_result<=2*leaf_count_optimal then
               return "A";
            else
               return "B";
            end if
         else #result contains complex but optimal is not
            return "C";
         end if
      else # result do not contain complex
           # this assumes optimal do not as well
         if leaf_count_result<=2*leaf_count_optimal then
            return "A";
         else
            return "B";
         end if
      end if
  else #ExpnType(result) > ExpnType(optimal)
      return "C";
  end if
end proc:
```

```
# is_contains_complex(result) takes expressions and returns true if it contains "I"
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
      1 else
    max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
        1 else
      max(2,ExpnType(op(1,expn))) end if else
    max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' or op(0,expn)='integrate' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
  end if
end proc:
```

```
ElementaryFunctionQ := proc(func)
  member(func,[exp,log,ln, sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[erf,erfc,erfi,FresnelS,FresnelC,Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:
AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
    op(2,u) else
  apply(op(0,u),op(2..nops(u),u))
  end if
end proc:
#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```