Computer algebra independent integration tests

1_Algebraic_functions/1.1_Binomial_products/1.1.4Improper/1.1.4.2(cx)^m(ax^j+bx^n)^p

Nasser M. Abbasi

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Contents

1 Introduction

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

1.1 Listing of CAS systems tested

The following systems were tested at this time.

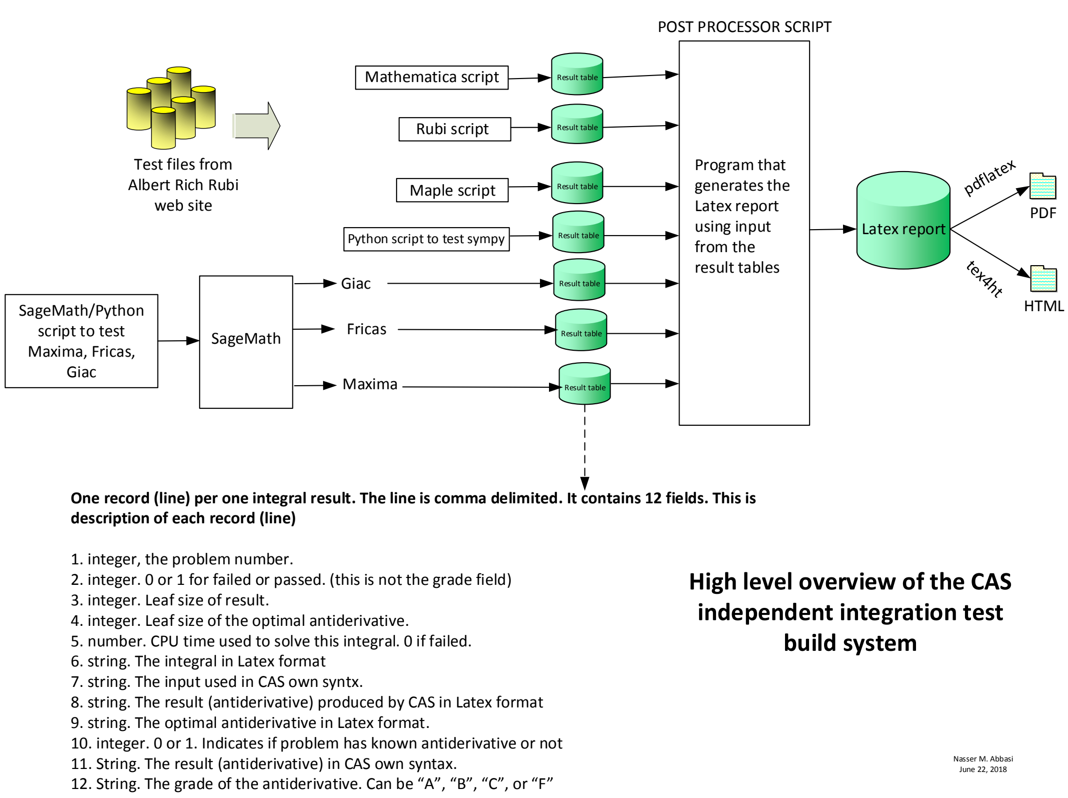
1. Mathematica 11.3 (64 bit).
2. Rubi 4.15.2 in Mathematica 11.3.
3. Rubi in Sympy (Version 1.3) under Python 3.7.0 using Anaconda distribution.
4. Maple 2018.1 (64 bit).
5. Maxima 5.41 Using Lisp ECL 16.1.2.
6. Fricas 1.3.4.
7. Sympy 1.3 under Python 3.7.0 using Anaconda distribution.
8. Giac/Xcas 1.4.9.

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

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

1.2 Design of the test system

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



1.3 Timing

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

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

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

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

1.4 Verification

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

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

1.5 Important notes about some of the results

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

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

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

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

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

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

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

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

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

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

These will fail With error `Exception raised: NotImplementedError`

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

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

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

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

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

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

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

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

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

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

  except Exception as ee:
         leafCount =1
```

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

1.6 Grading of results

The table below summarizes the grading of each CAS system.

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

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

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

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

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

System	solved	Failed
Rubi	% 100. (454)	% 0. (0)
Rubi in Sympy	% 91.63 (416)	% 8.37 (38)
Mathematica	% 99.12 (450)	% 0.88 (4)
Maple	% 84.8 (385)	% 15.2 (69)
Maxima	% 41.41 (188)	% 58.59 (266)
Fricas	% 56.17 (255)	% 43.83 (199)
Sympy	% 23.57 (107)	% 76.43 (347)
Giac	% 51.76 (235)	% 48.24 (219)

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

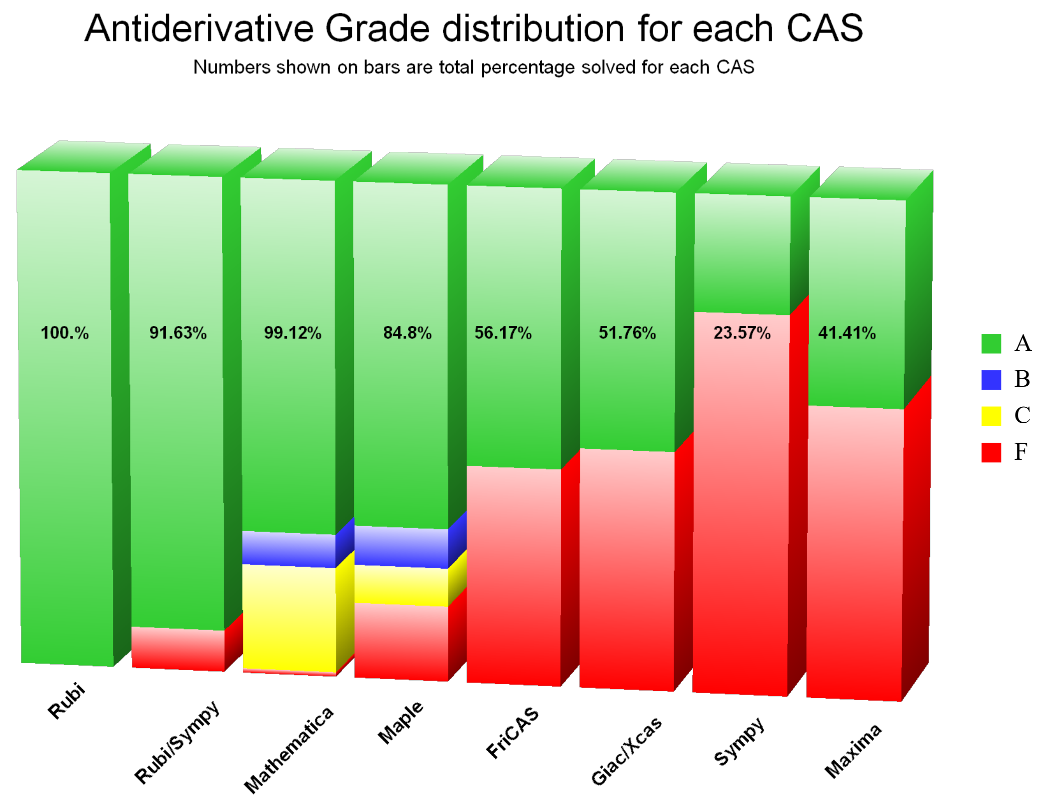
grade	description
A	Integral was solved and antiderivative is optimal in quality and leaf size.
B	Integral was solved and antiderivative is optimal in quality but leaf size is larger than twice the optimal antiderivatives leaf size.
C	Integral was solved and antiderivative is non-optimal in quality.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

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

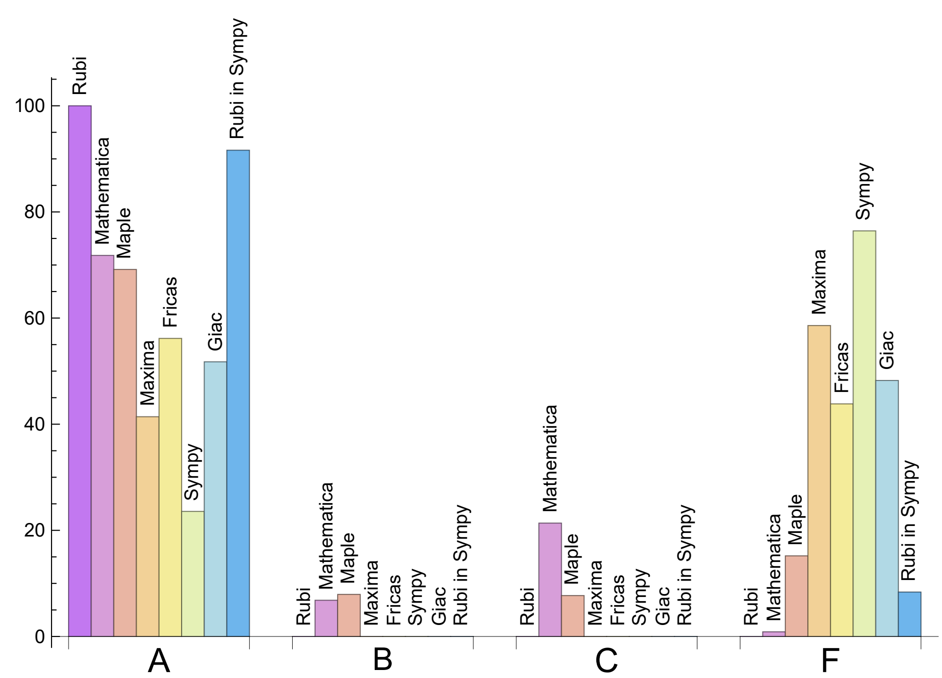
Based on the above, the following table summarizes the grading for this test suite.

System	% A grade	% B grade	% C grade	% F grade
Rubi	100.	0.	0.	0.
Rubi in Sympy	91.63	0.	0.	8.37
Mathematica	71.81	6.83	21.37	0.88
Maple	69.16	7.93	7.71	15.2
Maxima	41.41	0.	0.	58.59
Fricas	56.17	0.	0.	43.83
Sympy	23.57	0.	0.	76.43
Giac	51.76	0.	0.	48.24

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



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



1.7 Performance

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

System	Mean time (sec)	Mean size	Normalized mean	Median size	Normalized median
Rubi	0.26	119.35	1.	74.	1.
Rubi in Sympy	25.2	112.08	0.89	73.	0.89
Mathematica	0.13	87.58	1.19	77.	0.93
Maple	0.02	192.49	1.93	79.	0.94
Maxima	1.56	63.74	1.59	42.	1.06
Fricas	0.23	41.28	1.08	28.	0.92
Sympy	1.13	44.97	2.06	26.	0.87
Giac	0.26	97.52	1.78	62.	1.24

1.8 list of integrals that has no closed form antiderivative

{}

1.9 list of integrals not solved by each system

Not solved by Rubi {}

Not solved by Rubi in Sympy {3, 4, 5, 7, 10, 12, 23, 31, 175, 184, 185, 202, 206, 207, 213, 214, 215, 216, 222, 223, 224, 345, 347, 384, 385, 386, 388, 389, 410, 414, 445, 446, 448, 449, 450, 451, 452, 454}

Not solved by Mathematica {378, 380, 409, 413}

Not solved by Maple {277, 278, 279, 364, 365, 366, 367, 368, 370, 371, 372, 373, 374, 375, 376, 378, 379, 380, 381, 390, 391, 392, 393, 395, 396, 397, 398, 399, 400, 401, 403, 404, 405, 406, 409, 410, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 451, 452, 453, 454}

Not solved by Maxima {13, 15, 17, 19, 21, 23, 25, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 77, 79, 81, 83, 85, 86, 88, 90, 92, 93, 97, 98, 99, 100, 101, 102, 103, 104, 105, 110, 111, 112, 113, 117, 118, 119, 120, 124, 125, 126, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 172, 173, 174, 175, 180, 181, 182, 183, 184, 190, 191, 192, 193, 198, 199, 200, 201, 202, 236, 237, 238, 239, 246, 247, 248, 249, 250, 251, 256, 257, 258, 259, 264, 265, 266, 267, 268, 269, 270, 271, 272, 277, 278, 279, 280, 281, 282, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 304, 305, 307, 310, 311, 312, 313, 331, 335, 336, 348, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 432, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 453, 454}

Not solved by Fricas {38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 97, 98, 99, 100, 101, 102, 103, 104, 105, 110, 111, 112, 117, 118, 119, 120, 124, 125, 126, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 277, 278, 279, 289, 290, 291, 292, 293, 294, 295, 296, 298, 299, 301, 302, 304, 305, 307, 347, 364, 365, 366, 367, 368, 370, 371, 372, 373, 374, 375, 376, 378, 379, 380, 381, 390, 391, 392, 393, 395, 396, 397, 398, 399, 400, 401, 403, 404, 405, 406, 415, 417, 418, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 437, 438, 439, 440, 441, 442, 443}

Not solved by Sympy {38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 310, 311, 312, 313, 314, 315, 316, 317, 318, 331, 335, 336, 337, 343, 348, 360, 361, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454}

Not solved by Giac {38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 97, 98, 99, 100, 101, 102, 110, 111, 112, 114, 115, 116, 124, 125, 126, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 252, 253, 254, 257, 258, 259, 260, 261, 264, 265, 267, 268, 277, 278, 279, 280, 281, 282, 284, 285, 286, 289, 290, 291, 292, 293, 294, 295, 296, 298, 299, 301, 302, 304, 305, 307, 310, 311, 325, 326, 327, 331, 337, 355, 356, 357, 358, 359, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 385, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454}

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

Rubi {}

Rubi in Sympy {}

Mathematica {}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

1.11 list of integrals solved by CAS but failed verification

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

Rubi {437}

Mathematica {97, 98, 99, 100, 101, 102, 289, 290, 291, 292, 293, 294, 295, 296, 298, 299, 301, 302, 304, 305, 307, 347}

Maple Verification phase not implemented yet.

Maxima Verification phase not implemented yet.

Fricas Verification phase not implemented yet.

Sympy Verification phase not implemented yet.

Giac Verification phase not implemented yet.

Rubi in Sympy Verification phase not implemented yet.

2 detailed summary tables of results

2.1 Detailed conclusion table per each integral for all CAS systems

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

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

Problem 1	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	18	1	12	18	12
normalized size	1	1.	1.	0.82	1.06	0.06	0.71	1.06	0.71
time (sec)	N/A	0.015	0.002	0.001	1.416	0.184	0.036	0.216	3.854

Problem 2	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	18	1	12	18	12
normalized size	1	1.	1.	0.82	1.06	0.06	0.71	1.06	0.71
time (sec)	N/A	0.012	0.002	0.001	1.448	0.184	0.035	0.215	3.95

Problem 3	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	18	1	12	18	0
normalized size	1	1.	1.	0.82	1.06	0.06	0.71	1.06	0.
time (sec)	N/A	0.009	0.	0.001	1.415	0.182	0.033	0.217	0.

Problem 4	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	12	12	12	11	14	14	8	14	0
normalized size	1	1.	1.	0.92	1.17	1.17	0.67	1.17	0.
time (sec)	N/A	0.01	0.001	0.002	1.37	0.197	0.04	0.215	0.

Problem 5	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	13	13	13	12	15	15	10	19	0
normalized size	1	1.	1.	0.92	1.15	1.15	0.77	1.46	0.
time (sec)	N/A	0.012	0.002	0.002	2.711	0.202	0.08	0.221	0.

Problem 6	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	25	32	1	26	32	26
normalized size	1	1.	1.	0.83	1.07	0.03	0.87	1.07	0.87
time (sec)	N/A	0.039	0.001	0.002	1.377	0.186	0.063	0.218	6.802

Problem 7	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	25	32	1	24	32	0
normalized size	1	1.	1.	0.83	1.07	0.03	0.8	1.07	0.
time (sec)	N/A	0.054	0.002	0.	1.381	0.182	0.048	0.216	0.

Problem 8	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	25	32	1	26	32	26
normalized size	1	1.	1.	0.83	1.07	0.03	0.87	1.07	0.87
time (sec)	N/A	0.031	0.002	0.001	6.901	0.181	0.047	0.217	3.181

Problem 9	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	16	25	32	32	24	32	10
normalized size	1	1.	1.	1.56	2.	2.	1.5	2.	0.62
time (sec)	N/A	0.013	0.003	0.003	1.365	0.196	0.047	0.217	3.305

Problem 10	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	22	28	28	22	28	0
normalized size	1	1.	1.	0.88	1.12	1.12	0.88	1.12	0.
time (sec)	N/A	0.023	0.002	0.002	1.374	0.195	0.048	0.216	0.

Problem 11	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	46	37	49	1	42	49	42
normalized size	1	1.	1.	0.8	1.07	0.02	0.91	1.07	0.91
time (sec)	N/A	0.041	0.003	0.003	1.373	0.179	0.101	0.216	3.035

Problem 12	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	27	24	31	30	20	32	0
normalized size	1	1.	1.	0.89	1.15	1.11	0.74	1.19	0.
time (sec)	N/A	0.05	0.006	0.004	1.367	0.203	1.199	0.218	0.

Problem 13	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	31	31	31	27	0	1	56	35	26
normalized size	1	1.	1.	0.87	0.	0.03	1.81	1.13	0.84
time (sec)	N/A	0.039	0.015	0.005	0.	0.21	1.213	0.216	7.48

Problem 14	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	18	18	10	19	10
normalized size	1	1.	1.	0.93	1.2	1.2	0.67	1.27	0.67
time (sec)	N/A	0.015	0.003	0.002	1.406	0.201	0.245	0.215	3.311

Problem 15	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	24	16	0	1	53	20	22
normalized size	1	1.	1.	0.67	0.	0.04	2.21	0.83	0.92
time (sec)	N/A	0.019	0.007	0.002	0.	0.211	0.305	0.215	3.505

Problem 16	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	22	21	27	24	15	32	19
normalized size	1	1.	1.	0.95	1.23	1.09	0.68	1.45	0.86
time (sec)	N/A	0.032	0.007	0.005	1.374	0.206	0.499	0.218	158.157

Problem 17	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	34	34	34	30	0	1	65	39	29
normalized size	1	1.	1.	0.88	0.	0.03	1.91	1.15	0.85
time (sec)	N/A	0.036	0.021	0.005	0.	0.211	1.34	0.217	7.295

Problem 18	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	35	35	35	32	42	45	31	58	34
normalized size	1	1.	1.	0.91	1.2	1.29	0.89	1.66	0.97
time (sec)	N/A	0.057	0.01	0.009	1.377	0.207	1.642	0.219	9.658

Problem 19	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	43	43	39	0	1	87	54	37
normalized size	1	1.	1.	0.91	0.	0.02	2.02	1.26	0.86
time (sec)	N/A	0.052	0.034	0.007	0.	0.214	1.522	0.218	10.766

Problem 20	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	49	44	59	61	42	77	48
normalized size	1	1.	1.	0.9	1.2	1.24	0.86	1.57	0.98
time (sec)	N/A	0.07	0.011	0.009	1.365	0.207	1.833	0.218	12.36

Problem 21	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	45	36	0	1	78	47	36
normalized size	1	1.	1.	0.8	0.	0.02	1.73	1.04	0.8
time (sec)	N/A	0.033	0.042	0.006	0.	0.211	1.431	0.218	4.944

Problem 22	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	38	38	33	35	46	63	34	63	34
normalized size	1	1.	0.87	0.92	1.21	1.66	0.89	1.66	0.89
time (sec)	N/A	0.062	0.022	0.011	1.442	0.208	1.673	0.219	9.832

Problem 23	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	54	46	0	1	90	63	0
normalized size	1	1.	0.95	0.81	0.	0.02	1.58	1.11	0.
time (sec)	N/A	0.048	0.059	0.012	0.	0.217	1.725	0.216	0.

Problem 24	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	41	46	68	99	49	69	46
normalized size	1	1.	0.84	0.94	1.39	2.02	1.	1.41	0.94
time (sec)	N/A	0.082	0.059	0.014	1.395	0.207	2.046	0.218	12.633

Problem 25	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	67	59	0	1	114	80	61
normalized size	1	1.	0.99	0.87	0.	0.01	1.68	1.18	0.9
time (sec)	N/A	0.07	0.07	0.016	0.	0.216	2.122	0.219	14.536

Problem 26	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	13	13	29	22	28	28	19	31	8
normalized size	1	1.	2.23	1.69	2.15	2.15	1.46	2.38	0.62
time (sec)	N/A	0.023	0.007	0.002	1.369	0.204	0.17	0.219	4.682

Problem 27	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	18	19	24	19	14	20	14
normalized size	1	1.	0.9	0.95	1.2	0.95	0.7	1.	0.7
time (sec)	N/A	0.032	0.005	0.002	1.366	0.202	0.143	0.22	5.861

Problem 28	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	6	6	22	17	22	22	14	24	3
normalized size	1	1.	3.67	2.83	3.67	3.67	2.33	4.	0.5
time (sec)	N/A	0.017	0.005	0.003	1.381	0.203	0.178	0.218	4.433

Problem 29	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	12	12	12	14	18	11	8	20	10
normalized size	1	1.	1.	1.17	1.5	0.92	0.67	1.67	0.83
time (sec)	N/A	0.011	0.003	0.002	1.371	0.201	0.141	0.218	2.887

Problem 30	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	2	2	19	3	18	18	12	20	2
normalized size	1	1.	9.5	1.5	9.	9.	6.	10.	1.
time (sec)	N/A	0.007	0.004	0.001	1.364	0.203	0.177	0.219	1.077

Problem 31	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-2)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	16	20	15	10	22	0
normalized size	1	1.	1.	1.07	1.33	1.	0.67	1.47	0.
time (sec)	N/A	0.021	0.004	0.009	1.363	0.202	0.175	0.221	0.

Problem 32	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	8	8	24	19	24	27	15	27	5
normalized size	1	1.	3.	2.38	3.	3.38	1.88	3.38	0.62
time (sec)	N/A	0.016	0.005	0.01	1.391	0.205	0.213	0.216	4.246

Problem 33	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	22	21	27	32	17	35	20
normalized size	1	1.	1.	0.95	1.23	1.45	0.77	1.59	0.91
time (sec)	N/A	0.033	0.006	0.012	1.433	0.202	0.234	0.217	5.828

Problem 34	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	31	24	34	41	24	36	12
normalized size	1	1.	2.07	1.6	2.27	2.73	1.6	2.4	0.8
time (sec)	N/A	0.025	0.006	0.01	1.411	0.204	0.255	0.217	5.811

Problem 35	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	29	26	36	41	22	45	27
normalized size	1	1.	1.	0.9	1.24	1.41	0.76	1.55	0.93
time (sec)	N/A	0.035	0.006	0.013	1.388	0.202	0.277	0.221	6.108

Problem 36	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	18	18	12	24	15
normalized size	1	1.	1.	0.93	1.2	1.2	0.8	1.6	1.
time (sec)	N/A	0.025	0.006	0.006	1.372	0.201	0.288	0.217	25.026

Problem 37	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	18	16	20	20	12	24	15
normalized size	1	1.	1.	0.89	1.11	1.11	0.67	1.33	0.83
time (sec)	N/A	0.028	0.006	0.006	1.364	0.204	0.311	0.217	26.332

Problem 38	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	163	148	168	0	0	0	0	156
normalized size	1	1.	0.91	1.03	0.	0.	0.	0.	0.96
time (sec)	N/A	0.344	0.242	0.03	0.	0.	0.	0.	31.954

Problem 39	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	281	281	184	197	0	0	0	0	264
normalized size	1	1.	0.65	0.7	0.	0.	0.	0.	0.94
time (sec)	N/A	0.528	0.264	0.023	0.	0.	0.	0.	50.654

Problem 40	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	137	146	0	0	0	0	131
normalized size	1	1.	1.	1.07	0.	0.	0.	0.	0.96
time (sec)	N/A	0.243	0.183	0.024	0.	0.	0.	0.	22.568

Problem 41	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	255	255	170	175	0	0	0	0	240
normalized size	1	1.	0.67	0.69	0.	0.	0.	0.	0.94
time (sec)	N/A	0.382	0.237	0.022	0.	0.	0.	0.	35.791

Problem 42	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	101	124	0	0	0	0	109
normalized size	1	1.	0.89	1.1	0.	0.	0.	0.	0.96
time (sec)	N/A	0.182	0.227	0.023	0.	0.	0.	0.	16.219

Problem 43	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	248	248	168	177	0	0	0	0	231
normalized size	1	1.	0.68	0.71	0.	0.	0.	0.	0.93
time (sec)	N/A	0.419	0.269	0.026	0.	0.	0.	0.	40.385

Problem 44	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	116	116	104	123	0	0	0	0	112
normalized size	1	1.	0.9	1.06	0.	0.	0.	0.	0.97
time (sec)	N/A	0.185	0.315	0.006	0.	0.	0.	0.	16.322

Problem 45	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	283	283	192	201	0	0	0	0	262
normalized size	1	1.	0.68	0.71	0.	0.	0.	0.	0.93
time (sec)	N/A	0.509	0.348	0.005	0.	0.	0.	0.	50.756

Problem 46	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	186	186	159	188	0	0	0	0	178
normalized size	1	1.	0.85	1.01	0.	0.	0.	0.	0.96
time (sec)	N/A	0.424	0.26	0.024	0.	0.	0.	0.	40.208

Problem 47	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	304	304	195	217	0	0	0	0	286
normalized size	1	1.	0.64	0.71	0.	0.	0.	0.	0.94
time (sec)	N/A	0.595	0.493	0.025	0.	0.	0.	0.	60.234

Problem 48	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	148	166	0	0	0	0	151
normalized size	1	1.	0.94	1.05	0.	0.	0.	0.	0.96
time (sec)	N/A	0.273	0.218	0.023	0.	0.	0.	0.	25.389

Problem 49	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	275	275	184	195	0	0	0	0	258
normalized size	1	1.	0.67	0.71	0.	0.	0.	0.	0.94
time (sec)	N/A	0.467	0.268	0.024	0.	0.	0.	0.	45.638

Problem 50	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	113	144	0	0	0	0	128
normalized size	1	1.	0.84	1.07	0.	0.	0.	0.	0.96
time (sec)	N/A	0.249	0.303	0.023	0.	0.	0.	0.	23.018

Problem 51	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	274	274	183	194	0	0	0	0	260
normalized size	1	1.	0.67	0.71	0.	0.	0.	0.	0.95
time (sec)	N/A	0.458	0.333	0.023	0.	0.	0.	0.	45.104

Problem 52	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	107	139	0	0	0	0	129
normalized size	1	1.	0.8	1.04	0.	0.	0.	0.	0.96
time (sec)	N/A	0.25	0.286	0.027	0.	0.	0.	0.	23.101

Problem 53	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	277	277	189	196	0	0	0	0	260
normalized size	1	1.	0.68	0.71	0.	0.	0.	0.	0.94
time (sec)	N/A	0.499	0.317	0.028	0.	0.	0.	0.	49.603

Problem 54	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	116	142	0	0	0	0	133
normalized size	1	1.	0.85	1.04	0.	0.	0.	0.	0.97
time (sec)	N/A	0.251	0.408	0.032	0.	0.	0.	0.	23.276

Problem 55	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	306	306	205	223	0	0	0	0	284
normalized size	1	1.	0.67	0.73	0.	0.	0.	0.	0.93
time (sec)	N/A	0.613	0.414	0.032	0.	0.	0.	0.	60.929

Problem 56	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	163	150	169	0	0	0	0	158
normalized size	1	1.	0.92	1.04	0.	0.	0.	0.	0.97
time (sec)	N/A	0.338	0.297	0.031	0.	0.	0.	0.	31.369

Problem 57	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	140	140	138	149	0	0	0	0	134
normalized size	1	1.	0.99	1.06	0.	0.	0.	0.	0.96
time (sec)	N/A	0.271	0.134	0.025	0.	0.	0.	0.	23.676

Problem 58	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	258	258	170	178	0	0	0	0	241
normalized size	1	1.	0.66	0.69	0.	0.	0.	0.	0.93
time (sec)	N/A	0.433	0.204	0.023	0.	0.	0.	0.	40.86

Problem 59	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	116	116	101	127	0	0	0	0	109
normalized size	1	1.	0.87	1.09	0.	0.	0.	0.	0.94
time (sec)	N/A	0.193	0.234	0.023	0.	0.	0.	0.	16.702

Problem 60	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	229	229	108	158	0	0	0	0	214
normalized size	1	1.	0.47	0.69	0.	0.	0.	0.	0.93
time (sec)	N/A	0.341	0.076	0.023	0.	0.	0.	0.	31.567

Problem 61	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	85	108	0	0	0	0	90
normalized size	1	1.	0.92	1.17	0.	0.	0.	0.	0.98
time (sec)	N/A	0.115	0.037	0.02	0.	0.	0.	0.	9.203

Problem 62	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	253	253	170	182	0	0	0	0	233
normalized size	1	1.	0.67	0.72	0.	0.	0.	0.	0.92
time (sec)	N/A	0.427	0.164	0.025	0.	0.	0.	0.	40.952

Problem 63	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	119	119	106	129	0	0	0	0	114
normalized size	1	1.	0.89	1.08	0.	0.	0.	0.	0.96
time (sec)	N/A	0.191	0.233	0.027	0.	0.	0.	0.	16.51

Problem 64	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	286	286	195	204	0	0	0	0	267
normalized size	1	1.	0.68	0.71	0.	0.	0.	0.	0.93
time (sec)	N/A	0.531	0.218	0.03	0.	0.	0.	0.	50.709

Problem 65	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F(-2)	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	137	172	0	0	0	0	153
normalized size	1	1.	0.85	1.07	0.	0.	0.	0.	0.95
time (sec)	N/A	0.36	0.14	0.032	0.	0.	0.	0.	32.273

Problem 66	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F(-2)	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	279	279	173	200	0	0	0	0	260
normalized size	1	1.	0.62	0.72	0.	0.	0.	0.	0.93
time (sec)	N/A	0.534	0.178	0.028	0.	0.	0.	0.	51.415

Problem 67	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F(-2)	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	124	147	0	0	0	0	129
normalized size	1	1.	0.91	1.07	0.	0.	0.	0.	0.94
time (sec)	N/A	0.268	0.117	0.028	0.	0.	0.	0.	24.984

Problem 68	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F(-2)	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	253	253	161	182	0	0	0	0	235
normalized size	1	1.	0.64	0.72	0.	0.	0.	0.	0.93
time (sec)	N/A	0.436	0.135	0.028	0.	0.	0.	0.	41.554

Problem 69	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F(-2)	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	111	130	0	0	0	0	107
normalized size	1	1.	0.97	1.13	0.	0.	0.	0.	0.93
time (sec)	N/A	0.196	0.085	0.026	0.	0.	0.	0.	16.955

Problem 70	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F(-2)	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	254	254	162	184	0	0	0	0	231
normalized size	1	1.	0.64	0.72	0.	0.	0.	0.	0.91
time (sec)	N/A	0.441	0.127	0.026	0.	0.	0.	0.	41.798

Problem 71	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F(-2)	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	110	132	0	0	0	0	107
normalized size	1	1.	0.96	1.16	0.	0.	0.	0.	0.94
time (sec)	N/A	0.173	0.072	0.026	0.	0.	0.	0.	15.841

Problem 72	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	273	273	174	206	0	0	0	0	255
normalized size	1	1.	0.64	0.75	0.	0.	0.	0.	0.93
time (sec)	N/A	0.473	0.179	0.029	0.	0.	0.	0.	49.676

Problem 73	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	139	139	106	150	0	0	0	0	133
normalized size	1	1.	0.76	1.08	0.	0.	0.	0.	0.96
time (sec)	N/A	0.267	0.239	0.032	0.	0.	0.	0.	26.035

Problem 74	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	306	306	194	228	0	0	0	0	287
normalized size	1	1.	0.63	0.75	0.	0.	0.	0.	0.94
time (sec)	N/A	0.617	0.187	0.035	0.	0.	0.	0.	65.28

Problem 75	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	159	159	123	212	0	1	0	123	146
normalized size	1	1.	0.77	1.33	0.	0.01	0.	0.77	0.92
time (sec)	N/A	0.417	0.141	0.017	0.	0.227	0.	0.264	41.757

Problem 76	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	77	70	96	131	0	108	114
normalized size	1	1.	0.61	0.56	0.76	1.04	0.	0.86	0.9
time (sec)	N/A	0.319	0.047	0.009	1.483	0.211	0.	0.231	32.261

Problem 77	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	112	198	0	1	0	105	112
normalized size	1	1.	0.86	1.52	0.	0.01	0.	0.81	0.86
time (sec)	N/A	0.328	0.135	0.019	0.	0.225	0.	0.259	34.84

Problem 78	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	66	59	74	116	0	86	92
normalized size	1	1.	0.65	0.58	0.73	1.15	0.	0.85	0.91
time (sec)	N/A	0.25	0.046	0.009	1.526	0.214	0.	0.23	25.124

Problem 79	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	34	27	0	82	0	23	19
normalized size	1	1.	1.36	1.08	0.	3.28	0.	0.92	0.76
time (sec)	N/A	0.06	0.043	0.008	0.	0.212	0.	0.241	6.586

Problem 80	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	55	48	55	101	0	68	68
normalized size	1	1.	0.72	0.63	0.72	1.33	0.	0.89	0.89
time (sec)	N/A	0.182	0.042	0.008	1.493	0.211	0.	0.23	18.583

Problem 81	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	44	37	0	103	0	39	42
normalized size	1	1.	0.86	0.73	0.	2.02	0.	0.76	0.82
time (sec)	N/A	0.121	0.046	0.008	0.	0.211	0.	0.235	12.247

Problem 82	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	44	37	32	86	0	45	44
normalized size	1	1.	0.86	0.73	0.63	1.69	0.	0.88	0.86
time (sec)	N/A	0.121	0.034	0.007	1.5	0.21	0.	0.23	12.41

Problem 83	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	55	48	0	117	0	58	66
normalized size	1	1.	0.72	0.63	0.	1.54	0.	0.76	0.87
time (sec)	N/A	0.184	0.048	0.009	0.	0.211	0.	0.237	18.571

Problem 84	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	27	19	69	0	31	20
normalized size	1	1.	1.	1.08	0.76	2.76	0.	1.24	0.8
time (sec)	N/A	0.062	0.028	0.006	1.453	0.211	0.	0.224	6.625

Problem 85	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	66	59	0	128	0	74	90
normalized size	1	1.	0.65	0.58	0.	1.27	0.	0.73	0.89
time (sec)	N/A	0.248	0.046	0.007	0.	0.212	0.	0.237	26.713

Problem 86	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	123	217	0	1	0	154	112
normalized size	1	1.	0.95	1.67	0.	0.01	0.	1.18	0.86
time (sec)	N/A	0.328	0.201	0.017	0.	0.225	0.	0.231	34.434

Problem 87	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	77	70	124	149	0	96	114
normalized size	1	1.	0.61	0.56	0.98	1.18	0.	0.76	0.9
time (sec)	N/A	0.306	0.073	0.009	1.466	0.261	0.	0.26	32.629

Problem 88	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	159	159	143	234	0	1	0	142	146
normalized size	1	1.	0.9	1.47	0.	0.01	0.	0.89	0.92
time (sec)	N/A	0.393	0.209	0.018	0.	0.227	0.	1.629	41.644

Problem 89	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	88	81	142	163	0	116	139
normalized size	1	1.	0.58	0.53	0.93	1.07	0.	0.76	0.91
time (sec)	N/A	0.384	0.068	0.009	1.517	0.304	0.	0.287	43.113

Problem 90	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	189	189	157	247	0	1	0	165	177
normalized size	1	1.	0.83	1.31	0.	0.01	0.	0.87	0.94
time (sec)	N/A	0.478	0.235	0.024	0.	0.227	0.	1.998	54.845

Problem 91	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	180	180	99	92	157	178	0	136	168
normalized size	1	1.	0.55	0.51	0.87	0.99	0.	0.76	0.93
time (sec)	N/A	0.455	0.085	0.01	1.451	0.354	0.	0.284	52.087

Problem 92	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	55	81	997	0	1	0	61	46
normalized size	1	1.	1.47	18.13	0.	0.02	0.	1.11	0.84
time (sec)	N/A	0.123	0.069	0.048	0.	0.332	0.	0.241	12.868

Problem 93	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	61	979	0	1	0	31	29
normalized size	1	1.	1.91	30.59	0.	0.03	0.	0.97	0.91
time (sec)	N/A	0.056	0.03	0.028	0.	0.326	0.	0.225	6.762

Problem 94	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	23	27	35	26	0	19	20
normalized size	1	1.	1.	1.17	1.52	1.13	0.	0.83	0.87
time (sec)	N/A	0.059	0.026	0.006	1.407	0.213	0.	0.22	7.043

Problem 95	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	31	35	51	39	0	36	42
normalized size	1	1.	0.65	0.73	1.06	0.81	0.	0.75	0.88
time (sec)	N/A	0.118	0.035	0.007	1.411	0.216	0.	0.223	12.271

Problem 96	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	44	48	68	54	0	58	68
normalized size	1	1.	0.59	0.65	0.92	0.73	0.	0.78	0.92
time (sec)	N/A	0.182	0.044	0.008	1.417	0.214	0.	0.222	18.467

Problem 97	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	224	224	174	688	0	0	0	0	199
normalized size	1	1.	0.78	3.07	0.	0.	0.	0.	0.89
time (sec)	N/A	0.416	0.356	0.029	0.	0.	0.	0.	21.82

Problem 98	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	197	197	147	671	0	0	0	0	182
normalized size	1	1.	0.75	3.41	0.	0.	0.	0.	0.92
time (sec)	N/A	0.26	0.19	0.028	0.	0.	0.	0.	12.432

Problem 99	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	225	225	172	696	0	0	0	0	207
normalized size	1	1.	0.76	3.09	0.	0.	0.	0.	0.92
time (sec)	N/A	0.365	0.526	0.035	0.	0.	0.	0.	21.641

Problem 100	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	503	503	355	1079	0	0	0	0	454
normalized size	1	1.	0.71	2.15	0.	0.	0.	0.	0.9
time (sec)	N/A	0.972	1.486	0.028	0.	0.	0.	0.	59.806

Problem 101	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	474	474	333	1054	0	0	0	0	423
normalized size	1	1.	0.7	2.22	0.	0.	0.	0.	0.89
time (sec)	N/A	0.784	1.334	0.027	0.	0.	0.	0.	45.279

Problem 102	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	497	497	334	1083	0	0	0	0	445
normalized size	1	1.	0.67	2.18	0.	0.	0.	0.	0.9
time (sec)	N/A	0.936	1.273	0.031	0.	0.	0.	0.	55.926

Problem 103	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	174	174	115	227	0	0	0	150	163
normalized size	1	1.	0.66	1.3	0.	0.	0.	0.86	0.94
time (sec)	N/A	0.334	0.164	0.023	0.	0.	0.	0.279	33.241

Problem 104	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	116	116	89	185	0	0	0	112	107
normalized size	1	1.	0.77	1.59	0.	0.	0.	0.97	0.92
time (sec)	N/A	0.199	0.105	0.01	0.	0.	0.	0.278	19.562

Problem 105	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	62	83	0	0	0	73	49
normalized size	1	1.	1.11	1.48	0.	0.	0.	1.3	0.88
time (sec)	N/A	0.107	0.047	0.005	0.	0.	0.	0.274	9.472

Problem 106	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	153	23	26	0	34	22
normalized size	1	1.	1.	6.12	0.92	1.04	0.	1.36	0.88
time (sec)	N/A	0.068	0.026	0.016	1.454	0.268	0.	0.224	6.643

Problem 107	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	48	210	70	57	0	113	75
normalized size	1	1.	0.57	2.5	0.83	0.68	0.	1.35	0.89
time (sec)	N/A	0.2	0.035	0.015	6.681	0.266	0.	0.226	17.838

Problem 108	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	142	72	254	116	86	0	197	131
normalized size	1	1.	0.51	1.79	0.82	0.61	0.	1.39	0.92
time (sec)	N/A	0.349	0.044	0.016	5.317	0.269	0.	0.227	32.024

Problem 109	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	200	200	96	298	162	116	0	281	187
normalized size	1	1.	0.48	1.49	0.81	0.58	0.	1.4	0.94
time (sec)	N/A	0.518	0.054	0.02	1.453	0.276	0.	0.228	49.35

Problem 110	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	197	197	137	553	0	0	0	0	185
normalized size	1	1.	0.7	2.81	0.	0.	0.	0.	0.94
time (sec)	N/A	0.392	0.22	0.016	0.	0.	0.	0.	40.772

Problem 111	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	139	139	113	507	0	0	0	0	129
normalized size	1	1.	0.81	3.65	0.	0.	0.	0.	0.93
time (sec)	N/A	0.269	0.159	0.013	0.	0.	0.	0.	26.905

Problem 112	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	84	242	0	0	0	0	70
normalized size	1	1.	1.09	3.14	0.	0.	0.	0.	0.91
time (sec)	N/A	0.146	0.11	0.011	0.	0.	0.	0.	14.653

Problem 113	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	31	405	0	49	0	46	20
normalized size	1	1.	1.24	16.2	0.	1.96	0.	1.84	0.8
time (sec)	N/A	0.014	0.021	0.014	0.	0.252	0.	0.222	1.362

Problem 114	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	57	516	49	85	0	0	70
normalized size	1	1.	0.72	6.53	0.62	1.08	0.	0.	0.89
time (sec)	N/A	0.199	0.043	0.018	1.491	0.255	0.	0.	18.315

Problem 115	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	81	562	78	117	0	0	126
normalized size	1	1.	0.59	4.1	0.57	0.85	0.	0.	0.92
time (sec)	N/A	0.344	0.049	0.017	1.461	0.263	0.	0.	33.153

Problem 116	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	195	195	105	606	108	147	0	0	182
normalized size	1	1.	0.54	3.11	0.55	0.75	0.	0.	0.93
time (sec)	N/A	0.523	0.063	0.02	1.467	0.263	0.	0.	49.577

Problem 117	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	204	204	128	249	0	0	0	169	190
normalized size	1	1.	0.63	1.22	0.	0.	0.	0.83	0.93
time (sec)	N/A	0.388	0.173	0.013	0.	0.	0.	0.279	40.806

Problem 118	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	146	146	102	207	0	0	0	131	134
normalized size	1	1.	0.7	1.42	0.	0.	0.	0.9	0.92
time (sec)	N/A	0.272	0.135	0.009	0.	0.	0.	0.281	26.873

Problem 119	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	80	163	0	0	0	93	78
normalized size	1	1.	0.92	1.87	0.	0.	0.	1.07	0.9
time (sec)	N/A	0.162	0.084	0.009	0.	0.	0.	0.277	16.291

Problem 120	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	34	34	40	136	0	0	0	50	31
normalized size	1	1.	1.18	4.	0.	0.	0.	1.47	0.91
time (sec)	N/A	0.087	0.033	0.012	0.	0.	0.	0.272	8.365

Problem 121	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	37	186	47	39	0	72	46
normalized size	1	1.	0.69	3.44	0.87	0.72	0.	1.33	0.85
time (sec)	N/A	0.132	0.029	0.014	1.437	0.262	0.	0.231	11.893

Problem 122	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	59	232	93	68	0	155	102
normalized size	1	1.	0.53	2.07	0.83	0.61	0.	1.38	0.91
time (sec)	N/A	0.268	0.038	0.015	1.462	0.263	0.	0.226	24.654

Problem 123	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	170	170	83	276	139	97	0	239	158
normalized size	1	1.	0.49	1.62	0.82	0.57	0.	1.41	0.93
time (sec)	N/A	0.422	0.049	0.016	1.505	0.266	0.	0.227	40.59

Problem 124	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	171	171	124	531	0	0	0	0	160
normalized size	1	1.	0.73	3.11	0.	0.	0.	0.	0.94
time (sec)	N/A	0.32	0.19	0.014	0.	0.	0.	0.	33.56

Problem 125	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	100	444	0	0	0	0	104
normalized size	1	1.	0.88	3.93	0.	0.	0.	0.	0.92
time (sec)	N/A	0.228	0.143	0.014	0.	0.	0.	0.	21.295

Problem 126	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	72	238	0	0	0	0	53
normalized size	1	1.	1.2	3.97	0.	0.	0.	0.	0.88
time (sec)	N/A	0.14	0.073	0.006	0.	0.	0.	0.	12.255

Problem 127	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	45	112	34	73	0	35	29
normalized size	1	1.	1.5	3.73	1.13	2.43	0.	1.17	0.97
time (sec)	N/A	0.081	0.04	0.015	1.497	0.27	0.	0.22	7.463

Problem 128	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	70	540	61	107	0	0	95
normalized size	1	1.	0.65	5.05	0.57	1.	0.	0.	0.89
time (sec)	N/A	0.268	0.051	0.017	1.517	0.255	0.	0.	25.007

Problem 129	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	96	584	93	136	0	0	153
normalized size	1	1.	0.58	3.54	0.56	0.82	0.	0.	0.93
time (sec)	N/A	0.426	0.063	0.017	1.478	0.258	0.	0.	41.169

Problem 130	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	223	223	120	628	123	166	0	0	209
normalized size	1	1.	0.54	2.82	0.55	0.74	0.	0.	0.94
time (sec)	N/A	0.587	0.072	0.02	1.536	0.262	0.	0.	59.131

Problem 131	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	301	301	155	264	0	0	0	0	289
normalized size	1	1.	0.51	0.88	0.	0.	0.	0.	0.96
time (sec)	N/A	0.896	0.128	0.05	0.	0.	0.	0.	80.998

Problem 132	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	411	411	131	273	0	0	0	0	382
normalized size	1	1.	0.32	0.66	0.	0.	0.	0.	0.93
time (sec)	N/A	1.066	0.085	0.025	0.	0.	0.	0.	96.912

Problem 133	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	213	213	118	198	0	0	0	0	204
normalized size	1	1.	0.55	0.93	0.	0.	0.	0.	0.96
time (sec)	N/A	0.553	0.084	0.023	0.	0.	0.	0.	47.433

Problem 134	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	323	323	94	207	0	0	0	0	298
normalized size	1	1.	0.29	0.64	0.	0.	0.	0.	0.92
time (sec)	N/A	0.654	0.069	0.023	0.	0.	0.	0.	55.384

Problem 135	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	71	132	0	0	0	0	119
normalized size	1	1.	0.58	1.07	0.	0.	0.	0.	0.97
time (sec)	N/A	0.287	0.06	0.021	0.	0.	0.	0.	24.529

Problem 136	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	325	325	97	213	0	0	0	0	296
normalized size	1	1.	0.3	0.66	0.	0.	0.	0.	0.91
time (sec)	N/A	0.694	0.068	0.033	0.	0.	0.	0.	62.845

Problem 137	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	188	188	108	179	0	0	0	0	180
normalized size	1	1.	0.57	0.95	0.	0.	0.	0.	0.96
time (sec)	N/A	0.47	0.079	0.034	0.	0.	0.	0.	40.006

Problem 138	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	413	413	136	281	0	0	0	0	382
normalized size	1	1.	0.33	0.68	0.	0.	0.	0.	0.92
time (sec)	N/A	1.038	0.087	0.033	0.	0.	0.	0.	103.393

Problem 139	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	276	276	145	245	0	0	0	0	265
normalized size	1	1.	0.53	0.89	0.	0.	0.	0.	0.96
time (sec)	N/A	0.763	0.099	0.037	0.	0.	0.	0.	74.636

Problem 140	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	298	298	155	196	0	0	0	0	286
normalized size	1	1.	0.52	0.66	0.	0.	0.	0.	0.96
time (sec)	N/A	0.88	0.112	0.042	0.	0.	0.	0.	87.122

Problem 141	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	408	408	131	261	0	0	0	0	379
normalized size	1	1.	0.32	0.64	0.	0.	0.	0.	0.93
time (sec)	N/A	1.024	0.096	0.03	0.	0.	0.	0.	94.504

Problem 142	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	208	208	118	163	0	0	0	0	199
normalized size	1	1.	0.57	0.78	0.	0.	0.	0.	0.96
time (sec)	N/A	0.498	0.098	0.029	0.	0.	0.	0.	43.466

Problem 143	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	319	319	91	228	0	0	0	0	294
normalized size	1	1.	0.29	0.71	0.	0.	0.	0.	0.92
time (sec)	N/A	0.634	0.073	0.028	0.	0.	0.	0.	54.863

Problem 144	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	144	144	82	130	0	0	0	0	138
normalized size	1	1.	0.57	0.9	0.	0.	0.	0.	0.96
time (sec)	N/A	0.368	0.068	0.033	0.	0.	0.	0.	30.554

Problem 145	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	350	350	108	339	0	0	0	0	320
normalized size	1	1.	0.31	0.97	0.	0.	0.	0.	0.91
time (sec)	N/A	0.796	0.087	0.038	0.	0.	0.	0.	72.951

Problem 146	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	213	213	123	168	0	0	0	0	204
normalized size	1	1.	0.58	0.79	0.	0.	0.	0.	0.96
time (sec)	N/A	0.55	0.085	0.04	0.	0.	0.	0.	48.713

Problem 147	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	438	438	145	411	0	0	0	0	406
normalized size	1	1.	0.33	0.94	0.	0.	0.	0.	0.93
time (sec)	N/A	1.152	0.098	0.043	0.	0.	0.	0.	109.694

Problem 148	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	301	301	160	201	0	0	0	0	289
normalized size	1	1.	0.53	0.67	0.	0.	0.	0.	0.96
time (sec)	N/A	0.855	0.113	0.044	0.	0.	0.	0.	79.405

Problem 149	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	304	304	155	196	0	0	0	0	292
normalized size	1	1.	0.51	0.64	0.	0.	0.	0.	0.96
time (sec)	N/A	0.9	0.119	0.054	0.	0.	0.	0.	81.796

Problem 150	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	414	414	131	261	0	0	0	0	386
normalized size	1	1.	0.32	0.63	0.	0.	0.	0.	0.93
time (sec)	N/A	1.075	0.095	0.042	0.	0.	0.	0.	97.585

Problem 151	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	216	216	118	163	0	0	0	0	207
normalized size	1	1.	0.55	0.75	0.	0.	0.	0.	0.96
time (sec)	N/A	0.587	0.086	0.011	0.	0.	0.	0.	49.245

Problem 152	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	326	326	94	228	0	0	0	0	301
normalized size	1	1.	0.29	0.7	0.	0.	0.	0.	0.92
time (sec)	N/A	0.684	0.074	0.013	0.	0.	0.	0.	59.446

Problem 153	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	73	127	0	0	0	0	119
normalized size	1	1.	0.58	1.01	0.	0.	0.	0.	0.94
time (sec)	N/A	0.242	0.063	0.006	0.	0.	0.	0.	18.296

Problem 154	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	294	294	74	254	0	0	0	0	269
normalized size	1	1.	0.25	0.86	0.	0.	0.	0.	0.91
time (sec)	N/A	0.595	0.066	0.03	0.	0.	0.	0.	50.305

Problem 155	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	163	97	142	0	0	0	0	156
normalized size	1	1.	0.6	0.87	0.	0.	0.	0.	0.96
time (sec)	N/A	0.39	0.078	0.035	0.	0.	0.	0.	30.983

Problem 156	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	388	388	121	363	0	0	0	0	359
normalized size	1	1.	0.31	0.94	0.	0.	0.	0.	0.93
time (sec)	N/A	0.932	0.093	0.042	0.	0.	0.	0.	82.647

Problem 157	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	251	251	134	179	0	0	0	0	241
normalized size	1	1.	0.53	0.71	0.	0.	0.	0.	0.96
time (sec)	N/A	0.677	0.102	0.041	0.	0.	0.	0.	57.689

Problem 158	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	437	437	131	384	0	0	0	0	408
normalized size	1	1.	0.3	0.88	0.	0.	0.	0.	0.93
time (sec)	N/A	1.203	0.109	0.044	0.	0.	0.	0.	110.803

Problem 159	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	239	239	118	260	0	0	0	0	230
normalized size	1	1.	0.49	1.09	0.	0.	0.	0.	0.96
time (sec)	N/A	0.684	0.09	0.039	0.	0.	0.	0.	59.235

Problem 160	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	349	349	94	312	0	0	0	0	323
normalized size	1	1.	0.27	0.89	0.	0.	0.	0.	0.93
time (sec)	N/A	0.842	0.078	0.017	0.	0.	0.	0.	72.219

Problem 161	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	76	184	0	0	0	0	143
normalized size	1	1.	0.51	1.23	0.	0.	0.	0.	0.96
time (sec)	N/A	0.376	0.072	0.012	0.	0.	0.	0.	30.591

Problem 162	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	296	296	65	243	0	0	0	0	270
normalized size	1	1.	0.22	0.82	0.	0.	0.	0.	0.91
time (sec)	N/A	0.533	0.055	0.007	0.	0.	0.	0.	46.212

Problem 163	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	81	180	0	0	0	0	151
normalized size	1	1.	0.51	1.14	0.	0.	0.	0.	0.96
time (sec)	N/A	0.393	0.078	0.017	0.	0.	0.	0.	31.608

Problem 164	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	383	383	108	339	0	0	0	0	354
normalized size	1	1.	0.28	0.89	0.	0.	0.	0.	0.92
time (sec)	N/A	0.927	0.089	0.02	0.	0.	0.	0.	83.599

Problem 165	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	246	246	123	261	0	0	0	0	236
normalized size	1	1.	0.5	1.06	0.	0.	0.	0.	0.96
time (sec)	N/A	0.672	0.1	0.019	0.	0.	0.	0.	58.709

Problem 166	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	471	471	145	411	0	0	0	0	439
normalized size	1	1.	0.31	0.87	0.	0.	0.	0.	0.93
time (sec)	N/A	1.296	0.119	0.021	0.	0.	0.	0.	126.07

Problem 167	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	371	371	185	156	293	0	0	323	352
normalized size	1	1.	0.5	0.42	0.79	0.	0.	0.87	0.95
time (sec)	N/A	1.089	0.089	0.016	1.449	0.	0.	0.233	113.452

Problem 168	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	283	283	148	123	224	0	0	254	267
normalized size	1	1.	0.52	0.43	0.79	0.	0.	0.9	0.94
time (sec)	N/A	0.757	0.063	0.006	1.454	0.	0.	0.228	75.039

Problem 169	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	195	195	111	90	155	0	0	185	182
normalized size	1	1.	0.57	0.46	0.79	0.	0.	0.95	0.93
time (sec)	N/A	0.47	0.059	0.007	1.471	0.	0.	0.228	43.798

Problem 170	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	74	57	86	0	0	116	99
normalized size	1	1.	0.68	0.52	0.79	0.	0.	1.06	0.91
time (sec)	N/A	0.237	0.037	0.004	1.441	0.	0.	0.226	20.749

Problem 171	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	29	27	19	0	0	42	17
normalized size	1	1.	1.26	1.17	0.83	0.	0.	1.83	0.74
time (sec)	N/A	0.07	0.028	0.005	1.409	0.	0.	0.222	6.713

Problem 172	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	76	79	0	0	0	103	80
normalized size	1	1.	0.84	0.88	0.	0.	0.	1.14	0.89
time (sec)	N/A	0.241	0.127	0.005	0.	0.	0.	0.245	20.052

Problem 173	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	112	125	0	0	0	176	165
normalized size	1	1.	0.63	0.7	0.	0.	0.	0.99	0.93
time (sec)	N/A	0.507	0.177	0.018	0.	0.	0.	0.285	43.374

Problem 174	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	266	266	149	167	0	0	0	244	250
normalized size	1	1.	0.56	0.63	0.	0.	0.	0.92	0.94
time (sec)	N/A	0.804	0.251	0.023	0.	0.	0.	0.348	73.662

Problem 175	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	354	354	190	209	0	0	0	313	0
normalized size	1	1.	0.54	0.59	0.	0.	0.	0.88	0.
time (sec)	N/A	1.134	0.356	0.024	0.	0.	0.	0.51	0.

Problem 176	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	343	343	172	145	228	0	0	630	325
normalized size	1	1.	0.5	0.42	0.66	0.	0.	1.84	0.95
time (sec)	N/A	0.953	0.115	0.007	1.536	0.	0.	0.249	100.082

Problem 177	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	255	255	135	112	171	0	0	493	240
normalized size	1	1.	0.53	0.44	0.67	0.	0.	1.93	0.94
time (sec)	N/A	0.651	0.089	0.007	1.514	0.	0.	0.235	64.344

Problem 178	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	169	169	98	79	115	0	0	355	156
normalized size	1	1.	0.58	0.47	0.68	0.	0.	2.1	0.92
time (sec)	N/A	0.4	0.07	0.006	1.512	0.	0.	0.233	36.2

Problem 179	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	63	48	63	0	0	200	75
normalized size	1	1.	0.75	0.57	0.75	0.	0.	2.38	0.89
time (sec)	N/A	0.217	0.049	0.007	1.439	0.	0.	0.235	17.786

Problem 180	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	78	78	63	69	0	0	0	134	70
normalized size	1	1.	0.81	0.88	0.	0.	0.	1.72	0.9
time (sec)	N/A	0.229	0.118	0.006	0.	0.	0.	0.228	19.447

Problem 181	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	92	93	0	0	0	146	100
normalized size	1	1.	0.81	0.82	0.	0.	0.	1.29	0.88
time (sec)	N/A	0.318	0.135	0.005	0.	0.	0.	0.255	26.327

Problem 182	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	203	203	127	139	0	0	0	231	187
normalized size	1	1.	0.63	0.68	0.	0.	0.	1.14	0.92
time (sec)	N/A	0.583	0.238	0.019	0.	0.	0.	0.315	50.829

Problem 183	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	291	291	164	181	0	0	0	316	269
normalized size	1	1.	0.56	0.62	0.	0.	0.	1.09	0.92
time (sec)	N/A	0.882	0.298	0.022	0.	0.	0.	0.422	83.006

Problem 184	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	379	379	201	223	0	0	0	401	0
normalized size	1	1.	0.53	0.59	0.	0.	0.	1.06	0.
time (sec)	N/A	1.225	0.476	0.028	0.	0.	0.	0.542	0.

Problem 185	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F(-1)	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	401	401	185	167	316	0	0	348	0
normalized size	1	1.	0.46	0.42	0.79	0.	0.	0.87	0.
time (sec)	N/A	1.25	0.098	0.007	1.487	0.	0.	0.24	0.

Problem 186	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	313	313	148	134	247	0	0	279	298
normalized size	1	1.	0.47	0.43	0.79	0.	0.	0.89	0.95
time (sec)	N/A	0.9	0.073	0.007	1.45	0.	0.	0.227	87.221

Problem 187	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	225	225	111	101	178	0	0	211	212
normalized size	1	1.	0.49	0.45	0.79	0.	0.	0.94	0.94
time (sec)	N/A	0.583	0.058	0.007	1.449	0.	0.	0.229	52.95

Problem 188	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	74	68	109	0	0	142	128
normalized size	1	1.	0.54	0.5	0.8	0.	0.	1.04	0.93
time (sec)	N/A	0.307	0.042	0.007	1.463	0.	0.	0.224	26.466

Problem 189	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	37	36	41	0	0	62	41
normalized size	1	1.	0.79	0.77	0.87	0.	0.	1.32	0.87
time (sec)	N/A	0.09	0.022	0.005	1.487	0.	0.	0.222	7.711

Problem 190	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	61	61	0	0	0	77	54
normalized size	1	1.	1.	1.	0.	0.	0.	1.26	0.89
time (sec)	N/A	0.164	0.08	0.006	0.	0.	0.	0.241	13.019

Problem 191	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	153	153	101	126	0	0	0	155	141
normalized size	1	1.	0.66	0.82	0.	0.	0.	1.01	0.92
time (sec)	N/A	0.411	0.164	0.011	0.	0.	0.	0.279	34.009

Problem 192	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	241	241	138	188	0	0	0	224	226
normalized size	1	1.	0.57	0.78	0.	0.	0.	0.93	0.94
time (sec)	N/A	0.681	0.264	0.01	0.	0.	0.	0.34	61.854

Problem 193	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	329	329	175	248	0	0	0	293	311
normalized size	1	1.	0.53	0.75	0.	0.	0.	0.89	0.95
time (sec)	N/A	1.013	0.335	0.011	0.	0.	0.	0.473	96.844

Problem 194	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	336	336	172	143	270	0	0	311	320
normalized size	1	1.	0.51	0.43	0.8	0.	0.	0.93	0.95
time (sec)	N/A	1.007	0.093	0.01	1.49	0.	0.	0.24	99.297

Problem 195	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	248	248	135	110	201	0	0	242	235
normalized size	1	1.	0.54	0.44	0.81	0.	0.	0.98	0.95
time (sec)	N/A	0.684	0.069	0.01	1.459	0.	0.	0.232	63.539

Problem 196	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	160	160	98	77	132	0	0	173	150
normalized size	1	1.	0.61	0.48	0.82	0.	0.	1.08	0.94
time (sec)	N/A	0.398	0.056	0.01	1.437	0.	0.	0.23	34.945

Problem 197	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	45	45	63	0	0	103	61
normalized size	1	1.	0.66	0.66	0.93	0.	0.	1.51	0.9
time (sec)	N/A	0.143	0.055	0.01	1.432	0.	0.	0.224	12.823

Problem 198	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	71	55	0	0	0	117	53
normalized size	1	1.	1.18	0.92	0.	0.	0.	1.95	0.88
time (sec)	N/A	0.103	0.108	0.005	0.	0.	0.	0.226	8.959

Problem 199	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	146	146	112	88	0	0	0	166	134
normalized size	1	1.	0.77	0.6	0.	0.	0.	1.14	0.92
time (sec)	N/A	0.399	0.221	0.005	0.	0.	0.	0.293	35.483

Problem 200	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	236	236	149	126	0	0	0	235	221
normalized size	1	1.	0.63	0.53	0.	0.	0.	1.	0.94
time (sec)	N/A	0.688	0.302	0.026	0.	0.	0.	0.369	62.493

Problem 201	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	324	324	186	159	0	0	0	304	306
normalized size	1	1.	0.57	0.49	0.	0.	0.	0.94	0.94
time (sec)	N/A	0.977	0.383	0.03	0.	0.	0.	0.518	97.431

Problem 202	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	F(-1)	F(-1)	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	412	412	224	192	0	0	0	373	0
normalized size	1	1.	0.54	0.47	0.	0.	0.	0.91	0.
time (sec)	N/A	1.345	0.718	0.037	0.	0.	0.	0.771	0.

Problem 203	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	18	1	12	18	12
normalized size	1	1.	1.	0.82	1.06	0.06	0.71	1.06	0.71
time (sec)	N/A	0.014	0.002	0.001	1.38	0.221	0.066	0.215	3.666

Problem 204	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	18	1	12	18	12
normalized size	1	1.	1.	0.82	1.06	0.06	0.71	1.06	0.71
time (sec)	N/A	0.016	0.002	0.001	1.375	0.211	0.064	0.215	3.56

Problem 205	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	18	1	12	18	12
normalized size	1	1.	1.	0.82	1.06	0.06	0.71	1.06	0.71
time (sec)	N/A	0.013	0.	0.002	1.381	0.189	0.06	0.215	1.61

Problem 206	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	18	18	12	18	0
normalized size	1	1.	1.	0.82	1.06	1.06	0.71	1.06	0.
time (sec)	N/A	0.016	0.001	0.002	1.375	0.207	0.06	0.216	0.

Problem 207	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	12	12	12	11	14	14	8	14	0
normalized size	1	1.	1.	0.92	1.17	1.17	0.67	1.17	0.
time (sec)	N/A	0.012	0.001	0.002	1.392	0.211	0.066	0.217	0.

Problem 208	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	25	32	1	24	32	24
normalized size	1	1.	1.	0.83	1.07	0.03	0.8	1.07	0.8
time (sec)	N/A	0.056	0.003	0.001	1.379	0.195	0.094	0.217	8.061

Problem 209	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	25	32	1	26	32	26
normalized size	1	1.	1.	0.83	1.07	0.03	0.87	1.07	0.87
time (sec)	N/A	0.047	0.003	0.	1.427	0.194	0.092	0.217	7.522

Problem 210	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	25	32	1	24	32	24
normalized size	1	1.	1.	0.83	1.07	0.03	0.8	1.07	0.8
time (sec)	N/A	0.041	0.002	0.001	1.468	0.188	0.088	0.218	3.282

Problem 211	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	25	32	32	26	32	26
normalized size	1	1.	1.	0.83	1.07	1.07	0.87	1.07	0.87
time (sec)	N/A	0.04	0.002	0.002	1.405	0.198	0.087	0.217	6.932

Problem 212	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	25	32	32	24	32	24
normalized size	1	1.	1.	0.83	1.07	1.07	0.8	1.07	0.8
time (sec)	N/A	0.036	0.002	0.002	1.419	0.202	0.088	0.217	6.536

Problem 213	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	57	52	70	70	49	72	0
normalized size	1	1.	1.	0.91	1.23	1.23	0.86	1.26	0.
time (sec)	N/A	0.071	0.007	0.005	1.375	0.204	1.142	0.219	0.

Problem 214	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	44	41	57	55	37	58	0
normalized size	1	1.	1.	0.93	1.3	1.25	0.84	1.32	0.
time (sec)	N/A	0.054	0.006	0.005	1.379	0.207	1.135	0.217	0.

Problem 215	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	31	31	31	30	39	39	26	41	0
normalized size	1	1.	1.	0.97	1.26	1.26	0.84	1.32	0.
time (sec)	N/A	0.043	0.005	0.003	1.379	0.207	1.096	0.217	0.

Problem 216	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	18	19	24	23	14	26	0
normalized size	1	1.	1.	1.06	1.33	1.28	0.78	1.44	0.
time (sec)	N/A	0.032	0.004	0.003	1.375	0.212	1.048	0.218	0.

Problem 217	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	10	11	14	14	7	15	7
normalized size	1	1.	1.	1.1	1.4	1.4	0.7	1.5	0.7
time (sec)	N/A	0.021	0.002	0.001	1.397	0.204	0.092	0.219	2.806

Problem 218	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	18	19	24	22	10	27	12
normalized size	1	1.	1.	1.06	1.33	1.22	0.56	1.5	0.67
time (sec)	N/A	0.022	0.006	0.008	1.381	0.213	0.335	0.219	4.521

Problem 219	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	28	28	29	38	35	19	41	24
normalized size	1	1.	1.	1.04	1.36	1.25	0.68	1.46	0.86
time (sec)	N/A	0.035	0.007	0.016	1.38	0.222	1.271	0.219	14.127

Problem 220	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	42	41	54	55	31	61	37
normalized size	1	1.	1.	0.98	1.29	1.31	0.74	1.45	0.88
time (sec)	N/A	0.049	0.007	0.011	1.377	0.222	1.396	0.222	9.153

Problem 221	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	56	53	69	73	44	76	49
normalized size	1	1.	1.	0.95	1.23	1.3	0.79	1.36	0.88
time (sec)	N/A	0.058	0.008	0.011	1.394	0.231	1.516	0.217	10.865

Problem 222	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	54	57	80	99	54	84	0
normalized size	1	1.	0.93	0.98	1.38	1.71	0.93	1.45	0.
time (sec)	N/A	0.082	0.033	0.01	1.375	0.209	1.414	0.219	0.

Problem 223	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	43	45	63	84	44	65	0
normalized size	1	1.	0.93	0.98	1.37	1.83	0.96	1.41	0.
time (sec)	N/A	0.071	0.022	0.011	1.382	0.217	1.346	0.219	0.

Problem 224	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	33	33	29	34	49	63	31	46	0
normalized size	1	1.	0.88	1.03	1.48	1.91	0.94	1.39	0.
time (sec)	N/A	0.053	0.021	0.01	1.416	0.215	1.288	0.219	0.

Problem 225	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	20	24	35	38	20	32	19
normalized size	1	1.	0.87	1.04	1.52	1.65	0.87	1.39	0.83
time (sec)	N/A	0.04	0.01	0.01	1.452	0.206	1.186	0.217	6.835

Problem 226	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	12	13	18	18	10	16	8
normalized size	1	1.	0.57	0.62	0.86	0.86	0.48	0.76	0.38
time (sec)	N/A	0.012	0.005	0.002	1.407	0.2	1.124	0.218	2.783

Problem 227	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	24	30	38	53	22	42	24
normalized size	1	1.	0.83	1.03	1.31	1.83	0.76	1.45	0.83
time (sec)	N/A	0.042	0.016	0.011	1.406	0.213	1.376	0.22	7.65

Problem 228	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	35	43	61	85	36	61	39
normalized size	1	1.	0.83	1.02	1.45	2.02	0.86	1.45	0.93
time (sec)	N/A	0.058	0.07	0.017	7.047	0.216	1.578	0.219	10.157

Problem 229	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	53	57	86	116	54	86	56
normalized size	1	1.	0.91	0.98	1.48	2.	0.93	1.48	0.97
time (sec)	N/A	0.072	0.094	0.016	5.912	0.216	1.703	0.22	12.9

Problem 230	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	66	68	99	128	66	99	66
normalized size	1	1.	0.96	0.99	1.43	1.86	0.96	1.43	0.96
time (sec)	N/A	0.085	0.091	0.014	1.392	0.219	1.842	0.218	27.177

Problem 231	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	79	79	116	146	80	116	83
normalized size	1	1.	0.94	0.94	1.38	1.74	0.95	1.38	0.99
time (sec)	N/A	0.104	0.076	0.017	1.435	0.216	2.	0.219	17.599

Problem 232	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	64	57	72	84	0	100	95
normalized size	1	1.	0.61	0.54	0.69	0.8	0.	0.95	0.9
time (sec)	N/A	0.212	0.028	0.008	1.438	0.217	0.	0.221	21.633

Problem 233	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	53	46	57	69	0	80	71
normalized size	1	1.	0.66	0.57	0.71	0.86	0.	1.	0.89
time (sec)	N/A	0.131	0.021	0.007	1.394	0.227	0.	0.22	13.931

Problem 234	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	41	35	41	53	0	51	46
normalized size	1	1.	0.79	0.67	0.79	1.02	0.	0.98	0.88
time (sec)	N/A	0.08	0.015	0.005	1.405	0.216	0.	0.217	8.542

Problem 235	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	23	27	16	35	0	34	20
normalized size	1	1.	0.92	1.08	0.64	1.4	0.	1.36	0.8
time (sec)	N/A	0.065	0.017	0.003	1.416	0.225	0.	0.218	7.5

Problem 236	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	53	52	0	1	0	88	44
normalized size	1	1.	1.04	1.02	0.	0.02	0.	1.73	0.86
time (sec)	N/A	0.09	0.051	0.007	0.	0.227	0.	0.224	9.264

Problem 237	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	64	56	0	1	0	58	46
normalized size	1	1.	1.23	1.08	0.	0.02	0.	1.12	0.88
time (sec)	N/A	0.093	0.044	0.01	0.	0.229	0.	0.239	9.357

Problem 238	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	81	73	0	1	0	92	71
normalized size	1	1.	0.96	0.87	0.	0.01	0.	1.1	0.85
time (sec)	N/A	0.168	0.061	0.008	0.	0.238	0.	0.243	17.04

Problem 239	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	93	89	0	1	0	116	97
normalized size	1	1.	0.83	0.79	0.	0.01	0.	1.04	0.87
time (sec)	N/A	0.245	0.075	0.008	0.	0.24	0.	0.262	24.558

Problem 240	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	80	79	116	128	0	294	150
normalized size	1	1.	0.5	0.49	0.72	0.8	0.	1.83	0.93
time (sec)	N/A	0.357	0.047	0.009	1.411	0.216	0.	0.228	38.57

Problem 241	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	69	68	101	113	0	255	126
normalized size	1	1.	0.51	0.5	0.74	0.83	0.	1.88	0.93
time (sec)	N/A	0.278	0.039	0.008	1.402	0.227	0.	0.224	28.936

Problem 242	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	108	108	58	57	86	99	0	213	100
normalized size	1	1.	0.54	0.53	0.8	0.92	0.	1.97	0.93
time (sec)	N/A	0.227	0.034	0.007	1.405	0.22	0.	0.227	22.278

Problem 243	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	47	46	72	84	0	173	73
normalized size	1	1.	0.59	0.57	0.9	1.05	0.	2.16	0.91
time (sec)	N/A	0.205	0.034	0.007	1.403	0.215	0.	0.223	19.58

Problem 244	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	36	35	55	68	0	124	46
normalized size	1	1.	0.69	0.67	1.06	1.31	0.	2.38	0.88
time (sec)	N/A	0.134	0.032	0.004	1.394	0.234	0.	0.225	12.895

Problem 245	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	23	27	38	50	0	70	20
normalized size	1	1.	0.92	1.08	1.52	2.	0.	2.8	0.8
time (sec)	N/A	0.067	0.022	0.003	1.518	0.228	0.	0.221	7.458

Problem 246	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	68	61	0	1	0	115	66
normalized size	1	1.	0.92	0.82	0.	0.01	0.	1.55	0.89
time (sec)	N/A	0.163	0.082	0.006	0.	0.227	0.	0.226	15.907

Problem 247	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	66	72	0	1	0	84	65
normalized size	1	1.	0.9	0.99	0.	0.01	0.	1.15	0.89
time (sec)	N/A	0.159	0.075	0.016	0.	0.241	0.	0.243	15.951

Problem 248	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	82	74	0	1	0	95	75
normalized size	1	1.	1.01	0.91	0.	0.01	0.	1.17	0.93
time (sec)	N/A	0.16	0.07	0.017	0.	0.255	0.	0.248	16.309

Problem 249	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	94	87	0	1	0	124	94
normalized size	1	1.	0.86	0.8	0.	0.01	0.	1.14	0.86
time (sec)	N/A	0.235	0.087	0.019	0.	0.241	0.	0.267	24.603

Problem 250	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	104	101	0	1	0	147	122
normalized size	1	1.	0.76	0.74	0.	0.01	0.	1.07	0.89
time (sec)	N/A	0.319	0.093	0.018	0.	0.236	0.	0.262	32.645

Problem 251	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	116	113	0	1	0	170	150
normalized size	1	1.	0.7	0.68	0.	0.01	0.	1.03	0.91
time (sec)	N/A	0.404	0.12	0.02	0.	0.232	0.	0.285	41.656

Problem 252	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	53	55	72	69	0	0	94
normalized size	1	1.	0.51	0.53	0.7	0.67	0.	0.	0.91
time (sec)	N/A	0.242	0.033	0.006	1.398	0.212	0.	0.	26.673

Problem 253	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	75	42	44	57	54	0	0	66
normalized size	1	1.	0.56	0.59	0.76	0.72	0.	0.	0.88
time (sec)	N/A	0.161	0.026	0.009	1.398	0.218	0.	0.	19.039

Problem 254	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	30	33	41	38	0	0	41
normalized size	1	1.	0.61	0.67	0.84	0.78	0.	0.	0.84
time (sec)	N/A	0.085	0.021	0.005	1.404	0.217	0.	0.	12.17

Problem 255	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	21	25	16	28	0	35	17
normalized size	1	1.	0.91	1.09	0.7	1.22	0.	1.52	0.74
time (sec)	N/A	0.013	0.012	0.004	1.405	0.214	0.	0.226	6.198

Problem 256	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	46	39	0	1	0	61	29
normalized size	1	1.	1.53	1.3	0.	0.03	0.	2.03	0.97
time (sec)	N/A	0.026	0.022	0.007	0.	0.221	0.	0.223	2.353

Problem 257	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	60	55	0	1	0	0	46
normalized size	1	1.	1.11	1.02	0.	0.02	0.	0.	0.85
time (sec)	N/A	0.098	0.045	0.013	0.	0.229	0.	0.	9.848

Problem 258	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	83	77	0	1	0	0	78
normalized size	1	1.	0.95	0.89	0.	0.01	0.	0.	0.9
time (sec)	N/A	0.164	0.059	0.008	0.	0.233	0.	0.	16.72

Problem 259	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	96	95	0	1	0	0	105
normalized size	1	1.	0.83	0.83	0.	0.01	0.	0.	0.91
time (sec)	N/A	0.237	0.062	0.013	0.	0.24	0.	0.	24.367

Problem 260	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	50	56	55	81	0	0	88
normalized size	1	1.	0.51	0.57	0.56	0.83	0.	0.	0.9
time (sec)	N/A	0.236	0.031	0.008	1.605	0.226	0.	0.	27.33

Problem 261	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	39	46	41	66	0	0	63
normalized size	1	1.	0.54	0.64	0.57	0.92	0.	0.	0.88
time (sec)	N/A	0.159	0.025	0.007	1.421	0.221	0.	0.	19.261

Problem 262	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	26	34	26	51	0	38	39
normalized size	1	1.	0.55	0.72	0.55	1.09	0.	0.81	0.83
time (sec)	N/A	0.09	0.02	0.005	1.438	0.215	0.	0.229	12.677

Problem 263	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	19	27	16	39	0	50	19
normalized size	1	1.	0.9	1.29	0.76	1.86	0.	2.38	0.9
time (sec)	N/A	0.014	0.009	0.004	1.457	0.212	0.	0.233	7.624

Problem 264	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	54	54	0	1	0	0	46
normalized size	1	1.	1.04	1.04	0.	0.02	0.	0.	0.88
time (sec)	N/A	0.099	0.031	0.007	0.	0.231	0.	0.	9.862

Problem 265	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	75	62	62	0	1	0	0	68
normalized size	1	1.	0.83	0.83	0.	0.01	0.	0.	0.91
time (sec)	N/A	0.146	0.049	0.02	0.	0.231	0.	0.	15.694

Problem 266	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	84	76	0	1	0	4	100
normalized size	1	1.	0.76	0.69	0.	0.01	0.	0.04	0.91
time (sec)	N/A	0.191	0.059	0.021	0.	0.231	0.	0.556	18.937

Problem 267	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	138	138	96	86	0	1	0	0	129
normalized size	1	1.	0.7	0.62	0.	0.01	0.	0.	0.93
time (sec)	N/A	0.323	0.068	0.023	0.	0.231	0.	0.	31.865

Problem 268	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	166	166	106	100	0	1	0	0	156
normalized size	1	1.	0.64	0.6	0.	0.01	0.	0.	0.94
time (sec)	N/A	0.405	0.077	0.025	0.	0.232	0.	0.	40.599

Problem 269	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	125	125	103	103	0	1	0	86	114
normalized size	1	1.	0.82	0.82	0.	0.01	0.	0.69	0.91
time (sec)	N/A	0.294	0.071	0.012	0.	0.231	0.	0.227	27.998

Problem 270	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	92	92	0	1	0	70	85
normalized size	1	1.	0.97	0.97	0.	0.01	0.	0.74	0.89
time (sec)	N/A	0.22	0.051	0.009	0.	0.229	0.	0.226	20.736

Problem 271	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	73	78	0	1	0	51	51
normalized size	1	1.	1.22	1.3	0.	0.02	0.	0.85	0.85
time (sec)	N/A	0.145	0.045	0.007	0.	0.227	0.	0.226	14.069

Problem 272	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	34	34	54	58	0	1	0	31	31
normalized size	1	1.	1.59	1.71	0.	0.03	0.	0.91	0.91
time (sec)	N/A	0.077	0.022	0.008	0.	0.225	0.	0.224	8.404

Problem 273	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	23	27	20	28	0	41	22
normalized size	1	1.	0.92	1.08	0.8	1.12	0.	1.64	0.88
time (sec)	N/A	0.066	0.022	0.006	1.429	0.228	0.	0.22	7.31

Problem 274	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	31	33	42	39	0	74	49
normalized size	1	1.	0.55	0.59	0.75	0.7	0.	1.32	0.88
time (sec)	N/A	0.133	0.032	0.007	1.429	0.219	0.	0.226	12.782

Problem 275	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	44	46	62	54	0	104	78
normalized size	1	1.	0.51	0.53	0.72	0.63	0.	1.21	0.91
time (sec)	N/A	0.201	0.035	0.007	1.419	0.215	0.	0.224	19.133

Problem 276	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	116	116	55	57	82	69	0	139	107
normalized size	1	1.	0.47	0.49	0.71	0.59	0.	1.2	0.92
time (sec)	N/A	0.276	0.04	0.007	1.426	0.215	0.	0.227	26.199

Problem 277	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	58	0	0	0	0	0	46
normalized size	1	1.	0.95	0.	0.	0.	0.	0.	0.75
time (sec)	N/A	0.084	0.043	0.12	0.	0.	0.	0.	13.914

Problem 278	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	61	58	0	0	0	0	0	46
normalized size	1	1.27	1.21	0.	0.	0.	0.	0.	0.96
time (sec)	N/A	0.081	0.031	0.093	0.	0.	0.	0.	13.495

Problem 279	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	52	0	0	0	0	0	41
normalized size	1	1.	0.96	0.	0.	0.	0.	0.	0.76
time (sec)	N/A	0.081	0.03	0.081	0.	0.	0.	0.	13.248

Problem 280	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	30	36	0	51	0	0	27
normalized size	1	1.	0.94	1.12	0.	1.59	0.	0.	0.84
time (sec)	N/A	0.048	0.041	0.005	0.	0.246	0.	0.	8.284

Problem 281	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	58	50	0	95	0	0	60
normalized size	1	1.	0.83	0.71	0.	1.36	0.	0.	0.86
time (sec)	N/A	0.108	0.044	0.006	0.	0.238	0.	0.	16.905

Problem 282	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	116	116	72	84	0	150	0	0	102
normalized size	1	1.	0.62	0.72	0.	1.29	0.	0.	0.88
time (sec)	N/A	0.187	0.079	0.008	0.	0.24	0.	0.	29.587

Problem 283	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	24	31	49	49	36	30	14
normalized size	1	1.	1.26	1.63	2.58	2.58	1.89	1.58	0.74
time (sec)	N/A	0.023	0.014	0.006	1.391	0.204	2.265	0.221	4.172

Problem 284	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	46	48	62	57	0	0	71
normalized size	1	1.	0.57	0.6	0.78	0.71	0.	0.	0.89
time (sec)	N/A	0.171	0.037	0.008	1.411	0.216	0.	0.	18.747

Problem 285	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	34	37	46	41	0	0	44
normalized size	1	1.	0.65	0.71	0.88	0.79	0.	0.	0.85
time (sec)	N/A	0.094	0.027	0.007	1.462	0.214	0.	0.	12.422

Problem 286	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	27	19	28	0	0	19
normalized size	1	1.	1.	1.08	0.76	1.12	0.	0.	0.76
time (sec)	N/A	0.015	0.015	0.008	1.394	0.215	0.	0.	7.052

Problem 287	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	54	43	0	1	0	63	31
normalized size	1	1.	1.69	1.34	0.	0.03	0.	1.97	0.97
time (sec)	N/A	0.027	0.061	0.008	0.	0.223	0.	0.222	2.329

Problem 288	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	63	66	0	1	0	77	49
normalized size	1	1.	1.07	1.12	0.	0.02	0.	1.31	0.83
time (sec)	N/A	0.1	0.205	0.008	0.	0.231	0.	0.234	9.055

Problem 289	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	238	238	165	248	0	0	0	0	216
normalized size	1	1.	0.69	1.04	0.	0.	0.	0.	0.91
time (sec)	N/A	0.274	0.509	0.055	0.	0.	0.	0.	21.195

Problem 290	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	212	212	141	231	0	0	0	0	196
normalized size	1	1.	0.67	1.09	0.	0.	0.	0.	0.92
time (sec)	N/A	0.144	0.16	0.007	0.	0.	0.	0.	12.793

Problem 291	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	243	243	171	248	0	0	0	0	218
normalized size	1	1.	0.7	1.02	0.	0.	0.	0.	0.9
time (sec)	N/A	0.259	0.333	0.01	0.	0.	0.	0.	21.186

Problem 292	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	514	514	228	676	0	0	0	0	462
normalized size	1	1.	0.44	1.32	0.	0.	0.	0.	0.9
time (sec)	N/A	0.6	3.293	0.011	0.	0.	0.	0.	52.504

Problem 293	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	484	484	202	394	0	0	0	0	435
normalized size	1	1.	0.42	0.81	0.	0.	0.	0.	0.9
time (sec)	N/A	0.425	0.219	0.007	0.	0.	0.	0.	38.709

Problem 294	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	A	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	510	510	225	673	0	0	0	0	454
normalized size	1	1.	0.44	1.32	0.	0.	0.	0.	0.89
time (sec)	N/A	0.573	1.146	0.009	0.	0.	0.	0.	52.725

Problem 295	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	265	265	194	2017	0	0	0	0	243
normalized size	1	1.	0.73	7.61	0.	0.	0.	0.	0.92
time (sec)	N/A	0.561	0.443	0.087	0.	0.	0.	0.	34.077

Problem 296	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	525	525	362	2586	0	0	0	0	478
normalized size	1	1.	0.69	4.93	0.	0.	0.	0.	0.91
time (sec)	N/A	0.975	1.505	0.065	0.	0.	0.	0.	56.225

Problem 297	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	81	3347	0	1	0	59	54
normalized size	1	1.	1.25	51.49	0.	0.02	0.	0.91	0.83
time (sec)	N/A	0.155	0.081	0.064	0.	0.35	0.	0.248	13.541

Problem 298	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	237	237	178	1793	0	0	0	0	212
normalized size	1	1.	0.75	7.57	0.	0.	0.	0.	0.89
time (sec)	N/A	0.437	0.434	0.034	0.	0.	0.	0.	25.164

Problem 299	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	492	492	340	2374	0	0	0	0	444
normalized size	1	1.	0.69	4.83	0.	0.	0.	0.	0.9
time (sec)	N/A	0.799	1.347	0.036	0.	0.	0.	0.	44.067

Problem 300	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	36	36	59	480	0	1	0	55	32
normalized size	1	1.	1.64	13.33	0.	0.03	0.	1.53	0.89
time (sec)	N/A	0.083	0.038	0.036	0.	0.337	0.	0.229	8.019

Problem 301	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	203	203	151	437	0	0	0	0	189
normalized size	1	1.	0.74	2.15	0.	0.	0.	0.	0.93
time (sec)	N/A	0.313	0.201	0.062	0.	0.	0.	0.	17.226

Problem 302	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	519	519	341	2860	0	0	0	0	471
normalized size	1	1.	0.66	5.51	0.	0.	0.	0.	0.91
time (sec)	N/A	0.944	1.293	0.042	0.	0.	0.	0.	56.665

Problem 303	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	27	29	35	28	0	31	24
normalized size	1	1.	1.	1.07	1.3	1.04	0.	1.15	0.89
time (sec)	N/A	0.07	0.032	0.006	1.401	0.221	0.	0.223	7.069

Problem 304	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	235	235	176	1795	0	0	0	0	218
normalized size	1	1.	0.75	7.64	0.	0.	0.	0.	0.93
time (sec)	N/A	0.42	0.637	0.041	0.	0.	0.	0.	25.223

Problem 305	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	555	555	369	3048	0	0	0	0	508
normalized size	1	1.	0.66	5.49	0.	0.	0.	0.	0.92
time (sec)	N/A	1.114	1.741	0.046	0.	0.	0.	0.	69.592

Problem 306	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	35	37	51	42	0	49	49
normalized size	1	1.	0.62	0.66	0.91	0.75	0.	0.88	0.88
time (sec)	N/A	0.141	0.044	0.007	1.397	0.226	0.	0.225	12.27

Problem 307	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	C	F	F	F(-1)	F	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	265	265	190	2009	0	0	0	0	245
normalized size	1	1.	0.72	7.58	0.	0.	0.	0.	0.92
time (sec)	N/A	0.521	0.504	0.042	0.	0.	0.	0.	33.666

Problem 308	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	28	28	29	38	35	19	41	24
normalized size	1	1.	1.	1.04	1.36	1.25	0.68	1.46	0.86
time (sec)	N/A	0.04	0.007	0.008	1.384	0.227	1.262	0.22	7.094

Problem 309	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	42	41	54	55	31	61	37
normalized size	1	1.	1.	0.98	1.29	1.31	0.74	1.45	0.88
time (sec)	N/A	0.046	0.007	0.008	1.426	0.226	1.357	0.219	8.173

Problem 310	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	105	120	0	1	0	0	100
normalized size	1	1.	0.94	1.07	0.	0.01	0.	0.	0.89
time (sec)	N/A	0.31	0.073	0.01	0.	0.238	0.	0.	25.801

Problem 311	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	94	98	0	1	0	0	75
normalized size	1	1.	1.09	1.14	0.	0.01	0.	0.	0.87
time (sec)	N/A	0.219	0.05	0.01	0.	0.236	0.	0.	18.651

Problem 312	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	75	78	0	1	0	55	46
normalized size	1	1.	1.34	1.39	0.	0.02	0.	0.98	0.82
time (sec)	N/A	0.138	0.042	0.008	0.	0.237	0.	0.237	12.109

Problem 313	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	58	56	0	1	0	31	29
normalized size	1	1.	1.81	1.75	0.	0.03	0.	0.97	0.91
time (sec)	N/A	0.064	0.022	0.006	0.	0.229	0.	0.235	6.627

Problem 314	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	21	25	20	28	0	36	20
normalized size	1	1.	0.91	1.09	0.87	1.22	0.	1.57	0.87
time (sec)	N/A	0.015	0.018	0.005	1.423	0.218	0.	0.233	1.407

Problem 315	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	29	30	42	39	0	46	46
normalized size	1	1.	0.56	0.58	0.81	0.75	0.	0.88	0.88
time (sec)	N/A	0.086	0.027	0.006	1.429	0.222	0.	0.235	7.972

Problem 316	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	42	46	62	54	0	70	73
normalized size	1	1.	0.52	0.57	0.78	0.68	0.	0.88	0.91
time (sec)	N/A	0.156	0.031	0.006	1.439	0.233	0.	0.237	14.066

Problem 317	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	108	108	53	57	82	69	0	93	100
normalized size	1	1.	0.49	0.53	0.76	0.64	0.	0.86	0.93
time (sec)	N/A	0.237	0.042	0.006	1.429	0.227	0.	0.235	20.522

Problem 318	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	64	68	103	84	0	116	128
normalized size	1	1.	0.47	0.5	0.76	0.62	0.	0.85	0.94
time (sec)	N/A	0.317	0.044	0.007	1.419	0.221	0.	0.235	27.912

Problem 319	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	26	23	30	38	22	43	26
normalized size	1	1.	1.	0.88	1.15	1.46	0.85	1.65	1.
time (sec)	N/A	0.043	0.008	0.01	1.377	0.22	1.31	0.219	6.33

Problem 320	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	27	23	30	38	22	43	26
normalized size	1	1.	1.	0.85	1.11	1.41	0.81	1.59	0.96
time (sec)	N/A	0.045	0.008	0.009	1.376	0.212	0.517	0.219	6.521

Problem 321	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	8	8	14	9	19	11	5	20	5
normalized size	1	1.	1.75	1.12	2.38	1.38	0.62	2.5	0.62
time (sec)	N/A	0.01	0.004	0.001	1.379	0.212	0.09	0.217	2.162

Problem 322	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	10	11	22	24	15	22	8
normalized size	1	1.	1.	1.1	2.2	2.4	1.5	2.2	0.8
time (sec)	N/A	0.01	0.004	0.002	1.374	0.205	0.114	0.218	2.267

Problem 323	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	12	12	12	11	22	35	27	22	12
normalized size	1	1.	1.	0.92	1.83	2.92	2.25	1.83	1.
time (sec)	N/A	0.01	0.005	0.001	1.383	0.204	0.127	0.219	2.311

Problem 324	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	10	11	14	14	7	14	7
normalized size	1	1.	1.	1.1	1.4	1.4	0.7	1.4	0.7
time (sec)	N/A	0.007	0.001	0.001	1.396	0.201	0.096	0.217	2.296

Problem 325	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	20	19	28	30	32	0	10
normalized size	1	1.	1.	0.95	1.4	1.5	1.6	0.	0.5
time (sec)	N/A	0.019	0.006	0.003	1.538	0.238	1.94	0.	3.409

Problem 326	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	20	21	51	49	82	0	15
normalized size	1	1.	1.	1.05	2.55	2.45	4.1	0.	0.75
time (sec)	N/A	0.022	0.005	0.003	1.466	0.236	2.675	0.	3.693

Problem 327	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	20	21	69	70	119	0	15
normalized size	1	1.	1.	1.05	3.45	3.5	5.95	0.	0.75
time (sec)	N/A	0.027	0.005	0.002	1.382	0.24	3.468	0.	3.764

Problem 328	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	160	135	181	1	160	181	10
normalized size	1	1.	10.	8.44	11.31	0.06	10.	11.31	0.62
time (sec)	N/A	0.015	0.007	0.003	1.404	0.202	0.243	0.217	2.541

Problem 329	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	160	135	181	1	160	181	10
normalized size	1	1.	7.62	6.43	8.62	0.05	7.62	8.62	0.48
time (sec)	N/A	0.016	0.012	0.001	1.412	0.204	0.273	0.218	3.289

Problem 330	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	160	135	181	1	160	181	10
normalized size	1	1.	7.62	6.43	8.62	0.05	7.62	8.62	0.48
time (sec)	N/A	0.017	0.013	0.003	1.409	0.193	0.284	0.22	3.292

Problem 331	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	24	339	0	312	0	0	248
normalized size	1	1.	0.89	12.56	0.	11.56	0.	0.	9.19
time (sec)	N/A	0.034	0.03	0.107	0.	0.24	0.	0.	82.683

Problem 332	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	160	135	181	1	160	181	10
normalized size	1	1.	10.	8.44	11.31	0.06	10.	11.31	0.62
time (sec)	N/A	0.011	0.006	0.	1.4	0.207	0.247	0.218	2.515

Problem 333	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	160	135	181	1	160	181	10
normalized size	1	1.	10.	8.44	11.31	0.06	10.	11.31	0.62
time (sec)	N/A	0.014	0.008	0.004	1.387	0.195	0.254	0.217	2.592

Problem 334	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	160	135	181	1	160	181	10
normalized size	1	1.	10.	8.44	11.31	0.06	10.	11.31	0.62
time (sec)	N/A	0.015	0.01	0.003	1.375	0.196	0.264	0.217	2.617

Problem 335	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	193	287	0	277	0	294	19
normalized size	1	1.	7.15	10.63	0.	10.26	0.	10.89	0.7
time (sec)	N/A	0.024	0.116	0.063	0.	0.245	0.	0.245	3.573

Problem 336	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	88	126	0	126	0	134	19
normalized size	1	1.	3.26	4.67	0.	4.67	0.	4.96	0.7
time (sec)	N/A	0.026	0.073	0.035	0.	0.237	0.	0.225	3.566

Problem 337	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	27	39	89	111	0	0	22
normalized size	1	1.	1.	1.44	3.3	4.11	0.	0.	0.81
time (sec)	N/A	0.036	0.056	0.037	1.387	0.231	0.	0.	3.691

Problem 338	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	18	18	10	19	10
normalized size	1	1.	1.	0.93	1.2	1.2	0.67	1.27	0.67
time (sec)	N/A	0.01	0.004	0.001	1.383	0.214	0.236	0.216	2.486

Problem 339	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	18	18	10	19	10
normalized size	1	1.	1.	0.93	1.2	1.2	0.67	1.27	0.67
time (sec)	N/A	0.011	0.006	0.001	1.385	0.208	0.305	0.219	2.532

Problem 340	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	18	18	10	19	10
normalized size	1	1.	1.	0.93	1.2	1.2	0.67	1.27	0.67
time (sec)	N/A	0.009	0.007	0.001	1.379	0.209	0.365	0.218	2.54

Problem 341	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	24	31	49	49	36	30	14
normalized size	1	1.	1.26	1.63	2.58	2.58	1.89	1.58	0.74
time (sec)	N/A	0.017	0.015	0.007	1.375	0.206	1.642	0.22	3.529

Problem 342	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	24	31	49	49	36	30	14
normalized size	1	1.	1.26	1.63	2.58	2.58	1.89	1.58	0.74
time (sec)	N/A	0.019	0.014	0.007	1.378	0.21	18.984	0.216	3.298

Problem 343	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	24	31	49	49	0	30	14
normalized size	1	1.	1.26	1.63	2.58	2.58	0.	1.58	0.74
time (sec)	N/A	0.017	0.017	0.013	1.371	0.206	0.	0.215	3.29

Problem 344	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	24	23	30	34	19	30	19
normalized size	1	1.	1.	0.96	1.25	1.42	0.79	1.25	0.79
time (sec)	N/A	0.029	0.002	0.003	1.368	0.213	1.014	0.219	5.744

Problem 345	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	40	40	40	35	46	51	37	62	0
normalized size	1	1.	1.	0.88	1.15	1.27	0.92	1.55	0.
time (sec)	N/A	0.059	0.011	0.009	1.394	0.221	1.172	0.22	0.

Problem 346	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	50	45	59	65	48	61	46
normalized size	1	1.	1.	0.9	1.18	1.3	0.96	1.22	0.92
time (sec)	N/A	0.055	0.009	0.008	1.373	0.211	1.229	0.215	9.344

Problem 347	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	F(-2)	A	A	F(-1)
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	144	156	166	0	36	151	0
normalized size	1	1.	0.78	0.84	0.9	0.	0.19	0.82	0.
time (sec)	N/A	0.652	0.237	0.029	1.581	0.	4.132	0.225	0.

Problem 348	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	232	363	0	401	0	400	22
normalized size	1	1.	8.	12.52	0.	13.83	0.	13.79	0.76
time (sec)	N/A	0.038	0.327	0.257	0.	0.252	0.	0.922	4.732

Problem 349	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	160	135	19	1	160	19	10
normalized size	1	1.	10.	8.44	1.19	0.06	10.	1.19	0.62
time (sec)	N/A	0.011	0.008	0.002	1.379	0.194	0.219	0.218	2.121

Problem 350	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	160	135	181	1	160	181	10
normalized size	1	1.	7.62	6.43	8.62	0.05	7.62	8.62	0.48
time (sec)	N/A	0.013	0.011	0.	1.375	0.192	0.272	0.22	3.302

Problem 351	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	160	135	181	1	160	181	10
normalized size	1	1.	6.96	5.87	7.87	0.04	6.96	7.87	0.43
time (sec)	N/A	0.019	0.013	0.004	1.379	0.199	0.287	0.218	3.504

Problem 352	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	160	135	19	1	160	19	10
normalized size	1	1.	10.	8.44	1.19	0.06	10.	1.19	0.62
time (sec)	N/A	0.011	0.007	0.003	1.381	0.199	0.224	0.218	2.122

Problem 353	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	160	135	181	1	160	181	10
normalized size	1	1.	7.62	6.43	8.62	0.05	7.62	8.62	0.48
time (sec)	N/A	0.012	0.01	0.	1.375	0.199	0.288	0.221	3.29

Problem 354	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	160	135	19	1	160	19	10
normalized size	1	1.	10.	8.44	1.19	0.06	10.	1.19	0.62
time (sec)	N/A	0.014	0.009	0.001	1.375	0.195	0.241	0.218	2.121

Problem 355	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	26	36	50	36	48	0	14
normalized size	1	1.	1.13	1.57	2.17	1.57	2.09	0.	0.61
time (sec)	N/A	0.03	0.026	0.016	1.378	0.241	2.042	0.	3.409

Problem 356	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	22	39	36	38	41	0	19
normalized size	1	1.	0.96	1.7	1.57	1.65	1.78	0.	0.83
time (sec)	N/A	0.035	0.015	0.019	1.377	0.24	5.432	0.	7.074

Problem 357	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	41	26	38	39	0	10
normalized size	1	1.	1.	2.73	1.73	2.53	2.6	0.	0.67
time (sec)	N/A	0.02	0.007	0.018	1.387	0.237	5.523	0.	2.997

Problem 358	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	22	32	22	35	20	0	19
normalized size	1	1.	1.	1.45	1.	1.59	0.91	0.	0.86
time (sec)	N/A	0.026	0.012	0.019	1.376	0.236	4.991	0.	5.136

Problem 359	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	34	15	35	22	0	10
normalized size	1	1.	1.	2.27	1.	2.33	1.47	0.	0.67
time (sec)	N/A	0.015	0.005	0.016	1.379	0.234	5.03	0.	2.723

Problem 360	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	12	12	12	12	11	11	0	12	8
normalized size	1	1.	1.	1.	0.92	0.92	0.	1.	0.67
time (sec)	N/A	0.01	0.007	0.006	1.378	0.222	0.	0.221	1.944

Problem 361	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	14	14	14	116	23	11	0	24	10
normalized size	1	1.	1.	8.29	1.64	0.79	0.	1.71	0.71
time (sec)	N/A	0.012	0.007	0.072	1.366	0.22	0.	0.238	1.968

Problem 362	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	12	12	12	9	11	11	10	43	10
normalized size	1	1.	1.	0.75	0.92	0.92	0.83	3.58	0.83
time (sec)	N/A	0.01	0.006	0.003	1.535	0.224	1.123	0.22	1.881

Problem 363	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	29	39	42	34	71	0	34
normalized size	1	1.	1.21	1.62	1.75	1.42	2.96	0.	1.42
time (sec)	N/A	0.041	0.044	0.04	1.536	0.246	1.764	0.	4.171

Problem 364	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	75	104	0	0	0	0	0	58
normalized size	1	1.	1.39	0.	0.	0.	0.	0.	0.77
time (sec)	N/A	0.193	0.257	0.191	0.	0.	0.	0.	17.382

Problem 365	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	99	99	109	0	0	0	0	0	75
normalized size	1	1.	1.1	0.	0.	0.	0.	0.	0.76
time (sec)	N/A	0.264	0.098	0.412	0.	0.	0.	0.	26.227

Problem 366	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	103	0	0	0	0	0	76
normalized size	1	1.	1.13	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.259	0.278	0.076	0.	0.	0.	0.	24.164

Problem 367	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	99	0	0	0	0	0	58
normalized size	1	1.	1.39	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.136	0.18	0.088	0.	0.	0.	0.	13.778

Problem 368	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	100	0	0	0	0	0	73
normalized size	1	1.	1.15	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.235	0.251	0.07	0.	0.	0.	0.	23.629

Problem 369	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-2)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	45	39	0	1	0	0	41
normalized size	1	1.	0.88	0.76	0.	0.02	0.	0.	0.8
time (sec)	N/A	0.076	0.035	0.001	0.	0.242	0.	0.	9.405

Problem 370	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	102	0	0	0	0	0	71
normalized size	1	1.	1.21	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.285	0.16	0.084	0.	0.	0.	0.	23.676

Problem 371	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	95	0	0	0	0	0	51
normalized size	1	1.	1.56	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.146	0.148	0.067	0.	0.	0.	0.	10.651

Problem 372	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	102	0	0	0	0	0	73
normalized size	1	1.	1.2	0.	0.	0.	0.	0.	0.86
time (sec)	N/A	0.328	0.153	0.08	0.	0.	0.	0.	23.659

Problem 373	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	141	141	131	0	0	0	0	0	116
normalized size	1	1.	0.93	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.382	0.303	0.451	0.	0.	0.	0.	35.524

Problem 374	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	128	128	126	0	0	0	0	0	109
normalized size	1	1.	0.98	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.336	0.366	0.056	0.	0.	0.	0.	33.216

Problem 375	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	117	0	0	0	0	0	87
normalized size	1	1.	1.12	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.225	0.189	0.066	0.	0.	0.	0.	22.503

Problem 376	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	120	0	0	0	0	0	104
normalized size	1	1.	0.98	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.303	0.326	0.054	0.	0.	0.	0.	32.631

Problem 377	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-2)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	58	51	0	1	0	0	60
normalized size	1	1.	0.79	0.7	0.	0.01	0.	0.	0.82
time (sec)	N/A	0.1	0.067	0.002	0.	0.241	0.	0.	12.202

Problem 378	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	0	0	0	0	0	0	97
normalized size	1	1.	0.	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.357	0.407	0.056	0.	0.	0.	0.	31.947

Problem 379	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	113	0	0	0	0	0	87
normalized size	1	1.	1.15	0.	0.	0.	0.	0.	0.89
time (sec)	N/A	0.268	0.225	0.052	0.	0.	0.	0.	21.755

Problem 380	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	0	0	0	0	0	0	109
normalized size	1	1.	0.	0.	0.	0.	0.	0.	0.89
time (sec)	N/A	0.429	0.432	0.058	0.	0.	0.	0.	33.124

Problem 381	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	115	0	0	0	0	0	90
normalized size	1	1.	1.15	0.	0.	0.	0.	0.	0.9
time (sec)	N/A	0.326	0.231	0.069	0.	0.	0.	0.	26.065

Problem 382	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	58	47	0	1	0	88	41
normalized size	1	1.	1.14	0.92	0.	0.02	0.	1.73	0.8
time (sec)	N/A	0.126	0.046	0.01	0.	0.233	0.	0.222	8.515

Problem 383	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	71	61	0	1	0	92	34
normalized size	1	1.	1.69	1.45	0.	0.02	0.	2.19	0.81
time (sec)	N/A	0.062	0.047	0.01	0.	0.251	0.	0.223	4.933

Problem 384	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	66	55	0	1	0	93	0
normalized size	1	1.	1.29	1.08	0.	0.02	0.	1.82	0.
time (sec)	N/A	0.112	0.083	0.011	0.	0.238	0.	0.222	0.

Problem 385	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	69	74	0	1	0	0	0
normalized size	1	1.	1.13	1.21	0.	0.02	0.	0.	0.
time (sec)	N/A	0.138	0.059	0.055	0.	0.245	0.	0.	0.

Problem 386	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	66	56	0	1	0	82	0
normalized size	1	1.	1.25	1.06	0.	0.02	0.	1.55	0.
time (sec)	N/A	0.137	0.051	0.016	0.	0.239	0.	0.22	0.

Problem 387	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	43	67	81	0	1	0	86	34
normalized size	1	1.	1.56	1.88	0.	0.02	0.	2.	0.79
time (sec)	N/A	0.063	0.068	0.011	0.	0.244	0.	0.221	5.093

Problem 388	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	70	73	0	1	0	88	0
normalized size	1	1.	1.32	1.38	0.	0.02	0.	1.66	0.
time (sec)	N/A	0.12	0.093	0.034	0.	0.23	0.	0.223	0.

Problem 389	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	77	105	0	1	0	0	0
normalized size	1	1.	1.22	1.67	0.	0.02	0.	0.	0.
time (sec)	N/A	0.142	0.065	0.067	0.	0.246	0.	0.	0.

Problem 390	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	98	0	0	0	0	0	48
normalized size	1	1.	1.58	0.	0.	0.	0.	0.	0.77
time (sec)	N/A	0.187	0.158	0.114	0.	0.	0.	0.	16.854

Problem 391	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	89	0	0	0	0	0	46
normalized size	1	1.	1.68	0.	0.	0.	0.	0.	0.87
time (sec)	N/A	0.17	0.162	0.064	0.	0.	0.	0.	15.302

Problem 392	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	78	0	0	0	0	0	31
normalized size	1	1.	2.11	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.034	0.102	0.044	0.	0.	0.	0.	3.165

Problem 393	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	87	0	0	0	0	0	46
normalized size	1	1.	1.71	0.	0.	0.	0.	0.	0.9
time (sec)	N/A	0.148	0.139	0.061	0.	0.	0.	0.	15.68

Problem 394	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-2)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	31	31	31	26	0	1	0	0	27
normalized size	1	1.	1.	0.84	0.	0.03	0.	0.	0.87
time (sec)	N/A	0.054	0.029	0.002	0.	0.251	0.	0.	6.768

Problem 395	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	83	0	0	0	0	0	49
normalized size	1	1.	1.54	0.	0.	0.	0.	0.	0.91
time (sec)	N/A	0.186	0.15	0.06	0.	0.	0.	0.	15.734

Problem 396	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	40	40	81	0	0	0	0	0	36
normalized size	1	1.	2.02	0.	0.	0.	0.	0.	0.9
time (sec)	N/A	0.128	0.145	0.052	0.	0.	0.	0.	10.859

Problem 397	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	83	0	0	0	0	0	51
normalized size	1	1.	1.54	0.	0.	0.	0.	0.	0.94
time (sec)	N/A	0.21	0.177	0.061	0.	0.	0.	0.	15.945

Problem 398	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	117	0	0	0	0	0	85
normalized size	1	1.	1.09	0.	0.	0.	0.	0.	0.79
time (sec)	N/A	0.296	0.203	0.111	0.	0.	0.	0.	26.858

Problem 399	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	109	0	0	0	0	0	80
normalized size	1	1.	1.16	0.	0.	0.	0.	0.	0.85
time (sec)	N/A	0.267	0.185	0.052	0.	0.	0.	0.	24.955

Problem 400	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	91	0	0	0	0	0	60
normalized size	1	1.	1.26	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.157	0.19	0.048	0.	0.	0.	0.	15.153

Problem 401	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	104	0	0	0	0	0	70
normalized size	1	1.	1.22	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.235	0.202	0.05	0.	0.	0.	0.	23.6

Problem 402	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-2)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	52	42	0	1	0	0	42
normalized size	1	1.	0.96	0.78	0.	0.02	0.	0.	0.78
time (sec)	N/A	0.087	0.074	0.	0.	0.256	0.	0.	10.216

Problem 403	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	104	0	0	0	0	0	76
normalized size	1	1.	1.16	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.289	0.197	0.057	0.	0.	0.	0.	24.732

Problem 404	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	100	0	0	0	0	0	60
normalized size	1	1.	1.39	0.	0.	0.	0.	0.	0.83
time (sec)	N/A	0.248	0.182	0.053	0.	0.	0.	0.	19.625

Problem 405	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	104	0	0	0	0	0	80
normalized size	1	1.	1.16	0.	0.	0.	0.	0.	0.89
time (sec)	N/A	0.33	0.22	0.059	0.	0.	0.	0.	25.174

Problem 406	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	100	0	0	0	0	0	63
normalized size	1	1.	1.39	0.	0.	0.	0.	0.	0.88
time (sec)	N/A	0.254	0.192	0.054	0.	0.	0.	0.	19.71

Problem 407	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	63	477	0	1	0	0	27
normalized size	1	1.	1.97	14.91	0.	0.03	0.	0.	0.84
time (sec)	N/A	0.032	0.05	0.022	0.	0.345	0.	0.	2.492

Problem 408	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	59	49	0	1	0	0	27
normalized size	1	1.	1.84	1.53	0.	0.03	0.	0.	0.84
time (sec)	N/A	0.031	0.037	0.012	0.	0.239	0.	0.	2.509

Problem 409	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F(-2)	A
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	0	0	0	1	0	0	29
normalized size	1	1.	0.	0.	0.	0.03	0.	0.	0.91
time (sec)	N/A	0.034	0.038	0.04	0.	0.701	0.	0.	2.512

Problem 410	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F(-2)	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	76	0	0	1	0	0	0
normalized size	1	1.	2.05	0.	0.	0.03	0.	0.	0.
time (sec)	N/A	0.048	0.102	0.077	0.	0.239	0.	0.	0.

Problem 411	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	C	F(-2)	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	33	33	66	471	0	1	0	0	27
normalized size	1	1.	2.	14.27	0.	0.03	0.	0.	0.82
time (sec)	N/A	0.032	0.074	0.285	0.	0.347	0.	0.	2.343

Problem 412	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	33	33	62	53	0	1	0	0	27
normalized size	1	1.	1.88	1.61	0.	0.03	0.	0.	0.82
time (sec)	N/A	0.035	0.039	0.007	0.	0.238	0.	0.	2.348

Problem 413	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F(-2)	A
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	33	33	0	0	0	1	0	0	29
normalized size	1	1.	0.	0.	0.	0.03	0.	0.	0.88
time (sec)	N/A	0.035	0.039	0.052	0.	0.729	0.	0.	2.357

Problem 414	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F(-2)	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	38	38	76	0	0	1	0	0	0
normalized size	1	1.	2.	0.	0.	0.03	0.	0.	0.
time (sec)	N/A	0.043	0.12	0.112	0.	0.252	0.	0.	0.

Problem 415	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	78	0	0	0	0	0	31
normalized size	1	1.	2.11	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.045	0.107	0.073	0.	0.	0.	0.	3.414

Problem 416	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	78	0	0	1	0	0	31
normalized size	1	1.	2.11	0.	0.	0.03	0.	0.	0.84
time (sec)	N/A	0.041	0.026	0.086	0.	0.248	0.	0.	3.456

Problem 417	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	78	0	0	0	0	0	31
normalized size	1	1.	2.11	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.04	0.026	0.067	0.	0.	0.	0.	3.462

Problem 418	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	38	38	80	0	0	0	0	0	31
normalized size	1	1.	2.11	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.041	0.128	0.078	0.	0.	0.	0.	3.254

Problem 419	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	38	38	80	0	0	1	0	0	31
normalized size	1	1.	2.11	0.	0.	0.03	0.	0.	0.82
time (sec)	N/A	0.04	0.028	0.088	0.	0.247	0.	0.	3.3

Problem 420	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	38	38	80	0	0	0	0	0	31
normalized size	1	1.	2.11	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.039	0.028	0.066	0.	0.	0.	0.	3.292

Problem 421	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	218	0	0	0	0	0	97
normalized size	1	1.	2.04	0.	0.	0.	0.	0.	0.91
time (sec)	N/A	0.202	0.49	0.428	0.	0.	0.	0.	24.158

Problem 422	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	156	0	0	0	0	0	90
normalized size	1	1.	1.56	0.	0.	0.	0.	0.	0.9
time (sec)	N/A	0.203	0.279	0.321	0.	0.	0.	0.	23.699

Problem 423	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	106	0	0	0	0	0	92
normalized size	1	1.	1.04	0.	0.	0.	0.	0.	0.9
time (sec)	N/A	0.201	0.1	0.109	0.	0.	0.	0.	24.993

Problem 424	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	116	0	0	0	0	0	99
normalized size	1	1.	1.05	0.	0.	0.	0.	0.	0.89
time (sec)	N/A	0.212	0.164	0.09	0.	0.	0.	0.	25.601

Problem 425	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	166	0	0	0	0	0	99
normalized size	1	1.	1.5	0.	0.	0.	0.	0.	0.89
time (sec)	N/A	0.215	0.554	0.094	0.	0.	0.	0.	25.42

Problem 426	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	177	0	0	0	0	0	80
normalized size	1	1.	1.82	0.	0.	0.	0.	0.	0.82
time (sec)	N/A	0.136	0.317	0.118	0.	0.	0.	0.	12.446

Problem 427	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	134	0	0	0	0	0	75
normalized size	1	1.	1.54	0.	0.	0.	0.	0.	0.86
time (sec)	N/A	0.136	0.236	0.09	0.	0.	0.	0.	12.018

Problem 428	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	88	0	0	0	0	0	78
normalized size	1	1.	0.95	0.	0.	0.	0.	0.	0.84
time (sec)	N/A	0.129	0.075	0.068	0.	0.	0.	0.	13.173

Problem 429	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	104	0	0	0	0	0	82
normalized size	1	1.	1.03	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.142	0.139	0.058	0.	0.	0.	0.	13.676

Problem 430	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F(-2)	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	185	0	0	0	0	0	82
normalized size	1	1.	1.83	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	0.142	0.404	0.059	0.	0.	0.	0.	13.637

Problem 431	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	18	16	14	22	0	68	20
normalized size	1	1.	1.	0.89	0.78	1.22	0.	3.78	1.11
time (sec)	N/A	0.016	0.012	0.006	1.415	0.227	0.	0.229	1.185

Problem 432	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	29	18	0	26	0	15	17
normalized size	1	1.	1.45	0.9	0.	1.3	0.	0.75	0.85
time (sec)	N/A	0.01	0.019	0.013	0.	0.254	0.	0.219	1.021

Problem 433	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	8	8	8	7	8	8	7	8	7
normalized size	1	1.	1.	0.88	1.	1.	0.88	1.	0.88
time (sec)	N/A	0.01	0.005	0.005	1.533	0.235	0.522	0.217	2.133

Problem 434	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	29	19	38	0	36	20
normalized size	1	1.	1.	1.16	0.76	1.52	0.	1.44	0.8
time (sec)	N/A	0.014	0.023	0.008	1.393	0.228	0.	0.224	6.721

Problem 435	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	29	19	38	0	36	20
normalized size	1	1.	1.	1.16	0.76	1.52	0.	1.44	0.8
time (sec)	N/A	0.013	0.008	0.007	1.388	0.219	0.	0.225	5.679

Problem 436	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	29	19	38	0	19	20
normalized size	1	1.	1.	1.16	0.76	1.52	0.	0.76	0.8
time (sec)	N/A	0.02	0.021	0.007	1.398	0.226	0.	0.223	1.601

Problem 437	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F	F	A
verified	N/A	NO	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	988	988	99	0	0	0	0	0	799
normalized size	1	1.	0.1	0.	0.	0.	0.	0.	0.81
time (sec)	N/A	3.902	0.083	0.025	0.	0.	0.	0.	110.057

Problem 438	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F(-1)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	487	487	98	0	0	0	0	0	376
normalized size	1	1.	0.2	0.	0.	0.	0.	0.	0.77
time (sec)	N/A	1.701	0.064	0.026	0.	0.	0.	0.	50.499

Problem 439	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	92	92	0	0	0	0	0	82
normalized size	1	1.03	1.03	0.	0.	0.	0.	0.	0.92
time (sec)	N/A	0.14	0.112	0.339	0.	0.	0.	0.	29.477

Problem 440	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	73	0	0	0	0	0	63
normalized size	1	1.	1.06	0.	0.	0.	0.	0.	0.91
time (sec)	N/A	0.132	0.111	0.347	0.	0.	0.	0.	16.27

Problem 441	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	74	74	0	0	0	0	0	65
normalized size	1	1.12	1.12	0.	0.	0.	0.	0.	0.98
time (sec)	N/A	0.136	0.089	0.342	0.	0.	0.	0.	17.81

Problem 442	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	82	0	0	0	0	0	92
normalized size	1	1.	1.19	0.	0.	0.	0.	0.	1.33
time (sec)	N/A	0.151	0.141	0.343	0.	0.	0.	0.	22.2

Problem 443	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	83	0	0	0	0	0	54
normalized size	1	1.	0.99	0.	0.	0.	0.	0.	0.64
time (sec)	N/A	0.169	0.099	0.343	0.	0.	0.	0.	20.669

Problem 444	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	43	0	0	86	0	0	34
normalized size	1	1.	0.98	0.	0.	1.95	0.	0.	0.77
time (sec)	N/A	0.037	0.089	0.127	0.	0.256	0.	0.	3.141

Problem 445	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	43	0	0	82	0	0	0
normalized size	1	1.	0.98	0.	0.	1.86	0.	0.	0.
time (sec)	N/A	0.037	0.028	0.104	0.	0.255	0.	0.	0.

Problem 446	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	45	0	0	103	0	0	0
normalized size	1	1.	0.98	0.	0.	2.24	0.	0.	0.
time (sec)	N/A	0.12	0.11	0.241	0.	0.261	0.	0.	0.

Problem 447	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	45	0	0	107	0	0	37
normalized size	1	1.	0.98	0.	0.	2.33	0.	0.	0.8
time (sec)	N/A	0.085	0.037	0.345	0.	0.256	0.	0.	11.019

Problem 448	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	36	40	23	59	0	0	0
normalized size	1	1.	0.82	0.91	0.52	1.34	0.	0.	0.
time (sec)	N/A	0.039	0.061	0.051	1.403	0.241	0.	0.	0.

Problem 449	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	36	40	23	59	0	0	0
normalized size	1	1.	0.82	0.91	0.52	1.34	0.	0.	0.
time (sec)	N/A	0.038	0.054	0.037	1.404	0.243	0.	0.	0.

Problem 450	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	36	40	23	59	0	0	0
normalized size	1	1.	0.82	0.91	0.52	1.34	0.	0.	0.
time (sec)	N/A	0.039	0.055	0.037	1.409	0.245	0.	0.	0.

Problem 451	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	46	0	45	63	0	0	0
normalized size	1	1.	0.81	0.	0.79	1.11	0.	0.	0.
time (sec)	N/A	0.062	0.055	0.108	1.517	0.265	0.	0.	0.

Problem 452	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	45	0	38	73	0	0	0
normalized size	1	1.	0.74	0.	0.62	1.2	0.	0.	0.
time (sec)	N/A	0.055	0.066	0.105	1.541	0.26	0.	0.	0.

Problem 453	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	A	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	100	0	0	103	0	0	27
normalized size	1	1.	2.56	0.	0.	2.64	0.	0.	0.69
time (sec)	N/A	0.093	0.214	0.351	0.	0.268	0.	0.	10.092

Problem 454	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	40	40	38	0	0	86	0	0	0
normalized size	1	1.	0.95	0.	0.	2.15	0.	0.	0.
time (sec)	N/A	0.121	0.118	0.25	0.	0.262	0.	0.	0.

2.2 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is given. The larger this ratio is, the harder the integral was to solve. In this test, problem number [347] had the largest ratio of [0.7778]

Table 1: Rubi specific breakdown of results for each integral

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1	A	2	1	1.	13	0.077
2	A	2	1	1.	11	0.091
3	A	1	0	1.	9	0.
4	A	2	1	1.	13	0.077
5	A	2	1	1.	13	0.077
6	A	3	2	1.	15	0.133
7	A	4	3	1.	13	0.231
8	A	3	2	1.	11	0.182
9	A	2	2	1.	15	0.133
10	A	3	2	1.	15	0.133
11	A	3	2	1.	11	0.182
12	A	4	3	1.	15	0.2
13	A	3	3	1.	15	0.2
14	A	2	2	1.	15	0.133
15	A	2	2	1.	13	0.154
16	A	5	5	1.	11	0.454
17	A	3	3	1.	15	0.2
18	A	4	3	1.	15	0.2
19	A	4	3	1.	15	0.2
20	A	4	3	1.	15	0.2
21	A	3	3	1.	15	0.2
22	A	4	3	1.	13	0.231
23	A	4	4	1.	11	0.364
24	A	4	3	1.	15	0.2
25	A	5	4	1.	15	0.267
26	A	4	3	1.	13	0.231
27	A	4	3	1.	13	0.231
28	A	3	3	1.	13	0.231
29	A	2	2	1.	13	0.154
30	A	2	2	1.	11	0.182
31	A	5	5	1.	9	0.556
32	A	3	3	1.	13	0.231
33	A	4	3	1.	13	0.231
34	A	4	3	1.	13	0.231
35	A	4	3	1.	13	0.231
36	A	5	5	1.	9	0.556
37	A	5	5	1.	11	0.454
38	A	6	5	1.	17	0.294
39	A	7	7	1.	17	0.412
40	A	5	5	1.	15	0.333
41	A	6	6	1.	13	0.462
42	A	4	4	1.	17	0.235
43	A	6	6	1.	17	0.353
44	A	4	4	1.	17	0.235
45	A	7	7	1.	17	0.412

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
46	A	7	5	1.	17	0.294
47	A	8	7	1.	15	0.467
48	A	6	6	1.	13	0.462
49	A	7	7	1.	17	0.412
50	A	5	4	1.	17	0.235
51	A	7	7	1.	17	0.412
52	A	5	5	1.	17	0.294
53	A	7	6	1.	17	0.353
54	A	5	4	1.	17	0.235
55	A	8	7	1.	17	0.412
56	A	6	5	1.	17	0.294
57	A	5	4	1.	17	0.235
58	A	6	6	1.	17	0.353
59	A	4	4	1.	17	0.235
60	A	5	5	1.	15	0.333
61	A	3	3	1.	13	0.231
62	A	6	6	1.	17	0.353
63	A	4	4	1.	17	0.235
64	A	7	6	1.	17	0.353
65	A	6	5	1.	17	0.294
66	A	7	7	1.	17	0.412
67	A	5	5	1.	17	0.294
68	A	6	6	1.	17	0.353
69	A	4	4	1.	17	0.235
70	A	6	6	1.	17	0.353
71	A	4	4	1.	15	0.267
72	A	7	7	1.	13	0.538
73	A	5	5	1.	17	0.294
74	A	8	7	1.	17	0.412
75	A	7	4	1.	19	0.21
76	A	5	2	1.	19	0.105
77	A	6	3	1.	19	0.158
78	A	4	2	1.	19	0.105
79	A	1	1	1.	19	0.053
80	A	3	2	1.	19	0.105
81	A	2	2	1.	19	0.105
82	A	2	2	1.	19	0.105
83	A	3	2	1.	19	0.105
84	A	1	1	1.	19	0.053
85	A	4	2	1.	19	0.105
86	A	6	3	1.	19	0.158
87	A	5	2	1.	19	0.105
88	A	7	4	1.	19	0.21
89	A	6	3	1.	19	0.158
90	A	8	4	1.	19	0.21
91	A	7	3	1.	19	0.158
92	A	3	3	1.	17	0.176
93	A	2	2	1.	15	0.133
94	A	1	1	1.	17	0.059

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
95	A	2	2	1.	17	0.118
96	A	3	2	1.	17	0.118
97	A	4	4	1.	17	0.235
98	A	3	3	1.	13	0.231
99	A	4	4	1.	17	0.235
100	A	6	6	1.	17	0.353
101	A	5	5	1.	17	0.294
102	A	6	6	1.	17	0.353
103	A	8	5	1.	19	0.263
104	A	6	5	1.	17	0.294
105	A	4	4	1.	15	0.267
106	A	1	1	1.	19	0.053
107	A	3	2	1.	19	0.105
108	A	5	2	1.	19	0.105
109	A	7	2	1.	19	0.105
110	A	9	6	1.	19	0.316
111	A	7	6	1.	19	0.316
112	A	5	5	1.	17	0.294
113	A	1	1	1.	15	0.067
114	A	3	3	1.	19	0.158
115	A	5	3	1.	19	0.158
116	A	7	3	1.	19	0.158
117	A	9	5	1.	21	0.238
118	A	7	5	1.	21	0.238
119	A	5	5	1.	21	0.238
120	A	3	3	1.	21	0.143
121	A	2	2	1.	21	0.095
122	A	4	2	1.	21	0.095
123	A	6	2	1.	21	0.095
124	A	8	6	1.	21	0.286
125	A	6	6	1.	21	0.286
126	A	4	4	1.	21	0.19
127	A	2	2	1.	21	0.095
128	A	4	3	1.	21	0.143
129	A	6	3	1.	21	0.143
130	A	8	3	1.	21	0.143
131	A	11	6	1.	19	0.316
132	A	11	8	1.	19	0.421
133	A	8	6	1.	17	0.353
134	A	8	8	1.	15	0.533
135	A	5	5	1.	19	0.263
136	A	8	8	1.	19	0.421
137	A	7	6	1.	19	0.316
138	A	11	8	1.	19	0.421
139	A	10	6	1.	19	0.316
140	A	11	6	1.	19	0.316
141	A	11	8	1.	17	0.471
142	A	8	7	1.	15	0.467
143	A	8	8	1.	19	0.421

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
144	A	6	6	1.	19	0.316
145	A	9	8	1.	19	0.421
146	A	8	6	1.	19	0.316
147	A	12	8	1.	19	0.421
148	A	11	6	1.	19	0.316
149	A	11	5	1.	19	0.263
150	A	11	7	1.	19	0.368
151	A	8	5	1.	19	0.263
152	A	8	7	1.	17	0.412
153	A	5	5	1.	15	0.333
154	A	7	7	1.	19	0.368
155	A	6	5	1.	19	0.263
156	A	10	7	1.	19	0.368
157	A	9	5	1.	19	0.263
158	A	12	8	1.	19	0.421
159	A	9	6	1.	19	0.316
160	A	9	8	1.	19	0.421
161	A	6	6	1.	17	0.353
162	A	7	7	1.	15	0.467
163	A	6	6	1.	19	0.316
164	A	10	8	1.	19	0.421
165	A	9	6	1.	19	0.316
166	A	13	8	1.	19	0.421
167	A	13	3	1.	19	0.158
168	A	10	3	1.	19	0.158
169	A	7	3	1.	17	0.176
170	A	4	3	1.	15	0.2
171	A	1	1	1.	19	0.053
172	A	4	4	1.	19	0.21
173	A	7	4	1.	19	0.21
174	A	10	4	1.	19	0.21
175	A	13	4	1.	19	0.21
176	A	12	3	1.	19	0.158
177	A	9	3	1.	17	0.176
178	A	6	3	1.	15	0.2
179	A	3	2	1.	19	0.105
180	A	4	3	1.	19	0.158
181	A	5	4	1.	19	0.21
182	A	8	4	1.	19	0.21
183	A	11	4	1.	19	0.21
184	A	14	4	1.	19	0.21
185	A	14	3	1.	19	0.158
186	A	11	3	1.	19	0.158
187	A	8	3	1.	19	0.158
188	A	5	3	1.	17	0.176
189	A	2	2	1.	15	0.133
190	A	3	3	1.	19	0.158
191	A	6	3	1.	19	0.158
192	A	9	3	1.	19	0.158

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
193	A	12	3	1.	19	0.158
194	A	12	4	1.	19	0.21
195	A	9	4	1.	19	0.21
196	A	6	4	1.	19	0.21
197	A	3	3	1.	17	0.176
198	A	3	3	1.	15	0.2
199	A	6	4	1.	19	0.21
200	A	9	4	1.	19	0.21
201	A	12	4	1.	19	0.21
202	A	15	4	1.	19	0.21
203	A	2	1	1.	15	0.067
204	A	2	1	1.	13	0.077
205	A	1	0	1.	11	0.
206	A	2	1	1.	15	0.067
207	A	2	1	1.	15	0.067
208	A	3	2	1.	17	0.118
209	A	3	2	1.	15	0.133
210	A	3	2	1.	13	0.154
211	A	3	2	1.	17	0.118
212	A	3	2	1.	17	0.118
213	A	3	2	1.	17	0.118
214	A	3	2	1.	17	0.118
215	A	3	2	1.	17	0.118
216	A	3	2	1.	17	0.118
217	A	2	2	1.	17	0.118
218	A	4	4	1.	15	0.267
219	A	3	2	1.	13	0.154
220	A	3	2	1.	17	0.118
221	A	3	2	1.	17	0.118
222	A	3	2	1.	17	0.118
223	A	3	2	1.	17	0.118
224	A	3	2	1.	17	0.118
225	A	3	2	1.	17	0.118
226	A	1	1	1.	17	0.059
227	A	3	2	1.	17	0.118
228	A	3	2	1.	17	0.118
229	A	3	2	1.	15	0.133
230	A	3	2	1.	13	0.154
231	A	3	2	1.	17	0.118
232	A	4	3	1.	19	0.158
233	A	3	3	1.	17	0.176
234	A	2	2	1.	15	0.133
235	A	1	1	1.	19	0.053
236	A	3	3	1.	19	0.158
237	A	3	3	1.	19	0.158
238	A	4	4	1.	19	0.21
239	A	5	4	1.	19	0.21
240	A	6	3	1.	19	0.158
241	A	5	3	1.	17	0.176

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
242	A	4	3	1.	15	0.2
243	A	3	2	1.	19	0.105
244	A	2	2	1.	19	0.105
245	A	1	1	1.	19	0.053
246	A	4	3	1.	19	0.158
247	A	4	4	1.	19	0.21
248	A	4	3	1.	19	0.158
249	A	5	4	1.	19	0.21
250	A	6	4	1.	19	0.21
251	A	7	4	1.	19	0.21
252	A	4	2	1.	19	0.105
253	A	3	2	1.	19	0.105
254	A	2	2	1.	19	0.105
255	A	1	1	1.	17	0.059
256	A	2	2	1.	15	0.133
257	A	3	3	1.	19	0.158
258	A	4	3	1.	19	0.158
259	A	5	3	1.	19	0.158
260	A	4	3	1.	19	0.158
261	A	3	3	1.	19	0.158
262	A	2	2	1.	19	0.105
263	A	1	1	1.	19	0.053
264	A	3	3	1.	19	0.158
265	A	4	4	1.	17	0.235
266	A	5	4	1.	15	0.267
267	A	6	4	1.	19	0.21
268	A	7	4	1.	19	0.21
269	A	5	3	1.	21	0.143
270	A	4	3	1.	21	0.143
271	A	3	3	1.	21	0.143
272	A	2	2	1.	21	0.095
273	A	1	1	1.	21	0.048
274	A	2	2	1.	21	0.095
275	A	3	2	1.	21	0.095
276	A	4	2	1.	21	0.095
277	A	3	3	1.	21	0.143
278	A	3	3	1.27	19	0.158
279	A	3	3	1.	21	0.143
280	A	1	1	1.	21	0.048
281	A	2	2	1.	21	0.095
282	A	3	2	1.	21	0.095
283	A	2	2	1.	17	0.118
284	A	3	2	1.	19	0.105
285	A	2	2	1.	19	0.105
286	A	1	1	1.	19	0.053
287	A	2	2	1.	15	0.133
288	A	3	3	1.	19	0.158
289	A	3	3	1.	19	0.158
290	A	2	2	1.	17	0.118

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
291	A	3	3	1.	19	0.158
292	A	5	5	1.	19	0.263
293	A	4	4	1.	19	0.21
294	A	5	5	1.	19	0.263
295	A	5	4	1.	21	0.19
296	A	6	6	1.	21	0.286
297	A	3	3	1.	21	0.143
298	A	4	4	1.	21	0.19
299	A	5	5	1.	21	0.238
300	A	2	2	1.	21	0.095
301	A	3	3	1.	21	0.143
302	A	6	6	1.	21	0.286
303	A	1	1	1.	21	0.048
304	A	4	4	1.	21	0.19
305	A	7	6	1.	21	0.286
306	A	2	2	1.	21	0.095
307	A	5	4	1.	21	0.19
308	A	3	2	1.	15	0.133
309	A	3	2	1.	13	0.154
310	A	5	3	1.	19	0.158
311	A	4	3	1.	19	0.158
312	A	3	3	1.	19	0.158
313	A	2	2	1.	17	0.118
314	A	1	1	1.	15	0.067
315	A	2	2	1.	19	0.105
316	A	3	2	1.	19	0.105
317	A	4	2	1.	19	0.105
318	A	5	2	1.	19	0.105
319	A	4	3	1.	11	0.273
320	A	4	3	1.	13	0.231
321	A	3	3	1.	9	0.333
322	A	3	3	1.	9	0.333
323	A	3	3	1.	9	0.333
324	A	3	3	1.	13	0.231
325	A	3	3	1.	13	0.231
326	A	3	3	1.	13	0.231
327	A	3	3	1.	13	0.231
328	A	2	2	1.	11	0.182
329	A	1	1	1.	15	0.067
330	A	1	1	1.	15	0.067
331	A	2	2	1.	23	0.087
332	A	2	2	1.	11	0.182
333	A	2	2	1.	13	0.154
334	A	2	2	1.	13	0.154
335	A	2	2	1.	17	0.118
336	A	2	2	1.	17	0.118
337	A	2	2	1.	17	0.118
338	A	2	2	1.	11	0.182
339	A	2	2	1.	11	0.182

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
340	A	2	2	1.	11	0.182
341	A	2	2	1.	11	0.182
342	A	2	2	1.	13	0.154
343	A	2	2	1.	13	0.154
344	A	3	2	1.	11	0.182
345	A	4	3	1.	11	0.273
346	A	3	2	1.	11	0.182
347	A	7	7	1.	9	0.778
348	A	2	2	1.	22	0.091
349	A	1	1	1.	13	0.077
350	A	1	1	1.	15	0.067
351	A	1	1	1.	17	0.059
352	A	1	1	1.	13	0.077
353	A	1	1	1.	15	0.067
354	A	1	1	1.	13	0.077
355	A	2	2	1.	11	0.182
356	A	5	5	1.	13	0.385
357	A	2	2	1.	15	0.133
358	A	5	5	1.	13	0.385
359	A	2	2	1.	15	0.133
360	A	2	2	1.	11	0.182
361	A	2	2	1.	11	0.182
362	A	2	2	1.	9	0.222
363	A	5	5	1.	11	0.454
364	A	3	3	1.	25	0.12
365	A	4	4	1.	27	0.148
366	A	4	4	1.	23	0.174
367	A	4	4	1.	22	0.182
368	A	4	4	1.	21	0.19
369	A	5	5	1.	18	0.278
370	A	4	4	1.	23	0.174
371	A	3	3	1.	15	0.2
372	A	4	4	1.	23	0.174
373	A	5	4	1.	27	0.148
374	A	5	4	1.	23	0.174
375	A	5	4	1.	22	0.182
376	A	5	4	1.	21	0.19
377	A	6	5	1.	18	0.278
378	A	5	4	1.	23	0.174
379	A	5	5	1.	22	0.227
380	A	5	4	1.	23	0.174
381	A	5	4	1.	22	0.182
382	A	5	5	1.	13	0.385
383	A	5	5	1.	15	0.333
384	A	4	4	1.	15	0.267
385	A	4	4	1.	15	0.267
386	A	5	5	1.	15	0.333
387	A	5	5	1.	17	0.294
388	A	4	4	1.	17	0.235

Continued on next page

Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
389	A	4	4	1.	17	0.235
390	A	3	3	1.	27	0.111
391	A	3	3	1.	23	0.13
392	A	2	2	1.	15	0.133
393	A	3	3	1.	21	0.143
394	A	4	4	1.	18	0.222
395	A	3	3	1.	23	0.13
396	A	3	3	1.	22	0.136
397	A	3	3	1.	23	0.13
398	A	4	4	1.	27	0.148
399	A	4	4	1.	23	0.174
400	A	4	4	1.	22	0.182
401	A	4	4	1.	21	0.19
402	A	5	5	1.	18	0.278
403	A	4	4	1.	23	0.174
404	A	4	4	1.	22	0.182
405	A	4	4	1.	23	0.174
406	A	4	4	1.	22	0.182
407	A	3	3	1.	15	0.2
408	A	3	3	1.	15	0.2
409	A	3	3	1.	15	0.2
410	A	3	3	1.	19	0.158
411	A	3	3	1.	16	0.188
412	A	3	3	1.	16	0.188
413	A	3	3	1.	16	0.188
414	A	3	3	1.	20	0.15
415	A	3	3	1.	19	0.158
416	A	3	3	1.	17	0.176
417	A	3	3	1.	17	0.176
418	A	3	3	1.	20	0.15
419	A	3	3	1.	19	0.158
420	A	3	3	1.	18	0.167
421	A	3	3	1.	21	0.143
422	A	3	3	1.	21	0.143
423	A	3	3	1.	21	0.143
424	A	3	3	1.	21	0.143
425	A	3	3	1.	21	0.143
426	A	3	3	1.	15	0.2
427	A	3	3	1.	15	0.2
428	A	3	3	1.	15	0.2
429	A	3	3	1.	15	0.2
430	A	3	3	1.	15	0.2
431	A	2	2	1.	11	0.182
432	A	1	1	1.	11	0.091
433	A	3	3	1.	13	0.231
434	A	1	1	1.	17	0.059
435	A	1	1	1.	17	0.059
436	A	2	2	1.	15	0.133
437	A	11	10	1.	19	0.526

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Table 1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
438	A	9	8	1.	19	0.421
439	A	3	3	1.03	17	0.176
440	A	3	3	1.	22	0.136
441	A	3	3	1.12	22	0.136
442	A	3	3	1.	27	0.111
443	A	3	3	1.	27	0.111
444	A	1	1	1.	18	0.056
445	A	2	2	1.	17	0.118
446	A	2	2	1.	22	0.091
447	A	1	1	1.	23	0.043
448	A	2	2	1.	19	0.105
449	A	2	2	1.	19	0.105
450	A	2	2	1.	19	0.105
451	A	2	2	1.	19	0.105
452	A	2	2	1.	19	0.105
453	A	1	1	1.	25	0.04
454	A	2	2	1.	28	0.071

3 Listing of integrals

3.1 $\int x^2 \left(ax + bx^3\right) \, dx$

Optimal. Leaf size=17

$$\frac{ax^4}{4} + \frac{bx^6}{6}$$

```
[Out] (a*x^4)/4 + (b*x^6)/6
```

Rubi [A] time = 0.0150398, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$\frac{ax^4}{4} + \frac{bx^6}{6}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(a*x + b*x^3),x]

[Out] (a*x^4)/4 + (b*x^6)/6
```

Rubi in Sympy [A] time = 3.85395, size = 12, normalized size = 0.71

$$\frac{ax^4}{4} + \frac{bx^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a*x),x)

[Out] a*x**4/4 + b*x**6/6
```

Mathematica [A] time = 0.00245395, size = 17, normalized size = 1.

$$\frac{ax^4}{4} + \frac{bx^6}{6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(a*x + b*x^3),x]

[Out] (a*x^4)/4 + (b*x^6)/6
```

Maple [A] time = 0.001, size = 14, normalized size = 0.8

$$\frac{ax^4}{4} + \frac{bx^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a*x),x)
```

```
[Out] 1/4*a*x^4+1/6*b*x^6
```

Maxima [A] time = 1.41631, size = 18, normalized size = 1.06

$$\frac{1}{6}\,bx^6 + \frac{1}{4}\,ax^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^3 + a*x)*x^2,x, algorithm="maxima")
```

```
[Out] 1/6*b*x^6 + 1/4*a*x^4
```

Fricas [A] time = 0.183684, size = 1, normalized size = 0.06

$$\frac{1}{6}x^6b + \frac{1}{4}x^4a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^3 + a*x)*x^2,x, algorithm="fricas")
```

```
[Out] 1/6*x^6*b + 1/4*x^4*a
```

Sympy [A] time = 0.036024, size = 12, normalized size = 0.71

$$\frac{ax^4}{4} + \frac{bx^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(b*x**3+a*x),x)
```

```
[Out] a*x**4/4 + b*x**6/6
```

GIAC/XCAS [A] time = 0.216435, size = 18, normalized size = 1.06

$$\frac{1}{6}\,bx^6 + \frac{1}{4}\,ax^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x^3 + a*x)*x^2,x, algorithm="giac")
```

```
[Out] 1/6*b*x^6 + 1/4*a*x^4
```

3.2 $\int x\left(ax+bx^3\right)\,dx$

Optimal. Leaf size=17

$$\frac{ax^3}{3}+\frac{bx^5}{5}$$

```
[Out] (a*x^3)/3 + (b*x^5)/5
```

Rubi [A] time = 0.0123376, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{ax^3}{3}+\frac{bx^5}{5}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a*x + b*x^3),x]

[Out] (a*x^3)/3 + (b*x^5)/5
```

Rubi in Sympy [A] time = 3.95028, size = 12, normalized size = 0.71

$$\frac{ax^3}{3}+\frac{bx^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a*x),x)

[Out] a*x**3/3 + b*x**5/5
```

Mathematica [A] time = 0.00222324, size = 17, normalized size = 1.

$$\frac{ax^3}{3}+\frac{bx^5}{5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(a*x + b*x^3),x]

[Out] (a*x^3)/3 + (b*x^5)/5
```

Maple [A] time = 0.001, size = 14, normalized size = 0.8

$$\frac{ax^3}{3}+\frac{bx^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a*x),x)

[Out] 1/3*a*x^3+1/5*b*x^5
```

Maxima [A] time = 1.44792, size = 18, normalized size = 1.06

$$\frac{1}{5}\,bx^{5}+\frac{1}{3}\,ax^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)*x,x, algorithm="maxima")
```

```
[Out] 1/5*b*x^5 + 1/3*a*x^3
```

Fricas [A] time = 0.184482, size = 1, normalized size = 0.06

$$\frac{1}{5}x^{5}b+\frac{1}{3}x^{3}a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)*x,x, algorithm="fricas")
```

```
[Out] 1/5*x^5*b + 1/3*x^3*a
```

Sympy [A] time = 0.034967, size = 12, normalized size = 0.71

$$\frac{ax^{3}}{3}+\frac{bx^{5}}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a*x),x)
```

```
[Out] a*x**3/3 + b*x**5/5
```

GIAC/XCAS [A] time = 0.215297, size = 18, normalized size = 1.06

$$\frac{1}{5}\,bx^{5}+\frac{1}{3}\,ax^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)*x,x, algorithm="giac")
```

```
[Out] 1/5*b*x^5 + 1/3*a*x^3
```

3.3 $\int \left(ax+bx^3\right)\,dx$

Optimal. Leaf size=17

$$\frac{ax^2}{2}+\frac{bx^4}{4}$$

```
[Out] (a*x^2)/2 + (b*x^4)/4
```

Rubi [A] time = 0.0094459, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 0, integrand size = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.

$$\frac{ax^2}{2}+\frac{bx^4}{4}$$

Antiderivative was successfully verified.

```
[In]  Int[a*x + b*x^3,x]

[Out] (a*x^2)/2 + (b*x^4)/4
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$a\int x\,dx+\frac{bx^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(b*x**3+a*x,x)

[Out] a*Integral(x, x) + b*x**4/4
```

Mathematica [A] time = 0.0000681564, size = 17, normalized size = 1.

$$\frac{ax^2}{2}+\frac{bx^4}{4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[a*x + b*x^3,x]

[Out] (a*x^2)/2 + (b*x^4)/4
```

Maple [A] time = 0.001, size = 14, normalized size = 0.8

$$\frac{ax^2}{2}+\frac{bx^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(b*x^3+a*x,x)

[Out] 1/2*a*x^2+1/4*b*x^4
```

Maxima [A] time = 1.41492, size = 18, normalized size = 1.06

$$\frac{1}{4}\,bx^4 + \frac{1}{2}\,ax^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(b*x^3 + a*x,x, algorithm="maxima")
```

```
[Out] 1/4*b*x^4 + 1/2*a*x^2
```

Fricas [A] time = 0.182344, size = 1, normalized size = 0.06

$$\frac{1}{4}x^4b + \frac{1}{2}x^2a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(b*x^3 + a*x,x, algorithm="fricas")
```

```
[Out] 1/4*x^4*b + 1/2*x^2*a
```

Sympy [A] time = 0.032753, size = 12, normalized size = 0.71

$$\frac{ax^2}{2} + \frac{bx^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(b*x**3+a*x,x)
```

```
[Out] a*x**2/2 + b*x**4/4
```

GIAC/XCAS [A] time = 0.216936, size = 18, normalized size = 1.06

$$\frac{1}{4}\,bx^4 + \frac{1}{2}\,ax^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(b*x^3 + a*x,x, algorithm="giac")
```

```
[Out] 1/4*b*x^4 + 1/2*a*x^2
```

3.4 $\int \frac{ax+bx^3}{x} \, dx$

Optimal. Leaf size=12

$$ax + \frac{bx^3}{3}$$

[Out] a*x + (b*x^3)/3

Rubi [A] time = 0.00977164, antiderivative size = 12, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$ax + \frac{bx^3}{3}$$

Antiderivative was successfully verified.

[In] Int[(a*x + b*x^3)/x,x]

[Out] a*x + (b*x^3)/3

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{bx^3}{3} + \int a \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] rubi_integrate((b*x**3+a*x)/x,x)

[Out] b*x**3/3 + Integral(a, x)

Mathematica [A] time = 0.000616287, size = 12, normalized size = 1.

$$ax + \frac{bx^3}{3}$$

Antiderivative was successfully verified.

[In] Integrate[(a*x + b*x^3)/x,x]

[Out] a*x + (b*x^3)/3

Maple [A] time = 0.002, size = 11, normalized size = 0.9

$$ax + \frac{bx^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((b*x^3+a*x)/x,x)

[Out] a*x+1/3*b*x^3

Maxima [A] time = 1.36991, size = 14, normalized size = 1.17

$$\frac{1}{3}bx^3 + ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)/x,x, algorithm="maxima")
```

```
[Out] 1/3*b*x^3 + a*x
```

Fricas [A] time = 0.197114, size = 14, normalized size = 1.17

$$\frac{1}{3}bx^3 + ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)/x,x, algorithm="fricas")
```

```
[Out] 1/3*b*x^3 + a*x
```

Sympy [A] time = 0.03994, size = 8, normalized size = 0.67

$$ax + \frac{bx^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)/x,x)
```

```
[Out] a*x + b*x**3/3
```

GIAC/XCAS [A] time = 0.21486, size = 14, normalized size = 1.17

$$\frac{1}{3}bx^3 + ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)/x,x, algorithm="giac")
```

```
[Out] 1/3*b*x^3 + a*x
```

3.5 $\int \frac{ax+bx^3}{x^2}\,dx$

Optimal. Leaf size=13

$$a\log(x) + \frac{bx^2}{2}$$

```
[Out] (b*x^2)/2 + a*Log[x]
```

Rubi [A] time = 0.0122787, antiderivative size = 13, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$a\log(x) + \frac{bx^2}{2}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)/x^2,x]

[Out] (b*x^2)/2 + a*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$a\log(x) + b\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)/x**2,x)

[Out] a*log(x) + b*Integral(x, x)
```

Mathematica [A] time = 0.00167735, size = 13, normalized size = 1.

$$a\log(x) + \frac{bx^2}{2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)/x^2,x]

[Out] (b*x^2)/2 + a*Log[x]
```

Maple [A] time = 0.002, size = 12, normalized size = 0.9

$$\frac{bx^2}{2} + a\ln(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)/x^2,x)

[Out] 1/2*b*x^2+a*ln(x)
```

Maxima [A] time = 2.71103, size = 15, normalized size = 1.15

$$\frac{1}{2}bx^2 + a\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*b*x^2 + a*log(x)
```

Fricas [A] time = 0.202474, size = 15, normalized size = 1.15

$$\frac{1}{2}bx^2 + a\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)/x^2,x, algorithm="fricas")
```

```
[Out] 1/2*b*x^2 + a*log(x)
```

Sympy [A] time = 0.079554, size = 10, normalized size = 0.77

$$a\log(x) + \frac{bx^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)/x**2,x)
```

```
[Out] a*log(x) + b*x**2/2
```

GIAC/XCAS [A] time = 0.220729, size = 19, normalized size = 1.46

$$\frac{1}{2}bx^2 + \frac{1}{2}a\ln\left(x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)/x^2,x, algorithm="giac")
```

```
[Out] 1/2*b*x^2 + 1/2*a*ln(x^2)
```

3.6 $\int x^2 \left(ax+bx^3\right)^2 \, dx$

Optimal. Leaf size=30

$$\frac{a^2x^5}{5}+\frac{2}{7}abx^7+\frac{b^2x^9}{9}$$

```
[Out] (a^2*x^5)/5 + (2*a*b*x^7)/7 + (b^2*x^9)/9
```

Rubi [A] time = 0.0391118, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{a^2x^5}{5}+\frac{2}{7}abx^7+\frac{b^2x^9}{9}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(a*x + b*x^3)^2,x]

[Out] (a^2*x^5)/5 + (2*a*b*x^7)/7 + (b^2*x^9)/9
```

Rubi in Sympy [A] time = 6.80194, size = 26, normalized size = 0.87

$$\frac{a^2x^5}{5}+\frac{2abx^7}{7}+\frac{b^2x^9}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a*x)**2,x)

[Out] a**2*x**5/5 + 2*a*b*x**7/7 + b**2*x**9/9
```

Mathematica [A] time = 0.00122969, size = 30, normalized size = 1.

$$\frac{a^2x^5}{5}+\frac{2}{7}abx^7+\frac{b^2x^9}{9}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(a*x + b*x^3)^2,x]

[Out] (a^2*x^5)/5 + (2*a*b*x^7)/7 + (b^2*x^9)/9
```

Maple [A] time = 0.002, size = 25, normalized size = 0.8

$$\frac{a^2x^5}{5}+\frac{2\,abx^7}{7}+\frac{b^2x^9}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a*x)^2,x)

[Out] 1/5*a^2*x^5+2/7*a*b*x^7+1/9*b^2*x^9
```

Maxima [A] time = 1.37659, size = 32, normalized size = 1.07

$$\frac{1}{9}\,b^2x^9 + \frac{2}{7}\,abx^7 + \frac{1}{5}\,a^2x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2*x^2,x, algorithm="maxima")
```

```
[Out] 1/9*b^2*x^9 + 2/7*a*b*x^7 + 1/5*a^2*x^5
```

Fricas [A] time = 0.186236, size = 1, normalized size = 0.03

$$\frac{1}{9}x^9b^2 + \frac{2}{7}x^7ba + \frac{1}{5}x^5a^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2*x^2,x, algorithm="fricas")
```

```
[Out] 1/9*x^9*b^2 + 2/7*x^7*b*a + 1/5*x^5*a^2
```

Sympy [A] time = 0.063454, size = 26, normalized size = 0.87

$$\frac{a^2x^5}{5} + \frac{2abx^7}{7} + \frac{b^2x^9}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a*x)**2,x)
```

```
[Out] a**2*x**5/5 + 2*a*b*x**7/7 + b**2*x**9/9
```

GIAC/XCAS [A] time = 0.217535, size = 32, normalized size = 1.07

$$\frac{1}{9}\,b^2x^9 + \frac{2}{7}\,abx^7 + \frac{1}{5}\,a^2x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2*x^2,x, algorithm="giac")
```

```
[Out] 1/9*b^2*x^9 + 2/7*a*b*x^7 + 1/5*a^2*x^5
```

3.7 $\int x \left(ax+bx^3\right)^2 \, dx$

Optimal. Leaf size=30

$$\frac{a^2x^4}{4}+\frac{1}{3}abx^6+\frac{b^2x^8}{8}$$

```
[Out] (a^2*x^4)/4 + (a*b*x^6)/3 + (b^2*x^8)/8
```

Rubi [A] time = 0.0543405, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{a^2x^4}{4}+\frac{1}{3}abx^6+\frac{b^2x^8}{8}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a*x + b*x^3)^2,x]

[Out] (a^2*x^4)/4 + (a*b*x^6)/3 + (b^2*x^8)/8
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{a^2\int^{x^2} x\,dx}{2}+\frac{abx^6}{3}+\frac{b^2x^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a*x)**2,x)

[Out] a**2*Integral(x, (x, x**2))/2 + a*b*x**6/3 + b**2*x**8/8
```

Mathematica [A] time = 0.00165079, size = 30, normalized size = 1.

$$\frac{a^2x^4}{4}+\frac{1}{3}abx^6+\frac{b^2x^8}{8}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(a*x + b*x^3)^2,x]

[Out] (a^2*x^4)/4 + (a*b*x^6)/3 + (b^2*x^8)/8
```

Maple [A] time = 0., size = 25, normalized size = 0.8

$$\frac{a^2x^4}{4}+\frac{abx^6}{3}+\frac{b^2x^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a*x)^2,x)

[Out] 1/4*a^2*x^4+1/3*a*b*x^6+1/8*b^2*x^8
```

Maxima [A] time = 1.38127, size = 32, normalized size = 1.07

$$\frac{1}{8}\,b^2x^8 + \frac{1}{3}\,abx^6 + \frac{1}{4}\,a^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2*x,x, algorithm="maxima")

[Out] 1/8*b^2*x^8 + 1/3*a*b*x^6 + 1/4*a^2*x^4
```

Fricas [A] time = 0.181758, size = 1, normalized size = 0.03

$$\frac{1}{8}x^8b^2 + \frac{1}{3}x^6ba + \frac{1}{4}x^4a^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2*x,x, algorithm="fricas")

[Out] 1/8*x^8*b^2 + 1/3*x^6*b*a + 1/4*x^4*a^2
```

Sympy [A] time = 0.047868, size = 24, normalized size = 0.8

$$\frac{a^2x^4}{4} + \frac{abx^6}{3} + \frac{b^2x^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a*x)**2,x)

[Out] a**2*x**4/4 + a*b*x**6/3 + b**2*x**8/8
```

GIAC/XCAS [A] time = 0.215607, size = 32, normalized size = 1.07

$$\frac{1}{8}\,b^2x^8 + \frac{1}{3}\,abx^6 + \frac{1}{4}\,a^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2*x,x, algorithm="giac")

[Out] 1/8*b^2*x^8 + 1/3*a*b*x^6 + 1/4*a^2*x^4
```

3.8 $\int \left(ax+bx^3\right)^2 \, dx$

Optimal. Leaf size=30

$$\frac{a^2x^3}{3}+\frac{2}{5}abx^5+\frac{b^2x^7}{7}$$

```
[Out] (a^2*x^3)/3 + (2*a*b*x^5)/5 + (b^2*x^7)/7
```

Rubi [A] time = 0.0305165, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{a^2x^3}{3}+\frac{2}{5}abx^5+\frac{b^2x^7}{7}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^2,x]

[Out] (a^2*x^3)/3 + (2*a*b*x^5)/5 + (b^2*x^7)/7
```

Rubi in Sympy [A] time = 3.1807, size = 26, normalized size = 0.87

$$\frac{a^2x^3}{3}+\frac{2abx^5}{5}+\frac{b^2x^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**2,x)

[Out] a**2*x**3/3 + 2*a*b*x**5/5 + b**2*x**7/7
```

Mathematica [A] time = 0.00240467, size = 30, normalized size = 1.

$$\frac{a^2x^3}{3}+\frac{2}{5}abx^5+\frac{b^2x^7}{7}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^2,x]

[Out] (a^2*x^3)/3 + (2*a*b*x^5)/5 + (b^2*x^7)/7
```

Maple [A] time = 0.001, size = 25, normalized size = 0.8

$$\frac{a^2x^3}{3}+\frac{2\,ab x^5}{5}+\frac{b^2x^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^2,x)

[Out] 1/3*a^2*x^3+2/5*a*b*x^5+1/7*b^2*x^7
```

Maxima [A] time = 6.90061, size = 32, normalized size = 1.07

$$\frac{1}{7}\,b^2x^7 + \frac{2}{5}\,abx^5 + \frac{1}{3}\,a^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2,x, algorithm="maxima")
```

```
[Out] 1/7*b^2*x^7 + 2/5*a*b*x^5 + 1/3*a^2*x^3
```

Fricas [A] time = 0.180703, size = 1, normalized size = 0.03

$$\frac{1}{7}x^7b^2 + \frac{2}{5}x^5ba + \frac{1}{3}x^3a^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2,x, algorithm="fricas")
```

```
[Out] 1/7*x^7*b^2 + 2/5*x^5*b*a + 1/3*x^3*a^2
```

Sympy [A] time = 0.047495, size = 26, normalized size = 0.87

$$\frac{a^2x^3}{3} + \frac{2abx^5}{5} + \frac{b^2x^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**2,x)
```

```
[Out] a**2*x**3/3 + 2*a*b*x**5/5 + b**2*x**7/7
```

GIAC/XCAS [A] time = 0.216756, size = 32, normalized size = 1.07

$$\frac{1}{7}\,b^2x^7 + \frac{2}{5}\,abx^5 + \frac{1}{3}\,a^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2,x, algorithm="giac")
```

```
[Out] 1/7*b^2*x^7 + 2/5*a*b*x^5 + 1/3*a^2*x^3
```

3.9 $\int \frac{(ax+bx^3)^2}{x} dx$

Optimal. Leaf size=16

$$\frac{(a+bx^2)^3}{6b}$$

```
[Out] (a + b*x^2)^3/(6*b)
```

Rubi [A] time = 0.0126176, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.133$

$$\frac{(a+bx^2)^3}{6b}$$

Antiderivative was successfully verified.

```
[In] Int[(a*x + b*x^3)^2/x,x]
```

```
[Out] (a + b*x^2)^3/(6*b)
```

Rubi in Sympy [A] time = 3.30451, size = 10, normalized size = 0.62

$$\frac{(a+bx^2)^3}{6b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a*x)**2/x,x)
```

```
[Out] (a + b*x**2)**3/(6*b)
```

Mathematica [A] time = 0.00317135, size = 16, normalized size = 1.

$$\frac{(a+bx^2)^3}{6b}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*x + b*x^3)^2/x,x]
```

```
[Out] (a + b*x^2)^3/(6*b)
```

Maple [A] time = 0.003, size = 25, normalized size = 1.6

$$\frac{b^2x^6}{6} + \frac{abx^4}{2} + \frac{a^2x^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^3+a*x)^2/x,x)
```

```
[Out] 1/6*b^2*x^6+1/2*a*b*x^4+1/2*a^2*x^2
```

Maxima [A] time = 1.36521, size = 32, normalized size = 2.

$$\frac{1}{6}\,b^2x^6 + \frac{1}{2}\,abx^4 + \frac{1}{2}\,a^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2/x,x, algorithm="maxima")
```

```
[Out] 1/6*b^2*x^6 + 1/2*a*b*x^4 + 1/2*a^2*x^2
```

Fricas [A] time = 0.195822, size = 32, normalized size = 2.

$$\frac{1}{6}\,b^2x^6 + \frac{1}{2}\,abx^4 + \frac{1}{2}\,a^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2/x,x, algorithm="fricas")
```

```
[Out] 1/6*b^2*x^6 + 1/2*a*b*x^4 + 1/2*a^2*x^2
```

Sympy [A] time = 0.046914, size = 24, normalized size = 1.5

$$\frac{a^2x^2}{2} + \frac{abx^4}{2} + \frac{b^2x^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**2/x,x)
```

```
[Out] a**2*x**2/2 + a*b*x**4/2 + b**2*x**6/6
```

GIAC/XCAS [A] time = 0.217029, size = 32, normalized size = 2.

$$\frac{1}{6}\,b^2x^6 + \frac{1}{2}\,abx^4 + \frac{1}{2}\,a^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2/x,x, algorithm="giac")
```

```
[Out] 1/6*b^2*x^6 + 1/2*a*b*x^4 + 1/2*a^2*x^2
```

3.10 $\int \frac{(ax+bx^3)^2}{x^2}\,dx$

Optimal. Leaf size=25

$$a^2x+\frac{2}{3}abx^3+\frac{b^2x^5}{5}$$

```
[Out] a^2*x + (2*a*b*x^3)/3 + (b^2*x^5)/5
```

Rubi [A] time = 0.022954, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$a^2x+\frac{2}{3}abx^3+\frac{b^2x^5}{5}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^2/x^2,x]

[Out] a^2*x + (2*a*b*x^3)/3 + (b^2*x^5)/5
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{2abx^3}{3}+\frac{b^2x^5}{5}+\int a^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**2/x**2,x)

[Out] 2*a*b*x**3/3 + b**2*x**5/5 + Integral(a**2, x)
```

Mathematica [A] time = 0.00167767, size = 25, normalized size = 1.

$$a^2x+\frac{2}{3}abx^3+\frac{b^2x^5}{5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^2/x^2,x]

[Out] a^2*x + (2*a*b*x^3)/3 + (b^2*x^5)/5
```

Maple [A] time = 0.002, size = 22, normalized size = 0.9

$$a^2x+\frac{2\,abx^3}{3}+\frac{b^2x^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^2/x^2,x)

[Out] a^2*x+2/3*a*b*x^3+1/5*b^2*x^5
```

Maxima [A] time = 1.37403, size = 28, normalized size = 1.12

$$\frac{1}{5}\,b^2x^5 + \frac{2}{3}\,abx^3 + a^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2/x^2,x, algorithm="maxima")
```

```
[Out] 1/5*b^2*x^5 + 2/3*a*b*x^3 + a^2*x
```

Fricas [A] time = 0.195497, size = 28, normalized size = 1.12

$$\frac{1}{5}\,b^2x^5 + \frac{2}{3}\,abx^3 + a^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2/x^2,x, algorithm="fricas")
```

```
[Out] 1/5*b^2*x^5 + 2/3*a*b*x^3 + a^2*x
```

Sympy [A] time = 0.047896, size = 22, normalized size = 0.88

$$a^2x + \frac{2abx^3}{3} + \frac{b^2x^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**2/x**2,x)
```

```
[Out] a**2*x + 2*a*b*x**3/3 + b**2*x**5/5
```

GIAC/XCAS [A] time = 0.215578, size = 28, normalized size = 1.12

$$\frac{1}{5}\,b^2x^5 + \frac{2}{3}\,abx^3 + a^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^2/x^2,x, algorithm="giac")
```

```
[Out] 1/5*b^2*x^5 + 2/3*a*b*x^3 + a^2*x
```

3.11 $\int \left(-4x+3x^3\right)^6 \, dx$

Optimal. Leaf size=46

$$\frac{729x^{19}}{19}-\frac{5832x^{17}}{17}+1296x^{15}-\frac{34560x^{13}}{13}+\frac{34560x^{11}}{11}-2048x^9+\frac{4096x^7}{7}$$

```
[Out] (4096*x^7)/7 - 2048*x^9 + (34560*x^11)/11 - (34560*x^13)/13 + 129
6*x^15 - (5832*x^17)/17 + (729*x^19)/19
```

Rubi [A] time = 0.0410244, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{729x^{19}}{19}-\frac{5832x^{17}}{17}+1296x^{15}-\frac{34560x^{13}}{13}+\frac{34560x^{11}}{11}-2048x^9+\frac{4096x^7}{7}$$

Antiderivative was successfully verified.

```
[In] Int[(-4*x + 3*x^3)^6,x]
```

```
[Out] (4096*x^7)/7 - 2048*x^9 + (34560*x^11)/11 - (34560*x^13)/13 + 129
6*x^15 - (5832*x^17)/17 + (729*x^19)/19
```

Rubi in Sympy [A] time = 3.03478, size = 42, normalized size = 0.91

$$\frac{729x^{19}}{19}-\frac{5832x^{17}}{17}+1296x^{15}-\frac{34560x^{13}}{13}+\frac{34560x^{11}}{11}-2048x^9+\frac{4096x^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((3*x**3-4*x)**6,x)
```

```
[Out] 729*x**19/19 - 5832*x**17/17 + 1296*x**15 - 34560*x**13/13 + 3456
0*x**11/11 - 2048*x**9 + 4096*x**7/7
```

Mathematica [A] time = 0.00302032, size = 46, normalized size = 1.

$$\frac{729x^{19}}{19}-\frac{5832x^{17}}{17}+1296x^{15}-\frac{34560x^{13}}{13}+\frac{34560x^{11}}{11}-2048x^9+\frac{4096x^7}{7}$$

Antiderivative was successfully verified.

```
[In] Integrate[(-4*x + 3*x^3)^6,x]
```

```
[Out] (4096*x^7)/7 - 2048*x^9 + (34560*x^11)/11 - (34560*x^13)/13 + 129
6*x^15 - (5832*x^17)/17 + (729*x^19)/19
```

Maple [A] time = 0.003, size = 37, normalized size = 0.8

$$\frac{4096\,x^7}{7}-2048\,x^9+\frac{34560\,x^{11}}{11}-\frac{34560\,x^{13}}{13}+1296\,x^{15}-\frac{5832\,x^{17}}{17}+\frac{729\,x^{19}}{19}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^3-4*x)^6,x)
```

```
[Out] 4096/7*x^7-2048*x^9+34560/11*x^11-34560/13*x^13+1296*x^15-5832/17
*x^17+729/19*x^19
```

Maxima [A] time = 1.37253, size = 49, normalized size = 1.07

$$\frac{729}{19}\,x^{19} - \frac{5832}{17}\,x^{17} + 1296\,x^{15} - \frac{34560}{13}\,x^{13} + \frac{34560}{11}\,x^{11} - 2048\,x^{9} + \frac{4096}{7}\,x^{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^3 - 4*x)^6,x, algorithm="maxima")
```

```
[Out] 729/19*x^19 - 5832/17*x^17 + 1296*x^15 - 34560/13*x^13 + 34560/11
*x^11 - 2048*x^9 + 4096/7*x^7
```

Fricas [A] time = 0.178534, size = 1, normalized size = 0.02

$$\frac{729}{19}x^{19} - \frac{5832}{17}x^{17} + 1296x^{15} - \frac{34560}{13}x^{13} + \frac{34560}{11}x^{11} - 2048x^{9} + \frac{4096}{7}x^{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^3 - 4*x)^6,x, algorithm="fricas")
```

```
[Out] 729/19*x^19 - 5832/17*x^17 + 1296*x^15 - 34560/13*x^13 + 34560/11
*x^11 - 2048*x^9 + 4096/7*x^7
```

Sympy [A] time = 0.101324, size = 42, normalized size = 0.91

$$\frac{729x^{19}}{19} - \frac{5832x^{17}}{17} + 1296x^{15} - \frac{34560x^{13}}{13} + \frac{34560x^{11}}{11} - 2048x^{9} + \frac{4096x^{7}}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x**3-4*x)**6,x)
```

```
[Out] 729*x**19/19 - 5832*x**17/17 + 1296*x**15 - 34560*x**13/13 + 3456
0*x**11/11 - 2048*x**9 + 4096*x**7/7
```

GIAC/XCAS [A] time = 0.216305, size = 49, normalized size = 1.07

$$\frac{729}{19}\,x^{19} - \frac{5832}{17}\,x^{17} + 1296\,x^{15} - \frac{34560}{13}\,x^{13} + \frac{34560}{11}\,x^{11} - 2048\,x^{9} + \frac{4096}{7}\,x^{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^3 - 4*x)^6,x, algorithm="giac")
```

```
[Out] 729/19*x^19 - 5832/17*x^17 + 1296*x^15 - 34560/13*x^13 + 34560/11
*x^11 - 2048*x^9 + 4096/7*x^7
```

3.12 $\int \frac{x^4}{ax+bx^3} \, dx$

Optimal. Leaf size=27

$$\frac{x^2}{2b} - \frac{a \log(a + bx^2)}{2b^2}$$

```
[Out] x^2/(2*b) - (a*Log[a + b*x^2])/(2*b^2)
```

Rubi [A] time = 0.0497186, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{x^2}{2b} - \frac{a \log(a + bx^2)}{2b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/(a*x + b*x^3),x]

[Out] x^2/(2*b) - (a*Log[a + b*x^2])/(2*b^2)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a \log(a + bx^2)}{2b^2} + \frac{\int^{x^2} \frac{1}{b} \, dx}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**3+a*x),x)

[Out] -a*log(a + b*x**2)/(2*b**2) + Integral(1/b, (x, x**2))/2
```

Mathematica [A] time = 0.00636574, size = 27, normalized size = 1.

$$\frac{x^2}{2b} - \frac{a \log(a + bx^2)}{2b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/(a*x + b*x^3),x]

[Out] x^2/(2*b) - (a*Log[a + b*x^2])/(2*b^2)
```

Maple [A] time = 0.004, size = 24, normalized size = 0.9

$$\frac{x^2}{2\,b} - \frac{a \ln(bx^2 + a)}{2\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a*x),x)

[Out] 1/2*x^2/b-1/2*a*ln(b*x^2+a)/b^2
```

Maxima [A] time = 1.36723, size = 31, normalized size = 1.15

$$\frac{x^2}{2\,b} - \frac{a\log\left(bx^2 + a\right)}{2\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] 1/2*x^2/b - 1/2*a*log(b*x^2 + a)/b^2
```

Fricas [A] time = 0.20287, size = 30, normalized size = 1.11

$$\frac{bx^2 - a\log\left(bx^2 + a\right)}{2\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] 1/2*(b*x^2 - a*log(b*x^2 + a))/b^2
```

Sympy [A] time = 1.19921, size = 20, normalized size = 0.74

$$-\frac{a\log\left(a + bx^2\right)}{2b^2} + \frac{x^2}{2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a*x),x)
```

```
[Out] -a*log(a + b*x**2)/(2*b**2) + x**2/(2*b)
```

GIAC/XCAS [A] time = 0.218181, size = 32, normalized size = 1.19

$$\frac{x^2}{2\,b} - \frac{a\ln\left(\left|bx^2 + a\right|\right)}{2\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] 1/2*x^2/b - 1/2*a*ln(abs(b*x^2 + a))/b^2
```

3.13 $\int \frac{x^3}{ax+bx^3}\,dx$

Optimal. Leaf size=31

$$\frac{x}{b}-\frac{\sqrt{a}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{b^{3/2}}$$

```
[Out] x/b - (Sqrt[a]*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/b^(3/2)
```

Rubi [A] time = 0.0392814, antiderivative size = 31, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{x}{b}-\frac{\sqrt{a}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(a*x + b*x^3),x]

[Out] x/b - (Sqrt[a]*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/b^(3/2)
```

Rubi in Sympy [A] time = 7.48017, size = 26, normalized size = 0.84

$$-\frac{\sqrt{a}\,\mathrm{atan}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{b^{\frac{3}{2}}}+\frac{x}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a*x),x)

[Out] -sqrt(a)*atan(sqrt(b)*x/sqrt(a))/b**(3/2) + x/b
```

Mathematica [A] time = 0.0150965, size = 31, normalized size = 1.

$$\frac{x}{b}-\frac{\sqrt{a}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/(a*x + b*x^3),x]

[Out] x/b - (Sqrt[a]*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/b^(3/2)
```

Maple [A] time = 0.005, size = 27, normalized size = 0.9

$$\frac{x}{b}-\frac{a}{b}\arctan\left(bx\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a*x),x)
```

```
[Out] x/b-a/b/(a*b)^(1/2)*arctan(x*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.210498, size = 1, normalized size = 0.03

$$\left[\frac{\sqrt{-\frac{a}{b}}\log\left(\frac{bx^2-2\,bx\sqrt{-\frac{a}{b}}-a}{bx^2+a}\right)+2\,x}{2\,b}, -\frac{\sqrt{\frac{a}{b}}\arctan\left(\frac{x}{\sqrt{\frac{a}{b}}}\right)-x}{b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] [1/2*(sqrt(-a/b)*log((b*x^2 - 2*b*x*sqrt(-a/b) - a)/(b*x^2 + a))
+ 2*x)/b, -(sqrt(a/b)*arctan(x/sqrt(a/b)) - x)/b]
```

Sympy [A] time = 1.21273, size = 56, normalized size = 1.81

$$\frac{\sqrt{-\frac{a}{b^3}}\log\left(-b\sqrt{-\frac{a}{b^3}}+x\right)}{2}-\frac{\sqrt{-\frac{a}{b^3}}\log\left(b\sqrt{-\frac{a}{b^3}}+x\right)}{2}+\frac{x}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a*x),x)
```

```
[Out] sqrt(-a/b**3)*log(-b*sqrt(-a/b**3) + x)/2 - sqrt(-a/b**3)*log(b*s
qrt(-a/b**3) + x)/2 + x/b
```

GIAC/XCAS [A] time = 0.216362, size = 35, normalized size = 1.13

$$-\frac{a\arctan\left(\frac{bx}{\sqrt{ab}}\right)}{\sqrt{ab}b}+\frac{x}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] -a*arctan(b*x/sqrt(a*b))/(sqrt(a*b)*b) + x/b
```

3.14 $\int \frac{x^2}{ax+bx^3} \, dx$

Optimal. Leaf size=15

$$\frac{\log(a+bx^2)}{2b}$$

```
[Out] Log[a + b*x^2]/(2*b)
```

Rubi [A] time = 0.0152597, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{\log(a+bx^2)}{2b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(a*x + b*x^3),x]
```

```
[Out] Log[a + b*x^2]/(2*b)
```

Rubi in Sympy [A] time = 3.3114, size = 10, normalized size = 0.67

$$\frac{\log(a+bx^2)}{2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a*x),x)
```

```
[Out] log(a + b*x**2)/(2*b)
```

Mathematica [A] time = 0.0029752, size = 15, normalized size = 1.

$$\frac{\log(a+bx^2)}{2b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(a*x + b*x^3),x]
```

```
[Out] Log[a + b*x^2]/(2*b)
```

Maple [A] time = 0.002, size = 14, normalized size = 0.9

$$\frac{\ln(bx^2+a)}{2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a*x),x)
```

```
[Out] 1/2*ln(b*x^2+a)/b
```

Maxima [A] time = 1.40561, size = 18, normalized size = 1.2

$$\frac{\log\left(bx^2 + a\right)}{2\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] 1/2*log(b*x^2 + a)/b
```

Fricas [A] time = 0.200772, size = 18, normalized size = 1.2

$$\frac{\log\left(bx^2 + a\right)}{2\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] 1/2*log(b*x^2 + a)/b
```

Sympy [A] time = 0.244588, size = 10, normalized size = 0.67

$$\frac{\log\left(a + bx^2\right)}{2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a*x),x)
```

```
[Out] log(a + b*x**2)/(2*b)
```

GIAC/XCAS [A] time = 0.215477, size = 19, normalized size = 1.27

$$\frac{\ln\left(\left|bx^2 + a\right|\right)}{2\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] 1/2*ln(abs(b*x^2 + a))/b
```

3.15 $\int \frac{x}{ax+bx^3}\,dx$

Optimal. Leaf size=24

$$\frac{\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{\sqrt{a}\sqrt{b}}$$

```
[Out] ArcTan[(Sqrt[b]*x)/Sqrt[a]]/(Sqrt[a]*Sqrt[b])
```

Rubi [A] time = 0.0194166, antiderivative size = 24, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{\sqrt{a}\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(a*x + b*x^3),x]

[Out] ArcTan[(Sqrt[b]*x)/Sqrt[a]]/(Sqrt[a]*Sqrt[b])
```

Rubi in Sympy [A] time = 3.5055, size = 22, normalized size = 0.92

$$\frac{\operatorname{atan}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{\sqrt{a}\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a*x),x)

[Out] atan(sqrt(b)*x/sqrt(a))/(sqrt(a)*sqrt(b))
```

Mathematica [A] time = 0.00677692, size = 24, normalized size = 1.

$$\frac{\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{\sqrt{a}\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(a*x + b*x^3),x]

[Out] ArcTan[(Sqrt[b]*x)/Sqrt[a]]/(Sqrt[a]*Sqrt[b])
```

Maple [A] time = 0.002, size = 16, normalized size = 0.7

$$1 \arctan\left(bx\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a*x),x)
```

```
[Out] 1/(a*b)^(1/2)*arctan(x*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.21139, size = 1, normalized size = 0.04

$$\left[\frac{\log\left(\frac{2\,abx+\left(bx^2-a\right)\sqrt{-ab}}{bx^2+a}\right)}{2\,\sqrt{-ab}}, \frac{\arctan\left(\frac{\sqrt{ab}x}{a}\right)}{\sqrt{ab}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] [1/2*log((2*a*b*x + (b*x^2 - a)*sqrt(-a*b))/(b*x^2 + a))/sqrt(-a*
b), arctan(sqrt(a*b)*x/a)/sqrt(a*b)]
```

Sympy [A] time = 0.305062, size = 53, normalized size = 2.21

$$-\frac{\sqrt{-\frac{1}{ab}}\log\left(-a\sqrt{-\frac{1}{ab}}+x\right)}{2}+\frac{\sqrt{-\frac{1}{ab}}\log\left(a\sqrt{-\frac{1}{ab}}+x\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a*x),x)
```

```
[Out] -sqrt(-1/(a*b))*log(-a*sqrt(-1/(a*b)) + x)/2 + sqrt(-1/(a*b))*log
(a*sqrt(-1/(a*b)) + x)/2
```

GIAC/XCAS [A] time = 0.215349, size = 20, normalized size = 0.83

$$\frac{\arctan\left(\frac{bx}{\sqrt{ab}}\right)}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] arctan(b*x/sqrt(a*b))/sqrt(a*b)
```

3.16 $\int \frac{1}{ax+bx^3}\,dx$

Optimal. Leaf size=22

$$\frac{\log(x)}{a}-\frac{\log\left(a+bx^2\right)}{2a}$$

```
[Out] Log[x]/a - Log[a + b*x^2]/(2*a)
```

Rubi [A] time = 0.03242, antiderivative size = 22, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.454

$$\frac{\log(x)}{a}-\frac{\log\left(a+bx^2\right)}{2a}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(-1),x]

[Out] Log[x]/a - Log[a + b*x^2]/(2*a)
```

Rubi in Sympy [A] time = 158.157, size = 19, normalized size = 0.86

$$\frac{\log\left(x^2\right)}{2a}-\frac{\log\left(a+bx^2\right)}{2a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a*x),x)

[Out] log(x**2)/(2*a) - log(a + b*x**2)/(2*a)
```

Mathematica [A] time = 0.0066918, size = 22, normalized size = 1.

$$\frac{\log(x)}{a}-\frac{\log\left(a+bx^2\right)}{2a}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(-1),x]

[Out] Log[x]/a - Log[a + b*x^2]/(2*a)
```

Maple [A] time = 0.005, size = 21, normalized size = 1.

$$\frac{\ln(x)}{a}-\frac{\ln\left(bx^2+a\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a*x),x)

[Out] ln(x)/a-1/2*ln(b*x^2+a)/a
```

Maxima [A] time = 1.37395, size = 27, normalized size = 1.23

$$-\frac{\log\left(bx^2+a\right)}{2\,a}+\frac{\log\left(x\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] -1/2*log(b*x^2 + a)/a + log(x)/a
```

Fricas [A] time = 0.206427, size = 24, normalized size = 1.09

$$-\frac{\log\left(bx^2+a\right)-2\,\log\left(x\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] -1/2*(log(b*x^2 + a) - 2*log(x))/a
```

Sympy [A] time = 0.498641, size = 15, normalized size = 0.68

$$\frac{\log\left(x\right)}{a}-\frac{\log\left(\frac{a}{b}+x^2\right)}{2a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a*x),x)
```

```
[Out] log(x)/a - log(a/b + x**2)/(2*a)
```

GIAC/XCAS [A] time = 0.218236, size = 32, normalized size = 1.45

$$\frac{\ln\left(x^2\right)}{2\,a}-\frac{\ln\left(\left|bx^2+a\right|\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] 1/2*ln(x^2)/a - 1/2*ln(abs(b*x^2 + a))/a
```

3.17 $\int \frac{1}{x(ax+bx^3)}\,dx$

Optimal. Leaf size=34

$$-\frac{\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{a^{3/2}}-\frac{1}{ax}$$

```
[Out] -(1/(a*x)) - (Sqrt[b]*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/a^(3/2)
```

Rubi [A] time = 0.0362704, antiderivative size = 34, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$-\frac{\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{a^{3/2}}-\frac{1}{ax}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a*x + b*x^3)),x]
```

```
[Out] -(1/(a*x)) - (Sqrt[b]*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/a^(3/2)
```

Rubi in Sympy [A] time = 7.29499, size = 29, normalized size = 0.85

$$-\frac{1}{ax}-\frac{\sqrt{b}\,\mathrm{atan}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a*x),x)
```

```
[Out] -1/(a*x) - sqrt(b)*atan(sqrt(b)*x/sqrt(a))/a**(3/2)
```

Mathematica [A] time = 0.020885, size = 34, normalized size = 1.

$$-\frac{\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{a^{3/2}}-\frac{1}{ax}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a*x + b*x^3)),x]
```

```
[Out] -(1/(a*x)) - (Sqrt[b]*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/a^(3/2)
```

Maple [A] time = 0.005, size = 30, normalized size = 0.9

$$-\frac{b}{a}\arctan\left(bx\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}-\frac{1}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a*x),x)
```

```
[Out] -b/a/(a*b)^(1/2)*arctan(x*b/(a*b)^(1/2))-1/a/x
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.210633, size = 1, normalized size = 0.03

$$\left[\frac{x\sqrt{-\frac{b}{a}}\log\left(\frac{bx^2-2\,ax\sqrt{-\frac{b}{a}}-a}{bx^2+a}\right)-2}{2\,ax}, -\frac{x\sqrt{\frac{b}{a}}\arctan\left(\frac{bx}{a\sqrt{\frac{b}{a}}}\right)+1}{ax}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x),x, algorithm="fricas")
```

```
[Out] [1/2*(x*sqrt(-b/a)*log((b*x^2 - 2*a*x*sqrt(-b/a) - a)/(b*x^2 + a)
) - 2)/(a*x), -(x*sqrt(b/a)*arctan(b*x/(a*sqrt(b/a))) + 1)/(a*x)]
```

Sympy [A] time = 1.34004, size = 65, normalized size = 1.91

$$\frac{\sqrt{-\frac{b}{a^3}}\log\left(-\frac{a^2\sqrt{-\frac{b}{a^3}}}{b}+x\right)}{2}-\frac{\sqrt{-\frac{b}{a^3}}\log\left(\frac{a^2\sqrt{-\frac{b}{a^3}}}{b}+x\right)}{2}-\frac{1}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a*x),x)
```

```
[Out] sqrt(-b/a**3)*log(-a**2*sqrt(-b/a**3)/b + x)/2 - sqrt(-b/a**3)*lo
g(a**2*sqrt(-b/a**3)/b + x)/2 - 1/(a*x)
```

GIAC/XCAS [A] time = 0.217414, size = 39, normalized size = 1.15

$$-\frac{b\arctan\left(\frac{bx}{\sqrt{ab}}\right)}{\sqrt{ab}a}-\frac{1}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x),x, algorithm="giac")
```

```
[Out] -b*arctan(b*x/sqrt(a*b))/(sqrt(a*b)*a) - 1/(a*x)
```

3.18 $\int \frac{1}{x^2(ax+bx^3)}\,dx$

Optimal. Leaf size=35

$$\frac{b\log(a+bx^2)}{2a^2}-\frac{b\log(x)}{a^2}-\frac{1}{2ax^2}$$

```
[Out] -1/(2*a*x^2) - (b*Log[x])/a^2 + (b*Log[a + b*x^2])/(2*a^2)
```

Rubi [A] time = 0.057307, antiderivative size = 35, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{b\log(a+bx^2)}{2a^2}-\frac{b\log(x)}{a^2}-\frac{1}{2ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a*x + b*x^3)),x]

[Out] -1/(2*a*x^2) - (b*Log[x])/a^2 + (b*Log[a + b*x^2])/(2*a^2)
```

Rubi in Sympy [A] time = 9.65802, size = 34, normalized size = 0.97

$$-\frac{1}{2ax^2}-\frac{b\log(x^2)}{2a^2}+\frac{b\log(a+bx^2)}{2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a*x),x)

[Out] -1/(2*a*x**2) - b*log(x**2)/(2*a**2) + b*log(a + b*x**2)/(2*a**2)
```

Mathematica [A] time = 0.0102577, size = 35, normalized size = 1.

$$\frac{b\log(a+bx^2)}{2a^2}-\frac{b\log(x)}{a^2}-\frac{1}{2ax^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(a*x + b*x^3)),x]

[Out] -1/(2*a*x^2) - (b*Log[x])/a^2 + (b*Log[a + b*x^2])/(2*a^2)
```

Maple [A] time = 0.009, size = 32, normalized size = 0.9

$$-\frac{1}{2\,ax^2}-\frac{b\ln(x)}{a^2}+\frac{b\ln(bx^2+a)}{2\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a*x),x)

[Out] -1/2/a/x^2-b*ln(x)/a^2+1/2*b*ln(b*x^2+a)/a^2
```

Maxima [A] time = 1.37685, size = 42, normalized size = 1.2

$$\frac{b\log\left(bx^2+a\right)}{2\,a^2}-\frac{b\log\left(x\right)}{a^2}-\frac{1}{2\,ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^2),x, algorithm="maxima")
```

```
[Out] 1/2*b*log(b*x^2 + a)/a^2 - b*log(x)/a^2 - 1/2/(a*x^2)
```

Fricas [A] time = 0.206515, size = 45, normalized size = 1.29

$$\frac{bx^2\log\left(bx^2+a\right)-2\,bx^2\log\left(x\right)-a}{2\,a^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^2),x, algorithm="fricas")
```

```
[Out] 1/2*(b*x^2*log(b*x^2 + a) - 2*b*x^2*log(x) - a)/(a^2*x^2)
```

Sympy [A] time = 1.64168, size = 31, normalized size = 0.89

$$-\frac{1}{2ax^2}-\frac{b\log\left(x\right)}{a^2}+\frac{b\log\left(\frac{a}{b}+x^2\right)}{2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a*x),x)
```

```
[Out] -1/(2*a*x**2) - b*log(x)/a**2 + b*log(a/b + x**2)/(2*a**2)
```

GIAC/XCAS [A] time = 0.218645, size = 58, normalized size = 1.66

$$-\frac{b\ln\left(x^2\right)}{2\,a^2}+\frac{b\ln\left(\left|bx^2+a\right|\right)}{2\,a^2}+\frac{bx^2-a}{2\,a^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^2),x, algorithm="giac")
```

```
[Out] -1/2*b*ln(x^2)/a^2 + 1/2*b*ln(abs(b*x^2 + a))/a^2 + 1/2*(b*x^2 -
a)/(a^2*x^2)
```

3.19 $\int \frac{1}{x^3(ax+bx^3)}\,dx$

Optimal. Leaf size=43

$$\frac{b^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{a^{5/2}}+\frac{b}{a^2x}-\frac{1}{3ax^3}$$

```
[Out] -1/(3*a*x^3) + b/(a^2*x) + (b^(3/2)*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/
a^(5/2)
```

Rubi [A] time = 0.0517105, antiderivative size = 43, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{b^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{a^{5/2}}+\frac{b}{a^2x}-\frac{1}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(a*x + b*x^3)),x]
```

```
[Out] -1/(3*a*x^3) + b/(a^2*x) + (b^(3/2)*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/
a^(5/2)
```

Rubi in Sympy [A] time = 10.7657, size = 37, normalized size = 0.86

$$-\frac{1}{3ax^3}+\frac{b}{a^2x}+\frac{b^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a*x),x)
```

```
[Out] -1/(3*a*x**3) + b/(a**2*x) + b**(3/2)*atan(sqrt(b)*x/sqrt(a))/a**
(5/2)
```

Mathematica [A] time = 0.0337876, size = 43, normalized size = 1.

$$\frac{b^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{a^{5/2}}+\frac{b}{a^2x}-\frac{1}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(a*x + b*x^3)),x]
```

```
[Out] -1/(3*a*x^3) + b/(a^2*x) + (b^(3/2)*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/
a^(5/2)
```

Maple [A] time = 0.007, size = 39, normalized size = 0.9

$$-\frac{1}{3\,ax^3}+\frac{b}{a^2x}+\frac{b^2}{a^2}\arctan\left(bx\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a*x),x)
```

```
[Out] -1/3/a/x^3+b/a^2/x+b^2/a^2/(a*b)^(1/2)*arctan(x*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.21424, size = 1, normalized size = 0.02

$$\left[\frac{3\,bx^{3}\sqrt{-\frac{b}{a}}\log\left(\frac{bx^{2}+2\,ax\sqrt{-\frac{b}{a}}-a}{bx^{2}+a}\right)+6\,bx^{2}-2\,a}{6\,a^{2}x^{3}},\ \frac{3\,bx^{3}\sqrt{\frac{b}{a}}\arctan\left(\frac{bx}{a\sqrt{\frac{b}{a}}}\right)+3\,bx^{2}-a}{3\,a^{2}x^{3}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^3),x, algorithm="fricas")
```

```
[Out] [1/6*(3*b*x^3*sqrt(-b/a)*log((b*x^2 + 2*a*x*sqrt(-b/a) - a)/(b*x^
2 + a)) + 6*b*x^2 - 2*a)/(a^2*x^3), 1/3*(3*b*x^3*sqrt(b/a)*arctan
(b*x/(a*sqrt(b/a))) + 3*b*x^2 - a)/(a^2*x^3)]
```

Sympy [A] time = 1.52177, size = 87, normalized size = 2.02

$$-\frac{\sqrt{-\frac{b^{3}}{a^{5}}}\log\left(-\frac{a^{3}\sqrt{-\frac{b^{3}}{a^{5}}}}{b^{2}}+x\right)}{2}+\frac{\sqrt{-\frac{b^{3}}{a^{5}}}\log\left(\frac{a^{3}\sqrt{-\frac{b^{3}}{a^{5}}}}{b^{2}}+x\right)}{2}+\frac{-a+3bx^{2}}{3a^{2}x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**3+a*x),x)
```

```
[Out] -sqrt(-b**3/a**5)*log(-a**3*sqrt(-b**3/a**5)/b**2 + x)/2 + sqrt(-
b**3/a**5)*log(a**3*sqrt(-b**3/a**5)/b**2 + x)/2 + (-a + 3*b*x**2
)/(3*a**2*x**3)
```

GIAC/XCAS [A] time = 0.217859, size = 54, normalized size = 1.26

$$\frac{b^{2}\arctan\left(\frac{bx}{\sqrt{ab}}\right)}{\sqrt{ab}a^{2}}+\frac{3\,bx^{2}-a}{3\,a^{2}x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^3),x, algorithm="giac")
```

```
[Out] b^2*arctan(b*x/sqrt(a*b))/(sqrt(a*b)*a^2) + 1/3*(3*b*x^2 - a)/(a^
2*x^3)
```

3.20 $\int \frac{1}{x^4(ax+bx^3)}\,dx$

Optimal. Leaf size=49

$$-\frac{b^2\log\left(a+bx^2\right)}{2a^3}+\frac{b^2\log(x)}{a^3}+\frac{b}{2a^2x^2}-\frac{1}{4ax^4}$$

```
[Out] -1/(4*a*x^4) + b/(2*a^2*x^2) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*
x^2])/(2*a^3)
```

Rubi [A] time = 0.0699704, antiderivative size = 49, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$-\frac{b^2\log\left(a+bx^2\right)}{2a^3}+\frac{b^2\log(x)}{a^3}+\frac{b}{2a^2x^2}-\frac{1}{4ax^4}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^4*(a*x + b*x^3)),x]
```

```
[Out] -1/(4*a*x^4) + b/(2*a^2*x^2) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*
x^2])/(2*a^3)
```

Rubi in Sympy [A] time = 12.3596, size = 48, normalized size = 0.98

$$-\frac{1}{4ax^4}+\frac{b}{2a^2x^2}+\frac{b^2\log\left(x^2\right)}{2a^3}-\frac{b^2\log\left(a+bx^2\right)}{2a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**4/(b*x**3+a*x),x)
```

```
[Out] -1/(4*a*x**4) + b/(2*a**2*x**2) + b**2*log(x**2)/(2*a**3) - b**2*
log(a + b*x**2)/(2*a**3)
```

Mathematica [A] time = 0.0108957, size = 49, normalized size = 1.

$$-\frac{b^2\log\left(a+bx^2\right)}{2a^3}+\frac{b^2\log(x)}{a^3}+\frac{b}{2a^2x^2}-\frac{1}{4ax^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^4*(a*x + b*x^3)),x]
```

```
[Out] -1/(4*a*x^4) + b/(2*a^2*x^2) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*
x^2])/(2*a^3)
```

Maple [A] time = 0.009, size = 44, normalized size = 0.9

$$-\frac{1}{4\,ax^4}+\frac{b}{2\,a^2x^2}+\frac{b^2\ln(x)}{a^3}-\frac{b^2\ln\left(bx^2+a\right)}{2\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^4/(b*x^3+a*x),x)
```

```
[Out] -1/4/a/x^4+1/2*b/a^2/x^2+b^2*ln(x)/a^3-1/2*b^2*ln(b*x^2+a)/a^3
```

Maxima [A] time = 1.36462, size = 59, normalized size = 1.2

$$-\frac{b^2 \log\left(bx^2+a\right)}{2\,a^3}+\frac{b^2 \log\left(x\right)}{a^3}+\frac{2\,bx^2-a}{4\,a^2x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^4),x, algorithm="maxima")
```

```
[Out] -1/2*b^2*log(b*x^2 + a)/a^3 + b^2*log(x)/a^3 + 1/4*(2*b*x^2 - a)/
(a^2*x^4)
```

Fricas [A] time = 0.206677, size = 61, normalized size = 1.24

$$-\frac{2\,b^2x^4 \log\left(bx^2+a\right)-4\,b^2x^4 \log\left(x\right)-2\,abx^2+a^2}{4\,a^3x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^4),x, algorithm="fricas")
```

```
[Out] -1/4*(2*b^2*x^4*log(b*x^2 + a) - 4*b^2*x^4*log(x) - 2*a*b*x^2 + a
^2)/(a^3*x^4)
```

Sympy [A] time = 1.83326, size = 42, normalized size = 0.86

$$\frac{-a+2bx^2}{4a^2x^4}+\frac{b^2 \log\left(x\right)}{a^3}-\frac{b^2 \log\left(\frac{a}{b}+x^2\right)}{2a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**3+a*x),x)
```

```
[Out] (-a + 2*b*x**2)/(4*a**2*x**4) + b**2*log(x)/a**3 - b**2*log(a/b +
 x**2)/(2*a**3)
```

GIAC/XCAS [A] time = 0.217731, size = 77, normalized size = 1.57

$$\frac{b^2 \ln\left(x^2\right)}{2\,a^3}-\frac{b^2 \ln\left(\left|bx^2+a\right|\right)}{2\,a^3}-\frac{3\,b^2x^4-2\,abx^2+a^2}{4\,a^3x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)*x^4),x, algorithm="giac")
```

```
[Out] 1/2*b^2*ln(x^2)/a^3 - 1/2*b^2*ln(abs(b*x^2 + a))/a^3 - 1/4*(3*b^2
*x^4 - 2*a*b*x^2 + a^2)/(a^3*x^4)
```

3.21 $\int \frac{x^2}{(ax+bx^3)^2}\,dx$

Optimal. Leaf size=45

$$\frac{\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{3/2}\sqrt{b}}+\frac{x}{2a\left(a+bx^2\right)}$$

```
[Out] x/(2*a*(a + b*x^2)) + ArcTan[(Sqrt[b]*x)/Sqrt[a]]/(2*a^(3/2)*Sqrt
[b])
```

Rubi [A] time = 0.0328066, antiderivative size = 45, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{3/2}\sqrt{b}}+\frac{x}{2a\left(a+bx^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(a*x + b*x^3)^2,x]
```

```
[Out] x/(2*a*(a + b*x^2)) + ArcTan[(Sqrt[b]*x)/Sqrt[a]]/(2*a^(3/2)*Sqrt
[b])
```

Rubi in Sympy [A] time = 4.94367, size = 36, normalized size = 0.8

$$\frac{x}{2a\left(a+bx^2\right)}+\frac{\operatorname{atan}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a*x)**2,x)
```

```
[Out] x/(2*a*(a + b*x**2)) + atan(sqrt(b)*x/sqrt(a))/(2*a**(3/2)*sqrt(b
))
```

Mathematica [A] time = 0.0418397, size = 45, normalized size = 1.

$$\frac{\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{3/2}\sqrt{b}}+\frac{x}{2a\left(a+bx^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(a*x + b*x^3)^2,x]
```

```
[Out] x/(2*a*(a + b*x^2)) + ArcTan[(Sqrt[b]*x)/Sqrt[a]]/(2*a^(3/2)*Sqrt
[b])
```

Maple [A] time = 0.006, size = 36, normalized size = 0.8

$$\frac{x}{2\,a\left(bx^2+a\right)}+\frac{1}{2\,a}\arctan\left(bx\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a*x)^2,x)
```

```
[Out] 1/2*x/a/(b*x^2+a)+1/2/a/(a*b)^(1/2)*arctan(x*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.21109, size = 1, normalized size = 0.02

$$\left[\frac{(bx^2+a)\log\left(\frac{2\,abx+(bx^2-a)\sqrt{-ab}}{bx^2+a}\right)+2\sqrt{-ab}x}{4\,(abx^2+a^2)\sqrt{-ab}}, \frac{(bx^2+a)\arctan\left(\frac{\sqrt{ab}x}{a}\right)+\sqrt{ab}x}{2\,(abx^2+a^2)\sqrt{ab}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x)^2,x, algorithm="fricas")
```

```
[Out] [1/4*((b*x^2 + a)*log((2*a*b*x + (b*x^2 - a)*sqrt(-a*b))/(b*x^2 +
 a)) + 2*sqrt(-a*b)*x)/((a*b*x^2 + a^2)*sqrt(-a*b)), 1/2*((b*x^2
+ a)*arctan(sqrt(a*b)*x/a) + sqrt(a*b)*x)/((a*b*x^2 + a^2)*sqrt(a
*b))]
```

Sympy [A] time = 1.43121, size = 78, normalized size = 1.73

$$\frac{x}{2a^2+2abx^2}-\frac{\sqrt{-\frac{1}{a^3b}}\log\left(-a^2\sqrt{-\frac{1}{a^3b}}+x\right)}{4}+\frac{\sqrt{-\frac{1}{a^3b}}\log\left(a^2\sqrt{-\frac{1}{a^3b}}+x\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a*x)**2,x)
```

```
[Out] x/(2*a**2 + 2*a*b*x**2) - sqrt(-1/(a**3*b))*log(-a**2*sqrt(-1/(a*
*3*b)) + x)/4 + sqrt(-1/(a**3*b))*log(a**2*sqrt(-1/(a**3*b)) + x)
/4
```

GIAC/XCAS [A] time = 0.218348, size = 47, normalized size = 1.04

$$\frac{\arctan\left(\frac{bx}{\sqrt{ab}}\right)}{2\sqrt{ab}a}+\frac{x}{2\,(bx^2+a)a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x)^2,x, algorithm="giac")
```

```
[Out] 1/2*arctan(b*x/sqrt(a*b))/(sqrt(a*b)*a) + 1/2*x/((b*x^2 + a)*a)
```

3.22 $\int \frac{x}{(ax+bx^3)^2}\,dx$

Optimal. Leaf size=38

$$-\frac{\log\left(a+bx^2\right)}{2a^2}+\frac{\log(x)}{a^2}+\frac{1}{2a\left(a+bx^2\right)}$$

```
[Out] 1/(2*a*(a + b*x^2)) + Log[x]/a^2 - Log[a + b*x^2]/(2*a^2)
```

Rubi [A] time = 0.0617564, antiderivative size = 38, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{\log\left(a+bx^2\right)}{2a^2}+\frac{\log(x)}{a^2}+\frac{1}{2a\left(a+bx^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(a*x + b*x^3)^2,x]
```

```
[Out] 1/(2*a*(a + b*x^2)) + Log[x]/a^2 - Log[a + b*x^2]/(2*a^2)
```

Rubi in Sympy [A] time = 9.83224, size = 34, normalized size = 0.89

$$\frac{1}{2a\left(a+bx^2\right)}+\frac{\log\left(x^2\right)}{2a^2}-\frac{\log\left(a+bx^2\right)}{2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a*x)**2,x)
```

```
[Out] 1/(2*a*(a + b*x**2)) + log(x**2)/(2*a**2) - log(a + b*x**2)/(2*a*
*2)
```

Mathematica [A] time = 0.0221441, size = 33, normalized size = 0.87

$$\frac{\frac{a}{a+bx^2}-\log\left(a+bx^2\right)+2\log(x)}{2a^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(a*x + b*x^3)^2,x]
```

```
[Out] (a/(a + b*x^2) + 2*Log[x] - Log[a + b*x^2])/(2*a^2)
```

Maple [A] time = 0.011, size = 35, normalized size = 0.9

$$\frac{1}{2\,a\left(bx^2+a\right)}+\frac{\ln(x)}{a^2}-\frac{\ln\left(bx^2+a\right)}{2\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a*x)^2,x)
```

```
[Out] 1/2/a/(b*x^2+a)+ln(x)/a^2-1/2*ln(b*x^2+a)/a^2
```

Maxima [A] time = 1.44172, size = 46, normalized size = 1.21

$$\frac{1}{2\,(abx^2+a^2)}-\frac{\log\left(bx^2+a\right)}{2\,a^2}+\frac{\log\left(x\right)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x)^2,x, algorithm="maxima")
```

```
[Out] 1/2/(a*b*x^2 + a^2) - 1/2*log(b*x^2 + a)/a^2 + log(x)/a^2
```

Fricas [A] time = 0.20795, size = 63, normalized size = 1.66

$$-\frac{\left(bx^2+a\right)\log\left(bx^2+a\right)-2\left(bx^2+a\right)\log\left(x\right)-a}{2\,(a^2bx^2+a^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x)^2,x, algorithm="fricas")
```

```
[Out] -1/2*((b*x^2 + a)*log(b*x^2 + a) - 2*(b*x^2 + a)*log(x) - a)/(a^2
*b*x^2 + a^3)
```

Sympy [A] time = 1.67263, size = 34, normalized size = 0.89

$$\frac{1}{2a^2+2abx^2}+\frac{\log\left(x\right)}{a^2}-\frac{\log\left(\frac{a}{b}+x^2\right)}{2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a*x)**2,x)
```

```
[Out] 1/(2*a**2 + 2*a*b*x**2) + log(x)/a**2 - log(a/b + x**2)/(2*a**2)
```

GIAC/XCAS [A] time = 0.21927, size = 63, normalized size = 1.66

$$\frac{\ln\left(x^2\right)}{2\,a^2}-\frac{\ln\left(\left|bx^2+a\right|\right)}{2\,a^2}+\frac{bx^2+2\,a}{2\,(bx^2+a)a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x)^2,x, algorithm="giac")
```

```
[Out] 1/2*ln(x^2)/a^2 - 1/2*ln(abs(b*x^2 + a))/a^2 + 1/2*(b*x^2 + 2*a)/
((b*x^2 + a)*a^2)
```

3.23 $\int \frac{1}{(ax+bx^3)^2}\,dx$

Optimal. Leaf size=57

$$-\frac{3\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{5/2}}-\frac{3}{2a^2x}+\frac{1}{2ax\,(a+bx^2)}$$

```
[Out] -3/(2*a^2*x) + 1/(2*a*x*(a + b*x^2)) - (3*Sqrt[b]*ArcTan[(Sqrt[b]
*x)/Sqrt[a]])/(2*a^(5/2))
```

Rubi [A] time = 0.0484473, antiderivative size = 57, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.364

$$-\frac{3\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{5/2}}-\frac{3}{2a^2x}+\frac{1}{2ax\,(a+bx^2)}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(-2),x]
```

```
[Out] -3/(2*a^2*x) + 1/(2*a*x*(a + b*x^2)) - (3*Sqrt[b]*ArcTan[(Sqrt[b]
*x)/Sqrt[a]])/(2*a^(5/2))
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a*x)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.058906, size = 54, normalized size = 0.95

$$-\frac{3\sqrt{b}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{5/2}}-\frac{bx}{2a^2\,(a+bx^2)}-\frac{1}{a^2x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(-2),x]
```

```
[Out] -(1/(a^2*x)) - (b*x)/(2*a^2*(a + b*x^2)) - (3*Sqrt[b]*ArcTan[(Sqr
t[b]*x)/Sqrt[a]])/(2*a^(5/2))
```

Maple [A] time = 0.012, size = 46, normalized size = 0.8

$$-\frac{1}{a^2x}-\frac{bx}{2\,a^2\,(bx^2+a)}-\frac{3\,b}{2\,a^2}\arctan\left(bx\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a*x)^2,x)
```

```
[Out] -1/a^2/x-1/2*b/a^2*x/(b*x^2+a)-3/2*b/a^2/(a*b)^(1/2)*arctan(x*b/(
a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(-2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.216984, size = 1, normalized size = 0.02

$$\left[-\frac{6\,bx^2-3\left(bx^3+ax\right)\sqrt{-\frac{b}{a}}\log\left(\frac{bx^2-2\,ax\sqrt{-\frac{b}{a}}-a}{bx^2+a}\right)+4\,a}{4\left(a^2bx^3+a^3x\right)},-\frac{3\,bx^2+3\left(bx^3+ax\right)\sqrt{\frac{b}{a}}\arctan\left(\frac{bx}{a\sqrt{\frac{b}{a}}}\right)+2\,a}{2\left(a^2bx^3+a^3x\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(-2),x, algorithm="fricas")
```

```
[Out] [-1/4*(6*b*x^2 - 3*(b*x^3 + a*x)*sqrt(-b/a)*log((b*x^2 - 2*a*x*sq
rt(-b/a) - a)/(b*x^2 + a)) + 4*a)/(a^2*b*x^3 + a^3*x), -1/2*(3*b*
x^2 + 3*(b*x^3 + a*x)*sqrt(b/a)*arctan(b*x/(a*sqrt(b/a))) + 2*a)/
(a^2*b*x^3 + a^3*x)]
```

Sympy [A] time = 1.72512, size = 90, normalized size = 1.58

$$\frac{3\sqrt{-\frac{b}{a^5}}\log\left(-\frac{a^3\sqrt{-\frac{b}{a^5}}}{b}+x\right)}{4}-\frac{3\sqrt{-\frac{b}{a^5}}\log\left(\frac{a^3\sqrt{-\frac{b}{a^5}}}{b}+x\right)}{4}-\frac{2a+3bx^2}{2a^3x+2a^2bx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a*x)**2,x)
```

```
[Out] 3*sqrt(-b/a**5)*log(-a**3*sqrt(-b/a**5)/b + x)/4 - 3*sqrt(-b/a**5
)*log(a**3*sqrt(-b/a**5)/b + x)/4 - (2*a + 3*b*x**2)/(2*a**3*x +
2*a**2*b*x**3)
```

GIAC/XCAS [A] time = 0.215663, size = 63, normalized size = 1.11

$$-\frac{3\,b\arctan\left(\frac{bx}{\sqrt{ab}}\right)}{2\,\sqrt{ab}a^2}-\frac{3\,bx^2+2\,a}{2\,(bx^3+ax)a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(-2),x, algorithm="giac")
```

```
[Out] -3/2*b*arctan(b*x/sqrt(a*b))/(sqrt(a*b)*a^2) - 1/2*(3*b*x^2 + 2*a
)/((b*x^3 + a*x)*a^2)
```

3.24 $\int \frac{1}{x(ax+bx^3)^2}\,dx$

Optimal. Leaf size=49

$$\frac{b\log\left(a+bx^2\right)}{a^3}-\frac{2b\log(x)}{a^3}-\frac{b}{2a^2\left(a+bx^2\right)}-\frac{1}{2a^2x^2}$$

```
[Out] -1/(2*a^2*x^2) - b/(2*a^2*(a + b*x^2)) - (2*b*Log[x])/a^3 + (b*Lo
g[a + b*x^2])/a^3
```

Rubi [A] time = 0.0816251, antiderivative size = 49, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{b\log\left(a+bx^2\right)}{a^3}-\frac{2b\log(x)}{a^3}-\frac{b}{2a^2\left(a+bx^2\right)}-\frac{1}{2a^2x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a*x + b*x^3)^2),x]
```

```
[Out] -1/(2*a^2*x^2) - b/(2*a^2*(a + b*x^2)) - (2*b*Log[x])/a^3 + (b*Lo
g[a + b*x^2])/a^3
```

Rubi in Sympy [A] time = 12.6329, size = 46, normalized size = 0.94

$$-\frac{b}{2a^2\left(a+bx^2\right)}-\frac{1}{2a^2x^2}-\frac{b\log\left(x^2\right)}{a^3}+\frac{b\log\left(a+bx^2\right)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a*x)**2,x)
```

```
[Out] -b/(2*a**2*(a + b*x**2)) - 1/(2*a**2*x**2) - b*log(x**2)/a**3 + b
*log(a + b*x**2)/a**3
```

Mathematica [A] time = 0.0593991, size = 41, normalized size = 0.84

$$-\frac{a\left(\frac{b}{a+bx^2}+\frac{1}{x^2}\right)-2b\log\left(a+bx^2\right)+4b\log(x)}{2a^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a*x + b*x^3)^2),x]
```

```
[Out] -(a*(x^(-2) + b/(a + b*x^2)) + 4*b*Log[x] - 2*b*Log[a + b*x^2])/(
2*a^3)
```

Maple [A] time = 0.014, size = 46, normalized size = 0.9

$$-\frac{1}{2\,a^2x^2}-\frac{b}{2\,a^2\left(bx^2+a\right)}-2\,\frac{b\ln(x)}{a^3}+\frac{b\ln\left(bx^2+a\right)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a*x)^2,x)

[Out] -1/2/a^2/x^2-1/2*b/a^2/(b*x^2+a)-2*b*ln(x)/a^3+b*ln(b*x^2+a)/a^3
```

Maxima [A] time = 1.39546, size = 68, normalized size = 1.39

$$-\frac{2\,bx^2+a}{2\,(a^2bx^4+a^3x^2)}+\frac{b\log\left(bx^2+a\right)}{a^3}-\frac{2\,b\log\left(x\right)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^2*x),x, algorithm="maxima")

[Out] -1/2*(2*b*x^2 + a)/(a^2*b*x^4 + a^3*x^2) + b*log(b*x^2 + a)/a^3 -
 2*b*log(x)/a^3
```

Fricas [A] time = 0.20666, size = 99, normalized size = 2.02

$$-\frac{2\,abx^2+a^2-2\,\left(b^2x^4+abx^2\right)\log\left(bx^2+a\right)+4\,\left(b^2x^4+abx^2\right)\log\left(x\right)}{2\,(a^3bx^4+a^4x^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^2*x),x, algorithm="fricas")

[Out] -1/2*(2*a*b*x^2 + a^2 - 2*(b^2*x^4 + a*b*x^2)*log(b*x^2 + a) + 4*
(b^2*x^4 + a*b*x^2)*log(x))/(a^3*b*x^4 + a^4*x^2)
```

Sympy [A] time = 2.04594, size = 49, normalized size = 1.

$$-\frac{a+2bx^2}{2a^3x^2+2a^2bx^4}-\frac{2b\log\left(x\right)}{a^3}+\frac{b\log\left(\frac{a}{b}+x^2\right)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a*x)**2,x)

[Out] -(a + 2*b*x**2)/(2*a**3*x**2 + 2*a**2*b*x**4) - 2*b*log(x)/a**3 +
 b*log(a/b + x**2)/a**3
```

GIAC/XCAS [A] time = 0.218026, size = 69, normalized size = 1.41

$$-\frac{b\ln\left(x^2\right)}{a^3}+\frac{b\ln\left(\left|bx^2+a\right|\right)}{a^3}-\frac{2\,bx^2+a}{2\,(bx^4+ax^2)a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^2*x),x, algorithm="giac")

[Out] -b*ln(x^2)/a^3 + b*ln(abs(b*x^2 + a))/a^3 - 1/2*(2*b*x^2 + a)/((b
*x^4 + a*x^2)*a^2)
```

3.25 $\int \frac{1}{x^2(ax+bx^3)^2}\,dx$

Optimal. Leaf size=68

$$\frac{5b^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{7/2}}+\frac{5b}{2a^3x}-\frac{5}{6a^2x^3}+\frac{1}{2ax^3\left(a+bx^2\right)}$$

```
[Out] -5/(6*a^2*x^3) + (5*b)/(2*a^3*x) + 1/(2*a*x^3*(a + b*x^2)) + (5*b
^(3/2)*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/(2*a^(7/2))
```

Rubi [A] time = 0.0703671, antiderivative size = 68, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.267

$$\frac{5b^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{7/2}}+\frac{5b}{2a^3x}-\frac{5}{6a^2x^3}+\frac{1}{2ax^3\left(a+bx^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a*x + b*x^3)^2),x]
```

```
[Out] -5/(6*a^2*x^3) + (5*b)/(2*a^3*x) + 1/(2*a*x^3*(a + b*x^2)) + (5*b
^(3/2)*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/(2*a^(7/2))
```

Rubi in Sympy [A] time = 14.5361, size = 61, normalized size = 0.9

$$\frac{1}{2ax^3\left(a+bx^2\right)}-\frac{5}{6a^2x^3}+\frac{5b}{2a^3x}+\frac{5b^{\frac{3}{2}}\operatorname{atan}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a*x)**2,x)
```

```
[Out] 1/(2*a*x**3*(a + b*x**2)) - 5/(6*a**2*x**3) + 5*b/(2*a**3*x) + 5*
b**(3/2)*atan(sqrt(b)*x/sqrt(a))/(2*a**(7/2))
```

Mathematica [A] time = 0.0701812, size = 67, normalized size = 0.99

$$\frac{5b^{3/2}\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{a}}\right)}{2a^{7/2}}+\frac{b^2x}{2a^3\left(a+bx^2\right)}+\frac{2b}{a^3x}-\frac{1}{3a^2x^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(a*x + b*x^3)^2),x]
```

```
[Out] -1/(3*a^2*x^3) + (2*b)/(a^3*x) + (b^2*x)/(2*a^3*(a + b*x^2)) + (5
*b^(3/2)*ArcTan[(Sqrt[b]*x)/Sqrt[a]])/(2*a^(7/2))
```

Maple [A] time = 0.016, size = 59, normalized size = 0.9

$$-\frac{1}{3\,a^2x^3}+2\,\frac{b}{a^3x}+\frac{b^2x}{2\,a^3\left(bx^2+a\right)}+\frac{5\,b^2}{2\,a^3}\arctan\left(bx\frac{1}{\sqrt{ab}}\right)\frac{1}{\sqrt{ab}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a*x)^2,x)
```

```
[Out] -1/3/a^2/x^3+2*b/a^3/x+1/2/a^3*b^2*x/(b*x^2+a)+5/2/a^3*b^2/(a*b)^
(1/2)*arctan(x*b/(a*b)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^2*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.215621, size = 1, normalized size = 0.01

$$\left[\frac{30\,b^2x^4 + 20\,abx^2 + 15\,\left(b^2x^5 + abx^3\right)\sqrt{-\frac{b}{a}}\log\left(\frac{bx^2+2\,ax\sqrt{-\frac{b}{a}}-a}{bx^2+a}\right) - 4\,a^2}{12\,(a^3bx^5 + a^4x^3)}, \frac{15\,b^2x^4 + 10\,abx^2 + 15\,\left(b^2x^5 + abx^3\right)\sqrt{\frac{b}{a}}\arctan\left(\right.}{6\,(a^3bx^5 + a^4x^3)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^2*x^2),x, algorithm="fricas")
```

```
[Out] [1/12*(30*b^2*x^4 + 20*a*b*x^2 + 15*(b^2*x^5 + a*b*x^3)*sqrt(-b/a
)*log((b*x^2 + 2*a*x*sqrt(-b/a) - a)/(b*x^2 + a)) - 4*a^2)/(a^3*b
*x^5 + a^4*x^3), 1/6*(15*b^2*x^4 + 10*a*b*x^2 + 15*(b^2*x^5 + a*b
*x^3)*sqrt(b/a)*arctan(b*x/(a*sqrt(b/a))) - 2*a^2)/(a^3*b*x^5 + a
^4*x^3)]
```

Sympy [A] time = 2.12167, size = 114, normalized size = 1.68

$$-\frac{5\sqrt{-\frac{b^3}{a^7}}\log\left(-\frac{a^4\sqrt{-\frac{b^3}{a^7}}}{b^2} + x\right)}{4} + \frac{5\sqrt{-\frac{b^3}{a^7}}\log\left(\frac{a^4\sqrt{-\frac{b^3}{a^7}}}{b^2} + x\right)}{4} + \frac{-2a^2 + 10abx^2 + 15b^2x^4}{6a^4x^3 + 6a^3bx^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a*x)**2,x)
```

```
[Out] -5*sqrt(-b**3/a**7)*log(-a**4*sqrt(-b**3/a**7)/b**2 + x)/4 + 5*sq
rt(-b**3/a**7)*log(a**4*sqrt(-b**3/a**7)/b**2 + x)/4 + (-2*a**2 +
 10*a*b*x**2 + 15*b**2*x**4)/(6*a**4*x**3 + 6*a**3*b*x**5)
```

GIAC/XCAS [A] time = 0.219085, size = 80, normalized size = 1.18

$$\frac{5\,b^2\arctan\left(\frac{bx}{\sqrt{ab}}\right)}{2\,\sqrt{ab}a^3} + \frac{b^2x}{2\,(bx^2 + a)a^3} + \frac{6\,bx^2 - a}{3\,a^3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^2*x^2),x, algorithm="giac")
```

```
[Out] 5/2*b^2*arctan(b*x/sqrt(a*b))/(sqrt(a*b)*a^3) + 1/2*b^2*x/((b*x^2
 + a)*a^3) + 1/3*(6*b*x^2 - a)/(a^3*x^3)
```

3.26 $\int \frac{x^5}{x-x^3} \, dx$

Optimal. Leaf size=13

$$-\frac{x^3}{3} - x + \tanh^{-1}(x)$$

```
[Out] -x - x^3/3 + ArcTanh[x]
```

Rubi [A] time = 0.0229495, antiderivative size = 13, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{x^3}{3} - x + \tanh^{-1}(x)$$

Antiderivative was successfully verified.

```
[In] Int[x^5/(x - x^3),x]

[Out] -x - x^3/3 + ArcTanh[x]
```

Rubi in Sympy [A] time = 4.68189, size = 8, normalized size = 0.62

$$-\frac{x^3}{3} - x + \operatorname{atanh}(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**5/(-x**3+x),x)

[Out] -x**3/3 - x + atanh(x)
```

Mathematica [B] time = 0.00682492, size = 29, normalized size = 2.23

$$-\frac{x^3}{3} - x - \frac{1}{2}\log(1-x) + \frac{1}{2}\log(x+1)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5/(x - x^3),x]

[Out] -x - x^3/3 - Log[1 - x]/2 + Log[1 + x]/2
```

Maple [A] time = 0.002, size = 22, normalized size = 1.7

$$-\frac{x^3}{3} - x - \frac{\ln(-1+x)}{2} + \frac{\ln(1+x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5/(-x^3+x),x)

[Out] -1/3*x^3-x-1/2*ln(-1+x)+1/2*ln(1+x)
```

Maxima [A] time = 1.3692, size = 28, normalized size = 2.15

$$-\frac{1}{3}x^3 - x + \frac{1}{2}\log(x+1) - \frac{1}{2}\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^5/(x^3 - x),x, algorithm="maxima")
```

```
[Out] -1/3*x^3 - x + 1/2*log(x + 1) - 1/2*log(x - 1)
```

Fricas [A] time = 0.204217, size = 28, normalized size = 2.15

$$-\frac{1}{3}x^3 - x + \frac{1}{2}\log(x+1) - \frac{1}{2}\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^5/(x^3 - x),x, algorithm="fricas")
```

```
[Out] -1/3*x^3 - x + 1/2*log(x + 1) - 1/2*log(x - 1)
```

Sympy [A] time = 0.170204, size = 19, normalized size = 1.46

$$-\frac{x^3}{3} - x - \frac{\log(x-1)}{2} + \frac{\log(x+1)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(-x**3+x),x)
```

```
[Out] -x**3/3 - x - log(x - 1)/2 + log(x + 1)/2
```

GIAC/XCAS [A] time = 0.219067, size = 31, normalized size = 2.38

$$-\frac{1}{3}x^3 - x + \frac{1}{2}\ln(|x+1|) - \frac{1}{2}\ln(|x-1|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^5/(x^3 - x),x, algorithm="giac")
```

```
[Out] -1/3*x^3 - x + 1/2*ln(abs(x + 1)) - 1/2*ln(abs(x - 1))
```

3.27 $\int \frac{x^4}{x-x^3} \, dx$

Optimal. Leaf size=20

$$-\frac{x^2}{2}-\frac{1}{2}\log\left(1-x^2\right)$$

```
[Out] -x^2/2 - Log[1 - x^2]/2
```

Rubi [A] time = 0.0324703, antiderivative size = 20, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{x^2}{2}-\frac{1}{2}\log\left(1-x^2\right)$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/(x - x^3),x]

[Out] -x^2/2 - Log[1 - x^2]/2
```

Rubi in Sympy [A] time = 5.86129, size = 14, normalized size = 0.7

$$-\frac{x^2}{2}-\frac{\log\left(-x^2+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(-x**3+x),x)

[Out] -x**2/2 - log(-x**2 + 1)/2
```

Mathematica [A] time = 0.00480358, size = 18, normalized size = 0.9

$$-\frac{x^2}{2}-\frac{1}{2}\log\left(x^2-1\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/(x - x^3),x]

[Out] -x^2/2 - Log[-1 + x^2]/2
```

Maple [A] time = 0.002, size = 19, normalized size = 1.

$$-\frac{x^2}{2}-\frac{\ln\left(-1+x\right)}{2}-\frac{\ln\left(1+x\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(-x^3+x),x)

[Out] -1/2*x^2-1/2*ln(-1+x)-1/2*ln(1+x)
```

Maxima [A] time = 1.36626, size = 24, normalized size = 1.2

$$-\frac{1}{2}x^2 - \frac{1}{2}\log(x+1) - \frac{1}{2}\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^4/(x^3 - x),x, algorithm="maxima")

[Out] -1/2*x^2 - 1/2*log(x + 1) - 1/2*log(x - 1)
```

Fricas [A] time = 0.201721, size = 19, normalized size = 0.95

$$-\frac{1}{2}x^2 - \frac{1}{2}\log\left(x^2-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^4/(x^3 - x),x, algorithm="fricas")

[Out] -1/2*x^2 - 1/2*log(x^2 - 1)
```

Sympy [A] time = 0.143187, size = 14, normalized size = 0.7

$$-\frac{x^2}{2} - \frac{\log\left(x^2-1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(-x**3+x),x)

[Out] -x**2/2 - log(x**2 - 1)/2
```

GIAC/XCAS [A] time = 0.220191, size = 20, normalized size = 1.

$$-\frac{1}{2}x^2 - \frac{1}{2}\ln\left(\left|x^2-1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^4/(x^3 - x),x, algorithm="giac")

[Out] -1/2*x^2 - 1/2*ln(abs(x^2 - 1))
```

3.28 $\int \frac{x^3}{x-x^3} \, dx$

Optimal. Leaf size=6

$$\tanh^{-1}(x) - x$$

```
[Out] -x + ArcTanh[x]
```

Rubi [A] time = 0.0166474, antiderivative size = 6, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\tanh^{-1}(x) - x$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(x - x^3),x]

[Out] -x + ArcTanh[x]
```

Rubi in Sympy [A] time = 4.43305, size = 3, normalized size = 0.5

$$-x + \operatorname{atanh}(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(-x**3+x),x)

[Out] -x + atanh(x)
```

Mathematica [B] time = 0.00465543, size = 22, normalized size = 3.67

$$-x - \frac{1}{2}\log(1-x) + \frac{1}{2}\log(x+1)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/(x - x^3),x]

[Out] -x - Log[1 - x]/2 + Log[1 + x]/2
```

Maple [B] time = 0.003, size = 17, normalized size = 2.8

$$-x - \frac{\ln(-1+x)}{2} + \frac{\ln(1+x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(-x^3+x),x)

[Out] -x-1/2*ln(-1+x)+1/2*ln(1+x)
```

Maxima [A] time = 1.38121, size = 22, normalized size = 3.67

$$-x + \frac{1}{2}\log(x+1) - \frac{1}{2}\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^3/(x^3 - x),x, algorithm="maxima")

[Out] -x + 1/2*log(x + 1) - 1/2*log(x - 1)
```

Fricas [A] time = 0.202953, size = 22, normalized size = 3.67

$$-x + \frac{1}{2}\log(x+1) - \frac{1}{2}\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^3/(x^3 - x),x, algorithm="fricas")

[Out] -x + 1/2*log(x + 1) - 1/2*log(x - 1)
```

Sympy [A] time = 0.177513, size = 14, normalized size = 2.33

$$-x - \frac{\log(x-1)}{2} + \frac{\log(x+1)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(-x**3+x),x)

[Out] -x - log(x - 1)/2 + log(x + 1)/2
```

GIAC/XCAS [A] time = 0.217938, size = 24, normalized size = 4.

$$-x + \frac{1}{2}\ln(|x+1|) - \frac{1}{2}\ln(|x-1|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^3/(x^3 - x),x, algorithm="giac")

[Out] -x + 1/2*ln(abs(x + 1)) - 1/2*ln(abs(x - 1))
```

3.29 $\int \frac{x^2}{x-x^3} \, dx$

Optimal. Leaf size=12

$$-\frac{1}{2} \log \left(1-x^2\right)$$

```
[Out] -Log[1 - x^2]/2
```

Rubi [A] time = 0.0107102, antiderivative size = 12, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$-\frac{1}{2} \log \left(1-x^2\right)$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(x - x^3),x]

[Out] -Log[1 - x^2]/2
```

Rubi in Sympy [A] time = 2.88714, size = 10, normalized size = 0.83

$$-\frac{\log \left((x-1)(x+1)\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(-x**3+x),x)

[Out] -log((x - 1)*(x + 1))/2
```

Mathematica [A] time = 0.00290033, size = 12, normalized size = 1.

$$-\frac{1}{2} \log \left(1-x^2\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(x - x^3),x]

[Out] -Log[1 - x^2]/2
```

Maple [A] time = 0.002, size = 14, normalized size = 1.2

$$-\frac{\ln(-1+x)}{2}-\frac{\ln(1+x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(-x^3+x),x)

[Out] -1/2*ln(-1+x)-1/2*ln(1+x)
```

Maxima [A] time = 1.3714, size = 18, normalized size = 1.5

$$-\frac{1}{2}\log(x+1)-\frac{1}{2}\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^2/(x^3 - x),x, algorithm="maxima")

[Out] -1/2*log(x + 1) - 1/2*log(x - 1)
```

Fricas [A] time = 0.200665, size = 11, normalized size = 0.92

$$-\frac{1}{2}\log\left(x^2-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^2/(x^3 - x),x, algorithm="fricas")

[Out] -1/2*log(x^2 - 1)
```

Sympy [A] time = 0.140966, size = 8, normalized size = 0.67

$$-\frac{\log\left(x^2-1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(-x**3+x),x)

[Out] -log(x**2 - 1)/2
```

GIAC/XCAS [A] time = 0.21816, size = 20, normalized size = 1.67

$$-\frac{1}{2}\ln\left(|x+1|\right)-\frac{1}{2}\ln\left(|x-1|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x^2/(x^3 - x),x, algorithm="giac")

[Out] -1/2*ln(abs(x + 1)) - 1/2*ln(abs(x - 1))
```

3.30 $\int \frac{x}{x-x^3} \, dx$

Optimal. Leaf size=2

$$\tanh^{-1}(x)$$

```
[Out] ArcTanh[x]
```

Rubi [A] time = 0.00725849, antiderivative size = 2, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\tanh^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Int[x/(x - x^3),x]

[Out] ArcTanh[x]
```

Rubi in Sympy [A] time = 1.07745, size = 2, normalized size = 1.

$$\operatorname{atanh}(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(-x**3+x),x)

[Out] atanh(x)
```

Mathematica [B] time = 0.00355821, size = 19, normalized size = 9.5

$$\frac{1}{2}\log(x+1)-\frac{1}{2}\log(1-x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(x - x^3),x]

[Out] -Log[1 - x]/2 + Log[1 + x]/2
```

Maple [A] time = 0.001, size = 3, normalized size = 1.5

$$\mathit{Artanh}(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(-x^3+x),x)

[Out] arctanh(x)
```

Maxima [A] time = 1.36441, size = 18, normalized size = 9.

$$\frac{1}{2}\log(x+1)-\frac{1}{2}\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/(x^3 - x),x, algorithm="maxima")
```

```
[Out] 1/2*log(x + 1) - 1/2*log(x - 1)
```

Fricas [A] time = 0.203402, size = 18, normalized size = 9.

$$\frac{1}{2}\log\left(x+1\right)-\frac{1}{2}\log\left(x-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/(x^3 - x),x, algorithm="fricas")
```

```
[Out] 1/2*log(x + 1) - 1/2*log(x - 1)
```

Sympy [A] time = 0.176834, size = 12, normalized size = 6.

$$-\frac{\log\left(x-1\right)}{2}+\frac{\log\left(x+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(-x**3+x),x)
```

```
[Out] -log(x - 1)/2 + log(x + 1)/2
```

GIAC/XCAS [A] time = 0.218752, size = 20, normalized size = 10.

$$\frac{1}{2}\ln\left(|x+1|\right)-\frac{1}{2}\ln\left(|x-1|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-x/(x^3 - x),x, algorithm="giac")
```

```
[Out] 1/2*ln(abs(x + 1)) - 1/2*ln(abs(x - 1))
```

3.31 $\int \frac{1}{x-x^3} dx$

Optimal. Leaf size=15

$$\log(x) - \frac{1}{2}\log\left(1-x^2\right)$$

```
[Out] Log[x] - Log[1 - x^2]/2
```

Rubi [A] time = 0.0208824, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.556

$$\log(x) - \frac{1}{2}\log\left(1-x^2\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(x - x^3)^(-1),x]

[Out] Log[x] - Log[1 - x^2]/2
```

Rubi in Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(-x**3+x),x)

[Out] Exception raised: TypeError
```

Mathematica [A] time = 0.00394251, size = 15, normalized size = 1.

$$\log(x) - \frac{1}{2}\log\left(1-x^2\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x - x^3)^(-1),x]

[Out] Log[x] - Log[1 - x^2]/2
```

Maple [A] time = 0.009, size = 16, normalized size = 1.1

$$\ln(x) - \frac{\ln(-1+x)}{2} - \frac{\ln(1+x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(-x^3+x),x)

[Out] ln(x)-1/2*ln(-1+x)-1/2*ln(1+x)
```

Maxima [A] time = 1.36284, size = 20, normalized size = 1.33

$$-\frac{1}{2}\log(x+1)-\frac{1}{2}\log(x-1)+\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(x^3 - x),x, algorithm="maxima")
```

```
[Out] -1/2*log(x + 1) - 1/2*log(x - 1) + log(x)
```

Fricas [A] time = 0.201793, size = 15, normalized size = 1.

$$-\frac{1}{2}\log\left(x^2-1\right)+\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(x^3 - x),x, algorithm="fricas")
```

```
[Out] -1/2*log(x^2 - 1) + log(x)
```

Sympy [A] time = 0.175263, size = 10, normalized size = 0.67

$$\log(x)-\frac{\log\left(x^2-1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(-x**3+x),x)
```

```
[Out] log(x) - log(x**2 - 1)/2
```

GIAC/XCAS [A] time = 0.221381, size = 22, normalized size = 1.47

$$\frac{1}{2}\ln\left(x^2\right)-\frac{1}{2}\ln\left(\left|x^2-1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/(x^3 - x),x, algorithm="giac")
```

```
[Out] 1/2*ln(x^2) - 1/2*ln(abs(x^2 - 1))
```

3.32 $\int \frac{1}{x(x-x^3)}\,dx$

Optimal. Leaf size=8

$$\tanh^{-1}(x) - \frac{1}{x}$$

```
[Out] -x^(-1) + ArcTanh[x]
```

Rubi [A] time = 0.0157326, antiderivative size = 8, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\tanh^{-1}(x) - \frac{1}{x}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(x - x^3)),x]

[Out] -x^(-1) + ArcTanh[x]
```

Rubi in Sympy [A] time = 4.24567, size = 5, normalized size = 0.62

$$\operatorname{atanh}(x) - \frac{1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(-x**3+x),x)

[Out] atanh(x) - 1/x
```

Mathematica [B] time = 0.0048887, size = 24, normalized size = 3.

$$-\frac{1}{x} - \frac{1}{2}\log(1-x) + \frac{1}{2}\log(x+1)$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(x - x^3)),x]

[Out] -x^(-1) - Log[1 - x]/2 + Log[1 + x]/2
```

Maple [B] time = 0.01, size = 19, normalized size = 2.4

$$-\frac{\ln(-1+x)}{2} + \frac{\ln(1+x)}{2} - x^{-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(-x^3+x),x)

[Out] -1/2*ln(-1+x)+1/2*ln(1+x)-1/x
```

Maxima [A] time = 1.3911, size = 24, normalized size = 3.

$$-\frac{1}{x} + \frac{1}{2}\log\left(x + 1\right) - \frac{1}{2}\log\left(x - 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x),x, algorithm="maxima")
```

```
[Out] -1/x + 1/2*log(x + 1) - 1/2*log(x - 1)
```

Fricas [A] time = 0.204814, size = 27, normalized size = 3.38

$$\frac{x\log\left(x + 1\right) - x\log\left(x - 1\right) - 2}{2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x),x, algorithm="fricas")
```

```
[Out] 1/2*(x*log(x + 1) - x*log(x - 1) - 2)/x
```

Sympy [A] time = 0.212866, size = 15, normalized size = 1.88

$$-\frac{\log\left(x - 1\right)}{2} + \frac{\log\left(x + 1\right)}{2} - \frac{1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(-x**3+x),x)
```

```
[Out] -log(x - 1)/2 + log(x + 1)/2 - 1/x
```

GIAC/XCAS [A] time = 0.215718, size = 27, normalized size = 3.38

$$-\frac{1}{x} + \frac{1}{2}\ln\left(|x + 1|\right) - \frac{1}{2}\ln\left(|x - 1|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x),x, algorithm="giac")
```

```
[Out] -1/x + 1/2*ln(abs(x + 1)) - 1/2*ln(abs(x - 1))
```

3.33 $\int \frac{1}{x^2(x-x^3)}\,dx$

Optimal. Leaf size=22

$$-\frac{1}{2x^2}-\frac{1}{2}\log\left(1-x^2\right)+\log(x)$$

```
[Out] -1/(2*x^2) + Log[x] - Log[1 - x^2]/2
```

Rubi [A] time = 0.0328719, antiderivative size = 22, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{1}{2x^2}-\frac{1}{2}\log\left(1-x^2\right)+\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*(x - x^3)),x]

[Out] -1/(2*x^2) + Log[x] - Log[1 - x^2]/2
```

Rubi in Sympy [A] time = 5.82759, size = 20, normalized size = 0.91

$$\frac{\log\left(x^2\right)}{2}-\frac{\log\left(-x^2+1\right)}{2}-\frac{1}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**2/(-x**3+x),x)

[Out] log(x**2)/2 - log(-x**2 + 1)/2 - 1/(2*x**2)
```

Mathematica [A] time = 0.00583457, size = 22, normalized size = 1.

$$-\frac{1}{2x^2}-\frac{1}{2}\log\left(1-x^2\right)+\log(x)$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*(x - x^3)),x]

[Out] -1/(2*x^2) + Log[x] - Log[1 - x^2]/2
```

Maple [A] time = 0.012, size = 21, normalized size = 1.

$$-\frac{1}{2\,x^2}+\ln(x)-\frac{\ln(-1+x)}{2}-\frac{\ln(1+x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(-x^3+x),x)

[Out] -1/2/x^2+ln(x)-1/2*ln(-1+x)-1/2*ln(1+x)
```

Maxima [A] time = 1.43266, size = 27, normalized size = 1.23

$$-\frac{1}{2\,x^2}-\frac{1}{2}\,\log\left(x+1\right)-\frac{1}{2}\,\log\left(x-1\right)+\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^2),x, algorithm="maxima")

[Out] -1/2/x^2 - 1/2*log(x + 1) - 1/2*log(x - 1) + log(x)
```

Fricas [A] time = 0.201567, size = 32, normalized size = 1.45

$$-\frac{x^2\log\left(x^2-1\right)-2\,x^2\log\left(x\right)+1}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^2),x, algorithm="fricas")

[Out] -1/2*(x^2*log(x^2 - 1) - 2*x^2*log(x) + 1)/x^2
```

Sympy [A] time = 0.234198, size = 17, normalized size = 0.77

$$\log\left(x\right)-\frac{\log\left(x^2-1\right)}{2}-\frac{1}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(-x**3+x),x)

[Out] log(x) - log(x**2 - 1)/2 - 1/(2*x**2)
```

GIAC/XCAS [A] time = 0.217007, size = 35, normalized size = 1.59

$$-\frac{x^2+1}{2\,x^2}+\frac{1}{2}\ln\left(x^2\right)-\frac{1}{2}\ln\left(\left|x^2-1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^2),x, algorithm="giac")

[Out] -1/2*(x^2 + 1)/x^2 + 1/2*ln(x^2) - 1/2*ln(abs(x^2 - 1))
```

3.34 $\int \frac{1}{x^3(x-x^3)}\,dx$

Optimal. Leaf size=15

$$-\frac{1}{3x^3}-\frac{1}{x}+\tanh^{-1}(x)$$

```
[Out] -1/(3*x^3) - x^(-1) + ArcTanh[x]
```

Rubi [A] time = 0.0248044, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{1}{3x^3}-\frac{1}{x}+\tanh^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(x - x^3)),x]

[Out] -1/(3*x^3) - x^(-1) + ArcTanh[x]
```

Rubi in Sympy [A] time = 5.81055, size = 12, normalized size = 0.8

$$\operatorname{atanh}(x)-\frac{1}{x}-\frac{1}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(-x**3+x),x)

[Out] atanh(x) - 1/x - 1/(3*x**3)
```

Mathematica [B] time = 0.00590721, size = 31, normalized size = 2.07

$$-\frac{1}{3x^3}-\frac{1}{x}-\frac{1}{2}\log(1-x)+\frac{1}{2}\log(x+1)$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(x - x^3)),x]

[Out] -1/(3*x^3) - x^(-1) - Log[1 - x]/2 + Log[1 + x]/2
```

Maple [A] time = 0.01, size = 24, normalized size = 1.6

$$-\frac{1}{3\,x^3}-x^{-1}-\frac{\ln(-1+x)}{2}+\frac{\ln(1+x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(-x^3+x),x)

[Out] -1/3/x^3-1/x-1/2*ln(-1+x)+1/2*ln(1+x)
```

Maxima [A] time = 1.41126, size = 34, normalized size = 2.27

$$-\frac{3\,x^2+1}{3\,x^3}+\frac{1}{2}\,\log\left(x+1\right)-\frac{1}{2}\,\log\left(x-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^3),x, algorithm="maxima")
```

```
[Out] -1/3*(3*x^2 + 1)/x^3 + 1/2*log(x + 1) - 1/2*log(x - 1)
```

Fricas [A] time = 0.203688, size = 41, normalized size = 2.73

$$\frac{3\,x^3\log\left(x+1\right)-3\,x^3\log\left(x-1\right)-6\,x^2-2}{6\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^3),x, algorithm="fricas")
```

```
[Out] 1/6*(3*x^3*log(x + 1) - 3*x^3*log(x - 1) - 6*x^2 - 2)/x^3
```

Sympy [A] time = 0.255214, size = 24, normalized size = 1.6

$$-\frac{\log\left(x-1\right)}{2}+\frac{\log\left(x+1\right)}{2}-\frac{3x^2+1}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(-x**3+x),x)
```

```
[Out] -log(x - 1)/2 + log(x + 1)/2 - (3*x**2 + 1)/(3*x**3)
```

GIAC/XCAS [A] time = 0.217227, size = 36, normalized size = 2.4

$$-\frac{3\,x^2+1}{3\,x^3}+\frac{1}{2}\ln\left(|x+1|\right)-\frac{1}{2}\ln\left(|x-1|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^3),x, algorithm="giac")
```

```
[Out] -1/3*(3*x^2 + 1)/x^3 + 1/2*ln(abs(x + 1)) - 1/2*ln(abs(x - 1))
```

3.35 $\int \frac{1}{x^4(x-x^3)}\,dx$

Optimal. Leaf size=29

$$-\frac{1}{4x^4}-\frac{1}{2x^2}-\frac{1}{2}\log\left(1-x^2\right)+\log(x)$$

```
[Out] -1/(4*x^4) - 1/(2*x^2) + Log[x] - Log[1 - x^2]/2
```

Rubi [A] time = 0.0351831, antiderivative size = 29, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{1}{4x^4}-\frac{1}{2x^2}-\frac{1}{2}\log\left(1-x^2\right)+\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^4*(x - x^3)),x]

[Out] -1/(4*x^4) - 1/(2*x^2) + Log[x] - Log[1 - x^2]/2
```

Rubi in Sympy [A] time = 6.10786, size = 27, normalized size = 0.93

$$\frac{\log\left(x^2\right)}{2}-\frac{\log\left(-x^2+1\right)}{2}-\frac{1}{2x^2}-\frac{1}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**4/(-x**3+x),x)

[Out] log(x**2)/2 - log(-x**2 + 1)/2 - 1/(2*x**2) - 1/(4*x**4)
```

Mathematica [A] time = 0.00605696, size = 29, normalized size = 1.

$$-\frac{1}{4x^4}-\frac{1}{2x^2}-\frac{1}{2}\log\left(1-x^2\right)+\log(x)$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^4*(x - x^3)),x]

[Out] -1/(4*x^4) - 1/(2*x^2) + Log[x] - Log[1 - x^2]/2
```

Maple [A] time = 0.013, size = 26, normalized size = 0.9

$$-\frac{1}{4\,x^4}-\frac{1}{2\,x^2}+\ln(x)-\frac{\ln(-1+x)}{2}-\frac{\ln(1+x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^4/(-x^3+x),x)

[Out] -1/4/x^4-1/2/x^2+ln(x)-1/2*ln(-1+x)-1/2*ln(1+x)
```

Maxima [A] time = 1.38804, size = 36, normalized size = 1.24

$$-\frac{2\,x^2+1}{4\,x^4}-\frac{1}{2}\,\log\left(x+1\right)-\frac{1}{2}\,\log\left(x-1\right)+\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^4),x, algorithm="maxima")
```

```
[Out] -1/4*(2*x^2 + 1)/x^4 - 1/2*log(x + 1) - 1/2*log(x - 1) + log(x)
```

Fricas [A] time = 0.202468, size = 41, normalized size = 1.41

$$-\frac{2\,x^4\log\left(x^2-1\right)-4\,x^4\log\left(x\right)+2\,x^2+1}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^4),x, algorithm="fricas")
```

```
[Out] -1/4*(2*x^4*log(x^2 - 1) - 4*x^4*log(x) + 2*x^2 + 1)/x^4
```

Sympy [A] time = 0.276597, size = 22, normalized size = 0.76

$$\log\left(x\right)-\frac{\log\left(x^2-1\right)}{2}-\frac{2x^2+1}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(-x**3+x),x)
```

```
[Out] log(x) - log(x**2 - 1)/2 - (2*x**2 + 1)/(4*x**4)
```

GIAC/XCAS [A] time = 0.220574, size = 45, normalized size = 1.55

$$-\frac{3\,x^4+2\,x^2+1}{4\,x^4}+\frac{1}{2}\ln\left(x^2\right)-\frac{1}{2}\ln\left(\left|x^2-1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-1/((x^3 - x)*x^4),x, algorithm="giac")
```

```
[Out] -1/4*(3*x^4 + 2*x^2 + 1)/x^4 + 1/2*ln(x^2) - 1/2*ln(abs(x^2 - 1))
```

3.36 $\int \frac{1}{x+bx^3}\,dx$

Optimal. Leaf size=15

$$\log(x)-\frac{1}{2}\log\left(bx^2+1\right)$$

```
[Out] Log[x] - Log[1 + b*x^2]/2
```

Rubi [A] time = 0.0254655, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.556

$$\log(x)-\frac{1}{2}\log\left(bx^2+1\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(x + b*x^3)^(-1),x]
```

```
[Out] Log[x] - Log[1 + b*x^2]/2
```

Rubi in Sympy [A] time = 25.0264, size = 15, normalized size = 1.

$$\frac{\log\left(x^2\right)}{2}-\frac{\log\left(bx^2+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+x),x)
```

```
[Out] log(x**2)/2 - log(b*x**2 + 1)/2
```

Mathematica [A] time = 0.00553795, size = 15, normalized size = 1.

$$\log(x)-\frac{1}{2}\log\left(bx^2+1\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x + b*x^3)^(-1),x]
```

```
[Out] Log[x] - Log[1 + b*x^2]/2
```

Maple [A] time = 0.006, size = 14, normalized size = 0.9

$$\ln(x)-\frac{\ln\left(bx^2+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+x),x)
```

```
[Out] ln(x)-1/2*ln(b*x^2+1)
```

Maxima [A] time = 1.37166, size = 18, normalized size = 1.2

$$-\frac{1}{2}\log\left(bx^2+1\right)+\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + x),x, algorithm="maxima")
```

```
[Out] -1/2*log(b*x^2 + 1) + log(x)
```

Fricas [A] time = 0.200676, size = 18, normalized size = 1.2

$$-\frac{1}{2}\log\left(bx^2+1\right)+\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + x),x, algorithm="fricas")
```

```
[Out] -1/2*log(b*x^2 + 1) + log(x)
```

Sympy [A] time = 0.28776, size = 12, normalized size = 0.8

$$\log\left(x\right)-\frac{\log\left(x^2+\frac{1}{b}\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+x),x)
```

```
[Out] log(x) - log(x**2 + 1/b)/2
```

GIAC/XCAS [A] time = 0.216922, size = 24, normalized size = 1.6

$$\frac{1}{2}\ln\left(x^2\right)-\frac{1}{2}\ln\left(\left|bx^2+1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + x),x, algorithm="giac")
```

```
[Out] 1/2*ln(x^2) - 1/2*ln(abs(b*x^2 + 1))
```

3.37 $\int \frac{1}{-x+bx^3} dx$

Optimal. Leaf size=18

$$\frac{1}{2}\log\left(1-bx^2\right)-\log(x)$$

```
[Out] -Log[x] + Log[1 - b*x^2]/2
```

Rubi [A] time = 0.027988, antiderivative size = 18, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.454

$$\frac{1}{2}\log\left(1-bx^2\right)-\log(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(-x + b*x^3)^(-1),x]

[Out] -Log[x] + Log[1 - b*x^2]/2
```

Rubi in Sympy [A] time = 26.3318, size = 15, normalized size = 0.83

$$-\frac{\log\left(x^2\right)}{2}+\frac{\log\left(-bx^2+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3-x),x)

[Out] -log(x**2)/2 + log(-b*x**2 + 1)/2
```

Mathematica [A] time = 0.00581249, size = 18, normalized size = 1.

$$\frac{1}{2}\log\left(1-bx^2\right)-\log(x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(-x + b*x^3)^(-1),x]

[Out] -Log[x] + Log[1 - b*x^2]/2
```

Maple [A] time = 0.006, size = 16, normalized size = 0.9

$$-\ln(x)+\frac{\ln\left(bx^2-1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3-x),x)

[Out] -ln(x)+1/2*ln(b*x^2-1)
```

Maxima [A] time = 1.36393, size = 20, normalized size = 1.11

$$\frac{1}{2}\log\left(bx^2-1\right)-\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 - x),x, algorithm="maxima")

[Out] 1/2*log(b*x^2 - 1) - log(x)
```

Fricas [A] time = 0.203913, size = 20, normalized size = 1.11

$$\frac{1}{2}\log\left(bx^2-1\right)-\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 - x),x, algorithm="fricas")

[Out] 1/2*log(b*x^2 - 1) - log(x)
```

Sympy [A] time = 0.311111, size = 12, normalized size = 0.67

$$-\log\left(x\right)+\frac{\log\left(x^2-\frac{1}{b}\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3-x),x)

[Out] -log(x) + log(x**2 - 1/b)/2
```

GIAC/XCAS [A] time = 0.216535, size = 24, normalized size = 1.33

$$-\frac{1}{2}\ln\left(x^2\right)+\frac{1}{2}\ln\left(\left|bx^2-1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 - x),x, algorithm="giac")

[Out] -1/2*ln(x^2) + 1/2*ln(abs(b*x^2 - 1))
```

3.38 $\int x^3\sqrt{ax+bx^3}\,dx$

Optimal. Leaf size=163

$$\frac{10a^{11/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{231b^{9/4}\sqrt{ax+bx^3}}-\frac{20a^2\sqrt{ax+bx^3}}{231b^2}+\frac{2}{11}x^4\sqrt{ax+bx^3}+\frac{4ax^2\sqrt{ax+bx^3}}{77b}$$

```
[Out] (-20*a^2*Sqrt[a*x + b*x^3])/(231*b^2) + (4*a*x^2*Sqrt[a*x + b*x^3
])/(77*b) + (2*x^4*Sqrt[a*x + b*x^3])/11 + (10*a^(11/4)*Sqrt[x]*(
Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*El
lipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(231*b^(9/4)*S
qrt[a*x + b*x^3])
```

Rubi [A] time = 0.343981, antiderivative size = 163, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$\frac{10a^{11/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{231b^{9/4}\sqrt{ax+bx^3}}-\frac{20a^2\sqrt{ax+bx^3}}{231b^2}+\frac{2}{11}x^4\sqrt{ax+bx^3}+\frac{4ax^2\sqrt{ax+bx^3}}{77b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3*Sqrt[a*x + b*x^3],x]
```

```
[Out] (-20*a^2*Sqrt[a*x + b*x^3])/(231*b^2) + (4*a*x^2*Sqrt[a*x + b*x^3
])/(77*b) + (2*x^4*Sqrt[a*x + b*x^3])/11 + (10*a^(11/4)*Sqrt[x]*(
Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*El
lipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(231*b^(9/4)*S
qrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 31.9539, size = 156, normalized size = 0.96

$$\frac{10a^{\frac{11}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{231b^{\frac{9}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{20a^2\sqrt{ax+bx^3}}{231b^2}+\frac{4ax^2\sqrt{ax+bx^3}}{77b}+\frac{2x^4\sqrt{ax+bx^3}}{11}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(b*x**3+a*x)**(1/2),x)
```

```
[Out] 10*a**(11/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
 + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(
x)/a**(1/4)), 1/2)/(231*b**(9/4)*sqrt(x)*(a + b*x**2)) - 20*a**2*
sqrt(a*x + b*x**3)/(231*b**2) + 4*a*x**2*sqrt(a*x + b*x**3)/(77*b
) + 2*x**4*sqrt(a*x + b*x**3)/11
```

Mathematica [C] time = 0.24161, size = 148, normalized size = 0.91

$$\frac{2x\left(10ia^3\sqrt{x}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)+\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(-10a^3-4a^2bx^2+27ab^2x^4+21b^3x^6\right)\right)}{231b^2\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3*Sqrt[a*x + b*x^3],x]
```

```
[Out] (2*x*(Sqrt[(I*Sqrt[a])/Sqrt[b]]*(-10*a^3 - 4*a^2*b*x^2 + 27*a*b^2
*x^4 + 21*b^3*x^6) + (10*I)*a^3*Sqrt[1 + a/(b*x^2)]*Sqrt[x]*Ellip
ticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1]))/(231*Sqr
t[(I*Sqrt[a])/Sqrt[b]]*b^2*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.03, size = 168, normalized size = 1.

$$\frac{2\,x^4}{11}\sqrt{bx^3+ax}+\frac{4\,ax^2}{77\,b}\sqrt{bx^3+ax}-\frac{20\,a^2}{231\,b^2}\sqrt{bx^3+ax}$$
$$+\frac{10\,a^3}{231\,b^3}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(b*x^3+a*x)^(1/2),x)
```

```
[Out] 2/11*x^4*(b*x^3+a*x)^(1/2)+4/77*a*x^2*(b*x^3+a*x)^(1/2)/b-20/231*
a^2*(b*x^3+a*x)^(1/2)/b^2+10/231*a^3/b^3*(-a*b)^(1/2)*((x+1/b*(-a
*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b
)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*Ellipt
icF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{bx^3+ax}x^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x^3,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)*x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{bx^3+ax}x^3, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x^3,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*x^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^3 \sqrt{x\left(a + bx^2\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(x**3*sqrt(x*(a + b*x**2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx^3 + ax}x^3\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x^3,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)*x^3, x)
```

3.39 $\int x^2\sqrt{ax+bx^3}\,dx$

Optimal. Leaf size=281

$$-\frac{2a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15b^{7/4}\sqrt{ax+bx^3}}+\frac{4a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15b^{7/4}\sqrt{ax+bx^3}}-\frac{4a^2x\left(a+bx^2\right)}{15b^{3/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{2}{9}x^3\sqrt{ax+bx^3}+\frac{4ax\sqrt{ax+bx^3}}{45b}$$

```
[Out] (-4*a^2*x*(a + b*x^2))/(15*b^(3/2)*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x
 + b*x^3]) + (4*a*x*Sqrt[a*x + b*x^3])/(45*b) + (2*x^3*Sqrt[a*x +
 b*x^3])/9 + (4*a^(9/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b
*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x
])/a^(1/4)], 1/2])/(15*b^(7/4)*Sqrt[a*x + b*x^3]) - (2*a^(9/4)*Sq
rt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x
)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(15*b^(
7/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.528239, antiderivative size = 281, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$-\frac{2a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15b^{7/4}\sqrt{ax+bx^3}}+\frac{4a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15b^{7/4}\sqrt{ax+bx^3}}-\frac{4a^2x\left(a+bx^2\right)}{15b^{3/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{2}{9}x^3\sqrt{ax+bx^3}+\frac{4ax\sqrt{ax+bx^3}}{45b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*Sqrt[a*x + b*x^3],x]
```


```
[Out] (-4*a^2*x*(a + b*x^2))/(15*b^(3/2)*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x
 + b*x^3]) + (4*a*x*Sqrt[a*x + b*x^3])/(45*b) + (2*x^3*Sqrt[a*x +
 b*x^3])/9 + (4*a^(9/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b
*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x
])/a^(1/4)], 1/2])/(15*b^(7/4)*Sqrt[a*x + b*x^3]) - (2*a^(9/4)*Sq
rt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x
)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(15*b^(
7/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 50.6539, size = 264, normalized size = 0.94

$$\frac{4a^{\frac{9}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{15b^{\frac{7}{4}}\sqrt{x}\left(a+bx^2\right)} - \frac{2a^{\frac{9}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{15b^{\frac{7}{4}}\sqrt{x}\left(a+bx^2\right)} - \frac{4a^2\sqrt{ax+bx^3}}{15b^{\frac{3}{2}}\left(\sqrt{a}+\sqrt{b}x\right)} + \frac{4ax\sqrt{ax+bx^3}}{45b} + \frac{2x^3\sqrt{ax+bx^3}}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a*x)**(1/2),x)
```

```
[Out] 4*a**(9/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) +
 sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x)
/a**(1/4)), 1/2)/(15*b**(7/4)*sqrt(x)*(a + b*x**2)) - 2*a**(9/4)*
sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)
*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)),
 1/2)/(15*b**(7/4)*sqrt(x)*(a + b*x**2)) - 4*a**2*sqrt(a*x + b*x*
*3)/(15*b**(3/2)*(sqrt(a) + sqrt(b)*x)) + 4*a*x*sqrt(a*x + b*x**3
)/(45*b) + 2*x**3*sqrt(a*x + b*x**3)/9
```

Mathematica [C] time = 0.263585, size = 184, normalized size = 0.65

$$\frac{2x\left(6a^{5/2}\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-6a^{5/2}\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+\sqrt{b}x\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(2a^2+7abx^2+5\right.}{45b^{3/2}\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*Sqrt[a*x + b*x^3],x]
```

```
[Out] (2*x*(Sqrt[b]*x*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(2*a^2 + 7*a*b*x^2 +
5*b^2*x^4) - 6*a^(5/2)*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sq
rt[(I*Sqrt[b]*x)/Sqrt[a]]], -1] + 6*a^(5/2)*Sqrt[1 + (b*x^2)/a]*E
llipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))/(45*b^(3/2
)*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.023, size = 197, normalized size = 0.7

$$\frac{2\,x^3}{9}\sqrt{bx^3+ax}+\frac{4\,ax}{45\,b}\sqrt{bx^3+ax}$$
$$-\frac{2\,a^2}{15\,b^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\,\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a*x)^(1/2),x)
```

```
[Out] 2/9*x^3*(b*x^3+a*x)^(1/2)+4/45*a*x*(b*x^3+a*x)^(1/2)/b-2/15/b^2*a
^2*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(
x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/
2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-a*b)^
(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*Ellipt
```

```
icF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx^3 + ax}x^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)*x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{bx^3 + ax}x^2, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2 \sqrt{x \left(a + bx^2\right)} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(x**2*sqrt(x*(a + b*x**2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx^3 + ax}x^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)*x^2, x)
```

3.40 $\int x\sqrt{ax+bx^3}\,dx$

Optimal. Leaf size=137

$$-\frac{2a^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{21b^{5/4}\sqrt{ax+bx^3}}+\frac{4a\sqrt{ax+bx^3}}{21b}+\frac{2}{7}x^2\sqrt{ax+bx^3}$$

```
[Out] (4*a*Sqrt[a*x + b*x^3])/(21*b) + (2*x^2*Sqrt[a*x + b*x^3])/7 - (2
*a^(7/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a]
+ Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/
2])/(21*b^(5/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.243397, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333

$$-\frac{2a^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{21b^{5/4}\sqrt{ax+bx^3}}+\frac{4a\sqrt{ax+bx^3}}{21b}+\frac{2}{7}x^2\sqrt{ax+bx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x*Sqrt[a*x + b*x^3],x]
```

```
[Out] (4*a*Sqrt[a*x + b*x^3])/(21*b) + (2*x^2*Sqrt[a*x + b*x^3])/7 - (2
*a^(7/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a]
+ Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/
2])/(21*b^(5/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 22.568, size = 131, normalized size = 0.96

$$-\frac{2a^{\frac{7}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\text{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{21b^{\frac{5}{4}}\sqrt{x}\left(a+bx^2\right)}+\frac{4a\sqrt{ax+bx^3}}{21b}+\frac{2x^2\sqrt{ax+bx^3}}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a*x)**(1/2),x)
```

```
[Out] -2*a**(7/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(21*b**(5/4)*sqrt(x)*(a + b*x**2)) + 4*a*sqrt(a
*x + b*x**3)/(21*b) + 2*x**2*sqrt(a*x + b*x**3)/7
```

Mathematica [C] time = 0.18301, size = 137, normalized size = 1.

$$\frac{2x\left(\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(2a^2+5abx^2+3b^2x^4\right)-2ia^2\sqrt{x}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)\right)}{21b\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*Sqrt[a*x + b*x^3],x]
```

```
[Out] (2*x*(Sqrt[(I*Sqrt[a])/Sqrt[b]]*(2*a^2 + 5*a*b*x^2 + 3*b^2*x^4) -
 (2*I)*a^2*Sqrt[1 + a/(b*x^2)]*Sqrt[x]*EllipticF[I*ArcSinh[Sqrt[(
I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1]))/(21*Sqrt[(I*Sqrt[a])/Sqrt[b]]
*b*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.024, size = 146, normalized size = 1.1

$$\frac{2x^2}{7}\sqrt{bx^3+ax}+\frac{4a}{21b}\sqrt{bx^3+ax}$$
$$-\frac{2a^2}{21b^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a*x)^(1/2),x)
```

```
[Out] 2/7*x^2*(b*x^3+a*x)^(1/2)+4/21*a*(b*x^3+a*x)^(1/2)/b-2/21/b^2*a^2
*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-
1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)
/(b*x^3+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2)
)^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{bx^3+ax}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)*x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\sqrt{bx^3+ax}x,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\sqrt{x\left(a+bx^2\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(x*sqrt(x*(a + b*x**2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx^3 + ax}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)*x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)*x, x)
```

3.41 $\int \sqrt{ax+bx^3}\,dx$

Optimal. Leaf size=255

$$\frac{2a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+bx^3}} - \frac{4a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+bx^3}} + \frac{2}{5}x\sqrt{ax+bx^3} + \frac{4ax\left(a+bx^2\right)}{5\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

```
[Out] (4*a*x*(a + b*x^2))/(5*Sqrt[b]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b
*x^3]) + (2*x*Sqrt[a*x + b*x^3])/5 - (4*a^(5/4)*Sqrt[x]*(Sqrt[a]
+ Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[
2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*b^(3/4)*Sqrt[a*x +
b*x^3]) + (2*a^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^
2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/
a^(1/4)], 1/2])/(5*b^(3/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.381859, antiderivative size = 255, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.462$

$$\frac{2a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+bx^3}} - \frac{4a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+bx^3}} + \frac{2}{5}x\sqrt{ax+bx^3} + \frac{4ax\left(a+bx^2\right)}{5\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x + b*x^3],x]
```

```
[Out] (4*a*x*(a + b*x^2))/(5*Sqrt[b]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b
*x^3]) + (2*x*Sqrt[a*x + b*x^3])/5 - (4*a^(5/4)*Sqrt[x]*(Sqrt[a]
+ Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[
2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*b^(3/4)*Sqrt[a*x +
b*x^3]) + (2*a^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^
2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/
a^(1/4)], 1/2])/(5*b^(3/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 35.7914, size = 240, normalized size = 0.94

$$-\frac{4a^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)} + \frac{2a^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)} + \frac{4a\sqrt{ax+bx^3}}{5\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)} + \frac{2x\sqrt{ax+bx^3}}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(1/2),x)
```

```
[Out] -4*a**(5/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(5*b**(3/4)*sqrt(x)*(a + b*x**2)) + 2*a**(5/4)*
sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)
*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)),
 1/2)/(5*b**(3/4)*sqrt(x)*(a + b*x**2)) + 4*a*sqrt(a*x + b*x**3)/
(5*sqrt(b)*(sqrt(a) + sqrt(b)*x)) + 2*x*sqrt(a*x + b*x**3)/5
```

Mathematica [C] time = 0.237382, size = 170, normalized size = 0.67

$$\frac{2x\left(-2a^{3/2}\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+2a^{3/2}\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+\sqrt{b}x\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(a+bx^2\right)\right)}{5\sqrt{b}\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x + b*x^3],x]
```

```
[Out] (2*x*(Sqrt[b]*x*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(a + b*x^2) + 2*a^(3/
2)*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqr
t[a]]], -1] - 2*a^(3/2)*Sqrt[1 + (b*x^2)/a]*EllipticF[I*ArcSinh[S
qrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))/(5*Sqrt[b]*Sqrt[(I*Sqrt[b]*x)/
Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.022, size = 175, normalized size = 0.7

$$\frac{2x}{5}\sqrt{bx^3+ax}$$
$$+\frac{2a}{5b}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(1/2),x)
```

```
[Out] 2/5*x*(b*x^3+a*x)^(1/2)+2/5*a/b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2)
)*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^
(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1
/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(
1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(
1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{bx^3+ax}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{bx^3 + ax}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax + bx^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(sqrt(a*x + b*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx^3 + ax}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^3 + a*x), x)
```

3.42 $\int \frac{\sqrt{ax+bx^3}}{x} \, dx$

Optimal. Leaf size=113

$$\frac{2a^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{3\sqrt[4]{b}\sqrt{ax+bx^3}}+\frac{2}{3}\sqrt{ax+bx^3}$$

```
[Out] (2*Sqrt[a*x + b*x^3])/3 + (2*a^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x
)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b
^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(3*b^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.18192, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$\frac{2a^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{3\sqrt[4]{b}\sqrt{ax+bx^3}}+\frac{2}{3}\sqrt{ax+bx^3}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[a*x + b*x^3]/x,x]
```

```
[Out] (2*Sqrt[a*x + b*x^3])/3 + (2*a^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x
)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b
^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(3*b^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 16.219, size = 109, normalized size = 0.96

$$\frac{2a^{\frac{3}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{3\sqrt[4]{b}\sqrt{x}\left(a+bx^2\right)}+\frac{2\sqrt{ax+bx^3}}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a*x)**(1/2)/x,x)
```

```
[Out] 2*a**(3/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) +
 sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)
/a**(1/4)), 1/2)/(3*b**(1/4)*sqrt(x)*(a + b*x**2)) + 2*sqrt(a*x +
 b*x**3)/3
```

Mathematica [C] time = 0.227246, size = 101, normalized size = 0.89

$$\frac{2}{3}\sqrt{x\left(a+bx^2\right)}\left(1+\frac{2ia\sqrt{x}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(a+bx^2\right)}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[a*x + b*x^3]/x,x]
```

```
[Out] (2*Sqrt[x*(a + b*x^2)]*(1 + ((2*I)*a*Sqrt[1 + a/(b*x^2)]*Sqrt[x]*
EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/(Sqr
t[(I*Sqrt[a])/Sqrt[b]]*(a + b*x^2))))/3
```

Maple [A] time = 0.023, size = 124, normalized size = 1.1

$$\frac{2}{3}\sqrt{bx^3+ax} + \frac{2a}{3b}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\,EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3 \cdots}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(1/2)/x,x)
```

```
[Out] 2/3*(b*x^3+a*x)^(1/2)+2/3*a/b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*
b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1
/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*EllipticF(((x+1/b
*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3+ax}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3+ax}}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x\left(a+bx^2\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(1/2)/x,x)
```

```
[Out] Integral(sqrt(x*(a + b*x**2))/x, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3 + ax}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x,x, algorithm="giac")

[Out] integrate(sqrt(b*x^3 + a*x)/x, x)
```

3.43 $\int \frac{\sqrt{ax+bx^3}}{x^2}\,dx$

Optimal. Leaf size=248

$$-\frac{2\sqrt{ax+bx^3}}{x}+\frac{4\sqrt{b}\,x\left(a+bx^2\right)}{\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{2\sqrt[4]{a}\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{\sqrt{ax+bx^3}}-\frac{4\sqrt[4]{a}\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{\sqrt{ax+bx^3}}$$

```
[Out] (4*Sqrt[b]*x*(a + b*x^2))/((Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x^3
]) - (2*Sqrt[a*x + b*x^3])/x - (4*a^(1/4)*b^(1/4)*Sqrt[x]*(Sqrt[a
] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*Elliptic
E[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/Sqrt[a*x + b*x^3] +
(2*a^(1/4)*b^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)
/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^
(1/4)], 1/2])/Sqrt[a*x + b*x^3]
```

Rubi [A] time = 0.419252, antiderivative size = 248, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.353

$$-\frac{2\sqrt{ax+bx^3}}{x}+\frac{4\sqrt{b}\,x\left(a+bx^2\right)}{\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{2\sqrt[4]{a}\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{\sqrt{ax+bx^3}}-\frac{4\sqrt[4]{a}\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x + b*x^3]/x^2,x]
```


```
[Out] (4*Sqrt[b]*x*(a + b*x^2))/((Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x^3
]) - (2*Sqrt[a*x + b*x^3])/x - (4*a^(1/4)*b^(1/4)*Sqrt[x]*(Sqrt[a
] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*Elliptic
E[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/Sqrt[a*x + b*x^3] +
(2*a^(1/4)*b^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)
/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^
(1/4)], 1/2])/Sqrt[a*x + b*x^3]
```

Rubi in Sympy [A] time = 40.3853, size = 231, normalized size = 0.93

$$-\frac{4\sqrt[4]{a}\sqrt[4]{b}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{\sqrt{x}\left(a+bx^2\right)}+\frac{2\sqrt[4]{a}\sqrt[4]{b}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{\sqrt{x}\left(a+bx^2\right)}+\frac{4\sqrt{b}\sqrt{ax+bx^3}}{\sqrt{a}+\sqrt{b}x}-\frac{2\sqrt{ax+bx^3}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(1/2)/x**2,x)
```

```
[Out] -4*a**(1/4)*b**(1/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*
(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/
4)*sqrt(x)/a**(1/4)), 1/2)/(sqrt(x)*(a + b*x**2)) + 2*a**(1/4)*b*
*(1/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqr
t(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**
(1/4)), 1/2)/(sqrt(x)*(a + b*x**2)) + 4*sqrt(b)*sqrt(a*x + b*x**3
)/(sqrt(a) + sqrt(b)*x) - 2*sqrt(a*x + b*x**3)/x
```

Mathematica [C] time = 0.268551, size = 168, normalized size = 0.68

$$-\frac{2\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(a+bx^2\right)+2\sqrt{a}\sqrt{b}x\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-2\sqrt{a}\sqrt{b}x\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)\right)}{\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x + b*x^3]/x^2,x]
```

```
[Out] (-2*(Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(a + b*x^2) - 2*Sqrt[a]*Sqrt[b]*
x*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt
[a]]], -1] + 2*Sqrt[a]*Sqrt[b]*x*Sqrt[1 + (b*x^2)/a]*EllipticF[I*
ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))/(Sqrt[(I*Sqrt[b]*x)/S
qrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.026, size = 177, normalized size = 0.7

$$-2\,\frac{bx^2+a}{\sqrt{x\left(bx^2+a\right)}}$$

$$+2\,\frac{\sqrt{-ab}}{\sqrt{bx^3+ax}}\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-\frac{bx}{\sqrt{-ab}}}\left(-2\,\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/2\sqrt{\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(1/2)/x^2,x)
```

```
[Out] -2*(b*x^2+a)/(x*(b*x^2+a))^(1/2)+2*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1
/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2
))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)
^(1/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*
2^(1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b
)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3+ax}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)/x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3+ax}}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{x\,(a+bx^2)}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(1/2)/x**2,x)
```

```
[Out] Integral(sqrt(x*(a + b*x**2))/x**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{bx^3+ax}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)/x^2, x)
```

3.44 $\int \frac{\sqrt{ax+bx^3}}{x^3} \, dx$

Optimal. Leaf size=116

$$\frac{2b^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{3\sqrt[4]{a}\sqrt{ax+bx^3}}-\frac{2\sqrt{ax+bx^3}}{3x^2}$$

```
[Out] (-2*Sqrt[a*x + b*x^3])/(3*x^2) + (2*b^(3/4)*Sqrt[x]*(Sqrt[a] + Sq
rt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*Ar
cTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(3*a^(1/4)*Sqrt[a*x + b*x^
3])
```

Rubi [A] time = 0.184647, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$\frac{2b^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{3\sqrt[4]{a}\sqrt{ax+bx^3}}-\frac{2\sqrt{ax+bx^3}}{3x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x + b*x^3]/x^3,x]
```

```
[Out] (-2*Sqrt[a*x + b*x^3])/(3*x^2) + (2*b^(3/4)*Sqrt[x]*(Sqrt[a] + Sq
rt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*Ar
cTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(3*a^(1/4)*Sqrt[a*x + b*x^
3])
```

Rubi in Sympy [A] time = 16.3224, size = 112, normalized size = 0.97

$$-\frac{2\sqrt{ax+bx^3}}{3x^2}+\frac{2b^{\frac{3}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{3\sqrt[4]{a}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(1/2)/x**3,x)
```

```
[Out] -2*sqrt(a*x + b*x**3)/(3*x**2) + 2*b**(3/4)*sqrt((a + b*x**2)/(sq
rt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*e
lliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(3*a**(1/4)*sqr
t(x)*(a + b*x**2))
```

Mathematica [C] time = 0.315183, size = 104, normalized size = 0.9

$$\frac{2\sqrt{x\left(a+bx^2\right)}\left(-1+\frac{2ibx^{5/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(a+bx^2\right)}\right)}{3x^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x + b*x^3]/x^3,x]
```

```
[Out] (2*Sqrt[x*(a + b*x^2)]*(-1 + ((2*I)*b*Sqrt[1 + a/(b*x^2)]*x^(5/2)
*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/(Sq
rt[(I*Sqrt[a])/Sqrt[b]]*(a + b*x^2))))/(3*x^2)
```

Maple [A] time = 0.006, size = 123, normalized size = 1.1

$$-\frac{2}{3\,x^2}\sqrt{bx^3+ax}+\frac{2}{3}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(1/2)/x^3,x)
```

```
[Out] -2/3*(b*x^3+a*x)^(1/2)/x^2+2/3*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))
*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(
1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*EllipticF(((x+1/
b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3+ax}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^3,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)/x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3+ax}}{x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^3,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)/x^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x\,(a+bx^2)}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(1/2)/x**3,x)
```

```
[Out] Integral(sqrt(x*(a + b*x**2))/x**3, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3 + ax}}{x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^3,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)/x^3, x)
```

3.45 $\int \frac{\sqrt{ax+bx^3}}{x^4}\,dx$

Optimal. Leaf size=283

$$\frac{2b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{3/4}\sqrt{ax+bx^3}}-\frac{4b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{3/4}\sqrt{ax+bx^3}}+\frac{4b^{3/2}x\left(a+bx^2\right)}{5a\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}-\frac{4b\sqrt{ax+bx^3}}{5ax}-\frac{2\sqrt{ax+bx^3}}{5x^3}$$

```
[Out] (4*b^(3/2)*x*(a + b*x^2))/(5*a*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b
*x^3]) - (2*Sqrt[a*x + b*x^3])/(5*x^3) - (4*b*Sqrt[a*x + b*x^3])/
(5*a*x) - (4*b^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^
2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/
a^(1/4)], 1/2])/(5*a^(3/4)*Sqrt[a*x + b*x^3]) + (2*b^(5/4)*Sqrt[x
]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]
*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*a^(3/4)*
Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.509398, antiderivative size = 283, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$\frac{2b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{3/4}\sqrt{ax+bx^3}}-\frac{4b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{3/4}\sqrt{ax+bx^3}}+\frac{4b^{3/2}x\left(a+bx^2\right)}{5a\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}-\frac{4b\sqrt{ax+bx^3}}{5ax}-\frac{2\sqrt{ax+bx^3}}{5x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x + b*x^3]/x^4,x]
```

```
[Out] (4*b^(3/2)*x*(a + b*x^2))/(5*a*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b
*x^3]) - (2*Sqrt[a*x + b*x^3])/(5*x^3) - (4*b*Sqrt[a*x + b*x^3])/
(5*a*x) - (4*b^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^
2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/
a^(1/4)], 1/2])/(5*a^(3/4)*Sqrt[a*x + b*x^3]) + (2*b^(5/4)*Sqrt[x
]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]
*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*a^(3/4)*
Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 50.7563, size = 262, normalized size = 0.93

$$-\frac{2\sqrt{ax+bx^3}}{5x^3}+\frac{4b^{\frac{3}{2}}\sqrt{ax+bx^3}}{5a\left(\sqrt{a}+\sqrt{b}x\right)}-\frac{4b\sqrt{ax+bx^3}}{5ax}-\frac{4b^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}+\frac{2b^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(1/2)/x**4,x)
```

```
[Out] -2*sqrt(a*x + b*x**3)/(5*x**3) + 4*b**(3/2)*sqrt(a*x + b*x**3)/(5
*a*(sqrt(a) + sqrt(b)*x)) - 4*b*sqrt(a*x + b*x**3)/(5*a*x) - 4*b*
*(5/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqr
t(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x)/a**
(1/4)), 1/2)/(5*a**(3/4)*sqrt(x)*(a + b*x**2)) + 2*b**(5/4)*sqrt(
(a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt
(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)
/(5*a**(3/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.347662, size = 192, normalized size = 0.68

$$-\frac{2\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(a^2+3abx^2+2b^2x^4\right)+2\sqrt{a}b^{3/2}x^3\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-2\sqrt{a}b^{3/2}x^3\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{i\right.\right.\right.}{5ax^2\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x + b*x^3]/x^4,x]
```

```
[Out] (-2*(Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(a^2 + 3*a*b*x^2 + 2*b^2*x^4) -
2*Sqrt[a]*b^(3/2)*x^3*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqr
t[(I*Sqrt[b]*x)/Sqrt[a]]], -1] + 2*Sqrt[a]*b^(3/2)*x^3*Sqrt[1 + (
b*x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))
/(5*a*x^2*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.005, size = 201, normalized size = 0.7

$$-\frac{2}{5x^3}\sqrt{bx^3+ax}-\frac{\left(4bx^2+4a\right)b}{5a}\frac{1}{\sqrt{x\left(bx^2+a\right)}}+\frac{2b}{5a}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(1/2)/x^4,x)
```

```
[Out] -2/5*(b*x^3+a*x)^(1/2)/x^3-4/5*(b*x^2+a)*b/a/(x*(b*x^2+a))^(1/2)+
2/5/a*b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*
(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2)
)^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-
```

```
a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*E
llipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3+ax}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^4,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)/x^4, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3+ax}}{x^4},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^4,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)/x^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x\left(a+bx^2\right)}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(1/2)/x**4,x)
```

```
[Out] Integral(sqrt(x*(a + b*x**2))/x**4, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^3+ax}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x)/x^4,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^3 + a*x)/x^4, x)
```

3.46 $\int x^2 \left(ax+bx^3\right)^{3/2} dx$

Optimal. Leaf size=186

$$\frac{4a^{15/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{231b^{9/4}\sqrt{ax+bx^3}}-\frac{8a^3\sqrt{ax+bx^3}}{231b^2}+\frac{8a^2x^2\sqrt{ax+bx^3}}{385b}+\frac{2}{15}x^3\left(ax+bx^3\right)^{3/2}+\frac{4}{55}ax^4\sqrt{ax+bx^3}$$

```
[Out] (-8*a^3*Sqrt[a*x + b*x^3])/(231*b^2) + (8*a^2*x^2*Sqrt[a*x + b*x^
3])/(385*b) + (4*a*x^4*Sqrt[a*x + b*x^3])/55 + (2*x^3*(a*x + b*x^
3)^(3/2))/15 + (4*a^(15/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a
+ b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqr
t[x])/a^(1/4)], 1/2])/(231*b^(9/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.424496, antiderivative size = 186, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$\frac{4a^{15/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{231b^{9/4}\sqrt{ax+bx^3}}-\frac{8a^3\sqrt{ax+bx^3}}{231b^2}+\frac{8a^2x^2\sqrt{ax+bx^3}}{385b}+\frac{2}{15}x^3\left(ax+bx^3\right)^{3/2}+\frac{4}{55}ax^4\sqrt{ax+bx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(a*x + b*x^3)^(3/2),x]
```

```
[Out] (-8*a^3*Sqrt[a*x + b*x^3])/(231*b^2) + (8*a^2*x^2*Sqrt[a*x + b*x^
3])/(385*b) + (4*a*x^4*Sqrt[a*x + b*x^3])/55 + (2*x^3*(a*x + b*x^
3)^(3/2))/15 + (4*a^(15/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a
+ b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqr
t[x])/a^(1/4)], 1/2])/(231*b^(9/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 40.2077, size = 178, normalized size = 0.96

$$\frac{4a^{\frac{15}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{231b^{\frac{9}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{8a^3\sqrt{ax+bx^3}}{231b^2}+\frac{8a^2x^2\sqrt{ax+bx^3}}{385b}+\frac{4ax^4\sqrt{ax+bx^3}}{55}+\frac{2x^3\left(ax+bx^3\right)^{\frac{3}{2}}}{15}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a*x)**(3/2),x)
```

```
[Out] 4*a**(15/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(231*b**(9/4)*sqrt(x)*(a + b*x**2)) - 8*a**3*sq
rt(a*x + b*x**3)/(231*b**2) + 8*a**2*x**2*sqrt(a*x + b*x**3)/(385
*b) + 4*a*x**4*sqrt(a*x + b*x**3)/55 + 2*x**3*(a*x + b*x**3)**(3/
2)/15
```

Mathematica [C] time = 0.25999, size = 159, normalized size = 0.85

$$\frac{2x\left(20ia^4\sqrt{x}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)+\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(-20a^4-8a^3bx^2+131a^2b^2x^4+196ab^3x^6+77b^4x^8\right)\right)}{1155b^2\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(a*x + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(Sqrt[(I*Sqrt[a])/Sqrt[b]]*(-20*a^4 - 8*a^3*b*x^2 + 131*a^2*
b^2*x^4 + 196*a*b^3*x^6 + 77*b^4*x^8) + (20*I)*a^4*Sqrt[1 + a/(b*
x^2)]*Sqrt[x]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[
x]], -1]))/(1155*Sqrt[(I*Sqrt[a])/Sqrt[b]]*b^2*Sqrt[x*(a + b*x^2)
])
```

Maple [A] time = 0.024, size = 188, normalized size = 1.

$$\frac{2\,bx^6}{15}\sqrt{bx^3+ax}+\frac{34\,ax^4}{165}\sqrt{bx^3+ax}+\frac{8\,a^2x^2}{385\,b}\sqrt{bx^3+ax}-\frac{8\,a^3}{231\,b^2}\sqrt{bx^3+ax}$$
$$+\frac{4\,a^4}{231\,b^3}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a*x)^(3/2),x)
```

```
[Out] 2/15*b*x^6*(b*x^3+a*x)^(1/2)+34/165*a*x^4*(b*x^3+a*x)^(1/2)+8/385
*a^2*x^2*(b*x^3+a*x)^(1/2)/b-8/231*a^3*(b*x^3+a*x)^(1/2)/b^2+4/23
1*a^4/b^3*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2
)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/
2))^(1/2)/(b*x^3+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a
*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\left(bx^3+ax\right)^{\frac{3}{2}}x^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)*x^2,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)*x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(bx^5+ax^3\right)\sqrt{bx^3+ax},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)*x^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^5 + a*x^3)*sqrt(b*x^3 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2 \left(x \left(a + bx^2\right)\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a*x)**(3/2),x)

[Out] Integral(x**2*(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax\right)^{\frac{3}{2}} x^2\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)*x^2,x, algorithm="giac")

[Out] integrate((b*x^3 + a*x)^(3/2)*x^2, x)
```

3.47 $\int x\left(ax+bx^3\right)^{3/2}\,dx$

Optimal. Leaf size=304

$$-\frac{4a^{13/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{65b^{7/4}\sqrt{ax+bx^3}}+\frac{8a^{13/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{65b^{7/4}\sqrt{ax+bx^3}}-\frac{8a^3x\left(a+bx^2\right)}{65b^{3/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{8a^2x\sqrt{ax+bx^3}}{195b}+\frac{4}{39}ax^3\sqrt{ax+bx^3}+\frac{2}{13}x^2\left(ax+bx^3\right)^{3/2}$$

```
[Out] (-8*a^3*x*(a + b*x^2))/(65*b^(3/2)*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x
 + b*x^3]) + (8*a^2*x*Sqrt[a*x + b*x^3])/(195*b) + (4*a*x^3*Sqrt[
a*x + b*x^3])/39 + (2*x^2*(a*x + b*x^3)^(3/2))/13 + (8*a^(13/4)*S
qrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*
x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(65*b^
(7/4)*Sqrt[a*x + b*x^3]) - (4*a^(13/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]
*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[
(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(65*b^(7/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.595158, antiderivative size = 304, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.467

$$-\frac{4a^{13/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{65b^{7/4}\sqrt{ax+bx^3}}+\frac{8a^{13/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{65b^{7/4}\sqrt{ax+bx^3}}-\frac{8a^3x\left(a+bx^2\right)}{65b^{3/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{8a^2x\sqrt{ax+bx^3}}{195b}+\frac{4}{39}ax^3\sqrt{ax+bx^3}+\frac{2}{13}x^2\left(ax+bx^3\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a*x + b*x^3)^(3/2),x]
```


```
[Out] (-8*a^3*x*(a + b*x^2))/(65*b^(3/2)*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x
 + b*x^3]) + (8*a^2*x*Sqrt[a*x + b*x^3])/(195*b) + (4*a*x^3*Sqrt[
a*x + b*x^3])/39 + (2*x^2*(a*x + b*x^3)^(3/2))/13 + (8*a^(13/4)*S
qrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*
x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(65*b^
(7/4)*Sqrt[a*x + b*x^3]) - (4*a^(13/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]
*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[
(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(65*b^(7/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 60.2336, size = 286, normalized size = 0.94

$$\frac{8a^{\frac{13}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{65b^{\frac{7}{4}}\sqrt{x}\left(a+bx^2\right)} - \frac{4a^{\frac{13}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{65b^{\frac{7}{4}}\sqrt{x}\left(a+bx^2\right)} - \frac{8a^3\sqrt{ax+bx^3}}{65b^{\frac{3}{2}}\left(\sqrt{a}+\sqrt{b}x\right)} + \frac{8a^2x\sqrt{ax+bx^3}}{195b} + \frac{4ax^3\sqrt{ax+bx^3}}{39} + \frac{2x^2\left(ax+bx^3\right)^{\frac{3}{2}}}{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a*x)**(3/2),x)
```

```
[Out] 8*a**(13/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(65*b**(7/4)*sqrt(x)*(a + b*x**2)) - 4*a**(13/4
)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*
x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)
), 1/2)/(65*b**(7/4)*sqrt(x)*(a + b*x**2)) - 8*a**3*sqrt(a*x + b*
x**3)/(65*b**(3/2)*(sqrt(a) + sqrt(b)*x)) + 8*a**2*x*sqrt(a*x + b
*x**3)/(195*b) + 4*a*x**3*sqrt(a*x + b*x**3)/39 + 2*x**2*(a*x + b
*x**3)**(3/2)/13
```

Mathematica [C] time = 0.49274, size = 195, normalized size = 0.64

$$\frac{2x\left(12a^{7/2}\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-12a^{7/2}\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+\sqrt{b}x\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(4a^3+29a^2bx^2\right.\right.}{195b^{3/2}\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(a*x + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(Sqrt[b]*x*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(4*a^3 + 29*a^2*b*x^2
 + 40*a*b^2*x^4 + 15*b^3*x^6) - 12*a^(7/2)*Sqrt[1 + (b*x^2)/a]*El
lipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1] + 12*a^(7/2)*
Sqrt[1 + (b*x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a
]]], -1]))/(195*b^(3/2)*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a + b
*x^2)])
```

Maple [A] time = 0.025, size = 217, normalized size = 0.7

$$\frac{2\,bx^5}{13}\sqrt{bx^3+ax}+\frac{10\,ax^3}{39}\sqrt{bx^3+ax}+\frac{8\,a^2x}{195\,b}\sqrt{bx^3+ax}$$
$$-\frac{4\,a^3}{65\,b^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\,\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a*x)^(3/2),x)
```

```
[Out] 2/13*b*x^5*(b*x^3+a*x)^(1/2)+10/39*a*x^3*(b*x^3+a*x)^(1/2)+8/195*
a^2*x*(b*x^3+a*x)^(1/2)/b-4/65/b^2*a^3*(-a*b)^(1/2)*((x+1/b*(-a*b
```

```
)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^
(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-
a*b)^(1/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),
1/2*2^(1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(
-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3+ax\right)^{\frac{3}{2}}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)*x,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)*x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(bx^4+ax^2\right)\sqrt{bx^3+ax},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)*x,x, algorithm="fricas")
```

```
[Out] integral((b*x^4 + a*x^2)*sqrt(b*x^3 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(x*(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3+ax\right)^{\frac{3}{2}}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)*x,x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)*x, x)
```

3.48 $\int (ax+bx^3)^{3/2}\,dx$

Optimal. Leaf size=158

$$-\frac{4a^{11/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{77b^{5/4}\sqrt{ax+bx^3}}+\frac{8a^2\sqrt{ax+bx^3}}{77b}+\frac{2}{11}x\left(ax+bx^3\right)^{3/2}+\frac{12}{77}ax^2\sqrt{ax+bx^3}$$

```
[Out] (8*a^2*Sqrt[a*x + b*x^3])/(77*b) + (12*a*x^2*Sqrt[a*x + b*x^3])/7
7 + (2*x*(a*x + b*x^3)^(3/2))/11 - (4*a^(11/4)*Sqrt[x]*(Sqrt[a] +
 Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2
*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(77*b^(5/4)*Sqrt[a*x +
b*x^3])
```

Rubi [A] time = 0.273054, antiderivative size = 158, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.462$

$$-\frac{4a^{11/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{77b^{5/4}\sqrt{ax+bx^3}}+\frac{8a^2\sqrt{ax+bx^3}}{77b}+\frac{2}{11}x\left(ax+bx^3\right)^{3/2}+\frac{12}{77}ax^2\sqrt{ax+bx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2),x]
```

```
[Out] (8*a^2*Sqrt[a*x + b*x^3])/(77*b) + (12*a*x^2*Sqrt[a*x + b*x^3])/7
7 + (2*x*(a*x + b*x^3)^(3/2))/11 - (4*a^(11/4)*Sqrt[x]*(Sqrt[a] +
 Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2
*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(77*b^(5/4)*Sqrt[a*x +
b*x^3])
```

Rubi in Sympy [A] time = 25.389, size = 151, normalized size = 0.96

$$-\frac{4a^{\frac{11}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{77b^{\frac{5}{4}}\sqrt{x}\left(a+bx^2\right)}+\frac{8a^2\sqrt{ax+bx^3}}{77b}+\frac{12ax^2\sqrt{ax+bx^3}}{77}+\frac{2x\left(ax+bx^3\right)^{\frac{3}{2}}}{11}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2),x)
```

```
[Out] -4*a**(11/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
 + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(
x)/a**(1/4)), 1/2)/(77*b**(5/4)*sqrt(x)*(a + b*x**2)) + 8*a**2*sq
rt(a*x + b*x**3)/(77*b) + 12*a*x**2*sqrt(a*x + b*x**3)/77 + 2*x*(
a*x + b*x**3)**(3/2)/11
```

Mathematica [C] time = 0.217735, size = 148, normalized size = 0.94

$$\frac{2x\left(\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(4a^3+17a^2bx^2+20ab^2x^4+7b^3x^6\right)-4ia^3\sqrt{x}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)\right)}{77b\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(Sqrt[(I*Sqrt[a])/Sqrt[b]]*(4*a^3 + 17*a^2*b*x^2 + 20*a*b^2*
x^4 + 7*b^3*x^6) - (4*I)*a^3*Sqrt[1 + a/(b*x^2)]*Sqrt[x]*Elliptic
F[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1]))/(77*Sqrt[(I
*Sqrt[a])/Sqrt[b]]*b*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.023, size = 166, normalized size = 1.1

$$\frac{2\,bx^4}{11}\sqrt{bx^3+ax}+\frac{26\,ax^2}{77}\sqrt{bx^3+ax}+\frac{8\,a^2}{77\,b}\sqrt{bx^3+ax}$$
$$-\frac{4\,a^3}{77\,b^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2),x)
```

```
[Out] 2/11*b*x^4*(b*x^3+a*x)^(1/2)+26/77*a*x^2*(b*x^3+a*x)^(1/2)+8/77*a
^2*(b*x^3+a*x)^(1/2)/b-4/77/b^2*a^3*(-a*b)^(1/2)*((x+1/b*(-a*b)^(
1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/
2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*EllipticF((
(x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3+ax\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(bx^3+ax\right)^{\frac{3}{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((b*x^3 + a*x)^(3/2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax + bx^3\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral((a*x + b*x**3)**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2), x)
```

3.49 $\int \frac{(ax+bx^3)^{3/2}}{x}\,dx$

Optimal. Leaf size=275

$$\frac{4a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15b^{3/4}\sqrt{ax+bx^3}} - \frac{8a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15b^{3/4}\sqrt{ax+bx^3}} + \frac{8a^2x\left(a+bx^2\right)}{15\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}} + \frac{4}{15}ax\sqrt{ax+bx^3} + \frac{2}{9}\left(ax+bx^3\right)^{3/2}$$

```
[Out] (8*a^2*x*(a + b*x^2))/(15*Sqrt[b]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x
+ b*x^3]) + (4*a*x*Sqrt[a*x + b*x^3])/15 + (2*(a*x + b*x^3)^(3/2)
)/9 - (8*a^(9/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(
Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1
/4)], 1/2])/(15*b^(3/4)*Sqrt[a*x + b*x^3]) + (4*a^(9/4)*Sqrt[x]*(
Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*El
lipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(15*b^(3/4)*Sq
rt[a*x + b*x^3])
```

Rubi [A] time = 0.467027, antiderivative size = 275, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$\frac{4a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15b^{3/4}\sqrt{ax+bx^3}} - \frac{8a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15b^{3/4}\sqrt{ax+bx^3}} + \frac{8a^2x\left(a+bx^2\right)}{15\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}} + \frac{4}{15}ax\sqrt{ax+bx^3} + \frac{2}{9}\left(ax+bx^3\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2)/x,x]
```

```
[Out] (8*a^2*x*(a + b*x^2))/(15*Sqrt[b]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x
+ b*x^3]) + (4*a*x*Sqrt[a*x + b*x^3])/15 + (2*(a*x + b*x^3)^(3/2)
)/9 - (8*a^(9/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(
Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1
/4)], 1/2])/(15*b^(3/4)*Sqrt[a*x + b*x^3]) + (4*a^(9/4)*Sqrt[x]*(
Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*El
lipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(15*b^(3/4)*Sq
rt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 45.6382, size = 258, normalized size = 0.94

$$-\frac{8a^{\frac{9}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{15b^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}+\frac{4a^{\frac{9}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{15b^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}+\frac{8a^2\sqrt{ax+bx^3}}{15\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)}+\frac{4ax\sqrt{ax+bx^3}}{15}+\frac{2\left(ax+bx^3\right)^{\frac{3}{2}}}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2)/x,x)
```

```
[Out] -8*a**(9/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(15*b**(3/4)*sqrt(x)*(a + b*x**2)) + 4*a**(9/4)
*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x
)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4))
, 1/2)/(15*b**(3/4)*sqrt(x)*(a + b*x**2)) + 8*a**2*sqrt(a*x + b*x
**3)/(15*sqrt(b)*(sqrt(a) + sqrt(b)*x)) + 4*a*x*sqrt(a*x + b*x**3
)/15 + 2*(a*x + b*x**3)**(3/2)/9
```

Mathematica [C] time = 0.268022, size = 184, normalized size = 0.67

$$\frac{2x\left(-12a^{5/2}\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+12a^{5/2}\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+\sqrt{b}x\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(11a^2+16ab\right.}{45\sqrt{b}\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2)/x,x]
```

```
[Out] (2*x*(Sqrt[b]*x*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(11*a^2 + 16*a*b*x^2
+ 5*b^2*x^4) + 12*a^(5/2)*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh
[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1] - 12*a^(5/2)*Sqrt[1 + (b*x^2)/
a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))/(45*Sq
rt[b]*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.024, size = 195, normalized size = 0.7

$$\frac{2\,bx^3}{9}\sqrt{bx^3+ax}+\frac{22\,ax}{45}\sqrt{bx^3+ax}+\frac{4\,a^2}{15\,b}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2)/x,x)
```

```
[Out] 2/9*b*x^3*(b*x^3+a*x)^(1/2)+22/45*a*x*(b*x^3+a*x)^(1/2)+4/15*a^2/
b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x
-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2
)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-a*b)^(
```

```
1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*Ellipti
cF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3+ax\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{bx^3+ax}\left(bx^2+a\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*(b*x^2 + a), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2)/x,x)
```

```
[Out] Integral((x*(a + b*x**2))**(3/2)/x, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3+ax\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x,x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x, x)
```

3.50 $\int \frac{(ax+bx^3)^{3/2}}{x^2}\,dx$

Optimal. Leaf size=134

$$\frac{4a^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\mid\frac{1}{2}\right)}{7\sqrt[4]{b}\sqrt{ax+bx^3}}+\frac{4}{7}a\sqrt{ax+bx^3}+\frac{2\left(ax+bx^3\right)^{3/2}}{7x}$$

```
[Out] (4*a*Sqrt[a*x + b*x^3])/7 + (2*(a*x + b*x^3)^(3/2))/(7*x) + (4*a^
(7/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + S
qrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])
/(7*b^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.249345, antiderivative size = 134, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$\frac{4a^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\mid\frac{1}{2}\right)}{7\sqrt[4]{b}\sqrt{ax+bx^3}}+\frac{4}{7}a\sqrt{ax+bx^3}+\frac{2\left(ax+bx^3\right)^{3/2}}{7x}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2)/x^2,x]
```

```
[Out] (4*a*Sqrt[a*x + b*x^3])/7 + (2*(a*x + b*x^3)^(3/2))/(7*x) + (4*a^
(7/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + S
qrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])
/(7*b^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 23.0177, size = 128, normalized size = 0.96

$$\frac{4a^{\frac{7}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{7\sqrt[4]{b}\sqrt{x}\left(a+bx^2\right)}+\frac{4a\sqrt{ax+bx^3}}{7}+\frac{2\left(ax+bx^3\right)^{\frac{3}{2}}}{7x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2)/x**2,x)
```

```
[Out] 4*a**(7/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) +
 sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)
/a**(1/4)), 1/2)/(7*b**(1/4)*sqrt(x)*(a + b*x**2)) + 4*a*sqrt(a*x
 + b*x**3)/7 + 2*(a*x + b*x**3)**(3/2)/(7*x)
```

Mathematica [C] time = 0.303077, size = 113, normalized size = 0.84

$$\frac{2x\left(\frac{4ia^2\sqrt{x}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}+3a^2+4abx^2+b^2x^4\right)}{7\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2)/x^2,x]
```

```
[Out] (2*x*(3*a^2 + 4*a*b*x^2 + b^2*x^4 + ((4*I)*a^2*Sqrt[1 + a/(b*x^2)
]*Sqrt[x]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]],
 -1])/Sqrt[(I*Sqrt[a])/Sqrt[b]]))/(7*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.023, size = 144, normalized size = 1.1

$$\frac{2\,bx^2}{7}\sqrt{bx^3+ax}+\frac{6\,a}{7}\sqrt{bx^3+ax}$$
$$+\frac{4\,a^2}{7\,b}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2)/x^2,x)
```

```
[Out] 2/7*b*x^2*(b*x^3+a*x)^(1/2)+6/7*a*(b*x^3+a*x)^(1/2)+4/7*a^2/b*(-a
*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*
(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*
x^3+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1
/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3+ax\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^2,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3+ax}\left(bx^2+a\right)}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*(b*x^2 + a)/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2)/x**2,x)
```

```
[Out] Integral((x*(a + b*x**2))**(3/2)/x**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3 + ax\right)^{\frac{3}{2}}}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^2,x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^2, x)
```

3.51 $\int \frac{(ax+bx^3)^{3/2}}{x^3}\,dx$

Optimal. Leaf size=274

$$\frac{12a^{5/4}\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5\sqrt{ax+bx^3}} - \frac{24a^{5/4}\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5\sqrt{ax+bx^3}} + \frac{12}{5}bx\sqrt{ax+bx^3} - \frac{2\left(ax+bx^3\right)^{3/2}}{x^2} + \frac{24a\sqrt{b}x\left(a+bx^2\right)}{5\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

```
[Out] (24*a*Sqrt[b]*x*(a + b*x^2))/(5*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x +
b*x^3]) + (12*b*x*Sqrt[a*x + b*x^3])/5 - (2*(a*x + b*x^3)^(3/2))/
x^2 - (24*a^(5/4)*b^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a +
 b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt
[x])/a^(1/4)], 1/2])/(5*Sqrt[a*x + b*x^3]) + (12*a^(5/4)*b^(1/4)*
Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]
*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*Sq
rt[a*x + b*x^3])
```

Rubi [A] time = 0.45754, antiderivative size = 274, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$\frac{12a^{5/4}\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5\sqrt{ax+bx^3}} - \frac{24a^{5/4}\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5\sqrt{ax+bx^3}} + \frac{12}{5}bx\sqrt{ax+bx^3} - \frac{2\left(ax+bx^3\right)^{3/2}}{x^2} + \frac{24a\sqrt{b}x\left(a+bx^2\right)}{5\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2)/x^3,x]
```



```
[Out] (24*a*Sqrt[b]*x*(a + b*x^2))/(5*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x +
b*x^3]) + (12*b*x*Sqrt[a*x + b*x^3])/5 - (2*(a*x + b*x^3)^(3/2))/
x^2 - (24*a^(5/4)*b^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a +
 b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt
[x])/a^(1/4)], 1/2])/(5*Sqrt[a*x + b*x^3]) + (12*a^(5/4)*b^(1/4)*
Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]
*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*Sq
rt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 45.1036, size = 260, normalized size = 0.95

$$-\frac{24a^{\frac{5}{4}}\sqrt[4]{b}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5\sqrt{x}\left(a+bx^2\right)}+\frac{12a^{\frac{5}{4}}\sqrt[4]{b}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5\sqrt{x}\left(a+bx^2\right)}+\frac{24a\sqrt{b}\sqrt{ax+bx^3}}{5\left(\sqrt{a}+\sqrt{b}x\right)}+\frac{12bx\sqrt{ax+bx^3}}{5}-\frac{2\left(ax+bx^3\right)^{\frac{3}{2}}}{x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2)/x**3,x)
```

```
[Out] -24*a**(5/4)*b**(1/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)
*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1
/4)*sqrt(x)/a**(1/4)), 1/2)/(5*sqrt(x)*(a + b*x**2)) + 12*a**(5/4
)*b**(1/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) +
 sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)
/a**(1/4)), 1/2)/(5*sqrt(x)*(a + b*x**2)) + 24*a*sqrt(b)*sqrt(a*x
 + b*x**3)/(5*(sqrt(a) + sqrt(b)*x)) + 12*b*x*sqrt(a*x + b*x**3)/
5 - 2*(a*x + b*x**3)**(3/2)/x**2
```

Mathematica [C] time = 0.33325, size = 183, normalized size = 0.67

$$\frac{2\left(-12a^{3/2}\sqrt{b}x\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+12a^{3/2}\sqrt{b}x\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(-5a^2-4\right.\right.}{5\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2)/x^3,x]
```

```
[Out] (2*(Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(-5*a^2 - 4*a*b*x^2 + b^2*x^4) +
12*a^(3/2)*Sqrt[b]*x*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt
[(I*Sqrt[b]*x)/Sqrt[a]]], -1] - 12*a^(3/2)*Sqrt[b]*x*Sqrt[1 + (b*
x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))/(
5*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.023, size = 194, normalized size = 0.7

$$-2\frac{\left(bx^2+a\right)a}{\sqrt{x\left(bx^2+a\right)}}+\frac{2bx}{5}\sqrt{bx^3+ax}$$

$$+\frac{12a}{5}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2)/x^3,x)
```

```
[Out] -2*(b*x^2+a)*a/(x*(b*x^2+a))^(1/2)+2/5*b*x*(b*x^3+a*x)^(1/2)+12/5
*a*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(
x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/
2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-a*b)^
```

```
(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*Ellipt
icF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^3 + ax)^{\frac{3}{2}}}{x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^3,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3 + ax}(bx^2 + a)}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^3,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*(b*x^2 + a)/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x\left(a + bx^2\right)\right)^{\frac{3}{2}}}{x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2)/x**3,x)
```

```
[Out] Integral((x*(a + b*x**2))**(3/2)/x**3, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^3 + ax)^{\frac{3}{2}}}{x^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^3,x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^3, x)
```

3.52 $\int \frac{(ax+bx^3)^{3/2}}{x^4} dx$

Optimal. Leaf size=134

$$\frac{4a^{3/4}b^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{3\sqrt{ax+bx^3}}-\frac{2\left(ax+bx^3\right)^{3/2}}{3x^3}+\frac{4}{3}b\sqrt{ax+bx^3}$$

```
[Out] (4*b*Sqrt[a*x + b*x^3])/3 - (2*(a*x + b*x^3)^(3/2))/(3*x^3) + (4*
a^(3/4)*b^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(S
qrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/
4)], 1/2])/(3*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.249916, antiderivative size = 134, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$\frac{4a^{3/4}b^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{3\sqrt{ax+bx^3}}-\frac{2\left(ax+bx^3\right)^{3/2}}{3x^3}+\frac{4}{3}b\sqrt{ax+bx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2)/x^4,x]
```

```
[Out] (4*b*Sqrt[a*x + b*x^3])/3 - (2*(a*x + b*x^3)^(3/2))/(3*x^3) + (4*
a^(3/4)*b^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(S
qrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/
4)], 1/2])/(3*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 23.1007, size = 129, normalized size = 0.96

$$\frac{4a^{\frac{3}{4}}b^{\frac{3}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\text{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{3\sqrt{x}\left(a+bx^2\right)}+\frac{4b\sqrt{ax+bx^3}}{3}-\frac{2\left(ax+bx^3\right)^{\frac{3}{2}}}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2)/x**4,x)
```

```
[Out] 4*a**(3/4)*b**(3/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(
sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4
)*sqrt(x)/a**(1/4)), 1/2)/(3*sqrt(x)*(a + b*x**2)) + 4*b*sqrt(a*x
 + b*x**3)/3 - 2*(a*x + b*x**3)**(3/2)/(3*x**3)
```

Mathematica [C] time = 0.285941, size = 107, normalized size = 0.8

$$\frac{2\left(-a^2+\frac{4iabx^{5/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}+b^2x^4\right)}{3x\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2)/x^4,x]
```

```
[Out] (2*(-a^2 + b^2*x^4 + ((4*I)*a*b*Sqrt[1 + a/(b*x^2)]*x^(5/2)*Ellip
ticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/Sqrt[(I*S
qrt[a])/Sqrt[b]]))/(3*x*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.027, size = 139, normalized size = 1.

$$-\frac{2a}{3x^2}\sqrt{bx^3+ax}+\frac{2b}{3}\sqrt{bx^3+ax}$$
$$+\frac{4a}{3}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3 -}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2)/x^4,x)
```

```
[Out] -2/3*a*(b*x^3+a*x)^(1/2)/x^2+2/3*b*(b*x^3+a*x)^(1/2)+4/3*a*(-a*b)
^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a
*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3
+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)
,1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx^3+ax)^{\frac{3}{2}}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^4,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^4, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{bx^3+ax}\,(bx^2+a)}{x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^4,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*(b*x^2 + a)/x^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(x(a+bx^2))^{\frac{3}{2}}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2)/x**4,x)
```

```
[Out] Integral((x*(a + b*x**2))**(3/2)/x**4, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3 + ax\right)^{\frac{3}{2}}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^4,x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^4, x)
```

3.53 $\int \frac{\left(ax+bx^3\right)^{3/2}}{x^5}\,dx$

Optimal. Leaf size=277

$$\frac{24b^{3/2}x\left(a+bx^2\right)}{5\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{12\sqrt[4]{a}b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5\sqrt{ax+bx^3}}$$
$$-\frac{24\sqrt[4]{a}b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5\sqrt{ax+bx^3}}-\frac{12b\sqrt{ax+bx^3}}{5x}-\frac{2\left(ax+bx^3\right)^{3/2}}{5x^4}$$

```
[Out] (24*b^(3/2)*x*(a + b*x^2))/(5*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*
x^3]) - (12*b*Sqrt[a*x + b*x^3])/(5*x) - (2*(a*x + b*x^3)^(3/2))/
(5*x^4) - (24*a^(1/4)*b^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[
(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*
Sqrt[x])/a^(1/4)], 1/2])/(5*Sqrt[a*x + b*x^3]) + (12*a^(1/4)*b^(5
/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqr
t[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(
5*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.499068, antiderivative size = 277, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.353

$$\frac{24b^{3/2}x\left(a+bx^2\right)}{5\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{12\sqrt[4]{a}b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5\sqrt{ax+bx^3}}$$
$$-\frac{24\sqrt[4]{a}b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5\sqrt{ax+bx^3}}-\frac{12b\sqrt{ax+bx^3}}{5x}-\frac{2\left(ax+bx^3\right)^{3/2}}{5x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2)/x^5,x]
```


```
[Out] (24*b^(3/2)*x*(a + b*x^2))/(5*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*
x^3]) - (12*b*Sqrt[a*x + b*x^3])/(5*x) - (2*(a*x + b*x^3)^(3/2))/
(5*x^4) - (24*a^(1/4)*b^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[
(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*
Sqrt[x])/a^(1/4)], 1/2])/(5*Sqrt[a*x + b*x^3]) + (12*a^(1/4)*b^(5
/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqr
t[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(
5*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 49.6031, size = 260, normalized size = 0.94

$$-\frac{24\sqrt[4]{a}b^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5\sqrt{x}\left(a+bx^2\right)}$$
$$+\frac{12\sqrt[4]{a}b^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5\sqrt{x}\left(a+bx^2\right)}$$
$$+\frac{24b^{\frac{3}{2}}\sqrt{ax+bx^3}}{5\left(\sqrt{a}+\sqrt{b}x\right)}-\frac{12b\sqrt{ax+bx^3}}{5x}-\frac{2\left(ax+bx^3\right)^{\frac{3}{2}}}{5x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2)/x**5,x)
```

```
[Out] -24*a**(1/4)*b**(5/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)
*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1
/4)*sqrt(x)/a**(1/4)), 1/2)/(5*sqrt(x)*(a + b*x**2)) + 12*a**(1/4
)*b**(5/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) +
 sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)
/a**(1/4)), 1/2)/(5*sqrt(x)*(a + b*x**2)) + 24*b**(3/2)*sqrt(a*x
+ b*x**3)/(5*(sqrt(a) + sqrt(b)*x)) - 12*b*sqrt(a*x + b*x**3)/(5*
x) - 2*(a*x + b*x**3)**(3/2)/(5*x**4)
```

Mathematica [C] time = 0.316587, size = 189, normalized size = 0.68

$$-\frac{2\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(a^2+8abx^2+7b^2x^4\right)+12\sqrt{a}b^{3/2}x^3\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-12\sqrt{a}b^{3/2}x^3\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\right.\right.\right.}{5x^2\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2)/x^5,x]
```

```
[Out] (-2*(Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(a^2 + 8*a*b*x^2 + 7*b^2*x^4) -
12*Sqrt[a]*b^(3/2)*x^3*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sq
rt[(I*Sqrt[b]*x)/Sqrt[a]]], -1] + 12*Sqrt[a]*b^(3/2)*x^3*Sqrt[1 +
 (b*x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]
))/(5*x^2*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.028, size = 196, normalized size = 0.7

$$-\frac{2a}{5x^3}\sqrt{bx^3+ax}-\frac{\left(14bx^2+14a\right)b}{5}\frac{1}{\sqrt{x\left(bx^2+a\right)}}$$
$$+\frac{12b}{5}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2)/x^5,x)
```

```
[Out] -2/5*a*(b*x^3+a*x)^(1/2)/x^3-14/5*(b*x^2+a)*b/(x*(b*x^2+a))^(1/2)
+12/5*b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*
(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2)
)^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-
a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*E
llipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(bx^3+ax\right)^{\frac{3}{2}}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^5,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^5, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3+ax}\left(bx^2+a\right)}{x^4},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^5,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*(b*x^2 + a)/x^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2)/x**5,x)
```

```
[Out] Integral((x*(a + b*x**2))**(3/2)/x**5, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3+ax\right)^{\frac{3}{2}}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^5,x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^5, x)
```

3.54 $\int \frac{(ax+bx^3)^{3/2}}{x^6} dx$

Optimal. Leaf size=137

$$\frac{4b^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{7\sqrt[4]{a}\sqrt{ax+bx^3}}-\frac{2\left(ax+bx^3\right)^{3/2}}{7x^5}-\frac{4b\sqrt{ax+bx^3}}{7x^2}$$

```
[Out] (-4*b*Sqrt[a*x + b*x^3])/(7*x^2) - (2*(a*x + b*x^3)^(3/2))/(7*x^5
) + (4*b^(7/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sq
rt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4
)], 1/2])/(7*a^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.251313, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$\frac{4b^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{7\sqrt[4]{a}\sqrt{ax+bx^3}}-\frac{2\left(ax+bx^3\right)^{3/2}}{7x^5}-\frac{4b\sqrt{ax+bx^3}}{7x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2)/x^6,x]
```

```
[Out] (-4*b*Sqrt[a*x + b*x^3])/(7*x^2) - (2*(a*x + b*x^3)^(3/2))/(7*x^5
) + (4*b^(7/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sq
rt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4
)], 1/2])/(7*a^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 23.2765, size = 133, normalized size = 0.97

$$-\frac{4b\sqrt{ax+bx^3}}{7x^2}-\frac{2\left(ax+bx^3\right)^{\frac{3}{2}}}{7x^5}+\frac{4b^{\frac{7}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\text{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{7\sqrt[4]{a}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2)/x**6,x)
```

```
[Out] -4*b*sqrt(a*x + b*x**3)/(7*x**2) - 2*(a*x + b*x**3)**(3/2)/(7*x**
5) + 4*b**(7/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt
(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sq
rt(x)/a**(1/4)), 1/2)/(7*a**(1/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.408377, size = 116, normalized size = 0.85

$$\frac{2\left(-a^2+\frac{4ib^2x^{9/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}-4abx^2-3b^2x^4\right)}{7x^3\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2)/x^6,x]
```

```
[Out] (2*(-a^2 - 4*a*b*x^2 - 3*b^2*x^4 + ((4*I)*b^2*Sqrt[1 + a/(b*x^2)]
*x^(9/2)*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]],
-1])/Sqrt[(I*Sqrt[a])/Sqrt[b]]))/(7*x^3*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.032, size = 142, normalized size = 1.

$$-\frac{2a}{7x^4}\sqrt{bx^3+ax}-\frac{6b}{7x^2}\sqrt{bx^3+ax}$$
$$+\frac{4b}{7}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2)/x^6,x)
```

```
[Out] -2/7*a*(b*x^3+a*x)^(1/2)/x^4-6/7*b*(b*x^3+a*x)^(1/2)/x^2+4/7*b*(-
a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b
*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b
*x^3+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(
1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{(bx^3+ax)^{\frac{3}{2}}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^6,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^6, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\operatorname{integral}\left(\frac{\sqrt{bx^3+ax}\,(bx^2+a)}{x^5},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^6,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*(b*x^2 + a)/x^5, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{(x(a+bx^2))^{\frac{3}{2}}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2)/x**6,x)
```

```
[Out] Integral((x*(a + b*x**2))**(3/2)/x**6, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3 + ax\right)^{\frac{3}{2}}}{x^6}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^6,x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^6, x)
```

3.55 $\int \frac{(ax+bx^3)^{3/2}}{x^7}\,dx$

Optimal. Leaf size=306

$$\frac{4b^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15a^{3/4}\sqrt{ax+bx^3}} - \frac{8b^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15a^{3/4}\sqrt{ax+bx^3}} + \frac{8b^{5/2}x\left(a+bx^2\right)}{15a\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}} - \frac{8b^2\sqrt{ax+bx^3}}{15ax} - \frac{4b\sqrt{ax+bx^3}}{15x^3} - \frac{2\left(ax+bx^3\right)^{3/2}}{9x^6}$$

```
[Out] (8*b^(5/2)*x*(a + b*x^2))/(15*a*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x +
b*x^3]) - (4*b*Sqrt[a*x + b*x^3])/(15*x^3) - (8*b^2*Sqrt[a*x + b*
x^3])/(15*a*x) - (2*(a*x + b*x^3)^(3/2))/(9*x^6) - (8*b^(9/4)*Sqr
t[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)
^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(15*a^(3
/4)*Sqrt[a*x + b*x^3]) + (4*b^(9/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)
*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^
(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(15*a^(3/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.612893, antiderivative size = 306, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$\frac{4b^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15a^{3/4}\sqrt{ax+bx^3}} - \frac{8b^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{15a^{3/4}\sqrt{ax+bx^3}} + \frac{8b^{5/2}x\left(a+bx^2\right)}{15a\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}} - \frac{8b^2\sqrt{ax+bx^3}}{15ax} - \frac{4b\sqrt{ax+bx^3}}{15x^3} - \frac{2\left(ax+bx^3\right)^{3/2}}{9x^6}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2)/x^7,x]
```

```
[Out] (8*b^(5/2)*x*(a + b*x^2))/(15*a*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x +
b*x^3]) - (4*b*Sqrt[a*x + b*x^3])/(15*x^3) - (8*b^2*Sqrt[a*x + b*
x^3])/(15*a*x) - (2*(a*x + b*x^3)^(3/2))/(9*x^6) - (8*b^(9/4)*Sqr
t[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)
^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(15*a^(3
/4)*Sqrt[a*x + b*x^3]) + (4*b^(9/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)
*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^
(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(15*a^(3/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 60.9292, size = 284, normalized size = 0.93

$$-\frac{4b\sqrt{ax+bx^3}}{15x^3}-\frac{2\left(ax+bx^3\right)^{\frac{3}{2}}}{9x^6}+\frac{8b^{\frac{5}{2}}\sqrt{ax+bx^3}}{15a\left(\sqrt{a}+\sqrt{b}x\right)}-\frac{8b^2\sqrt{ax+bx^3}}{15ax}-\frac{8b^{\frac{9}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{15a^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}+\frac{4b^{\frac{9}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{15a^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2)/x**7,x)
```

```
[Out] -4*b*sqrt(a*x + b*x**3)/(15*x**3) - 2*(a*x + b*x**3)**(3/2)/(9*x*
*6) + 8*b**(5/2)*sqrt(a*x + b*x**3)/(15*a*(sqrt(a) + sqrt(b)*x))
- 8*b**2*sqrt(a*x + b*x**3)/(15*a*x) - 8*b**(9/4)*sqrt((a + b*x**
2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x
**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(15*a**(3
/4)*sqrt(x)*(a + b*x**2)) + 4*b**(9/4)*sqrt((a + b*x**2)/(sqrt(a)
 + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*ellipt
ic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(15*a**(3/4)*sqrt(x)
*(a + b*x**2))
```

Mathematica [C] time = 0.414215, size = 205, normalized size = 0.67

$$-\frac{2\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(5a^3+16a^2bx^2+23ab^2x^4+12b^3x^6\right)+12\sqrt{a}b^{5/2}x^5\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-12\sqrt{a}b^{5/2}x^5\sqrt{\frac{bx^2}{a}+\cdots}\right.}{45ax^4\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2)/x^7,x]
```

```
[Out] (-2*(Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(5*a^3 + 16*a^2*b*x^2 + 23*a*b^2
*x^4 + 12*b^3*x^6) - 12*Sqrt[a]*b^(5/2)*x^5*Sqrt[1 + (b*x^2)/a]*E
llipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1] + 12*Sqrt[a]
*b^(5/2)*x^5*Sqrt[1 + (b*x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt
[b]*x)/Sqrt[a]]], -1]))/(45*a*x^4*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqr
t[x*(a + b*x^2)])
```

Maple [A] time = 0.032, size = 223, normalized size = 0.7

$$-\frac{2\,a}{9\,x^5}\sqrt{bx^3+ax}-\frac{22\,b}{45\,x^3}\sqrt{bx^3+ax}-\frac{\left(8\,bx^2+8\,a\right)b^2}{15\,a}\frac{1}{\sqrt{x\left(bx^2+a\right)}}+\frac{4\,b^2}{15\,a}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\,\frac{\sqrt{-ab}}{b}{\it EllipticE}\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/\cdots\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2)/x^7,x)
```

```
[Out] -2/9*a*(b*x^3+a*x)^(1/2)/x^5-22/45*b*(b*x^3+a*x)^(1/2)/x^3-8/15*(
b*x^2+a)/a*b^2/(x*(b*x^2+a))^(1/2)+4/15/a*b^2*(-a*b)^(1/2)*((x+1/
```

```
b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/
(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(
-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))
^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/
2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3 + ax\right)^{\frac{3}{2}}}{x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^7,x, algorithm="maxima")

[Out] integrate((b*x^3 + a*x)^(3/2)/x^7, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3 + ax}\left(bx^2 + a\right)}{x^6}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^7,x, algorithm="fricas")

[Out] integral(sqrt(b*x^3 + a*x)*(b*x^2 + a)/x^6, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x\left(a + bx^2\right)\right)^{\frac{3}{2}}}{x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2)/x**7,x)

[Out] Integral((x*(a + b*x**2))**(3/2)/x**7, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3 + ax\right)^{\frac{3}{2}}}{x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^7,x, algorithm="giac")

[Out] integrate((b*x^3 + a*x)^(3/2)/x^7, x)
```

3.56 $\int \frac{(ax+bx^3)^{3/2}}{x^8}\,dx$

Optimal. Leaf size=163

$$-\frac{4b^{11/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{77a^{5/4}\sqrt{ax+bx^3}} - \frac{8b^2\sqrt{ax+bx^3}}{77ax^2} - \frac{2\left(ax+bx^3\right)^{3/2}}{11x^7} - \frac{12b\sqrt{ax+bx^3}}{77x^4}$$

```
[Out] (-12*b*Sqrt[a*x + b*x^3])/(77*x^4) - (8*b^2*Sqrt[a*x + b*x^3])/(7
7*a*x^2) - (2*(a*x + b*x^3)^(3/2))/(11*x^7) - (4*b^(11/4)*Sqrt[x]
*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*
EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(77*a^(5/4)*
Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.337996, antiderivative size = 163, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$-\frac{4b^{11/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{77a^{5/4}\sqrt{ax+bx^3}} - \frac{8b^2\sqrt{ax+bx^3}}{77ax^2} - \frac{2\left(ax+bx^3\right)^{3/2}}{11x^7} - \frac{12b\sqrt{ax+bx^3}}{77x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(3/2)/x^8,x]
```

```
[Out] (-12*b*Sqrt[a*x + b*x^3])/(77*x^4) - (8*b^2*Sqrt[a*x + b*x^3])/(7
7*a*x^2) - (2*(a*x + b*x^3)^(3/2))/(11*x^7) - (4*b^(11/4)*Sqrt[x]
*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*
EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(77*a^(5/4)*
Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 31.3691, size = 158, normalized size = 0.97

$$-\frac{12b\sqrt{ax+bx^3}}{77x^4} - \frac{2\left(ax+bx^3\right)^{\frac{3}{2}}}{11x^7} - \frac{8b^2\sqrt{ax+bx^3}}{77ax^2} - \frac{4b^{\frac{11}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{77a^{\frac{5}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x)**(3/2)/x**8,x)
```

```
[Out] -12*b*sqrt(a*x + b*x**3)/(77*x**4) - 2*(a*x + b*x**3)**(3/2)/(11*
x**7) - 8*b**2*sqrt(a*x + b*x**3)/(77*a*x**2) - 4*b**(11/4)*sqrt(
(a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt
(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)
/(77*a**(5/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.297343, size = 150, normalized size = 0.92

$$-\frac{2\left(\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(7a^3+20a^2bx^2+17ab^2x^4+4b^3x^6\right)+4ib^3x^{13/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)\right)}{77ax^5\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^3)^(3/2)/x^8,x]
```

```
[Out] (-2*(Sqrt[(I*Sqrt[a])/Sqrt[b]]*(7*a^3 + 20*a^2*b*x^2 + 17*a*b^2*x
^4 + 4*b^3*x^6) + (4*I)*b^3*Sqrt[1 + a/(b*x^2)]*x^(13/2)*Elliptic
F[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1]))/(77*a*Sqrt[
(I*Sqrt[a])/Sqrt[b]]*x^5*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.031, size = 169, normalized size = 1.

$$-\frac{2\,a}{11\,x^6}\sqrt{bx^3+ax}-\frac{26\,b}{77\,x^4}\sqrt{bx^3+ax}-\frac{8\,b^2}{77\,ax^2}\sqrt{bx^3+ax}$$
$$-\frac{4\,b^2}{77\,a}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x)^(3/2)/x^8,x)
```

```
[Out] -2/11*a*(b*x^3+a*x)^(1/2)/x^6-26/77*b*(b*x^3+a*x)^(1/2)/x^4-8/77*
b^2*(b*x^3+a*x)^(1/2)/a/x^2-4/77/a*b^2*(-a*b)^(1/2)*((x+1/b*(-a*b
)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^
(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*Elliptic
F(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3+ax\right)^{\frac{3}{2}}}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^8,x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^8, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx^3+ax}\left(bx^2+a\right)}{x^7},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^8,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x^3 + a*x)*(b*x^2 + a)/x^7, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x)**(3/2)/x**8,x)
```

```
[Out] Integral((x*(a + b*x**2))**(3/2)/x**8, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3+ax\right)^{\frac{3}{2}}}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(3/2)/x^8,x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(3/2)/x^8, x)
```

3.57 $\int \frac{x^4}{\sqrt{ax+bx^3}}\,dx$

Optimal. Leaf size=140

$$\frac{5a^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{21b^{9/4}\sqrt{ax+bx^3}}-\frac{10a\sqrt{ax+bx^3}}{21b^2}+\frac{2x^2\sqrt{ax+bx^3}}{7b}$$

```
[Out] (-10*a*Sqrt[a*x + b*x^3])/(21*b^2) + (2*x^2*Sqrt[a*x + b*x^3])/(7
*b) + (5*a^(7/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(
Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1
/4)], 1/2])/(21*b^(9/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.271384, antiderivative size = 140, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.235$

$$\frac{5a^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{21b^{9/4}\sqrt{ax+bx^3}}-\frac{10a\sqrt{ax+bx^3}}{21b^2}+\frac{2x^2\sqrt{ax+bx^3}}{7b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/Sqrt[a*x + b*x^3],x]
```

```
[Out] (-10*a*Sqrt[a*x + b*x^3])/(21*b^2) + (2*x^2*Sqrt[a*x + b*x^3])/(7
*b) + (5*a^(7/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(
Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1
/4)], 1/2])/(21*b^(9/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 23.6756, size = 134, normalized size = 0.96

$$\frac{5a^{\frac{7}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{21b^{\frac{9}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{10a\sqrt{ax+bx^3}}{21b^2}+\frac{2x^2\sqrt{ax+bx^3}}{7b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**3+a*x)**(1/2),x)
```

```
[Out] 5*a**(7/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) +
 sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)
/a**(1/4)), 1/2)/(21*b**(9/4)*sqrt(x)*(a + b*x**2)) - 10*a*sqrt(a
*x + b*x**3)/(21*b**2) + 2*x**2*sqrt(a*x + b*x**3)/(7*b)
```

Mathematica [C] time = 0.133743, size = 138, normalized size = 0.99

$$\frac{10ia^2x^{3/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)-2x\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(5a^2+2abx^2-3b^2x^4\right)}{21b^2\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/Sqrt[a*x + b*x^3],x]
```

```
[Out] (-2*Sqrt[(I*Sqrt[a])/Sqrt[b]]*x*(5*a^2 + 2*a*b*x^2 - 3*b^2*x^4) +
 (10*I)*a^2*Sqrt[1 + a/(b*x^2)]*x^(3/2)*EllipticF[I*ArcSinh[Sqrt[
(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/(21*Sqrt[(I*Sqrt[a])/Sqrt[b]]
*b^2*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.025, size = 149, normalized size = 1.1

$$\frac{2x^2}{7b}\sqrt{bx^3+ax}-\frac{10a}{21b^2}\sqrt{bx^3+ax}+\frac{5a^2}{21b^3}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\mathit{EllipticF}\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a*x)^(1/2),x)
```

```
[Out] 2/7*x^2*(b*x^3+a*x)^(1/2)/b-10/21*a*(b*x^3+a*x)^(1/2)/b^2+5/21*a^
2/b^3*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-
2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^
(1/2)/(b*x^3+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^
(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{bx^3+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^4/sqrt(b*x^3 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{\sqrt{bx^3+ax}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] integral(x^4/sqrt(b*x^3 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{x(a+bx^2)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(x**4/sqrt(x*(a + b*x**2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{bx^3 + ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] integrate(x^4/sqrt(b*x^3 + a*x), x)
```

3.58 $\int \frac{x^3}{\sqrt{ax+bx^3}}\,dx$

Optimal. Leaf size=258

$$-\frac{3a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{7/4}\sqrt{ax+bx^3}}+\frac{6a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{7/4}\sqrt{ax+bx^3}}-\frac{6ax\left(a+bx^2\right)}{5b^{3/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{2x\sqrt{ax+bx^3}}{5b}$$

```
[Out] (-6*a*x*(a + b*x^2))/(5*b^(3/2)*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x +
b*x^3]) + (2*x*Sqrt[a*x + b*x^3])/(5*b) + (6*a^(5/4)*Sqrt[x]*(Sqr
t[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*Ellip
ticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*b^(7/4)*Sqrt[a
*x + b*x^3]) - (3*a^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a +
 b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt
[x])/a^(1/4)], 1/2])/(5*b^(7/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.433092, antiderivative size = 258, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.353

$$-\frac{3a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{7/4}\sqrt{ax+bx^3}}+\frac{6a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{7/4}\sqrt{ax+bx^3}}-\frac{6ax\left(a+bx^2\right)}{5b^{3/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{2x\sqrt{ax+bx^3}}{5b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/Sqrt[a*x + b*x^3],x]
```

```
[Out] (-6*a*x*(a + b*x^2))/(5*b^(3/2)*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x +
b*x^3]) + (2*x*Sqrt[a*x + b*x^3])/(5*b) + (6*a^(5/4)*Sqrt[x]*(Sqr
t[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*Ellip
ticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*b^(7/4)*Sqrt[a
*x + b*x^3]) - (3*a^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a +
 b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt
[x])/a^(1/4)], 1/2])/(5*b^(7/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 40.8602, size = 241, normalized size = 0.93

$$\frac{6a^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{7}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{3a^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{7}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{6a\sqrt{ax+bx^3}}{5b^{\frac{3}{2}}\left(\sqrt{a}+\sqrt{b}x\right)}+\frac{2x\sqrt{ax+bx^3}}{5b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a*x)**(1/2),x)
```

```
[Out] 6*a**(5/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) +
 sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x)
/a**(1/4)), 1/2)/(5*b**(7/4)*sqrt(x)*(a + b*x**2)) - 3*a**(5/4)*s
qrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*
sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)),
1/2)/(5*b**(7/4)*sqrt(x)*(a + b*x**2)) - 6*a*sqrt(a*x + b*x**3)/(
5*b**(3/2)*(sqrt(a) + sqrt(b)*x)) + 2*x*sqrt(a*x + b*x**3)/(5*b)
```

Mathematica [C] time = 0.20389, size = 170, normalized size = 0.66

$$\frac{2x\left(3a^{3/2}\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-3a^{3/2}\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+\sqrt{b}x\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(a+bx^2\right)\right)}{5b^{3/2}\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/Sqrt[a*x + b*x^3],x]
```

```
[Out] (2*x*(Sqrt[b]*x*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(a + b*x^2) - 3*a^(3/
2)*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqr
t[a]]], -1] + 3*a^(3/2)*Sqrt[1 + (b*x^2)/a]*EllipticF[I*ArcSinh[S
qrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))/(5*b^(3/2)*Sqrt[(I*Sqrt[b]*x)/
Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.023, size = 178, normalized size = 0.7

$$\frac{2x}{5b}\sqrt{bx^3+ax}$$
$$-\frac{3a}{5b^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a*x)^(1/2),x)
```

```
[Out] 2/5*x*(b*x^3+a*x)^(1/2)/b-3/5*a/b^2*(-a*b)^(1/2)*((x+1/b*(-a*b)^(
1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/
2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b
)^(1/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2
*2^(1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*
b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{bx^3+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^3/sqrt(b*x^3 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\sqrt{bx^3+ax}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^3 + a*x),x, algorithm="fricas")

[Out] integral(x^3/sqrt(b*x^3 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{x\,(a+bx^2)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a*x)**(1/2),x)

[Out] Integral(x**3/sqrt(x*(a + b*x**2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{bx^3+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^3 + a*x),x, algorithm="giac")

[Out] integrate(x^3/sqrt(b*x^3 + a*x), x)
```

3.59 $\int \frac{x^2}{\sqrt{ax+bx^3}} \, dx$

Optimal. Leaf size=116

$$\frac{2\sqrt{ax+bx^3}}{3b} - \frac{a^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\mid\frac{1}{2}\right)}{3b^{5/4}\sqrt{ax+bx^3}}$$

```
[Out] (2*Sqrt[a*x + b*x^3])/(3*b) - (a^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]
*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[
(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(3*b^(5/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.193174, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.235$

$$\frac{2\sqrt{ax+bx^3}}{3b} - \frac{a^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\mid\frac{1}{2}\right)}{3b^{5/4}\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/Sqrt[a*x + b*x^3],x]
```

```
[Out] (2*Sqrt[a*x + b*x^3])/(3*b) - (a^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]
*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[
(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(3*b^(5/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 16.7018, size = 109, normalized size = 0.94

$$-\frac{a^{\frac{3}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{3b^{\frac{5}{4}}\sqrt{x}\left(a+bx^2\right)} + \frac{2\sqrt{ax+bx^3}}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a*x)**(1/2),x)
```

```
[Out] -a**(3/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) +
sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/
a**(1/4)), 1/2)/(3*b**(5/4)*sqrt(x)*(a + b*x**2)) + 2*sqrt(a*x +
b*x**3)/(3*b)
```

Mathematica [C] time = 0.234093, size = 101, normalized size = 0.87

$$\frac{2x\left(-\frac{ia\sqrt{x}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}+a+bx^2\right)}{3b\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/Sqrt[a*x + b*x^3],x]
```

```
[Out] (2*x*(a + b*x^2 - (I*a*Sqrt[1 + a/(b*x^2)]*Sqrt[x]*EllipticF[I*Ar
cSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/Sqrt[(I*Sqrt[a])/S
qrt[b]]))/(3*b*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.023, size = 127, normalized size = 1.1

$$\frac{2}{3\,b}\sqrt{bx^3+ax} \\ -\frac{a}{3\,b^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\mathit{EllipticF}\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3+ax}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a*x)^(1/2),x)
```

```
[Out] 2/3*(b*x^3+a*x)^(1/2)/b-1/3*a/b^2*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/
2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2)
)^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*EllipticF(((x
+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{bx^3+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^2/sqrt(b*x^3 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^2}{\sqrt{bx^3+ax}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] integral(x^2/sqrt(b*x^3 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{x\,(a+bx^2)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(x*(a + b*x**2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{bx^3 + ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] integrate(x^2/sqrt(b*x^3 + a*x), x)
```

3.60 $\int \frac{x}{\sqrt{ax+bx^3}}\,dx$

Optimal. Leaf size=229

$$\frac{\sqrt[4]{a}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{b^{3/4}\sqrt{ax+bx^3}} - \frac{2\sqrt[4]{a}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{b^{3/4}\sqrt{ax+bx^3}} + \frac{2x\left(a+bx^2\right)}{\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

```
[Out] (2*x*(a + b*x^2))/(Sqrt[b]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x^3
]) - (2*a^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(S
qrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/
4)], 1/2])/(b^(3/4)*Sqrt[a*x + b*x^3]) + (a^(1/4)*Sqrt[x]*(Sqrt[a
] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*Elliptic
F[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(b^(3/4)*Sqrt[a*x +
b*x^3])
```

Rubi [A] time = 0.340734, antiderivative size = 229, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$

$$\frac{\sqrt[4]{a}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{b^{3/4}\sqrt{ax+bx^3}} - \frac{2\sqrt[4]{a}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{b^{3/4}\sqrt{ax+bx^3}} + \frac{2x\left(a+bx^2\right)}{\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/Sqrt[a*x + b*x^3],x]
```

```
[Out] (2*x*(a + b*x^2))/(Sqrt[b]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x^3
]) - (2*a^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(S
qrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/
4)], 1/2])/(b^(3/4)*Sqrt[a*x + b*x^3]) + (a^(1/4)*Sqrt[x]*(Sqrt[a
] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*Elliptic
F[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(b^(3/4)*Sqrt[a*x +
b*x^3])
```

Rubi in Sympy [A] time = 31.567, size = 214, normalized size = 0.93

$$-\frac{2\sqrt[4]{a}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{b^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)} + \frac{\sqrt[4]{a}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{b^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)} + \frac{2\sqrt{ax+bx^3}}{\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a*x)**(1/2),x)
```

```
[Out] -2*a**(1/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(b**(3/4)*sqrt(x)*(a + b*x**2)) + a**(1/4)*sqrt
((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqr
t(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2
)/(b**(3/4)*sqrt(x)*(a + b*x**2)) + 2*sqrt(a*x + b*x**3)/(sqrt(b)
*(sqrt(a) + sqrt(b)*x))
```

Mathematica [C] time = 0.0761848, size = 108, normalized size = 0.47

$$\frac{2ix^2\sqrt{\frac{bx^2}{a}+1}\left(E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)\right)}{\left(\frac{i\sqrt{b}x}{\sqrt{a}}\right)^{3/2}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/Sqrt[a*x + b*x^3],x]
```

```
[Out] ((2*I)*x^2*Sqrt[1 + (b*x^2)/a]*(EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[
b]*x)/Sqrt[a]]], -1] - EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqr
t[a]]], -1]))/(((I*Sqrt[b]*x)/Sqrt[a])^(3/2)*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.023, size = 158, normalized size = 0.7

$$\frac{1}{b}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/2\sqrt{2}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a*x)^(1/2),x)
```

```
[Out] 1/b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*
(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1
/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-a*b)
^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*Ellip
ticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{bx^3+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(x/sqrt(b*x^3 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\sqrt{bx^3+ax}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] integral(x/sqrt(b*x^3 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{x\left(a+bx^2\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(x/sqrt(x*(a + b*x**2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{bx^3+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] integrate(x/sqrt(b*x^3 + a*x), x)
```

3.61 $\int \frac{1}{\sqrt{ax+bx^3}}\,dx$

Optimal. Leaf size=92

$$\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{\sqrt[4]{a}\sqrt[4]{b}\sqrt{ax+bx^3}}$$

```
[Out] (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b
]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(a^(
1/4)*b^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.115134, antiderivative size = 92, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{\sqrt[4]{a}\sqrt[4]{b}\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[a*x + b*x^3],x]
```

```
[Out] (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b
]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(a^(
1/4)*b^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 9.2035, size = 90, normalized size = 0.98

$$\frac{\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{\sqrt[4]{a}\sqrt[4]{b}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a*x)**(1/2),x)
```

```
[Out] sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)
*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)),
 1/2)/(a**(1/4)*b**(1/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.0374777, size = 85, normalized size = 0.92

$$\frac{2ix^{3/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[a*x + b*x^3],x]
```

```
[Out] ((2*I)*Sqrt[1 + a/(b*x^2)]*x^(3/2)*EllipticF[I*ArcSinh[Sqrt[(I*Sq
rt[a])/Sqrt[b]]/Sqrt[x]], -1])/(Sqrt[(I*Sqrt[a])/Sqrt[b]]*Sqrt[x*
```

```
(a + b*x^2)])
```

Maple [A] time = 0.02, size = 108, normalized size = 1.2

$$\frac{1}{b}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3+ax}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a*x)^(1/2),x)
```

```
[Out] 1/b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*
(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1
/2)/(b*x^3+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1
/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^3 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(1/sqrt(b*x^3 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^3+ax}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^3 + a*x),x, algorithm="fricas")
```

```
[Out] integral(1/sqrt(b*x^3 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax+bx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(1/sqrt(a*x + b*x**3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^3 + a*x),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt(b*x^3 + a*x), x)
```

3.62 $\int \frac{1}{x\sqrt{ax+bx^3}}\,dx$

Optimal. Leaf size=253

$$\frac{\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{a^{3/4}\sqrt{ax+bx^3}}-\frac{2\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{a^{3/4}\sqrt{ax+bx^3}}-\frac{2\sqrt{ax+bx^3}}{ax}+\frac{2\sqrt{b}x\left(a+bx^2\right)}{a\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

```
[Out] (2*Sqrt[b]*x*(a + b*x^2))/(a*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x
^3]) - (2*Sqrt[a*x + b*x^3])/(a*x) - (2*b^(1/4)*Sqrt[x]*(Sqrt[a]
+ Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[
2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(a^(3/4)*Sqrt[a*x + b*
x^3]) + (b^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(
Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1
/4)], 1/2])/(a^(3/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.42683, antiderivative size = 253, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.353$

$$\frac{\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{a^{3/4}\sqrt{ax+bx^3}}-\frac{2\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{a^{3/4}\sqrt{ax+bx^3}}-\frac{2\sqrt{ax+bx^3}}{ax}+\frac{2\sqrt{b}x\left(a+bx^2\right)}{a\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[a*x + b*x^3]),x]
```

```
[Out] (2*Sqrt[b]*x*(a + b*x^2))/(a*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x
^3]) - (2*Sqrt[a*x + b*x^3])/(a*x) - (2*b^(1/4)*Sqrt[x]*(Sqrt[a]
+ Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[
2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(a^(3/4)*Sqrt[a*x + b*
x^3]) + (b^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(
Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1
/4)], 1/2])/(a^(3/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 40.952, size = 233, normalized size = 0.92

$$\frac{2\sqrt{b}\sqrt{ax+bx^3}}{a\left(\sqrt{a}+\sqrt{b}x\right)}-\frac{2\sqrt{ax+bx^3}}{ax}-\frac{2\sqrt[4]{b}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{a^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}+\frac{\sqrt[4]{b}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{a^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a*x)**(1/2),x)
```

```
[Out] 2*sqrt(b)*sqrt(a*x + b*x**3)/(a*(sqrt(a) + sqrt(b)*x)) - 2*sqrt(a
*x + b*x**3)/(a*x) - 2*b**(1/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt
(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*
atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(a**(3/4)*sqrt(x)*(a + b*x*
*2)) + b**(1/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt
(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sq
rt(x)/a**(1/4)), 1/2)/(a**(3/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.163803, size = 170, normalized size = 0.67

$$-\frac{2\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(a+bx^2\right)+\sqrt{a}\sqrt{b}x\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-\sqrt{a}\sqrt{b}x\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)\right)}{a\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*Sqrt[a*x + b*x^3]),x]
```

```
[Out] (-2*(Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(a + b*x^2) - Sqrt[a]*Sqrt[b]*x*
Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a
]]], -1] + Sqrt[a]*Sqrt[b]*x*Sqrt[1 + (b*x^2)/a]*EllipticF[I*ArcS
inh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))/(a*Sqrt[(I*Sqrt[b]*x)/Sqr
t[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.025, size = 182, normalized size = 0.7

$$-2\,\frac{bx^2+a}{a\sqrt{x\left(bx^2+a\right)}}$$
$$+\frac{1}{a}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\,\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/2\sqrt{\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a*x)^(1/2),x)
```

```
[Out] -2*(b*x^2+a)/a/(x*(b*x^2+a))^(1/2)+1/a*(-a*b)^(1/2)*((x+1/b*(-a*b
)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^
(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-
a*b)^(1/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),
1/2*2^(1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(
-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3+axx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a*x)*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^3 + axx}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^3 + a*x)*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{x\left(a + bx^2\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(x*(a + b*x**2))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3 + axx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a*x)*x), x)
```

3.63 $\int \frac{1}{x^2\sqrt{ax+bx^3}}\,dx$

Optimal. Leaf size=119

$$-\frac{b^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{3a^{5/4}\sqrt{ax+bx^3}}-\frac{2\sqrt{ax+bx^3}}{3ax^2}$$

```
[Out] (-2*Sqrt[a*x + b*x^3])/(3*a*x^2) - (b^(3/4)*Sqrt[x]*(Sqrt[a] + Sq
rt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*Ar
cTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(3*a^(5/4)*Sqrt[a*x + b*x^
3])
```

Rubi [A] time = 0.191054, antiderivative size = 119, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$-\frac{b^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{3a^{5/4}\sqrt{ax+bx^3}}-\frac{2\sqrt{ax+bx^3}}{3ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*Sqrt[a*x + b*x^3]),x]
```

```
[Out] (-2*Sqrt[a*x + b*x^3])/(3*a*x^2) - (b^(3/4)*Sqrt[x]*(Sqrt[a] + Sq
rt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*Ar
cTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(3*a^(5/4)*Sqrt[a*x + b*x^
3])
```

Rubi in Sympy [A] time = 16.5101, size = 114, normalized size = 0.96

$$-\frac{2\sqrt{ax+bx^3}}{3ax^2}-\frac{b^{\frac{3}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{3a^{\frac{5}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a*x)**(1/2),x)
```

```
[Out] -2*sqrt(a*x + b*x**3)/(3*a*x**2) - b**(3/4)*sqrt((a + b*x**2)/(sq
rt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*e
lliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(3*a**(5/4)*sqr
t(x)*(a + b*x**2))
```

Mathematica [C] time = 0.232874, size = 106, normalized size = 0.89

$$\frac{2\left(-\frac{ibx^{5/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}-a-bx^2\right)}{3ax\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*Sqrt[a*x + b*x^3]),x]
```

```
[Out] (2*(-a - b*x^2 - (I*b*Sqrt[1 + a/(b*x^2)]*x^(5/2)*EllipticF[I*Arc
Sinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/Sqrt[(I*Sqrt[a])/Sq
rt[b]]))/(3*a*x*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.027, size = 129, normalized size = 1.1

$$-\frac{2}{3\,ax^2}\sqrt{bx^3+ax}$$
$$-\frac{1}{3\,a}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a*x)^(1/2),x)
```

```
[Out] -2/3*(b*x^3+a*x)^(1/2)/a/x^2-1/3/a*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1
/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2
))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*EllipticF(((
x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3+ax}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a*x)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\sqrt{bx^3+ax}x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^3 + a*x)*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{x\left(a+bx^2\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(x*(a + b*x**2))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3 + ax}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a*x)*x^2), x)
```

3.64 $\int \frac{1}{x^3\sqrt{ax+bx^3}}\,dx$

Optimal. Leaf size=286

$$-\frac{3b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{7/4}\sqrt{ax+bx^3}}+\frac{6b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{7/4}\sqrt{ax+bx^3}}-\frac{6b^{3/2}x\left(a+bx^2\right)}{5a^2\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{6b\sqrt{ax+bx^3}}{5a^2x}-\frac{2\sqrt{ax+bx^3}}{5ax^3}$$

```
[Out] (-6*b^(3/2)*x*(a + b*x^2))/(5*a^2*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x
+ b*x^3]) - (2*Sqrt[a*x + b*x^3])/(5*a*x^3) + (6*b*Sqrt[a*x + b*x
^3])/(5*a^2*x) + (6*b^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a
 + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sq
rt[x])/a^(1/4)], 1/2])/(5*a^(7/4)*Sqrt[a*x + b*x^3]) - (3*b^(5/4)
*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b
]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*a
^(7/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.531091, antiderivative size = 286, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.353$

$$-\frac{3b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{7/4}\sqrt{ax+bx^3}}+\frac{6b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{7/4}\sqrt{ax+bx^3}}-\frac{6b^{3/2}x\left(a+bx^2\right)}{5a^2\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{6b\sqrt{ax+bx^3}}{5a^2x}-\frac{2\sqrt{ax+bx^3}}{5ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[a*x + b*x^3]),x]
```


```
[Out] (-6*b^(3/2)*x*(a + b*x^2))/(5*a^2*(Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x
+ b*x^3]) - (2*Sqrt[a*x + b*x^3])/(5*a*x^3) + (6*b*Sqrt[a*x + b*x
^3])/(5*a^2*x) + (6*b^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a
 + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sq
rt[x])/a^(1/4)], 1/2])/(5*a^(7/4)*Sqrt[a*x + b*x^3]) - (3*b^(5/4)
*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b
]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*a
^(7/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 50.709, size = 267, normalized size = 0.93

$$-\frac{2\sqrt{ax+bx^3}}{5ax^3}-\frac{6b^{\frac{3}{2}}\sqrt{ax+bx^3}}{5a^2\left(\sqrt{a}+\sqrt{b}x\right)}+\frac{6b\sqrt{ax+bx^3}}{5a^2x}+\frac{6b^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{7}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{3b^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{7}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a*x)**(1/2),x)
```

```
[Out] -2*sqrt(a*x + b*x**3)/(5*a*x**3) - 6*b**(3/2)*sqrt(a*x + b*x**3)/
(5*a**2*(sqrt(a) + sqrt(b)*x)) + 6*b*sqrt(a*x + b*x**3)/(5*a**2*x
) + 6*b**(5/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(
a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqr
t(x)/a**(1/4)), 1/2)/(5*a**(7/4)*sqrt(x)*(a + b*x**2)) - 3*b**(5/
4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)
*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4
)), 1/2)/(5*a**(7/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.217788, size = 195, normalized size = 0.68

$$\frac{2\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(-a^2+2abx^2+3b^2x^4\right)+6\sqrt{a}b^{3/2}x^3\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-6\sqrt{a}b^{3/2}x^3\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)}{5a^2x^2\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*Sqrt[a*x + b*x^3]),x]
```

```
[Out] (2*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(-a^2 + 2*a*b*x^2 + 3*b^2*x^4) - 6
*Sqrt[a]*b^(3/2)*x^3*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt
[(I*Sqrt[b]*x)/Sqrt[a]]], -1] + 6*Sqrt[a]*b^(3/2)*x^3*Sqrt[1 + (b
*x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1])/(
5*a^2*x^2*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.03, size = 204, normalized size = 0.7

$$-\frac{2}{5\,ax^3}\sqrt{bx^3+ax}+\frac{\left(6\,bx^2+6\,a\right)b}{5\,a^2}\frac{1}{\sqrt{x\left(bx^2+a\right)}}-\frac{3\,b}{5\,a^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a*x)^(1/2),x)
```

```
[Out] -2/5*(b*x^3+a*x)^(1/2)/a/x^3+6/5*(b*x^2+a)*b/a^2/(x*(b*x^2+a))^(1
/2)-3/5/a^2*b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^
(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)
^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+
```

```
1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(
1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^
(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3 + ax}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a*x)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^3 + ax}x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^3 + a*x)*x^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\sqrt{x\,(a + bx^2)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**3+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(x*(a + b*x**2))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^3 + ax}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^3 + a*x)*x^3), x)
```

3.65 $\int \frac{x^7}{(ax+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=161

$$\frac{15a^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{14b^{13/4}\sqrt{ax+bx^3}} - \frac{15a\sqrt{ax+bx^3}}{7b^3} + \frac{9x^2\sqrt{ax+bx^3}}{7b^2} - \frac{x^5}{b\sqrt{ax+bx^3}}$$

```
[Out] -(x^5/(b*Sqrt[a*x + b*x^3])) - (15*a*Sqrt[a*x + b*x^3])/(7*b^3) +
 (9*x^2*Sqrt[a*x + b*x^3])/(7*b^2) + (15*a^(7/4)*Sqrt[x]*(Sqrt[a]
 + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF
[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(14*b^(13/4)*Sqrt[a*x
 + b*x^3])
```

Rubi [A] time = 0.360021, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$\frac{15a^{7/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{14b^{13/4}\sqrt{ax+bx^3}} - \frac{15a\sqrt{ax+bx^3}}{7b^3} + \frac{9x^2\sqrt{ax+bx^3}}{7b^2} - \frac{x^5}{b\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/(a*x + b*x^3)^(3/2),x]
```

```
[Out] -(x^5/(b*Sqrt[a*x + b*x^3])) - (15*a*Sqrt[a*x + b*x^3])/(7*b^3) +
 (9*x^2*Sqrt[a*x + b*x^3])/(7*b^2) + (15*a^(7/4)*Sqrt[x]*(Sqrt[a]
 + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF
[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(14*b^(13/4)*Sqrt[a*x
 + b*x^3])
```

Rubi in Sympy [A] time = 32.2734, size = 153, normalized size = 0.95

$$\frac{15a^{\frac{7}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{14b^{\frac{13}{4}}\sqrt{x}\left(a+bx^2\right)} - \frac{15a\sqrt{ax+bx^3}}{7b^3} - \frac{x^5}{b\sqrt{ax+bx^3}} + \frac{9x^2\sqrt{ax+bx^3}}{7b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(b*x**3+a*x)**(3/2),x)
```

```
[Out] 15*a**(7/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(14*b**(13/4)*sqrt(x)*(a + b*x**2)) - 15*a*sqrt
(a*x + b*x**3)/(7*b**3) - x**5/(b*sqrt(a*x + b*x**3)) + 9*x**2*sq
rt(a*x + b*x**3)/(7*b**2)
```

Mathematica [C] time = 0.140377, size = 137, normalized size = 0.85

$$\frac{x\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(-15a^2-6abx^2+2b^2x^4\right)+15ia^2x^{3/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{7b^3\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7/(a*x + b*x^3)^(3/2),x]
```

```
[Out] (Sqrt[(I*Sqrt[a])/Sqrt[b]]*x*(-15*a^2 - 6*a*b*x^2 + 2*b^2*x^4) +
(15*I)*a^2*Sqrt[1 + a/(b*x^2)]*x^(3/2)*EllipticF[I*ArcSinh[Sqrt[(
I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/(7*Sqrt[(I*Sqrt[a])/Sqrt[b]]*b
^3*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.032, size = 172, normalized size = 1.1

$$-\frac{a^2x}{b^3}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}+\frac{2\,x^2}{7\,b^2}\sqrt{bx^3+ax}-\frac{8\,a}{7\,b^3}\sqrt{bx^3+ax}$$
$$+\frac{15\,a^2}{14\,b^4}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(b*x^3+a*x)^(3/2),x)
```

```
[Out] -x/b^3*a^2/((x^2+a/b)*x*b)^(1/2)+2/7*x^2*(b*x^3+a*x)^(1/2)/b^2-8/
7*a*(b*x^3+a*x)^(1/2)/b^3+15/14*a^2/b^4*(-a*b)^(1/2)*((x+1/b*(-a*
b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)
^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*Ellipti
cF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/(b*x^3 + a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^6}{\sqrt{bx^3+ax}(bx^2+a)},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/(b*x^3 + a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x^6/(sqrt(b*x^3 + a*x)*(b*x^2 + a)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7}{(x(a+bx^2))^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(x**7/(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^7}{(bx^3+ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/(b*x^3 + a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^7/(b*x^3 + a*x)^(3/2), x)
```

3.66 $\int \frac{x^6}{(ax+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=279

$$-\frac{21a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{10b^{11/4}\sqrt{ax+bx^3}}+\frac{21a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{11/4}\sqrt{ax+bx^3}}-\frac{21ax\left(a+bx^2\right)}{5b^{5/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{7x\sqrt{ax+bx^3}}{5b^2}-\frac{x^4}{b\sqrt{ax+bx^3}}$$

```
[Out] -(x^4/(b*Sqrt[a*x + b*x^3])) - (21*a*x*(a + b*x^2))/(5*b^(5/2)*(S
qrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x^3]) + (7*x*Sqrt[a*x + b*x^3])/
(5*b^2) + (21*a^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x
^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])
/a^(1/4)], 1/2])/(5*b^(11/4)*Sqrt[a*x + b*x^3]) - (21*a^(5/4)*Sqr
t[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)
^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(10*b^(1
1/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.533806, antiderivative size = 279, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$-\frac{21a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{10b^{11/4}\sqrt{ax+bx^3}}+\frac{21a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5b^{11/4}\sqrt{ax+bx^3}}-\frac{21ax\left(a+bx^2\right)}{5b^{5/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{7x\sqrt{ax+bx^3}}{5b^2}-\frac{x^4}{b\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/(a*x + b*x^3)^(3/2),x]
```

```
[Out] -(x^4/(b*Sqrt[a*x + b*x^3])) - (21*a*x*(a + b*x^2))/(5*b^(5/2)*(S
qrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x^3]) + (7*x*Sqrt[a*x + b*x^3])/
(5*b^2) + (21*a^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x
^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])
/a^(1/4)], 1/2])/(5*b^(11/4)*Sqrt[a*x + b*x^3]) - (21*a^(5/4)*Sqr
t[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)
^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(10*b^(1
1/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 51.415, size = 260, normalized size = 0.93

$$\frac{21a^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{11}{4}}\sqrt{x}\,(a+bx^2)} - \frac{21a^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{10b^{\frac{11}{4}}\sqrt{x}\,(a+bx^2)} - \frac{21a\sqrt{ax+bx^3}}{5b^{\frac{5}{2}}\left(\sqrt{a}+\sqrt{b}x\right)} - \frac{x^4}{b\sqrt{ax+bx^3}} + \frac{7x\sqrt{ax+bx^3}}{5b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x**6/(b*x**3+a*x)**(3/2),x)
```

```
[Out] 21*a**(5/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(5*b**(11/4)*sqrt(x)*(a + b*x**2)) - 21*a**(5/4
)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*
x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)
), 1/2)/(10*b**(11/4)*sqrt(x)*(a + b*x**2)) - 21*a*sqrt(a*x + b*x
**3)/(5*b**(5/2)*(sqrt(a) + sqrt(b)*x)) - x**4/(b*sqrt(a*x + b*x*
*3)) + 7*x*sqrt(a*x + b*x**3)/(5*b**2)
```

Mathematica [C] time = 0.178064, size = 173, normalized size = 0.62

$$\frac{x\left(21a^{3/2}\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right) - 21a^{3/2}\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right) + \sqrt{b}x\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(7a+2bx^2\right)\right)}{5b^{5/2}\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\,(a+bx^2)}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[x^6/(a*x + b*x^3)^(3/2),x]
```

```
[Out] (x*(Sqrt[b]*x*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(7*a + 2*b*x^2) - 21*a^
(3/2)*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/
Sqrt[a]]], -1] + 21*a^(3/2)*Sqrt[1 + (b*x^2)/a]*EllipticF[I*ArcSi
nh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]))/(5*b^(5/2)*Sqrt[(I*Sqrt[b]
*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.028, size = 200, normalized size = 0.7

$$\frac{ax^2}{b^2}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}} + \frac{2\,x}{5\,b^2}\sqrt{bx^3+ax}$$
$$-\frac{21\,a}{10\,b^3}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\,\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^6/(b*x^3+a*x)^(3/2),x)
```

```
[Out] x^2/b^2*a/((x^2+a/b)*x*b)^(1/2)+2/5*x*(b*x^3+a*x)^(1/2)/b^2-21/10
*a/b^3*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(
-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))
^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-a
```

```
*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*El
lipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^5}{\sqrt{bx^3 + ax}(bx^2 + a)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x^5/(sqrt(b*x^3 + a*x)*(b*x^2 + a)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(x(a + bx^2))^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(x**6/(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{(bx^3 + ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^6/(b*x^3 + a*x)^(3/2), x)
```

3.67 $\int \frac{x^5}{(ax+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=137

$$-\frac{5a^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{6b^{9/4}\sqrt{ax+bx^3}}+\frac{5\sqrt{ax+bx^3}}{3b^2}-\frac{x^3}{b\sqrt{ax+bx^3}}$$

```
[Out] -(x^3/(b*Sqrt[a*x + b*x^3])) + (5*Sqrt[a*x + b*x^3])/(3*b^2) - (5
*a^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a]
+ Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/
2])/(6*b^(9/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.268411, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$-\frac{5a^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{6b^{9/4}\sqrt{ax+bx^3}}+\frac{5\sqrt{ax+bx^3}}{3b^2}-\frac{x^3}{b\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/(a*x + b*x^3)^(3/2),x]
```

```
[Out] -(x^3/(b*Sqrt[a*x + b*x^3])) + (5*Sqrt[a*x + b*x^3])/(3*b^2) - (5
*a^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a]
+ Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/
2])/(6*b^(9/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 24.9843, size = 129, normalized size = 0.94

$$-\frac{5a^{\frac{3}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{6b^{\frac{9}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{x^3}{b\sqrt{ax+bx^3}}+\frac{5\sqrt{ax+bx^3}}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a*x)**(3/2),x)
```

```
[Out] -5*a**(3/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(6*b**(9/4)*sqrt(x)*(a + b*x**2)) - x**3/(b*sqr
t(a*x + b*x**3)) + 5*sqrt(a*x + b*x**3)/(3*b**2)
```

Mathematica [C] time = 0.117299, size = 124, normalized size = 0.91

$$\frac{x\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(5a+2bx^2\right)-5iax^{3/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{3b^2\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/(a*x + b*x^3)^(3/2),x]
```

```
[Out] (Sqrt[(I*Sqrt[a])/Sqrt[b]]*x*(5*a + 2*b*x^2) - (5*I)*a*Sqrt[1 + a
/(b*x^2)]*x^(3/2)*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/S
qrt[x]], -1])/(3*Sqrt[(I*Sqrt[a])/Sqrt[b]]*b^2*Sqrt[x*(a + b*x^2)
])
```

Maple [A] time = 0.028, size = 147, normalized size = 1.1

$$\frac{ax}{b^2}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}+\frac{2}{3\,b^2}\sqrt{bx^3+ax}$$
$$-\frac{5\,a}{6\,b^3}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^3+a*x)^(3/2),x)
```

```
[Out] x/b^2*a/((x^2+a/b)*x*b)^(1/2)+2/3*(b*x^3+a*x)^(1/2)/b^2-5/6*a/b^3
*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-
1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)
/(b*x^3+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2)
)^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{\sqrt{bx^3+ax}(bx^2+a)},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x^4/(sqrt(b*x^3 + a*x)*(b*x^2 + a)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^5}{\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(x**5/(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{(bx^3 + ax)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^5/(b*x^3 + a*x)^(3/2), x)
```

3.68 $\int \frac{x^4}{(ax+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=253

$$\frac{3x\,(a+bx^2)}{b^{3/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{3\sqrt[4]{a}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2b^{7/4}\sqrt{ax+bx^3}}-\frac{3\sqrt[4]{a}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{b^{7/4}\sqrt{ax+bx^3}}-\frac{x^2}{b\sqrt{ax+bx^3}}$$

```
[Out] -(x^2/(b*Sqrt[a*x + b*x^3])) + (3*x*(a + b*x^2))/(b^(3/2)*(Sqrt[a
] + Sqrt[b]*x)*Sqrt[a*x + b*x^3]) - (3*a^(1/4)*Sqrt[x]*(Sqrt[a] +
 Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2
*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(b^(7/4)*Sqrt[a*x + b*x
^3]) + (3*a^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/
(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(
1/4)], 1/2])/(2*b^(7/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.436303, antiderivative size = 253, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.353$

$$\frac{3x\,(a+bx^2)}{b^{3/2}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{3\sqrt[4]{a}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2b^{7/4}\sqrt{ax+bx^3}}-\frac{3\sqrt[4]{a}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{b^{7/4}\sqrt{ax+bx^3}}-\frac{x^2}{b\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/(a*x + b*x^3)^(3/2),x]
```



```
[Out] -(x^2/(b*Sqrt[a*x + b*x^3])) + (3*x*(a + b*x^2))/(b^(3/2)*(Sqrt[a
] + Sqrt[b]*x)*Sqrt[a*x + b*x^3]) - (3*a^(1/4)*Sqrt[x]*(Sqrt[a] +
 Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2
*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(b^(7/4)*Sqrt[a*x + b*x
^3]) + (3*a^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/
(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(
1/4)], 1/2])/(2*b^(7/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 41.5544, size = 235, normalized size = 0.93

$$-\frac{3\sqrt[4]{a}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{b^{\frac{7}{4}}\sqrt{x}\,(a+bx^2)}+\frac{3\sqrt[4]{a}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{2b^{\frac{7}{4}}\sqrt{x}\,(a+bx^2)}-\frac{x^2}{b\sqrt{ax+bx^3}}+\frac{3\sqrt{ax+bx^3}}{b^{\frac{3}{2}}\left(\sqrt{a}+\sqrt{b}x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**3+a*x)**(3/2),x)
```

```
[Out] -3*a**(1/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(b**(7/4)*sqrt(x)*(a + b*x**2)) + 3*a**(1/4)*sq
rt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*s
qrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1
/2)/(2*b**(7/4)*sqrt(x)*(a + b*x**2)) - x**2/(b*sqrt(a*x + b*x**3
)) + 3*sqrt(a*x + b*x**3)/(b**(3/2)*(sqrt(a) + sqrt(b)*x))
```

Mathematica [C] time = 0.135128, size = 161, normalized size = 0.64

$$-\frac{x\left(3\sqrt{a}\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-3\sqrt{a}\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+\sqrt{b}x\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)}{b^{3/2}\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/(a*x + b*x^3)^(3/2),x]
```

```
[Out] -((x*(Sqrt[b]*x*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]] - 3*Sqrt[a]*Sqrt[1 +
(b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1]
+ 3*Sqrt[a]*Sqrt[1 + (b*x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[
b]*x)/Sqrt[a]]], -1]))/(b^(3/2)*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[
x*(a + b*x^2)]))
```

Maple [A] time = 0.028, size = 182, normalized size = 0.7

$$-\frac{x^2}{b}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}$$
$$+\frac{3}{2b^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a*x)^(3/2),x)
```

```
[Out] -x^2/b/((x^2+a/b)*x*b)^(1/2)+3/2/b^2*(-a*b)^(1/2)*((x+1/b*(-a*b)^
(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1
/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*
b)^(1/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/
2*2^(1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a
*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\sqrt{bx^3 + ax}(bx^2 + a)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x^3/(sqrt(b*x^3 + a*x)*(b*x^2 + a)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\left(x\left(a + bx^2\right)\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(x**4/(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\left(bx^3 + ax\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^4/(b*x^3 + a*x)^(3/2), x)
```

3.69 $\int \frac{x^3}{(ax+bx^3)^{3/2}} dx$

Optimal. Leaf size=115

$$\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2\sqrt[4]{a}b^{5/4}\sqrt{ax+bx^3}}-\frac{x}{b\sqrt{ax+bx^3}}$$

```
[Out] -(x/(b*Sqrt[a*x + b*x^3])) + (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[
(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*
Sqrt[x])/a^(1/4)], 1/2])/(2*a^(1/4)*b^(5/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.196399, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.235$

$$\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2\sqrt[4]{a}b^{5/4}\sqrt{ax+bx^3}}-\frac{x}{b\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(a*x + b*x^3)^(3/2),x]
```

```
[Out] -(x/(b*Sqrt[a*x + b*x^3])) + (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[
(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*
Sqrt[x])/a^(1/4)], 1/2])/(2*a^(1/4)*b^(5/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 16.9554, size = 107, normalized size = 0.93

$$-\frac{x}{b\sqrt{ax+bx^3}}+\frac{\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\text{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{2\sqrt[4]{a}b^{\frac{5}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a*x)**(3/2),x)
```

```
[Out] -x/(b*sqrt(a*x + b*x**3)) + sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*
x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan
(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(2*a**(1/4)*b**(5/4)*sqrt(x)*(a
 + b*x**2))
```

Mathematica [C] time = 0.0853897, size = 111, normalized size = 0.97

$$\frac{ix^{3/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)-x\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{b\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/(a*x + b*x^3)^(3/2),x]
```

```
[Out] (-(Sqrt[(I*Sqrt[a])/Sqrt[b]]*x) + I*Sqrt[1 + a/(b*x^2)]*x^(3/2)*E
llipticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/(Sqrt
[(I*Sqrt[a])/Sqrt[b]]*b*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.026, size = 130, normalized size = 1.1

$$-\frac{x}{b}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}+\frac{1}{2\,b^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a*x)^(3/2),x)
```

```
[Out] -x/b/((x^2+a/b)*x*b)^(1/2)+1/2/b^2*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1
/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2
))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*EllipticF(((
x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{\sqrt{bx^3+ax}(bx^2+a)},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x^2/(sqrt(b*x^3 + a*x)*(b*x^2 + a)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^3}{\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(x**3/(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{(bx^3 + ax)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^3/(b*x^3 + a*x)^(3/2), x)
```

3.70 $\int \frac{x^2}{(ax+bx^3)^{3/2}} \, dx$

Optimal. Leaf size=254

$$-\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2a^{3/4}b^{3/4}\sqrt{ax+bx^3}}+\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{a^{3/4}b^{3/4}\sqrt{ax+bx^3}}+\frac{x^2}{a\sqrt{ax+bx^3}}-\frac{x\left(a+bx^2\right)}{a\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

```
[Out] x^2/(a*Sqrt[a*x + b*x^3]) - (x*(a + b*x^2))/(a*Sqrt[b]*(Sqrt[a] +
 Sqrt[b]*x)*Sqrt[a*x + b*x^3]) + (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*S
qrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1
/4)*Sqrt[x])/a^(1/4)], 1/2])/(a^(3/4)*b^(3/4)*Sqrt[a*x + b*x^3])
- (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt
[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(2
*a^(3/4)*b^(3/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.441025, antiderivative size = 254, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.353$

$$-\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2a^{3/4}b^{3/4}\sqrt{ax+bx^3}}+\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{a^{3/4}b^{3/4}\sqrt{ax+bx^3}}+\frac{x^2}{a\sqrt{ax+bx^3}}-\frac{x\left(a+bx^2\right)}{a\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(a*x + b*x^3)^(3/2),x]
```

```
[Out] x^2/(a*Sqrt[a*x + b*x^3]) - (x*(a + b*x^2))/(a*Sqrt[b]*(Sqrt[a] +
 Sqrt[b]*x)*Sqrt[a*x + b*x^3]) + (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*S
qrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1
/4)*Sqrt[x])/a^(1/4)], 1/2])/(a^(3/4)*b^(3/4)*Sqrt[a*x + b*x^3])
- (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt
[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(2
*a^(3/4)*b^(3/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 41.7981, size = 231, normalized size = 0.91

$$\frac{x^2}{a\sqrt{ax+bx^3}}-\frac{\sqrt{ax+bx^3}}{a\sqrt{b}\left(\sqrt{a}+\sqrt{b}x\right)}+\frac{\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{a^{\frac{3}{4}}b^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{2a^{\frac{3}{4}}b^{\frac{3}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a*x)**(3/2),x)
```

```
[Out] x**2/(a*sqrt(a*x + b*x**3)) - sqrt(a*x + b*x**3)/(a*sqrt(b)*(sqrt
(a) + sqrt(b)*x)) + sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(
sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4
)*sqrt(x)/a**(1/4)), 1/2)/(a**(3/4)*b**(3/4)*sqrt(x)*(a + b*x**2)
) - sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b
)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/
4)), 1/2)/(2*a**(3/4)*b**(3/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.127202, size = 162, normalized size = 0.64

$$\frac{x\left(\sqrt{a}\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-\sqrt{a}\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+\sqrt{b}x\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)}{a\sqrt{b}\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(a*x + b*x^3)^(3/2),x]
```

```
[Out] (x*(Sqrt[b]*x*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]] - Sqrt[a]*Sqrt[1 + (b*x
^2)/a]*EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1] + Sq
rt[a]*Sqrt[1 + (b*x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/
Sqrt[a]]], -1]))/(a*Sqrt[b]*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a
 + b*x^2)])
```

Maple [A] time = 0.026, size = 184, normalized size = 0.7

$$\frac{x^2}{a}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}$$

$$-\frac{1}{2\,ab}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a*x)^(3/2),x)
```

```
[Out] x^2/a/((x^2+a/b)*x*b)^(1/2)-1/2/a/b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(
1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/
2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b
)^(1/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2
*2^(1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*
b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\sqrt{bx^3+ax}(bx^2+a)},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x)^(3/2),x, algorithm="fricas")

[Out] integral(x/(sqrt(b*x^3 + a*x)*(b*x^2 + a)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a*x)**(3/2),x)

[Out] Integral(x**2/(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\left(bx^3+ax\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x)^(3/2),x, algorithm="giac")

[Out] integrate(x^2/(b*x^3 + a*x)^(3/2), x)
```

3.71 $\int \frac{x}{(ax+bx^3)^{3/2}} dx$

Optimal. Leaf size=114

$$\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2a^{5/4}\sqrt[4]{b}\sqrt{ax+bx^3}}+\frac{x}{a\sqrt{ax+bx^3}}$$

```
[Out] x/(a*Sqrt[a*x + b*x^3]) + (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a
+ b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqr
t[x])/a^(1/4)], 1/2])/(2*a^(5/4)*b^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.173098, antiderivative size = 114, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.267

$$\frac{\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2a^{5/4}\sqrt[4]{b}\sqrt{ax+bx^3}}+\frac{x}{a\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(a*x + b*x^3)^(3/2),x]
```

```
[Out] x/(a*Sqrt[a*x + b*x^3]) + (Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a
+ b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqr
t[x])/a^(1/4)], 1/2])/(2*a^(5/4)*b^(1/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 15.841, size = 107, normalized size = 0.94

$$\frac{x}{a\sqrt{ax+bx^3}}+\frac{\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\text{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{2a^{\frac{5}{4}}\sqrt[4]{b}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a*x)**(3/2),x)
```

```
[Out] x/(a*sqrt(a*x + b*x**3)) + sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x
)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(
b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(2*a**(5/4)*b**(1/4)*sqrt(x)*(a
+ b*x**2))
```

Mathematica [C] time = 0.0715716, size = 110, normalized size = 0.96

$$\frac{ix^{3/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)+x\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{a\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(a*x + b*x^3)^(3/2),x]
```

```
[Out] (Sqrt[(I*Sqrt[a])/Sqrt[b]]*x + I*Sqrt[1 + a/(b*x^2)]*x^(3/2)*Elli
pticF[I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/(a*Sqrt[
(I*Sqrt[a])/Sqrt[b]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.026, size = 132, normalized size = 1.2

$$\frac{x}{a}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}$$
$$+\frac{1}{2\,ab}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a*x)^(3/2),x)
```

```
[Out] x/a/((x^2+a/b)*x*b)^(1/2)+1/2/a/b*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/
2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2)
)^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^(1/2)*EllipticF(((x
+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^3+ax}(bx^2+a)},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^3 + a*x)*(b*x^2 + a)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{\left(x\left(a+bx^2\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(x/(x*(a + b*x**2))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(bx^3 + ax\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x/(b*x^3 + a*x)^(3/2), x)
```

3.72 $\int \frac{1}{(ax+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=273

$$\frac{3\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2a^{7/4}\sqrt{ax+bx^3}}-\frac{3\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{a^{7/4}\sqrt{ax+bx^3}}-\frac{3\sqrt{ax+bx^3}}{a^2x}+\frac{3\sqrt{b}x\left(a+bx^2\right)}{a^2\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{1}{a\sqrt{ax+bx^3}}$$

```
[Out] 1/(a*Sqrt[a*x + b*x^3]) + (3*Sqrt[b]*x*(a + b*x^2))/(a^2*(Sqrt[a]
 + Sqrt[b]*x)*Sqrt[a*x + b*x^3]) - (3*Sqrt[a*x + b*x^3])/(a^2*x)
- (3*b^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt
[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)]
, 1/2])/(a^(7/4)*Sqrt[a*x + b*x^3]) + (3*b^(1/4)*Sqrt[x]*(Sqrt[a]
 + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF
[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(2*a^(7/4)*Sqrt[a*x +
 b*x^3])
```

Rubi [A] time = 0.4734, antiderivative size = 273, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.538

$$\frac{3\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{2a^{7/4}\sqrt{ax+bx^3}}-\frac{3\sqrt[4]{b}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{a^{7/4}\sqrt{ax+bx^3}}-\frac{3\sqrt{ax+bx^3}}{a^2x}+\frac{3\sqrt{b}x\left(a+bx^2\right)}{a^2\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{1}{a\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^3)^(-3/2),x]
```


```
[Out] 1/(a*Sqrt[a*x + b*x^3]) + (3*Sqrt[b]*x*(a + b*x^2))/(a^2*(Sqrt[a]
 + Sqrt[b]*x)*Sqrt[a*x + b*x^3]) - (3*Sqrt[a*x + b*x^3])/(a^2*x)
- (3*b^(1/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt
[a] + Sqrt[b]*x)^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)]
, 1/2])/(a^(7/4)*Sqrt[a*x + b*x^3]) + (3*b^(1/4)*Sqrt[x]*(Sqrt[a]
 + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF
[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(2*a^(7/4)*Sqrt[a*x +
 b*x^3])
```

Rubi in Sympy [A] time = 49.6762, size = 255, normalized size = 0.93

$$\frac{1}{a\sqrt{ax+bx^3}}+\frac{3\sqrt{b}\sqrt{ax+bx^3}}{a^2\left(\sqrt{a}+\sqrt{b}x\right)}-\frac{3\sqrt{ax+bx^3}}{a^2x}-\frac{3\sqrt[4]{b}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{a^{\frac{7}{4}}\sqrt{x}\,(a+bx^2)}+\frac{3\sqrt[4]{b}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{2a^{\frac{7}{4}}\sqrt{x}\,(a+bx^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(1/(b*x**3+a*x)**(3/2),x)
```

```
[Out] 1/(a*sqrt(a*x + b*x**3)) + 3*sqrt(b)*sqrt(a*x + b*x**3)/(a**2*(sq
rt(a) + sqrt(b)*x)) - 3*sqrt(a*x + b*x**3)/(a**2*x) - 3*b**(1/4)*
sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)
*sqrt(a*x + b*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x)/a**(1/4)),
 1/2)/(a**(7/4)*sqrt(x)*(a + b*x**2)) + 3*b**(1/4)*sqrt((a + b*x*
*2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*
x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(2*a**(7
/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.179313, size = 174, normalized size = 0.64

$$\frac{-\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(2a+3bx^2\right)-3\sqrt{a}\sqrt{b}x\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)+3\sqrt{a}\sqrt{b}x\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)}{a^2\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\,(a+bx^2)}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[(a*x + b*x^3)^(-3/2),x]
```

```
[Out] (-(Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(2*a + 3*b*x^2)) + 3*Sqrt[a]*Sqrt[
b]*x*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/S
qrt[a]]], -1] - 3*Sqrt[a]*Sqrt[b]*x*Sqrt[1 + (b*x^2)/a]*EllipticF
[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1])/(a^2*Sqrt[(I*Sqrt[b
]*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.029, size = 206, normalized size = 0.8

$$-2\,\frac{bx^2+a}{a^2\sqrt{x\,(bx^2+a)}}-\frac{bx^2}{a^2}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}+\frac{3}{2\,a^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\,\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1/2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/(b*x^3+a*x)^(3/2),x)
```

```
[Out] -2*(b*x^2+a)/a^2/(x*(b*x^2+a))^(1/2)-x^2*b/a^2/((x^2+a/b)*x*b)^(1
/2)+3/2/a^2*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1
/2)*(-2*(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(
1/2))^(1/2)/(b*x^3+a*x)^(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/
```

```
b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/
2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1
/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + ax)^{\frac{3}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(-3/2),x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x)^(-3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{(bx^3 + ax)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(-3/2),x, algorithm="fricas")
```

```
[Out] integral((b*x^3 + a*x)^(-3/2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(ax + bx^3)^{\frac{3}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral((a*x + b*x**3)**(-3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + ax)^{\frac{3}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x)^(-3/2),x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x)^(-3/2), x)
```

3.73 $\int \frac{1}{x(ax+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=139

$$-\frac{5b^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{6a^{9/4}\sqrt{ax+bx^3}}-\frac{5\sqrt{ax+bx^3}}{3a^2x^2}+\frac{1}{ax\sqrt{ax+bx^3}}$$

```
[Out] 1/(a*x*Sqrt[a*x + b*x^3]) - (5*Sqrt[a*x + b*x^3])/(3*a^2*x^2) - (
5*b^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a]
 + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1
/2])/(6*a^(9/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.267133, antiderivative size = 139, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$-\frac{5b^{3/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{6a^{9/4}\sqrt{ax+bx^3}}-\frac{5\sqrt{ax+bx^3}}{3a^2x^2}+\frac{1}{ax\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a*x + b*x^3)^(3/2)),x]
```

```
[Out] 1/(a*x*Sqrt[a*x + b*x^3]) - (5*Sqrt[a*x + b*x^3])/(3*a^2*x^2) - (
5*b^(3/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a]
 + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1
/2])/(6*a^(9/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 26.0352, size = 133, normalized size = 0.96

$$\frac{1}{ax\sqrt{ax+bx^3}}-\frac{5\sqrt{ax+bx^3}}{3a^2x^2}-\frac{5b^{\frac{3}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{6a^{\frac{9}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a*x)**(3/2),x)
```

```
[Out] 1/(a*x*sqrt(a*x + b*x**3)) - 5*sqrt(a*x + b*x**3)/(3*a**2*x**2) -
 5*b**(3/4)*sqrt((a + b*x**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a)
+ sqrt(b)*x)*sqrt(a*x + b*x**3)*elliptic_f(2*atan(b**(1/4)*sqrt(x
)/a**(1/4)), 1/2)/(6*a**(9/4)*sqrt(x)*(a + b*x**2))
```

Mathematica [C] time = 0.238528, size = 106, normalized size = 0.76

$$\frac{-\frac{5ibx^{5/2}\sqrt{\frac{a}{bx^2}+1}F\left(i\sinh^{-1}\left(\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right)\middle|-1\right)}{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}-2a-5bx^2}{3a^2x\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a*x + b*x^3)^(3/2)),x]
```

```
[Out] (-2*a - 5*b*x^2 - ((5*I)*b*Sqrt[1 + a/(b*x^2)]*x^(5/2)*EllipticF[
I*ArcSinh[Sqrt[(I*Sqrt[a])/Sqrt[b]]/Sqrt[x]], -1])/Sqrt[(I*Sqrt[a
])/Sqrt[b]])/(3*a^2*x*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.032, size = 150, normalized size = 1.1

$$-\frac{bx}{a^2}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}-\frac{2}{3\,a^2x^2}\sqrt{bx^3+ax}$$
$$-\frac{5}{6\,a^2}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a*x)^(3/2),x)
```

```
[Out] -x*b/a^2/((x^2+a/b)*x*b)^(1/2)-2/3*(b*x^3+a*x)^(1/2)/a^2/x^2-5/6/
a^2*(-a*b)^(1/2)*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*
(x-1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1
/2)/(b*x^3+a*x)^(1/2)*EllipticF(((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1
/2))^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+ax)^{\frac{3}{2}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(3/2)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a*x)^(3/2)*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{(bx^4+ax^2)\sqrt{bx^3+ax}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(3/2)*x),x, algorithm="fricas")
```

```
[Out] integral(1/((b*x^4 + a*x^2)*sqrt(b*x^3 + a*x)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\,(x\,(a+bx^2))^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x*(x*(a + b*x**2))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3 + ax)^{\frac{3}{2}}x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(3/2)*x),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a*x)^(3/2)*x), x)
```

3.74 $\int \frac{1}{x^2(ax+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=306

$$-\frac{21b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{10a^{11/4}\sqrt{ax+bx^3}}+\frac{21b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{11/4}\sqrt{ax+bx^3}}-\frac{21b^{3/2}x\left(a+bx^2\right)}{5a^3\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{21b\sqrt{ax+bx^3}}{5a^3x}-\frac{7\sqrt{ax+bx^3}}{5a^2x^3}+\frac{1}{ax^2\sqrt{ax+bx^3}}$$

```
[Out] 1/(a*x^2*Sqrt[a*x + b*x^3]) - (21*b^(3/2)*x*(a + b*x^2))/(5*a^3*(
Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x^3]) - (7*Sqrt[a*x + b*x^3])/(
5*a^2*x^3) + (21*b*Sqrt[a*x + b*x^3])/(5*a^3*x) + (21*b^(5/4)*Sqr
t[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)
^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*a^(11
/4)*Sqrt[a*x + b*x^3]) - (21*b^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x
)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b
^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(10*a^(11/4)*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.616708, antiderivative size = 306, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$-\frac{21b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{10a^{11/4}\sqrt{ax+bx^3}}+\frac{21b^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)|\frac{1}{2}\right)}{5a^{11/4}\sqrt{ax+bx^3}}-\frac{21b^{3/2}x\left(a+bx^2\right)}{5a^3\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}}+\frac{21b\sqrt{ax+bx^3}}{5a^3x}-\frac{7\sqrt{ax+bx^3}}{5a^2x^3}+\frac{1}{ax^2\sqrt{ax+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a*x + b*x^3)^(3/2)),x]
```


```
[Out] 1/(a*x^2*Sqrt[a*x + b*x^3]) - (21*b^(3/2)*x*(a + b*x^2))/(5*a^3*(
Sqrt[a] + Sqrt[b]*x)*Sqrt[a*x + b*x^3]) - (7*Sqrt[a*x + b*x^3])/(
5*a^2*x^3) + (21*b*Sqrt[a*x + b*x^3])/(5*a^3*x) + (21*b^(5/4)*Sqr
t[x]*(Sqrt[a] + Sqrt[b]*x)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)
^2]*EllipticE[2*ArcTan[(b^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(5*a^(11
/4)*Sqrt[a*x + b*x^3]) - (21*b^(5/4)*Sqrt[x]*(Sqrt[a] + Sqrt[b]*x
)*Sqrt[(a + b*x^2)/(Sqrt[a] + Sqrt[b]*x)^2]*EllipticF[2*ArcTan[(b
^(1/4)*Sqrt[x])/a^(1/4)], 1/2])/(10*a^(11/4)*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 65.28, size = 287, normalized size = 0.94

$$\frac{1}{ax^2\sqrt{ax+bx^3}}-\frac{7\sqrt{ax+bx^3}}{5a^2x^3}-\frac{21b^{\frac{3}{2}}\sqrt{ax+bx^3}}{5a^3\left(\sqrt{a}+\sqrt{b}x\right)}+\frac{21b\sqrt{ax+bx^3}}{5a^3x}+\frac{21b^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{11}{4}}\sqrt{x}\left(a+bx^2\right)}-\frac{21b^{\frac{5}{4}}\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}x\right)^2}}\left(\sqrt{a}+\sqrt{b}x\right)\sqrt{ax+bx^3}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{b}\sqrt{x}}{\sqrt[4]{a}}\right)\middle|\frac{1}{2}\right)}{10a^{\frac{11}{4}}\sqrt{x}\left(a+bx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a*x)**(3/2),x)
```

```
[Out] 1/(a*x**2*sqrt(a*x + b*x**3)) - 7*sqrt(a*x + b*x**3)/(5*a**2*x**3
) - 21*b**(3/2)*sqrt(a*x + b*x**3)/(5*a**3*(sqrt(a) + sqrt(b)*x))
 + 21*b*sqrt(a*x + b*x**3)/(5*a**3*x) + 21*b**(5/4)*sqrt((a + b*x
**2)/(sqrt(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b
*x**3)*elliptic_e(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(5*a**(
11/4)*sqrt(x)*(a + b*x**2)) - 21*b**(5/4)*sqrt((a + b*x**2)/(sqrt
(a) + sqrt(b)*x)**2)*(sqrt(a) + sqrt(b)*x)*sqrt(a*x + b*x**3)*ell
iptic_f(2*atan(b**(1/4)*sqrt(x)/a**(1/4)), 1/2)/(10*a**(11/4)*sqr
t(x)*(a + b*x**2))
```

Mathematica [C] time = 0.187402, size = 194, normalized size = 0.63

$$\frac{\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\left(-2a^2+14abx^2+21b^2x^4\right)+21\sqrt{a}b^{3/2}x^3\sqrt{\frac{bx^2}{a}+1}F\left(i\sinh^{-1}\left(\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\right)\middle|-1\right)-21\sqrt{a}b^{3/2}x^3\sqrt{\frac{bx^2}{a}+1}E\left(i\sinh^{-1}\left(\right.\right.}{5a^3x^2\sqrt{\frac{i\sqrt{b}x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(a*x + b*x^3)^(3/2)),x]
```

```
[Out] (Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*(-2*a^2 + 14*a*b*x^2 + 21*b^2*x^4) -
 21*Sqrt[a]*b^(3/2)*x^3*Sqrt[1 + (b*x^2)/a]*EllipticE[I*ArcSinh[S
qrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1] + 21*Sqrt[a]*b^(3/2)*x^3*Sqrt[1
+ (b*x^2)/a]*EllipticF[I*ArcSinh[Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]], -1
])/(5*a^3*x^2*Sqrt[(I*Sqrt[b]*x)/Sqrt[a]]*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.035, size = 228, normalized size = 0.8

$$-\frac{2}{5\,a^2x^3}\sqrt{bx^3+ax}+\frac{\left(16\,bx^2+16\,a\right)b}{5\,a^3}\frac{1}{\sqrt{x\left(bx^2+a\right)}}+\frac{b^2x^2}{a^3}\frac{1}{\sqrt{\left(x^2+\frac{a}{b}\right)xb}}-\frac{21\,b}{10\,a^3}\sqrt{-ab}\sqrt{b\left(x+\frac{1}{b}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{b}{\sqrt{-ab}}\left(x-\frac{\sqrt{-ab}}{b}\right)}\sqrt{-bx\frac{1}{\sqrt{-ab}}}\left(-2\,\frac{\sqrt{-ab}}{b}EllipticE\left(\sqrt{\frac{b}{\sqrt{-ab}}\left(x+\frac{\sqrt{-ab}}{b}\right)},1\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a*x)^(3/2),x)
```

```
[Out] -2/5*(b*x^3+a*x)^(1/2)/a^2/x^3+16/5*(b*x^2+a)*b/a^3/(x*(b*x^2+a))
^(1/2)+x^2*b^2/a^3/((x^2+a/b)*x*b)^(1/2)-21/10/a^3*b*(-a*b)^(1/2)
```

```
*((x+1/b*(-a*b)^(1/2))*b/(-a*b)^(1/2))^(1/2)*(-2*(x-1/b*(-a*b)^(1
/2))*b/(-a*b)^(1/2))^(1/2)*(-x*b/(-a*b)^(1/2))^(1/2)/(b*x^3+a*x)^
(1/2)*(-2/b*(-a*b)^(1/2)*EllipticE(((x+1/b*(-a*b)^(1/2))*b/(-a*b)
^(1/2))^(1/2),1/2*2^(1/2))+1/b*(-a*b)^(1/2)*EllipticF(((x+1/b*(-a
*b)^(1/2))*b/(-a*b)^(1/2))^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+ax)^{\frac{3}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a*x)^(3/2)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{(bx^5+ax^3)\sqrt{bx^3+ax}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/((b*x^5 + a*x^3)*sqrt(b*x^3 + a*x)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\,(x\,(a+bx^2))^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x**2*(x*(a + b*x**2))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+ax)^{\frac{3}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a*x)^(3/2)*x^2), x)
```

3.75 $\int \frac{x^{29/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=159

$$-\frac{9a\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax+bx^3}}\right)}{2b^{11/2}}+\frac{9\sqrt{x}\sqrt{ax+bx^3}}{2b^5}-\frac{3x^{7/2}}{b^4\sqrt{ax+bx^3}}-\frac{3x^{13/2}}{5b^3\left(ax+bx^3\right)^{3/2}}-\frac{9x^{19/2}}{35b^2\left(ax+bx^3\right)^{5/2}}-\frac{x^{25/2}}{7b\left(ax+bx^3\right)^{7/2}}$$

```
[Out] -x^(25/2)/(7*b*(a*x + b*x^3)^(7/2)) - (9*x^(19/2))/(35*b^2*(a*x +
 b*x^3)^(5/2)) - (3*x^(13/2))/(5*b^3*(a*x + b*x^3)^(3/2)) - (3*x^
(7/2))/(b^4*Sqrt[a*x + b*x^3]) + (9*Sqrt[x]*Sqrt[a*x + b*x^3])/(2
*b^5) - (9*a*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x + b*x^3]])/(2*b^(
11/2))
```

Rubi [A] time = 0.416639, antiderivative size = 159, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$-\frac{9a\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax+bx^3}}\right)}{2b^{11/2}}+\frac{9\sqrt{x}\sqrt{ax+bx^3}}{2b^5}-\frac{3x^{7/2}}{b^4\sqrt{ax+bx^3}}-\frac{3x^{13/2}}{5b^3\left(ax+bx^3\right)^{3/2}}-\frac{9x^{19/2}}{35b^2\left(ax+bx^3\right)^{5/2}}-\frac{x^{25/2}}{7b\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(29/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -x^(25/2)/(7*b*(a*x + b*x^3)^(7/2)) - (9*x^(19/2))/(35*b^2*(a*x +
 b*x^3)^(5/2)) - (3*x^(13/2))/(5*b^3*(a*x + b*x^3)^(3/2)) - (3*x^
(7/2))/(b^4*Sqrt[a*x + b*x^3]) + (9*Sqrt[x]*Sqrt[a*x + b*x^3])/(2
*b^5) - (9*a*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x + b*x^3]])/(2*b^(
11/2))
```

Rubi in Sympy [A] time = 41.7567, size = 146, normalized size = 0.92

$$-\frac{9a\,\mathrm{atanh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{ax+bx^3}}\right)}{2b^{\frac{11}{2}}}-\frac{x^{\frac{25}{2}}}{7b\left(ax+bx^3\right)^{\frac{7}{2}}}-\frac{9x^{\frac{19}{2}}}{35b^2\left(ax+bx^3\right)^{\frac{5}{2}}}-\frac{3x^{\frac{13}{2}}}{5b^3\left(ax+bx^3\right)^{\frac{3}{2}}}-\frac{3x^{\frac{7}{2}}}{b^4\sqrt{ax+bx^3}}+\frac{9\sqrt{x}\sqrt{ax+bx^3}}{2b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(29/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] -9*a*atanh(sqrt(b)*x**(3/2)/sqrt(a*x + b*x**3))/(2*b**(11/2)) - x
**(25/2)/(7*b*(a*x + b*x**3)**(7/2)) - 9*x**(19/2)/(35*b**2*(a*x
+ b*x**3)**(5/2)) - 3*x**(13/2)/(5*b**3*(a*x + b*x**3)**(3/2)) -
3*x**(7/2)/(b**4*sqrt(a*x + b*x**3)) + 9*sqrt(x)*sqrt(a*x + b*x**
3)/(2*b**5)
```

Mathematica [A] time = 0.141101, size = 123, normalized size = 0.77

$$\frac{\sqrt{x}\left(\sqrt{b}x\left(315a^4+1050a^3bx^2+1218a^2b^2x^4+528ab^3x^6+35b^4x^8\right)-315a\left(a+bx^2\right)^{7/2}\log\left(\sqrt{b}\sqrt{a+bx^2}+bx\right)\right)}{70b^{11/2}\left(a+bx^2\right)^3\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[x^(29/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (Sqrt[x]*(Sqrt[b]*x*(315*a^4 + 1050*a^3*b*x^2 + 1218*a^2*b^2*x^4
+ 528*a*b^3*x^6 + 35*b^4*x^8) - 315*a*(a + b*x^2)^(7/2)*Log[b*x +
 Sqrt[b]*Sqrt[a + b*x^2]]))/(70*b^(11/2)*(a + b*x^2)^3*Sqrt[x*(a
+ b*x^2)])
```

Maple [A] time = 0.017, size = 212, normalized size = 1.3

$$-\frac{1}{70\left(bx^{2}+a\right)^{4}}\sqrt{x\left(bx^{2}+a\right)}\left(-35\,x^{9}b^{9/2}+315\,\ln\left(x\sqrt{b}+\sqrt{bx^{2}+a}\right)x^{6}ab^{3}\sqrt{bx^{2}+a}-528\,b^{7/2}x^{7}a+945\,\ln\left(x\sqrt{b}+\sqrt{bx^{2}+\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(29/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/70*(x*(b*x^2+a))^(1/2)/b^(11/2)*(-35*x^9*b^(9/2)+315*ln(x*b^(1
/2)+(b*x^2+a)^(1/2))*x^6*a*b^3*(b*x^2+a)^(1/2)-528*b^(7/2)*x^7*a+
945*ln(x*b^(1/2)+(b*x^2+a)^(1/2))*x^4*a^2*b^2*(b*x^2+a)^(1/2)-121
8*b^(5/2)*x^5*a^2+945*ln(x*b^(1/2)+(b*x^2+a)^(1/2))*x^2*a^3*b*(b*
x^2+a)^(1/2)-1050*b^(3/2)*x^3*a^3+315*ln(x*b^(1/2)+(b*x^2+a)^(1/2
))*a^4*(b*x^2+a)^(1/2)-315*b^(1/2)*x*a^4)/x^(1/2)/(b*x^2+a)^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{29}{2}}}{\left(bx^{3}+ax\right)^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^(29/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(29/2)/(b*x^3 + a*x)^(9/2), x)
```

Fricas [A] time = 0.226874, size = 1, normalized size = 0.01

$$\left[\frac{2\left(35\,b^{4}x^{8}+528\,ab^{3}x^{6}+1218\,a^{2}b^{2}x^{4}+1050\,a^{3}bx^{2}+315\,a^{4}\right)\sqrt{bx^{3}+ax}\sqrt{b}\sqrt{x}+315\left(ab^{4}x^{8}+4\,a^{2}b^{3}x^{6}+6\,a^{3}b^{2}x^{4}+4\,a^{4}bx\right.}{140\left(b^{9}x^{8}+4\,ab^{8}x^{6}+6\,a^{2}b^{7}x^{4}+4\,a^{3}b^{6}x^{2}+a^{4}b^{5}\right)\sqrt{b}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^(29/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] [1/140*(2*(35*b^4*x^8 + 528*a*b^3*x^6 + 1218*a^2*b^2*x^4 + 1050*a
^3*b*x^2 + 315*a^4)*sqrt(b*x^3 + a*x)*sqrt(b)*sqrt(x) + 315*(a*b^
4*x^8 + 4*a^2*b^3*x^6 + 6*a^3*b^2*x^4 + 4*a^4*b*x^2 + a^5)*log(-2
*sqrt(b*x^3 + a*x)*b*sqrt(x) + (2*b*x^2 + a)*sqrt(b)))/((b^9*x^8
+ 4*a*b^8*x^6 + 6*a^2*b^7*x^4 + 4*a^3*b^6*x^2 + a^4*b^5)*sqrt(b))
, 1/70*((35*b^4*x^8 + 528*a*b^3*x^6 + 1218*a^2*b^2*x^4 + 1050*a^3
*b*x^2 + 315*a^4)*sqrt(b*x^3 + a*x)*sqrt(-b)*sqrt(x) + 315*(a*b^4
*x^8 + 4*a^2*b^3*x^6 + 6*a^3*b^2*x^4 + 4*a^4*b*x^2 + a^5)*arctan(
b*x^(3/2)/(sqrt(b*x^3 + a*x)*sqrt(-b))))/((b^9*x^8 + 4*a*b^8*x^6
+ 6*a^2*b^7*x^4 + 4*a^3*b^6*x^2 + a^4*b^5)*sqrt(-b))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(29/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.263948, size = 123, normalized size = 0.77

$$\frac{\left(\left(\left(x^2\left(\frac{35\,x^2}{b}+\frac{528\,a}{b^2}\right)+\frac{1218\,a^2}{b^3}\right)x^2+\frac{1050\,a^3}{b^4}\right)x^2+\frac{315\,a^4}{b^5}\right)x}{70\,(bx^2+a)^{\frac{7}{2}}}+\frac{9\,a\ln\left(\left|-\sqrt{b}x+\sqrt{bx^2+a}\right|\right)}{2\,b^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(29/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] 1/70*(((x^2*(35*x^2/b + 528*a/b^2) + 1218*a^2/b^3)*x^2 + 1050*a^3
/b^4)*x^2 + 315*a^4/b^5)*x/(b*x^2 + a)^(7/2) + 9/2*a*ln(abs(-sqrt
(b)*x + sqrt(b*x^2 + a)))/b^(11/2)
```

3.76 $\int \frac{x^{27/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=126

$$\frac{128\sqrt{ax+bx^3}}{35b^5\sqrt{x}}-\frac{64x^{5/2}}{35b^4\sqrt{ax+bx^3}}-\frac{16x^{11/2}}{35b^3\left(ax+bx^3\right)^{3/2}}-\frac{8x^{17/2}}{35b^2\left(ax+bx^3\right)^{5/2}}-\frac{x^{23/2}}{7b\left(ax+bx^3\right)^{7/2}}$$

```
[Out] -x^(23/2)/(7*b*(a*x + b*x^3)^(7/2)) - (8*x^(17/2))/(35*b^2*(a*x +
 b*x^3)^(5/2)) - (16*x^(11/2))/(35*b^3*(a*x + b*x^3)^(3/2)) - (64
*x^(5/2))/(35*b^4*Sqrt[a*x + b*x^3]) + (128*Sqrt[a*x + b*x^3])/(3
5*b^5*Sqrt[x])
```

Rubi [A] time = 0.318935, antiderivative size = 126, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{128\sqrt{ax+bx^3}}{35b^5\sqrt{x}}-\frac{64x^{5/2}}{35b^4\sqrt{ax+bx^3}}-\frac{16x^{11/2}}{35b^3\left(ax+bx^3\right)^{3/2}}-\frac{8x^{17/2}}{35b^2\left(ax+bx^3\right)^{5/2}}-\frac{x^{23/2}}{7b\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(27/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -x^(23/2)/(7*b*(a*x + b*x^3)^(7/2)) - (8*x^(17/2))/(35*b^2*(a*x +
 b*x^3)^(5/2)) - (16*x^(11/2))/(35*b^3*(a*x + b*x^3)^(3/2)) - (64
*x^(5/2))/(35*b^4*Sqrt[a*x + b*x^3]) + (128*Sqrt[a*x + b*x^3])/(3
5*b^5*Sqrt[x])
```

Rubi in Sympy [A] time = 32.2613, size = 114, normalized size = 0.9

$$-\frac{x^{\frac{23}{2}}}{7b\left(ax+bx^3\right)^{\frac{7}{2}}}-\frac{8x^{\frac{17}{2}}}{35b^2\left(ax+bx^3\right)^{\frac{5}{2}}}-\frac{16x^{\frac{11}{2}}}{35b^3\left(ax+bx^3\right)^{\frac{3}{2}}}-\frac{64x^{\frac{5}{2}}}{35b^4\sqrt{ax+bx^3}}+\frac{128\sqrt{ax+bx^3}}{35b^5\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(27/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] -x**(23/2)/(7*b*(a*x + b*x**3)**(7/2)) - 8*x**(17/2)/(35*b**2*(a*
x + b*x**3)**(5/2)) - 16*x**(11/2)/(35*b**3*(a*x + b*x**3)**(3/2)
) - 64*x**(5/2)/(35*b**4*sqrt(a*x + b*x**3)) + 128*sqrt(a*x + b*x
**3)/(35*b**5*sqrt(x))
```

Mathematica [A] time = 0.0470836, size = 77, normalized size = 0.61

$$\frac{\sqrt{x}\left(128a^4+448a^3bx^2+560a^2b^2x^4+280ab^3x^6+35b^4x^8\right)}{35b^5\left(a+bx^2\right)^3\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(27/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (Sqrt[x]*(128*a^4 + 448*a^3*b*x^2 + 560*a^2*b^2*x^4 + 280*a*b^3*x
^6 + 35*b^4*x^8))/(35*b^5*(a + b*x^2)^3*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.009, size = 70, normalized size = 0.6

$$\frac{(bx^2+a)(35x^8b^4+280ax^6b^3+560a^2x^4b^2+448a^3x^2b+128a^4)}{35b^5}x^{\frac{9}{2}}(bx^3+ax)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(27/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] 1/35*(b*x^2+a)*(35*b^4*x^8+280*a*b^3*x^6+560*a^2*b^2*x^4+448*a^3*
b*x^2+128*a^4)*x^(9/2)/b^5/(b*x^3+a*x)^(9/2)
```

Maxima [A] time = 1.4828, size = 96, normalized size = 0.76

$$\frac{35\sqrt{bx^2+a}+\frac{140(bx^2+a)^3a-70(bx^2+a)^2a^2+28(bx^2+a)a^3-5a^4}{(bx^2+a)^{\frac{7}{2}}}}{35b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(27/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] 1/35*(35*sqrt(b*x^2 + a) + (140*(b*x^2 + a)^3*a - 70*(b*x^2 + a)^
2*a^2 + 28*(b*x^2 + a)*a^3 - 5*a^4)/(b*x^2 + a)^(7/2))/b^5
```

Fricas [A] time = 0.210801, size = 131, normalized size = 1.04

$$\frac{35b^4x^9+280ab^3x^7+560a^2b^2x^5+448a^3bx^3+128a^4x}{35(b^8x^6+3ab^7x^4+3a^2b^6x^2+a^3b^5)\sqrt{bx^3+ax}\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(27/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] 1/35*(35*b^4*x^9 + 280*a*b^3*x^7 + 560*a^2*b^2*x^5 + 448*a^3*b*x^
3 + 128*a^4*x)/((b^8*x^6 + 3*a*b^7*x^4 + 3*a^2*b^6*x^2 + a^3*b^5)
*sqrt(b*x^3 + a*x)*sqrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(27/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.231073, size = 108, normalized size = 0.86

$$\frac{35\sqrt{bx^2+a}+\frac{140(bx^2+a)^3a-70(bx^2+a)^2a^2+28(bx^2+a)a^3-5a^4}{(bx^2+a)^{\frac{7}{2}}}}{35b^5}-\frac{128\sqrt{a}}{35b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(27/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] 1/35*(35*sqrt(b*x^2 + a) + (140*(b*x^2 + a)^3*a - 70*(b*x^2 + a)^
2*a^2 + 28*(b*x^2 + a)*a^3 - 5*a^4)/(b*x^2 + a)^(7/2))/b^5 - 128/
35*sqrt(a)/b^5
```

3.77 $\int \frac{x^{25/2}}{(ax+bx^3)^{9/2}} dx$

Optimal. Leaf size=130

$$\frac{\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax+bx^3}}\right)}{b^{9/2}}-\frac{x^{3/2}}{b^4\sqrt{ax+bx^3}}-\frac{x^{9/2}}{3b^3(ax+bx^3)^{3/2}}-\frac{x^{15/2}}{5b^2(ax+bx^3)^{5/2}}-\frac{x^{21/2}}{7b(ax+bx^3)^{7/2}}$$

```
[Out] -x^(21/2)/(7*b*(a*x + b*x^3)^(7/2)) - x^(15/2)/(5*b^2*(a*x + b*x^
3)^(5/2)) - x^(9/2)/(3*b^3*(a*x + b*x^3)^(3/2)) - x^(3/2)/(b^4*Sq
rt[a*x + b*x^3]) + ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x + b*x^3]]/b
^(9/2)
```

Rubi [A] time = 0.328099, antiderivative size = 130, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax+bx^3}}\right)}{b^{9/2}}-\frac{x^{3/2}}{b^4\sqrt{ax+bx^3}}-\frac{x^{9/2}}{3b^3(ax+bx^3)^{3/2}}-\frac{x^{15/2}}{5b^2(ax+bx^3)^{5/2}}-\frac{x^{21/2}}{7b(ax+bx^3)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(25/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -x^(21/2)/(7*b*(a*x + b*x^3)^(7/2)) - x^(15/2)/(5*b^2*(a*x + b*x^
3)^(5/2)) - x^(9/2)/(3*b^3*(a*x + b*x^3)^(3/2)) - x^(3/2)/(b^4*Sq
rt[a*x + b*x^3]) + ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x + b*x^3]]/b
^(9/2)
```

Rubi in Sympy [A] time = 34.8403, size = 112, normalized size = 0.86

$$-\frac{x^{\frac{21}{2}}}{7b(ax+bx^3)^{\frac{7}{2}}}-\frac{x^{\frac{15}{2}}}{5b^2(ax+bx^3)^{\frac{5}{2}}}-\frac{x^{\frac{9}{2}}}{3b^3(ax+bx^3)^{\frac{3}{2}}}-\frac{x^{\frac{3}{2}}}{b^4\sqrt{ax+bx^3}}+\frac{\operatorname{atanh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{ax+bx^3}}\right)}{b^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(25/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] -x**(21/2)/(7*b*(a*x + b*x**3)**(7/2)) - x**(15/2)/(5*b**2*(a*x +
 b*x**3)**(5/2)) - x**(9/2)/(3*b**3*(a*x + b*x**3)**(3/2)) - x**(
3/2)/(b**4*sqrt(a*x + b*x**3)) + atanh(sqrt(b)*x**(3/2)/sqrt(a*x
+ b*x**3))/b**(9/2)
```

Mathematica [A] time = 0.135401, size = 112, normalized size = 0.86

$$\frac{\sqrt{x}\left(105\left(a+bx^2\right)^{7/2}\log\left(\sqrt{b}\sqrt{a+bx^2}+bx\right)-\sqrt{b}x\left(105a^3+350a^2bx^2+406ab^2x^4+176b^3x^6\right)\right)}{105b^{9/2}\left(a+bx^2\right)^3\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(25/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (Sqrt[x]*(-(Sqrt[b]*x*(105*a^3 + 350*a^2*b*x^2 + 406*a*b^2*x^4 +
176*b^3*x^6)) + 105*(a + b*x^2)^(7/2)*Log[b*x + Sqrt[b]*Sqrt[a +
```

```
b*x^2]]))/(105*b^(9/2)*(a + b*x^2)^3*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.019, size = 198, normalized size = 1.5

$$\frac{1}{105\,(bx^2+a)^4}\sqrt{x\,(bx^2+a)}\left(105\,\ln\left(x\sqrt{b}+\sqrt{bx^2+a}\right)x^6b^3\sqrt{bx^2+a}-176\,x^7b^{7/2}+315\,\ln\left(x\sqrt{b}+\sqrt{bx^2+a}\right)x^4ab^2\sqrt{bx^2+
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(25/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] 1/105*(x*(b*x^2+a))^(1/2)/b^(9/2)*(105*ln(x*b^(1/2)+(b*x^2+a)^(1/
2))*x^6*b^3*(b*x^2+a)^(1/2)-176*x^7*b^(7/2)+315*ln(x*b^(1/2)+(b*x
^2+a)^(1/2))*x^4*a*b^2*(b*x^2+a)^(1/2)-406*b^(5/2)*x^5*a+315*ln(x
*b^(1/2)+(b*x^2+a)^(1/2))*x^2*a^2*b*(b*x^2+a)^(1/2)-350*b^(3/2)*x
^3*a^2+105*ln(x*b^(1/2)+(b*x^2+a)^(1/2))*a^3*(b*x^2+a)^(1/2)-105*
b^(1/2)*x*a^3)/x^(1/2)/(b*x^2+a)^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{25}{2}}}{(bx^3+ax)^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(25/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(25/2)/(b*x^3 + a*x)^(9/2), x)
```

Fricas [A] time = 0.224739, size = 1, normalized size = 0.01

$$\left[-\frac{2\left(176\,b^3x^6+406\,ab^2x^4+350\,a^2bx^2+105\,a^3\right)\sqrt{bx^3+ax}\sqrt{b}\sqrt{x}-105\left(b^4x^8+4\,ab^3x^6+6\,a^2b^2x^4+4\,a^3bx^2+a^4\right)\log\left(2\sqrt{}\right.}{210\left(b^8x^8+4\,ab^7x^6+6\,a^2b^6x^4+4\,a^3b^5x^2+a^4b^4\right)\sqrt{b}}\right.$$

$$-\frac{\left(176\,b^3x^6+406\,ab^2x^4+350\,a^2bx^2+105\,a^3\right)\sqrt{bx^3+ax}\sqrt{-b}\sqrt{x}+105\left(b^4x^8+4\,ab^3x^6+6\,a^2b^2x^4+4\,a^3bx^2+a^4\right)\arctan\left(\right.}{105\left(b^8x^8+4\,ab^7x^6+6\,a^2b^6x^4+4\,a^3b^5x^2+a^4b^4\right)\sqrt{-b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(25/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] [-1/210*(2*(176*b^3*x^6 + 406*a*b^2*x^4 + 350*a^2*b*x^2 + 105*a^3
)*sqrt(b*x^3 + a*x)*sqrt(b)*sqrt(x) - 105*(b^4*x^8 + 4*a*b^3*x^6
+ 6*a^2*b^2*x^4 + 4*a^3*b*x^2 + a^4)*log(2*sqrt(b*x^3 + a*x)*b*sq
rt(x) + (2*b*x^2 + a)*sqrt(b)))/((b^8*x^8 + 4*a*b^7*x^6 + 6*a^2*b
^6*x^4 + 4*a^3*b^5*x^2 + a^4*b^4)*sqrt(b)), -1/105*((176*b^3*x^6
+ 406*a*b^2*x^4 + 350*a^2*b*x^2 + 105*a^3)*sqrt(b*x^3 + a*x)*sqrt
(-b)*sqrt(x) + 105*(b^4*x^8 + 4*a*b^3*x^6 + 6*a^2*b^2*x^4 + 4*a^3
*b*x^2 + a^4)*arctan(b*x^(3/2)/(sqrt(b*x^3 + a*x)*sqrt(-b))))/((b
^8*x^8 + 4*a*b^7*x^6 + 6*a^2*b^6*x^4 + 4*a^3*b^5*x^2 + a^4*b^4)*s
qrt(-b))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**(25/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.259158, size = 105, normalized size = 0.81

$$-\frac{\left(2\left(x^2\left(\frac{88x^2}{b}+\frac{203a}{b^2}\right)+\frac{175a^2}{b^3}\right)x^2+\frac{105a^3}{b^4}\right)x}{105\left(bx^2+a\right)^{\frac{7}{2}}}-\frac{\ln\left(\left|-\sqrt{b}x+\sqrt{bx^2+a}\right|\right)}{b^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^(25/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] -1/105*(2*(x^2*(88*x^2/b + 203*a/b^2) + 175*a^2/b^3)*x^2 + 105*a^
3/b^4)*x/(b*x^2 + a)^(7/2) - ln(abs(-sqrt(b)*x + sqrt(b*x^2 + a))
)/b^(9/2)
```

3.78 $\int \frac{x^{23/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=101

$$-\frac{16\sqrt{x}}{35b^4\sqrt{ax+bx^3}}-\frac{8x^{7/2}}{35b^3\left(ax+bx^3\right)^{3/2}}-\frac{6x^{13/2}}{35b^2\left(ax+bx^3\right)^{5/2}}-\frac{x^{19/2}}{7b\left(ax+bx^3\right)^{7/2}}$$

```
[Out] -x^(19/2)/(7*b*(a*x + b*x^3)^(7/2)) - (6*x^(13/2))/(35*b^2*(a*x +
 b*x^3)^(5/2)) - (8*x^(7/2))/(35*b^3*(a*x + b*x^3)^(3/2)) - (16*S
qrt[x])/(35*b^4*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.249992, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$-\frac{16\sqrt{x}}{35b^4\sqrt{ax+bx^3}}-\frac{8x^{7/2}}{35b^3\left(ax+bx^3\right)^{3/2}}-\frac{6x^{13/2}}{35b^2\left(ax+bx^3\right)^{5/2}}-\frac{x^{19/2}}{7b\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(23/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -x^(19/2)/(7*b*(a*x + b*x^3)^(7/2)) - (6*x^(13/2))/(35*b^2*(a*x +
 b*x^3)^(5/2)) - (8*x^(7/2))/(35*b^3*(a*x + b*x^3)^(3/2)) - (16*S
qrt[x])/(35*b^4*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 25.1243, size = 92, normalized size = 0.91

$$-\frac{x^{\frac{19}{2}}}{7b\left(ax+bx^3\right)^{\frac{7}{2}}}-\frac{6x^{\frac{13}{2}}}{35b^2\left(ax+bx^3\right)^{\frac{5}{2}}}-\frac{8x^{\frac{7}{2}}}{35b^3\left(ax+bx^3\right)^{\frac{3}{2}}}-\frac{16\sqrt{x}}{35b^4\sqrt{ax+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(23/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] -x**(19/2)/(7*b*(a*x + b*x**3)**(7/2)) - 6*x**(13/2)/(35*b**2*(a*
x + b*x**3)**(5/2)) - 8*x**(7/2)/(35*b**3*(a*x + b*x**3)**(3/2))
- 16*sqrt(x)/(35*b**4*sqrt(a*x + b*x**3))
```

Mathematica [A] time = 0.0455262, size = 66, normalized size = 0.65

$$-\frac{\sqrt{x}\left(16a^3+56a^2bx^2+70ab^2x^4+35b^3x^6\right)}{35b^4\left(a+bx^2\right)^3\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(23/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -(Sqrt[x]*(16*a^3 + 56*a^2*b*x^2 + 70*a*b^2*x^4 + 35*b^3*x^6))/(3
5*b^4*(a + b*x^2)^3*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.009, size = 59, normalized size = 0.6

$$-\frac{\left(bx^2+a\right)\left(35\,x^6b^3+70\,ax^4b^2+56\,a^2x^2b+16\,a^3\right)}{35\,b^4}x^{\frac{9}{2}}\left(bx^3+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(23/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/35*(b*x^2+a)*(35*b^3*x^6+70*a*b^2*x^4+56*a^2*b*x^2+16*a^3)*x^(
9/2)/b^4/(b*x^3+a*x)^(9/2)
```

Maxima [A] time = 1.52599, size = 74, normalized size = 0.73

$$-\frac{35\,\left(bx^2+a\right)^3-35\,\left(bx^2+a\right)^2a+21\,\left(bx^2+a\right)a^2-5\,a^3}{35\,\left(bx^2+a\right)^{\frac{7}{2}}b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^(23/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] -1/35*(35*(b*x^2 + a)^3 - 35*(b*x^2 + a)^2*a + 21*(b*x^2 + a)*a^2
 - 5*a^3)/((b*x^2 + a)^(7/2)*b^4)
```

Fricas [A] time = 0.213751, size = 116, normalized size = 1.15

$$-\frac{35\,b^3x^7+70\,ab^2x^5+56\,a^2bx^3+16\,a^3x}{35\,\left(b^7x^6+3\,ab^6x^4+3\,a^2b^5x^2+a^3b^4\right)\sqrt{bx^3+ax}\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^(23/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] -1/35*(35*b^3*x^7 + 70*a*b^2*x^5 + 56*a^2*b*x^3 + 16*a^3*x)/((b^7
*x^6 + 3*a*b^6*x^4 + 3*a^2*b^5*x^2 + a^3*b^4)*sqrt(b*x^3 + a*x)*s
qrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**(23/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.230306, size = 86, normalized size = 0.85

$$\frac{16}{35\,\sqrt{a}b^4}-\frac{35\,\left(bx^2+a\right)^3-35\,\left(bx^2+a\right)^2a+21\,\left(bx^2+a\right)a^2-5\,a^3}{35\,\left(bx^2+a\right)^{\frac{7}{2}}b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^(23/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] 16/35/(sqrt(a)*b^4) - 1/35*(35*(b*x^2 + a)^3 - 35*(b*x^2 + a)^2*a
 + 21*(b*x^2 + a)*a^2 - 5*a^3)/((b*x^2 + a)^(7/2)*b^4)
```

3.79 $\int \frac{x^{21/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=25

$$\frac{x^{21/2}}{7a\,(ax+bx^3)^{7/2}}$$

[Out] x^(21/2)/(7*a*(a*x + b*x^3)^(7/2))

Rubi [A] time = 0.0601888, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053

$$\frac{x^{21/2}}{7a\,(ax+bx^3)^{7/2}}$$

Antiderivative was successfully verified.

[In] Int[x^(21/2)/(a*x + b*x^3)^(9/2),x]

[Out] x^(21/2)/(7*a*(a*x + b*x^3)^(7/2))

Rubi in Sympy [A] time = 6.58553, size = 19, normalized size = 0.76

$$\frac{x^{\frac{21}{2}}}{7a\,(ax+bx^3)^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] rubi_integrate(x**(21/2)/(b*x**3+a*x)**(9/2),x)

[Out] x**(21/2)/(7*a*(a*x + b*x**3)**(7/2))

Mathematica [A] time = 0.0431971, size = 34, normalized size = 1.36

$$\frac{x^{13/2}\sqrt{x\,(a+bx^2)}}{7a\,(a+bx^2)^4}$$

Antiderivative was successfully verified.

[In] Integrate[x^(21/2)/(a*x + b*x^3)^(9/2),x]

[Out] (x^(13/2)*Sqrt[x*(a + b*x^2)])/(7*a*(a + b*x^2)^4)

Maple [A] time = 0.008, size = 27, normalized size = 1.1

$$\frac{bx^2+a}{7\,a}x^{\frac{23}{2}}\left(bx^3+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(x^(21/2)/(b*x^3+a*x)^(9/2),x)

```
[Out] 1/7*(b*x^2+a)/a*x^(23/2)/(b*x^3+a*x)^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{21}{2}}}{(bx^3 + ax)^{\frac{9}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(21/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(21/2)/(b*x^3 + a*x)^(9/2), x)
```

Fricas [A] time = 0.211851, size = 82, normalized size = 3.28

$$\frac{\sqrt{bx^3 + ax}x^{\frac{13}{2}}}{7\,(ab^4x^8 + 4\,a^2b^3x^6 + 6\,a^3b^2x^4 + 4\,a^4bx^2 + a^5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(21/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] 1/7*sqrt(b*x^3 + a*x)*x^(13/2)/(a*b^4*x^8 + 4*a^2*b^3*x^6 + 6*a^3
*b^2*x^4 + 4*a^4*b*x^2 + a^5)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(21/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.240617, size = 23, normalized size = 0.92

$$\frac{x^7}{7\,(bx^2 + a)^{\frac{7}{2}}a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(21/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] 1/7*x^7/((b*x^2 + a)^(7/2)*a)
```

3.80 $\int \frac{x^{19/2}}{(ax+bx^3)^{9/2}}\, dx$

Optimal. Leaf size=76

$$-\frac{8x^{3/2}}{105b^3\left(ax+bx^3\right)^{3/2}}-\frac{4x^{9/2}}{35b^2\left(ax+bx^3\right)^{5/2}}-\frac{x^{15/2}}{7b\left(ax+bx^3\right)^{7/2}}$$

```
[Out] -x^(15/2)/(7*b*(a*x + b*x^3)^(7/2)) - (4*x^(9/2))/(35*b^2*(a*x +
b*x^3)^(5/2)) - (8*x^(3/2))/(105*b^3*(a*x + b*x^3)^(3/2))
```

Rubi [A] time = 0.182234, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$-\frac{8x^{3/2}}{105b^3\left(ax+bx^3\right)^{3/2}}-\frac{4x^{9/2}}{35b^2\left(ax+bx^3\right)^{5/2}}-\frac{x^{15/2}}{7b\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In] Int[x^(19/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -x^(15/2)/(7*b*(a*x + b*x^3)^(7/2)) - (4*x^(9/2))/(35*b^2*(a*x +
b*x^3)^(5/2)) - (8*x^(3/2))/(105*b^3*(a*x + b*x^3)^(3/2))
```

Rubi in Sympy [A] time = 18.5827, size = 68, normalized size = 0.89

$$-\frac{x^{\frac{15}{2}}}{7b\left(ax+bx^3\right)^{\frac{7}{2}}}-\frac{4x^{\frac{9}{2}}}{35b^2\left(ax+bx^3\right)^{\frac{5}{2}}}-\frac{8x^{\frac{3}{2}}}{105b^3\left(ax+bx^3\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(19/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] -x**(15/2)/(7*b*(a*x + b*x**3)**(7/2)) - 4*x**(9/2)/(35*b**2*(a*x
 + b*x**3)**(5/2)) - 8*x**(3/2)/(105*b**3*(a*x + b*x**3)**(3/2))
```

Mathematica [A] time = 0.042192, size = 55, normalized size = 0.72

$$-\frac{\sqrt{x}\left(8a^2+28abx^2+35b^2x^4\right)}{105b^3\left(a+bx^2\right)^3\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(19/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -(Sqrt[x]*(8*a^2 + 28*a*b*x^2 + 35*b^2*x^4))/(105*b^3*(a + b*x^2)
^3*Sqrt[x*(a + b*x^2)])
```

Maple [A] time = 0.008, size = 48, normalized size = 0.6

$$-\frac{\left(bx^2+a\right)\left(35\,x^4b^2+28\,ax^2b+8\,a^2\right)}{105\,b^3}x^{\frac{9}{2}}\left(bx^3+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(19/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/105*(b*x^2+a)*(35*b^2*x^4+28*a*b*x^2+8*a^2)*x^(9/2)/b^3/(b*x^3
+a*x)^(9/2)
```

Maxima [A] time = 1.49293, size = 55, normalized size = 0.72

$$-\frac{35 \left(bx^2+a\right)^2-42 \left(bx^2+a\right) a+15 a^2}{105 \left(bx^2+a\right)^{\frac{7}{2}} b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(19/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] -1/105*(35*(b*x^2 + a)^2 - 42*(b*x^2 + a)*a + 15*a^2)/((b*x^2 + a
)^(7/2)*b^3)
```

Fricas [A] time = 0.210718, size = 101, normalized size = 1.33

$$-\frac{35 b^2x^5+28 abx^3+8 a^2x}{105 \left(b^6x^6+3 ab^5x^4+3 a^2b^4x^2+a^3b^3\right)\sqrt{bx^3+ax}\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(19/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] -1/105*(35*b^2*x^5 + 28*a*b*x^3 + 8*a^2*x)/((b^6*x^6 + 3*a*b^5*x^
4 + 3*a^2*b^4*x^2 + a^3*b^3)*sqrt(b*x^3 + a*x)*sqrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(19/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.229833, size = 68, normalized size = 0.89

$$\frac{8}{105 a^{\frac{3}{2}} b^3}-\frac{35 \left(bx^2+a\right)^2-42 \left(bx^2+a\right) a+15 a^2}{105 \left(bx^2+a\right)^{\frac{7}{2}} b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(19/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] 8/105/(a^(3/2)*b^3) - 1/105*(35*(b*x^2 + a)^2 - 42*(b*x^2 + a)*a
+ 15*a^2)/((b*x^2 + a)^(7/2)*b^3)
```

3.81 $\int \frac{x^{17/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=51

$$\frac{2x^{15/2}}{35a^2\left(ax+bx^3\right)^{5/2}}+\frac{x^{17/2}}{7a\left(ax+bx^3\right)^{7/2}}$$

```
[Out] x^(17/2)/(7*a*(a*x + b*x^3)^(7/2)) + (2*x^(15/2))/(35*a^2*(a*x +
b*x^3)^(5/2))
```

Rubi [A] time = 0.120685, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{2x^{15/2}}{35a^2\left(ax+bx^3\right)^{5/2}}+\frac{x^{17/2}}{7a\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In] Int[x^(17/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] x^(17/2)/(7*a*(a*x + b*x^3)^(7/2)) + (2*x^(15/2))/(35*a^2*(a*x +
b*x^3)^(5/2))
```

Rubi in Sympy [A] time = 12.2469, size = 42, normalized size = 0.82

$$\frac{x^{\frac{17}{2}}}{7a\left(ax+bx^3\right)^{\frac{7}{2}}}+\frac{2x^{\frac{15}{2}}}{35a^2\left(ax+bx^3\right)^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(17/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] x**(17/2)/(7*a*(a*x + b*x**3)**(7/2)) + 2*x**(15/2)/(35*a**2*(a*x
 + b*x**3)**(5/2))
```

Mathematica [A] time = 0.0456865, size = 44, normalized size = 0.86

$$\frac{x^{9/2}\sqrt{x\left(a+bx^2\right)}\left(7a+2bx^2\right)}{35a^2\left(a+bx^2\right)^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(17/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (x^(9/2)*Sqrt[x*(a + b*x^2)]*(7*a + 2*b*x^2))/(35*a^2*(a + b*x^2)
^4)
```

Maple [A] time = 0.008, size = 37, normalized size = 0.7

$$\frac{\left(bx^2+a\right)\left(2\,bx^2+7\,a\right)}{35\,a^2}x^{\frac{19}{2}}\left(bx^3+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(17/2)/(b*x^3+a*x)^(9/2),x)

[Out] 1/35*(b*x^2+a)*x^(19/2)*(2*b*x^2+7*a)/a^2/(b*x^3+a*x)^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{17}{2}}}{(bx^3+ax)^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(17/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")

[Out] integrate(x^(17/2)/(b*x^3 + a*x)^(9/2), x)
```

Fricas [A] time = 0.210888, size = 103, normalized size = 2.02

$$\frac{(2\,bx^6+7\,ax^4)\sqrt{bx^3+ax}\sqrt{x}}{35\,(a^2b^4x^8+4\,a^3b^3x^6+6\,a^4b^2x^4+4\,a^5bx^2+a^6)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(17/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")

[Out] 1/35*(2*b*x^6 + 7*a*x^4)*sqrt(b*x^3 + a*x)*sqrt(x)/(a^2*b^4*x^8 +
 4*a^3*b^3*x^6 + 6*a^4*b^2*x^4 + 4*a^5*b*x^2 + a^6)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(17/2)/(b*x**3+a*x)**(9/2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.234793, size = 39, normalized size = 0.76

$$\frac{x^5\left(\frac{2\,bx^2}{a^2}+\frac{7}{a}\right)}{35\,(bx^2+a)^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(17/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")

[Out] 1/35*x^5*(2*b*x^2/a^2 + 7/a)/(b*x^2 + a)^(7/2)
```

3.82 $\int \frac{x^{15/2}}{(ax+bx^3)^{9/2}} dx$

Optimal. Leaf size=51

$$-\frac{2x^{5/2}}{35b^2(ax+bx^3)^{5/2}}-\frac{x^{11/2}}{7b(ax+bx^3)^{7/2}}$$

```
[Out] -x^(11/2)/(7*b*(a*x + b*x^3)^(7/2)) - (2*x^(5/2))/(35*b^2*(a*x +
b*x^3)^(5/2))
```

Rubi [A] time = 0.121487, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$

$$-\frac{2x^{5/2}}{35b^2(ax+bx^3)^{5/2}}-\frac{x^{11/2}}{7b(ax+bx^3)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(15/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -x^(11/2)/(7*b*(a*x + b*x^3)^(7/2)) - (2*x^(5/2))/(35*b^2*(a*x +
b*x^3)^(5/2))
```

Rubi in Sympy [A] time = 12.4103, size = 44, normalized size = 0.86

$$-\frac{x^{\frac{11}{2}}}{7b(ax+bx^3)^{\frac{7}{2}}}-\frac{2x^{\frac{5}{2}}}{35b^2(ax+bx^3)^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(15/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] -x**(11/2)/(7*b*(a*x + b*x**3)**(7/2)) - 2*x**(5/2)/(35*b**2*(a*x
 + b*x**3)**(5/2))
```

Mathematica [A] time = 0.0338084, size = 44, normalized size = 0.86

$$-\frac{\sqrt{x}(2a+7bx^2)}{35b^2(a+bx^2)^3\sqrt{x(a+bx^2)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(15/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -(Sqrt[x]*(2*a + 7*b*x^2))/(35*b^2*(a + b*x^2)^3*Sqrt[x*(a + b*x^
2)])
```

Maple [A] time = 0.007, size = 37, normalized size = 0.7

$$-\frac{(bx^2+a)(7\,bx^2+2\,a)}{35\,b^2}x^{\frac{9}{2}}(bx^3+ax)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(15/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/35*(b*x^2+a)*(7*b*x^2+2*a)*x^(9/2)/b^2/(b*x^3+a*x)^(9/2)
```

Maxima [A] time = 1.50049, size = 32, normalized size = 0.63

$$-\frac{7\,bx^2 + 2\,a}{35\,(bx^2 + a)^{\frac{7}{2}}\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(15/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] -1/35*(7*b*x^2 + 2*a)/((b*x^2 + a)^(7/2)*b^2)
```

Fricas [A] time = 0.21041, size = 86, normalized size = 1.69

$$-\frac{7\,bx^3 + 2\,ax}{35\,(b^5x^6 + 3\,ab^4x^4 + 3\,a^2b^3x^2 + a^3b^2)\sqrt{bx^3 + ax}\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(15/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] -1/35*(7*b*x^3 + 2*a*x)/((b^5*x^6 + 3*a*b^4*x^4 + 3*a^2*b^3*x^2 +
 a^3*b^2)*sqrt(b*x^3 + a*x)*sqrt(x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(15/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.229927, size = 45, normalized size = 0.88

$$-\frac{7\,bx^2 + 2\,a}{35\,(bx^2 + a)^{\frac{7}{2}}\,b^2} + \frac{2}{35\,a^{\frac{5}{2}}\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(15/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] -1/35*(7*b*x^2 + 2*a)/((b*x^2 + a)^(7/2)*b^2) + 2/35/(a^(5/2)*b^2
)
```

3.83 $\int \frac{x^{13/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=76

$$\frac{8x^{9/2}}{105a^3\left(ax+bx^3\right)^{3/2}}+\frac{4x^{11/2}}{35a^2\left(ax+bx^3\right)^{5/2}}+\frac{x^{13/2}}{7a\left(ax+bx^3\right)^{7/2}}$$

```
[Out] x^(13/2)/(7*a*(a*x + b*x^3)^(7/2)) + (4*x^(11/2))/(35*a^2*(a*x +
b*x^3)^(5/2)) + (8*x^(9/2))/(105*a^3*(a*x + b*x^3)^(3/2))
```

Rubi [A] time = 0.183992, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{8x^{9/2}}{105a^3\left(ax+bx^3\right)^{3/2}}+\frac{4x^{11/2}}{35a^2\left(ax+bx^3\right)^{5/2}}+\frac{x^{13/2}}{7a\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(13/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] x^(13/2)/(7*a*(a*x + b*x^3)^(7/2)) + (4*x^(11/2))/(35*a^2*(a*x +
b*x^3)^(5/2)) + (8*x^(9/2))/(105*a^3*(a*x + b*x^3)^(3/2))
```

Rubi in Sympy [A] time = 18.5708, size = 66, normalized size = 0.87

$$\frac{x^{\frac{13}{2}}}{7a\left(ax+bx^3\right)^{\frac{7}{2}}}+\frac{4x^{\frac{11}{2}}}{35a^2\left(ax+bx^3\right)^{\frac{5}{2}}}+\frac{8x^{\frac{9}{2}}}{105a^3\left(ax+bx^3\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(13/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] x**(13/2)/(7*a*(a*x + b*x**3)**(7/2)) + 4*x**(11/2)/(35*a**2*(a*x
 + b*x**3)**(5/2)) + 8*x**(9/2)/(105*a**3*(a*x + b*x**3)**(3/2))
```

Mathematica [A] time = 0.0477667, size = 55, normalized size = 0.72

$$\frac{x^{5/2}\sqrt{x\left(a+bx^2\right)}\left(35a^2+28abx^2+8b^2x^4\right)}{105a^3\left(a+bx^2\right)^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(13/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (x^(5/2)*Sqrt[x*(a + b*x^2)]*(35*a^2 + 28*a*b*x^2 + 8*b^2*x^4))/(
105*a^3*(a + b*x^2)^4)
```

Maple [A] time = 0.009, size = 48, normalized size = 0.6

$$\frac{\left(bx^2+a\right)\left(8\,b^2x^4+28\,abx^2+35\,a^2\right)}{105\,a^3}x^{\frac{15}{2}}\left(bx^3+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(13/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] 1/105*(b*x^2+a)*x^(15/2)*(8*b^2*x^4+28*a*b*x^2+35*a^2)/a^3/(b*x^3
+a*x)^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{13}{2}}}{(bx^3 + ax)^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(13/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(13/2)/(b*x^3 + a*x)^(9/2), x)
```

Fricas [A] time = 0.211442, size = 117, normalized size = 1.54

$$\frac{\left(8\,b^2x^6 + 28\,abx^4 + 35\,a^2x^2\right)\sqrt{bx^3 + ax}\,\sqrt{x}}{105\,(a^3b^4x^8 + 4\,a^4b^3x^6 + 6\,a^5b^2x^4 + 4\,a^6bx^2 + a^7)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(13/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] 1/105*(8*b^2*x^6 + 28*a*b*x^4 + 35*a^2*x^2)*sqrt(b*x^3 + a*x)*sqr
t(x)/(a^3*b^4*x^8 + 4*a^4*b^3*x^6 + 6*a^5*b^2*x^4 + 4*a^6*b*x^2 +
 a^7)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(13/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.237024, size = 58, normalized size = 0.76

$$\frac{\left(4\,x^2\left(\frac{2\,b^2x^2}{a^3} + \frac{7\,b}{a^2}\right) + \frac{35}{a}\right)x^3}{105\,(bx^2 + a)^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(13/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] 1/105*(4*x^2*(2*b^2*x^2/a^3 + 7*b/a^2) + 35/a)*x^3/(b*x^2 + a)^(7
/2)
```

3.84 $\int \frac{x^{11/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=25

$$-\frac{x^{7/2}}{7b\,(ax+bx^3)^{7/2}}$$

```
[Out] -x^(7/2)/(7*b*(a*x + b*x^3)^(7/2))
```

Rubi [A] time = 0.0619765, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053

$$-\frac{x^{7/2}}{7b\,(ax+bx^3)^{7/2}}$$

Antiderivative was successfully verified.

```
[In] Int[x^(11/2)/(a*x + b*x^3)^(9/2),x]

[Out] -x^(7/2)/(7*b*(a*x + b*x^3)^(7/2))
```

Rubi in Sympy [A] time = 6.62515, size = 20, normalized size = 0.8

$$-\frac{x^{\frac{7}{2}}}{7b\,(ax+bx^3)^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**(11/2)/(b*x**3+a*x)**(9/2),x)

[Out] -x**(7/2)/(7*b*(a*x + b*x**3)**(7/2))
```

Mathematica [A] time = 0.0276645, size = 25, normalized size = 1.

$$-\frac{x^{7/2}}{7b\,(x\,(a+bx^2))^{7/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(11/2)/(a*x + b*x^3)^(9/2),x]

[Out] -x^(7/2)/(7*b*(x*(a + b*x^2))^(7/2))
```

Maple [A] time = 0.006, size = 27, normalized size = 1.1

$$-\frac{bx^2+a}{7\,b}x^{\frac{9}{2}}\left(bx^3+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^(11/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/7*(b*x^2+a)/b*x^(9/2)/(b*x^3+a*x)^(9/2)
```

Maxima [A] time = 1.45263, size = 19, normalized size = 0.76

$$-\frac{1}{7\,(bx^2+a)^{\frac{7}{2}}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(11/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] -1/7/((b*x^2 + a)^(7/2)*b)
```

Fricas [A] time = 0.210611, size = 69, normalized size = 2.76

$$-\frac{\sqrt{x}}{7\,(b^4x^6+3\,ab^3x^4+3\,a^2b^2x^2+a^3b)\sqrt{bx^3+ax}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(11/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] -1/7*sqrt(x)/((b^4*x^6 + 3*a*b^3*x^4 + 3*a^2*b^2*x^2 + a^3*b)*sqr
t(b*x^3 + a*x))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(11/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223668, size = 31, normalized size = 1.24

$$-\frac{1}{7\,(bx^2+a)^{\frac{7}{2}}b}+\frac{1}{7\,a^{\frac{7}{2}}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(11/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] -1/7/((b*x^2 + a)^(7/2)*b) + 1/7/(a^(7/2)*b)
```

3.85 $\int \frac{x^{9/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=101

$$\frac{16x^{3/2}}{35a^4\sqrt{ax+bx^3}}+\frac{8x^{5/2}}{35a^3\,(ax+bx^3)^{3/2}}+\frac{6x^{7/2}}{35a^2\,(ax+bx^3)^{5/2}}+\frac{x^{9/2}}{7a\,(ax+bx^3)^{7/2}}$$

```
[Out] x^(9/2)/(7*a*(a*x + b*x^3)^(7/2)) + (6*x^(7/2))/(35*a^2*(a*x + b*
x^3)^(5/2)) + (8*x^(5/2))/(35*a^3*(a*x + b*x^3)^(3/2)) + (16*x^(3
/2))/(35*a^4*Sqrt[a*x + b*x^3])
```

Rubi [A] time = 0.247836, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{16x^{3/2}}{35a^4\sqrt{ax+bx^3}}+\frac{8x^{5/2}}{35a^3\,(ax+bx^3)^{3/2}}+\frac{6x^{7/2}}{35a^2\,(ax+bx^3)^{5/2}}+\frac{x^{9/2}}{7a\,(ax+bx^3)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(9/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] x^(9/2)/(7*a*(a*x + b*x^3)^(7/2)) + (6*x^(7/2))/(35*a^2*(a*x + b*
x^3)^(5/2)) + (8*x^(5/2))/(35*a^3*(a*x + b*x^3)^(3/2)) + (16*x^(3
/2))/(35*a^4*Sqrt[a*x + b*x^3])
```

Rubi in Sympy [A] time = 26.7129, size = 90, normalized size = 0.89

$$\frac{x^{\frac{9}{2}}}{7a\,(ax+bx^3)^{\frac{7}{2}}}+\frac{6x^{\frac{7}{2}}}{35a^2\,(ax+bx^3)^{\frac{5}{2}}}+\frac{8x^{\frac{5}{2}}}{35a^3\,(ax+bx^3)^{\frac{3}{2}}}+\frac{16x^{\frac{3}{2}}}{35a^4\sqrt{ax+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(9/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] x**(9/2)/(7*a*(a*x + b*x**3)**(7/2)) + 6*x**(7/2)/(35*a**2*(a*x +
 b*x**3)**(5/2)) + 8*x**(5/2)/(35*a**3*(a*x + b*x**3)**(3/2)) + 1
6*x**(3/2)/(35*a**4*sqrt(a*x + b*x**3))
```

Mathematica [A] time = 0.0462548, size = 66, normalized size = 0.65

$$\frac{\sqrt{x}\sqrt{x\,(a+bx^2)}\,(35a^3+70a^2bx^2+56ab^2x^4+16b^3x^6)}{35a^4\,(a+bx^2)^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(9/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (Sqrt[x]*Sqrt[x*(a + b*x^2)]*(35*a^3 + 70*a^2*b*x^2 + 56*a*b^2*x^
4 + 16*b^3*x^6))/(35*a^4*(a + b*x^2)^4)
```

Maple [A] time = 0.007, size = 59, normalized size = 0.6

$$\frac{(bx^2+a)\,(16\,b^3x^6+56\,b^2x^4a+70\,bx^2a^2+35\,a^3)}{35\,a^4}x^{\frac{11}{2}}\,(bx^3+ax)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(9/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] 1/35*(b*x^2+a)*x^(11/2)*(16*b^3*x^6+56*a*b^2*x^4+70*a^2*b*x^2+35*
a^3)/a^4/(b*x^3+a*x)^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{9}{2}}}{(bx^3 + ax)^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(9/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(9/2)/(b*x^3 + a*x)^(9/2), x)
```

Fricas [A] time = 0.211771, size = 128, normalized size = 1.27

$$\frac{\left(16\,b^3x^6 + 56\,ab^2x^4 + 70\,a^2bx^2 + 35\,a^3\right)\sqrt{bx^3 + ax}\sqrt{x}}{35\,(a^4b^4x^8 + 4\,a^5b^3x^6 + 6\,a^6b^2x^4 + 4\,a^7bx^2 + a^8)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(9/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] 1/35*(16*b^3*x^6 + 56*a*b^2*x^4 + 70*a^2*b*x^2 + 35*a^3)*sqrt(b*x
^3 + a*x)*sqrt(x)/(a^4*b^4*x^8 + 4*a^5*b^3*x^6 + 6*a^6*b^2*x^4 +
4*a^7*b*x^2 + a^8)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(9/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.237407, size = 74, normalized size = 0.73

$$\frac{\left(2\left(4\,x^2\left(\frac{2\,b^3x^2}{a^4} + \frac{7\,b^2}{a^3}\right) + \frac{35\,b}{a^2}\right)x^2 + \frac{35}{a}\right)x}{35\,(bx^2 + a)^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(9/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] 1/35*(2*(4*x^2*(2*b^3*x^2/a^4 + 7*b^2/a^3) + 35*b/a^2)*x^2 + 35/a
)*x/(b*x^2 + a)^(7/2)
```

3.86 $\int \frac{x^{7/2}}{(ax+bx^3)^{9/2}} dx$

Optimal. Leaf size=130

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{a^{9/2}}+\frac{\sqrt{x}}{a^4\sqrt{ax+bx^3}}+\frac{x^{3/2}}{3a^3\left(ax+bx^3\right)^{3/2}}+\frac{x^{5/2}}{5a^2\left(ax+bx^3\right)^{5/2}}+\frac{x^{7/2}}{7a\left(ax+bx^3\right)^{7/2}}$$

```
[Out] x^(7/2)/(7*a*(a*x + b*x^3)^(7/2)) + x^(5/2)/(5*a^2*(a*x + b*x^3)^
(5/2)) + x^(3/2)/(3*a^3*(a*x + b*x^3)^(3/2)) + Sqrt[x]/(a^4*Sqrt[
a*x + b*x^3]) - ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^3]]/a^(9
/2)
```

Rubi [A] time = 0.32764, antiderivative size = 130, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{a^{9/2}}+\frac{\sqrt{x}}{a^4\sqrt{ax+bx^3}}+\frac{x^{3/2}}{3a^3\left(ax+bx^3\right)^{3/2}}+\frac{x^{5/2}}{5a^2\left(ax+bx^3\right)^{5/2}}+\frac{x^{7/2}}{7a\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(7/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] x^(7/2)/(7*a*(a*x + b*x^3)^(7/2)) + x^(5/2)/(5*a^2*(a*x + b*x^3)^
(5/2)) + x^(3/2)/(3*a^3*(a*x + b*x^3)^(3/2)) + Sqrt[x]/(a^4*Sqrt[
a*x + b*x^3]) - ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^3]]/a^(9
/2)
```

Rubi in Sympy [A] time = 34.4343, size = 112, normalized size = 0.86

$$\frac{x^{\frac{7}{2}}}{7a\left(ax+bx^3\right)^{\frac{7}{2}}}+\frac{x^{\frac{5}{2}}}{5a^2\left(ax+bx^3\right)^{\frac{5}{2}}}+\frac{x^{\frac{3}{2}}}{3a^3\left(ax+bx^3\right)^{\frac{3}{2}}}+\frac{\sqrt{x}}{a^4\sqrt{ax+bx^3}}-\frac{\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{a^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(7/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] x**(7/2)/(7*a*(a*x + b*x**3)**(7/2)) + x**(5/2)/(5*a**2*(a*x + b*
x**3)**(5/2)) + x**(3/2)/(3*a**3*(a*x + b*x**3)**(3/2)) + sqrt(x)
/(a**4*sqrt(a*x + b*x**3)) - atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*x
**3))/a**(9/2)
```

Mathematica [A] time = 0.200504, size = 123, normalized size = 0.95

$$\frac{\sqrt{x}\left(\sqrt{a}\left(176a^3+406a^2bx^2+350ab^2x^4+105b^3x^6\right)+105\log(x)\left(a+bx^2\right)^{7/2}-105\left(a+bx^2\right)^{7/2}\log\left(\sqrt{a}\sqrt{a+bx^2}+a\right)\right)}{105a^{9/2}\left(a+bx^2\right)^3\sqrt{x\left(a+bx^2\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(7/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (Sqrt[x]*(Sqrt[a]*(176*a^3 + 406*a^2*b*x^2 + 350*a*b^2*x^4 + 105*
b^3*x^6) + 105*(a + b*x^2)^(7/2)*Log[x] - 105*(a + b*x^2)^(7/2)*L
og[a + Sqrt[a]*Sqrt[a + b*x^2]]))/(105*a^(9/2)*(a + b*x^2)^3*Sqrt
```

```
[x*(a + b*x^2)])
```

Maple [B] time = 0.017, size = 217, normalized size = 1.7

$$-\frac{1}{105\,(bx^2+a)^4}\sqrt{x\,(bx^2+a)}\left(105\,\ln\left(2\,\frac{\sqrt{a}\sqrt{bx^2+a}+a}{x}\right)x^6b^3\sqrt{bx^2+a}-105\,\sqrt{a}x^6b^3+315\,\ln\left(2\,\frac{\sqrt{a}\sqrt{bx^2+a}+a}{x}\right)x^4ab^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(7/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/105*(x*(b*x^2+a))^(1/2)/a^(9/2)*(105*ln(2*(a^(1/2)*(b*x^2+a)^(
1/2)+a)/x)*x^6*b^3*(b*x^2+a)^(1/2)-105*a^(1/2)*x^6*b^3+315*ln(2*(
a^(1/2)*(b*x^2+a)^(1/2)+a)/x)*x^4*a*b^2*(b*x^2+a)^(1/2)-350*a^(3/
2)*x^4*b^2+315*ln(2*(a^(1/2)*(b*x^2+a)^(1/2)+a)/x)*x^2*a^2*b*(b*x
^2+a)^(1/2)-406*x^2*b*a^(5/2)+105*ln(2*(a^(1/2)*(b*x^2+a)^(1/2)+a
)/x)*a^3*(b*x^2+a)^(1/2)-176*a^(7/2))/x^(1/2)/(b*x^2+a)^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{7}{2}}}{(bx^3+ax)^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(7/2)/(b*x^3 + a*x)^(9/2), x)
```

Fricas [A] time = 0.224973, size = 1, normalized size = 0.01

$$\left[\frac{105\left(b^3x^6+3\,ab^2x^4+3\,a^2bx^2+a^3\right)\sqrt{bx^3+ax}\sqrt{x}\log\left(-\frac{2\,\sqrt{bx^3+ax}a\sqrt{x}-(bx^3+2\,ax)\sqrt{a}}{x^3}\right)+2\left(105\,b^3x^7+350\,ab^2x^5+406\,a^2bx^3\right.}{210\,(a^4b^3x^6+3\,a^5b^2x^4+3\,a^6bx^2+a^7)\sqrt{bx^3+ax}\sqrt{a}\sqrt{x}}\right.$$

$$-\frac{105\left(b^3x^6+3\,ab^2x^4+3\,a^2bx^2+a^3\right)\sqrt{bx^3+ax}\sqrt{x}\arctan\left(\frac{\sqrt{bx^3+ax}\sqrt{-a}}{a\sqrt{x}}\right)-\left(105\,b^3x^7+350\,ab^2x^5+406\,a^2bx^3+176\,a^3x\right)\sqrt{}}{105\,(a^4b^3x^6+3\,a^5b^2x^4+3\,a^6bx^2+a^7)\sqrt{bx^3+ax}\sqrt{-a}\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] [1/210*(105*(b^3*x^6 + 3*a*b^2*x^4 + 3*a^2*b*x^2 + a^3)*sqrt(b*x^
3 + a*x)*sqrt(x)*log(-(2*sqrt(b*x^3 + a*x)*a*sqrt(x) - (b*x^3 + 2
*a*x)*sqrt(a))/x^3) + 2*(105*b^3*x^7 + 350*a*b^2*x^5 + 406*a^2*b*
x^3 + 176*a^3*x)*sqrt(a))/((a^4*b^3*x^6 + 3*a^5*b^2*x^4 + 3*a^6*b
*x^2 + a^7)*sqrt(b*x^3 + a*x)*sqrt(a)*sqrt(x)), -1/105*(105*(b^3*
x^6 + 3*a*b^2*x^4 + 3*a^2*b*x^2 + a^3)*sqrt(b*x^3 + a*x)*sqrt(x)*
arctan(sqrt(b*x^3 + a*x)*sqrt(-a)/(a*sqrt(x))) - (105*b^3*x^7 + 3
50*a*b^2*x^5 + 406*a^2*b*x^3 + 176*a^3*x)*sqrt(-a))/((a^4*b^3*x^6
 + 3*a^5*b^2*x^4 + 3*a^6*b*x^2 + a^7)*sqrt(b*x^3 + a*x)*sqrt(-a)*
sqrt(x))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(7/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.230585, size = 154, normalized size = 1.18

$$\frac{\arctan\left(\frac{\sqrt{bx^2+a}}{\sqrt{-a}}\right)}{\sqrt{-a}a^4} - \frac{105\sqrt{a}\arctan\left(\frac{\sqrt{a}}{\sqrt{-a}}\right) + 176\sqrt{-a}}{105\sqrt{-a}a^{\frac{9}{2}}} + \frac{105\left(bx^2+a\right)^3 + 35\left(bx^2+a\right)^2 a + 21\left(bx^2+a\right)a^2 + 15a^3}{105\left(bx^2+a\right)^{\frac{7}{2}}a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] arctan(sqrt(b*x^2 + a)/sqrt(-a))/(sqrt(-a)*a^4) - 1/105*(105*sqrt
(a)*arctan(sqrt(a)/sqrt(-a)) + 176*sqrt(-a))/(sqrt(-a)*a^(9/2)) +
 1/105*(105*(b*x^2 + a)^3 + 35*(b*x^2 + a)^2*a + 21*(b*x^2 + a)*a
^2 + 15*a^3)/((b*x^2 + a)^(7/2)*a^4)
```

3.87 $\int \frac{x^{5/2}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=126

$$-\frac{128\sqrt{ax+bx^3}}{35a^5x^{3/2}}+\frac{64}{35a^4\sqrt{x}\sqrt{ax+bx^3}}+\frac{16\sqrt{x}}{35a^3\left(ax+bx^3\right)^{3/2}}+\frac{8x^{3/2}}{35a^2\left(ax+bx^3\right)^{5/2}}+\frac{x^{5/2}}{7a\left(ax+bx^3\right)^{7/2}}$$

```
[Out] x^(5/2)/(7*a*(a*x + b*x^3)^(7/2)) + (8*x^(3/2))/(35*a^2*(a*x + b*
x^3)^(5/2)) + (16*Sqrt[x])/(35*a^3*(a*x + b*x^3)^(3/2)) + 64/(35*
a^4*Sqrt[x]*Sqrt[a*x + b*x^3]) - (128*Sqrt[a*x + b*x^3])/(35*a^5*
x^(3/2))
```

Rubi [A] time = 0.305633, antiderivative size = 126, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$-\frac{128\sqrt{ax+bx^3}}{35a^5x^{3/2}}+\frac{64}{35a^4\sqrt{x}\sqrt{ax+bx^3}}+\frac{16\sqrt{x}}{35a^3\left(ax+bx^3\right)^{3/2}}+\frac{8x^{3/2}}{35a^2\left(ax+bx^3\right)^{5/2}}+\frac{x^{5/2}}{7a\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(5/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] x^(5/2)/(7*a*(a*x + b*x^3)^(7/2)) + (8*x^(3/2))/(35*a^2*(a*x + b*
x^3)^(5/2)) + (16*Sqrt[x])/(35*a^3*(a*x + b*x^3)^(3/2)) + 64/(35*
a^4*Sqrt[x]*Sqrt[a*x + b*x^3]) - (128*Sqrt[a*x + b*x^3])/(35*a^5*
x^(3/2))
```

Rubi in Sympy [A] time = 32.6293, size = 114, normalized size = 0.9

$$\frac{x^{\frac{5}{2}}}{7a\left(ax+bx^3\right)^{\frac{7}{2}}}+\frac{8x^{\frac{3}{2}}}{35a^2\left(ax+bx^3\right)^{\frac{5}{2}}}+\frac{16\sqrt{x}}{35a^3\left(ax+bx^3\right)^{\frac{3}{2}}}+\frac{64}{35a^4\sqrt{x}\sqrt{ax+bx^3}}-\frac{128\sqrt{ax+bx^3}}{35a^5x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] x**(5/2)/(7*a*(a*x + b*x**3)**(7/2)) + 8*x**(3/2)/(35*a**2*(a*x +
 b*x**3)**(5/2)) + 16*sqrt(x)/(35*a**3*(a*x + b*x**3)**(3/2)) + 6
4/(35*a**4*sqrt(x)*sqrt(a*x + b*x**3)) - 128*sqrt(a*x + b*x**3)/(
35*a**5*x**(3/2))
```

Mathematica [A] time = 0.073335, size = 77, normalized size = 0.61

$$-\frac{\sqrt{x\left(a+bx^2\right)}\left(35a^4+280a^3bx^2+560a^2b^2x^4+448ab^3x^6+128b^4x^8\right)}{35a^5x^{3/2}\left(a+bx^2\right)^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(5/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] -(Sqrt[x*(a + b*x^2)]*(35*a^4 + 280*a^3*b*x^2 + 560*a^2*b^2*x^4 +
 448*a*b^3*x^6 + 128*b^4*x^8))/(35*a^5*x^(3/2)*(a + b*x^2)^4)
```

Maple [A] time = 0.009, size = 70, normalized size = 0.6

$$-\frac{(bx^2+a)\left(128\,b^4x^8+448\,b^3x^6a+560\,b^2x^4a^2+280\,bx^2a^3+35\,a^4\right)}{35\,a^5}x^{\frac{7}{2}}\left(bx^3+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^(5/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/35*x^(7/2)*(b*x^2+a)*(128*b^4*x^8+448*a*b^3*x^6+560*a^2*b^2*x^
4+280*a^3*b*x^2+35*a^4)/a^5/(b*x^3+a*x)^(9/2)
```

Maxima [A] time = 1.46572, size = 124, normalized size = 0.98

$$-\frac{128\,b^4x^8+448\,ab^3x^6+560\,a^2b^2x^4+280\,a^3bx^2+35\,a^4}{35\,(a^5b^3x^7+3\,a^6b^2x^5+3\,a^7bx^3+a^8x)\sqrt{bx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^(5/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] -1/35*(128*b^4*x^8 + 448*a*b^3*x^6 + 560*a^2*b^2*x^4 + 280*a^3*b*
x^2 + 35*a^4)/((a^5*b^3*x^7 + 3*a^6*b^2*x^5 + 3*a^7*b*x^3 + a^8*x
)*sqrt(b*x^2 + a))
```

Fricas [A] time = 0.261192, size = 149, normalized size = 1.18

$$-\frac{\left(128\,b^4x^8+448\,ab^3x^6+560\,a^2b^2x^4+280\,a^3bx^2+35\,a^4\right)\sqrt{bx^3+ax}\sqrt{x}}{35\,(a^5b^4x^{10}+4\,a^6b^3x^8+6\,a^7b^2x^6+4\,a^8bx^4+a^9x^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^(5/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] -1/35*(128*b^4*x^8 + 448*a*b^3*x^6 + 560*a^2*b^2*x^4 + 280*a^3*b*
x^2 + 35*a^4)*sqrt(b*x^3 + a*x)*sqrt(x)/(a^5*b^4*x^10 + 4*a^6*b^3
*x^8 + 6*a^7*b^2*x^6 + 4*a^8*b*x^4 + a^9*x^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**(5/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.259575, size = 96, normalized size = 0.76

$$-\frac{\left(\left(x^2\left(\frac{93\,b^4x^2}{a^5}+\frac{308\,b^3}{a^4}\right)+\frac{350\,b^2}{a^3}\right)x^2+\frac{140\,b}{a^2}\right)x}{35\,(bx^2+a)^{\frac{7}{2}}}-\frac{\sqrt{b+\frac{a}{x^2}}}{a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] -1/35*((x^2*(93*b^4*x^2/a^5 + 308*b^3/a^4) + 350*b^2/a^3)*x^2 + 1
40*b/a^2)*x/(b*x^2 + a)^(7/2) - sqrt(b + a/x^2)/a^5
```

3.88 $\int \frac{x^{3/2}}{(ax+bx^3)^{9/2}} \, dx$

Optimal. Leaf size=159

$$\frac{9b\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{2a^{11/2}}-\frac{9\sqrt{ax+bx^3}}{2a^5x^{5/2}}+\frac{3}{a^4x^{3/2}\sqrt{ax+bx^3}}+\frac{3}{5a^3\sqrt{x}\,(ax+bx^3)^{3/2}}+\frac{9\sqrt{x}}{35a^2\,(ax+bx^3)^{5/2}}+\frac{x^{3/2}}{7a\,(ax+bx^3)^{7/2}}$$

```
[Out] x^(3/2)/(7*a*(a*x + b*x^3)^(7/2)) + (9*Sqrt[x])/(35*a^2*(a*x + b*
x^3)^(5/2)) + 3/(5*a^3*Sqrt[x]*(a*x + b*x^3)^(3/2)) + 3/(a^4*x^(3
/2)*Sqrt[a*x + b*x^3]) - (9*Sqrt[a*x + b*x^3])/(2*a^5*x^(5/2)) +
(9*b*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^3]])/(2*a^(11/2))
```

Rubi [A] time = 0.392649, antiderivative size = 159, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{9b\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{2a^{11/2}}-\frac{9\sqrt{ax+bx^3}}{2a^5x^{5/2}}+\frac{3}{a^4x^{3/2}\sqrt{ax+bx^3}}+\frac{3}{5a^3\sqrt{x}\,(ax+bx^3)^{3/2}}+\frac{9\sqrt{x}}{35a^2\,(ax+bx^3)^{5/2}}+\frac{x^{3/2}}{7a\,(ax+bx^3)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(3/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] x^(3/2)/(7*a*(a*x + b*x^3)^(7/2)) + (9*Sqrt[x])/(35*a^2*(a*x + b*
x^3)^(5/2)) + 3/(5*a^3*Sqrt[x]*(a*x + b*x^3)^(3/2)) + 3/(a^4*x^(3
/2)*Sqrt[a*x + b*x^3]) - (9*Sqrt[a*x + b*x^3])/(2*a^5*x^(5/2)) +
(9*b*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^3]])/(2*a^(11/2))
```

Rubi in Sympy [A] time = 41.6444, size = 146, normalized size = 0.92

$$\frac{x^{\frac{3}{2}}}{7a\,(ax+bx^3)^{\frac{7}{2}}}+\frac{9\sqrt{x}}{35a^2\,(ax+bx^3)^{\frac{5}{2}}}+\frac{3}{5a^3\sqrt{x}\,(ax+bx^3)^{\frac{3}{2}}}+\frac{3}{a^4x^{\frac{3}{2}}\sqrt{ax+bx^3}}-\frac{9\sqrt{ax+bx^3}}{2a^5x^{\frac{5}{2}}}+\frac{9b\,\mathrm{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{2a^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] x**(3/2)/(7*a*(a*x + b*x**3)**(7/2)) + 9*sqrt(x)/(35*a**2*(a*x +
b*x**3)**(5/2)) + 3/(5*a**3*sqrt(x)*(a*x + b*x**3)**(3/2)) + 3/(a
**4*x**(3/2)*sqrt(a*x + b*x**3)) - 9*sqrt(a*x + b*x**3)/(2*a**5*x
**(5/2)) + 9*b*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*x**3))/(2*a**(1
1/2))
```

Mathematica [A] time = 0.209065, size = 143, normalized size = 0.9

$$\frac{\sqrt{x\,(a+bx^2)}\left(-\sqrt{a}\,(35a^4+528a^3bx^2+1218a^2b^2x^4+1050ab^3x^6+315b^4x^8)-315bx^2\log(x)\,(a+bx^2)^{7/2}+315bx^2\,(a+bx\right.}{70a^{11/2}x^{5/2}\,(a+bx^2)^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(3/2)/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (Sqrt[x*(a + b*x^2)]*(-(Sqrt[a]*(35*a^4 + 528*a^3*b*x^2 + 1218*a^
2*b^2*x^4 + 1050*a*b^3*x^6 + 315*b^4*x^8)) - 315*b*x^2*(a + b*x^2
)^(7/2)*Log[x] + 315*b*x^2*(a + b*x^2)^(7/2)*Log[a + Sqrt[a]*Sqrt
[a + b*x^2]]))/(70*a^(11/2)*x^(5/2)*(a + b*x^2)^4)
```

Maple [A] time = 0.018, size = 234, normalized size = 1.5

$$\frac{1}{70\,(bx^2+a)^4}\sqrt{x\,(bx^2+a)}\left(315\,\ln\left(2\,\frac{\sqrt{a}\sqrt{bx^2+a}+a}{x}\right)x^8b^4\sqrt{bx^2+a}-315\,\sqrt{a}x^8b^4+945\,\ln\left(2\,\frac{\sqrt{a}\sqrt{bx^2+a}+a}{x}\right)x^6ab^3\sqrt{\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] 1/70*(x*(b*x^2+a))^(1/2)/a^(11/2)*(315*ln(2*(a^(1/2)*(b*x^2+a)^(1
/2)+a)/x)*x^8*b^4*(b*x^2+a)^(1/2)-315*a^(1/2)*x^8*b^4+945*ln(2*(a
^(1/2)*(b*x^2+a)^(1/2)+a)/x)*x^6*a*b^3*(b*x^2+a)^(1/2)-1050*a^(3/
2)*x^6*b^3+945*ln(2*(a^(1/2)*(b*x^2+a)^(1/2)+a)/x)*x^4*a^2*b^2*(b
*x^2+a)^(1/2)-1218*a^(5/2)*x^4*b^2+315*ln(2*(a^(1/2)*(b*x^2+a)^(1
/2)+a)/x)*x^2*a^3*b*(b*x^2+a)^(1/2)-528*a^(7/2)*x^2*b-35*a^(9/2))
/x^(5/2)/(b*x^2+a)^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{3}{2}}}{(bx^3+ax)^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(3/2)/(b*x^3 + a*x)^(9/2), x)
```

Fricas [A] time = 0.227267, size = 1, normalized size = 0.01

$$\left[\frac{315\left(b^4x^7+3\,ab^3x^5+3\,a^2b^2x^3+a^3bx\right)\sqrt{bx^3+ax}\sqrt{x}\log\left(\frac{2\,\sqrt{bx^3+ax}a\sqrt{x}+(bx^3+2\,ax)\sqrt{a}}{x^3}\right)-2\left(315\,b^4x^8+1050\,ab^3x^6+1218\,a\right.}{140\left(a^5b^3x^7+3\,a^6b^2x^5+3\,a^7bx^3+a^8x\right)\sqrt{bx^3+ax}\sqrt{a}\sqrt{x}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] [1/140*(315*(b^4*x^7 + 3*a*b^3*x^5 + 3*a^2*b^2*x^3 + a^3*b*x)*sqr
t(b*x^3 + a*x)*sqrt(x)*log((2*sqrt(b*x^3 + a*x)*a*sqrt(x) + (b*x^
3 + 2*a*x)*sqrt(a))/x^3) - 2*(315*b^4*x^8 + 1050*a*b^3*x^6 + 1218
*a^2*b^2*x^4 + 528*a^3*b*x^2 + 35*a^4)*sqrt(a))/((a^5*b^3*x^7 + 3
*a^6*b^2*x^5 + 3*a^7*b*x^3 + a^8*x)*sqrt(b*x^3 + a*x)*sqrt(a)*sqr
t(x)), 1/70*(315*(b^4*x^7 + 3*a*b^3*x^5 + 3*a^2*b^2*x^3 + a^3*b*x
)*sqrt(b*x^3 + a*x)*sqrt(x)*arctan(sqrt(b*x^3 + a*x)*sqrt(-a)/(a*
sqrt(x))) - (315*b^4*x^8 + 1050*a*b^3*x^6 + 1218*a^2*b^2*x^4 + 52
8*a^3*b*x^2 + 35*a^4)*sqrt(-a))/((a^5*b^3*x^7 + 3*a^6*b^2*x^5 + 3
```

```
*a^7*b*x^3 + a^8*x)*sqrt(b*x^3 + a*x)*sqrt(-a)*sqrt(x))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 1.6294, size = 142, normalized size = 0.89

$$-\frac{1}{70}\,b\left(\frac{315\,\arctan\left(\frac{\sqrt{bx^2+a}}{\sqrt{-a}}\right)}{\sqrt{-a}a^5}+\frac{2\left(140\left(bx^2+a\right)^3+35\left(bx^2+a\right)^2a+14\left(bx^2+a\right)a^2+5\,a^3\right)}{\left(bx^2+a\right)^{\frac{7}{2}}a^5}+\frac{35\,\sqrt{bx^2+a}}{a^5bx^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] -1/70*b*(315*arctan(sqrt(b*x^2 + a)/sqrt(-a))/(sqrt(-a)*a^5) + 2*
(140*(b*x^2 + a)^3 + 35*(b*x^2 + a)^2*a + 14*(b*x^2 + a)*a^2 + 5*
a^3)/((b*x^2 + a)^(7/2)*a^5) + 35*sqrt(b*x^2 + a)/(a^5*b*x^2))
```

3.89 $\int \frac{\sqrt{x}}{(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=152

$$\frac{256b\sqrt{ax+bx^3}}{21a^6x^{3/2}}-\frac{128\sqrt{ax+bx^3}}{21a^5x^{7/2}}+\frac{32}{7a^4x^{5/2}\sqrt{ax+bx^3}}+\frac{16}{21a^3x^{3/2}(ax+bx^3)^{3/2}}+\frac{2}{7a^2\sqrt{x}(ax+bx^3)^{5/2}}+\frac{\sqrt{x}}{7a(ax+bx^3)^{7/2}}$$

```
[Out] Sqrt[x]/(7*a*(a*x + b*x^3)^(7/2)) + 2/(7*a^2*Sqrt[x]*(a*x + b*x^3
)^(5/2)) + 16/(21*a^3*x^(3/2)*(a*x + b*x^3)^(3/2)) + 32/(7*a^4*x^
(5/2)*Sqrt[a*x + b*x^3]) - (128*Sqrt[a*x + b*x^3])/(21*a^5*x^(7/2
)) + (256*b*Sqrt[a*x + b*x^3])/(21*a^6*x^(3/2))
```

Rubi [A] time = 0.383619, antiderivative size = 152, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{256b\sqrt{ax+bx^3}}{21a^6x^{3/2}}-\frac{128\sqrt{ax+bx^3}}{21a^5x^{7/2}}+\frac{32}{7a^4x^{5/2}\sqrt{ax+bx^3}}+\frac{16}{21a^3x^{3/2}(ax+bx^3)^{3/2}}+\frac{2}{7a^2\sqrt{x}(ax+bx^3)^{5/2}}+\frac{\sqrt{x}}{7a(ax+bx^3)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x]/(a*x + b*x^3)^(9/2),x]
```

```
[Out] Sqrt[x]/(7*a*(a*x + b*x^3)^(7/2)) + 2/(7*a^2*Sqrt[x]*(a*x + b*x^3
)^(5/2)) + 16/(21*a^3*x^(3/2)*(a*x + b*x^3)^(3/2)) + 32/(7*a^4*x^
(5/2)*Sqrt[a*x + b*x^3]) - (128*Sqrt[a*x + b*x^3])/(21*a^5*x^(7/2
)) + (256*b*Sqrt[a*x + b*x^3])/(21*a^6*x^(3/2))
```

Rubi in Sympy [A] time = 43.1134, size = 139, normalized size = 0.91

$$\frac{\sqrt{x}}{7a(ax+bx^3)^{\frac{7}{2}}}+\frac{2}{7a^2\sqrt{x}(ax+bx^3)^{\frac{5}{2}}}+\frac{16}{21a^3x^{\frac{3}{2}}(ax+bx^3)^{\frac{3}{2}}}+\frac{32}{7a^4x^{\frac{5}{2}}\sqrt{ax+bx^3}}-\frac{128\sqrt{ax+bx^3}}{21a^5x^{\frac{7}{2}}}+\frac{256b\sqrt{ax+bx^3}}{21a^6x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(1/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] sqrt(x)/(7*a*(a*x + b*x**3)**(7/2)) + 2/(7*a**2*sqrt(x)*(a*x + b*
x**3)**(5/2)) + 16/(21*a**3*x**(3/2)*(a*x + b*x**3)**(3/2)) + 32/
(7*a**4*x**(5/2)*sqrt(a*x + b*x**3)) - 128*sqrt(a*x + b*x**3)/(21
*a**5*x**(7/2)) + 256*b*sqrt(a*x + b*x**3)/(21*a**6*x**(3/2))
```

Mathematica [A] time = 0.067614, size = 88, normalized size = 0.58

$$\frac{\sqrt{x(a+bx^2)}\left(-7a^5+70a^4bx^2+560a^3b^2x^4+1120a^2b^3x^6+896ab^4x^8+256b^5x^{10}\right)}{21a^6x^{7/2}(a+bx^2)^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x]/(a*x + b*x^3)^(9/2),x]
```

```
[Out] (Sqrt[x*(a + b*x^2)]*(-7*a^5 + 70*a^4*b*x^2 + 560*a^3*b^2*x^4 + 1
120*a^2*b^3*x^6 + 896*a*b^4*x^8 + 256*b^5*x^10))/(21*a^6*x^(7/2)*
(a + b*x^2)^4)
```

Maple [A] time = 0.009, size = 81, normalized size = 0.5

$$-\frac{\left(bx^{2}+a\right)\left(-256\,b^{5}x^{10}-896\,b^{4}x^{8}a-1120\,b^{3}x^{6}a^{2}-560\,b^{2}x^{4}a^{3}-70\,bx^{2}a^{4}+7\,a^{5}\right)}{21\,a^{6}}x^{\frac{3}{2}}\left(bx^{3}+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/21*x^(3/2)*(b*x^2+a)*(-256*b^5*x^10-896*a*b^4*x^8-1120*a^2*b^3
*x^6-560*a^3*b^2*x^4-70*a^4*b*x^2+7*a^5)/a^6/(b*x^3+a*x)^(9/2)
```

Maxima [A] time = 1.51693, size = 142, normalized size = 0.93

$$\frac{256\,b^{5}x^{10}+896\,ab^{4}x^{8}+1120\,a^{2}b^{3}x^{6}+560\,a^{3}b^{2}x^{4}+70\,a^{4}bx^{2}-7\,a^{5}}{21\,(a^{6}b^{3}x^{9}+3\,a^{7}b^{2}x^{7}+3\,a^{8}bx^{5}+a^{9}x^{3})\sqrt{bx^{2}+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/(b*x^3 + a*x)^(9/2),x, algorithm="maxima")
```

```
[Out] 1/21*(256*b^5*x^10 + 896*a*b^4*x^8 + 1120*a^2*b^3*x^6 + 560*a^3*b
^2*x^4 + 70*a^4*b*x^2 - 7*a^5)/((a^6*b^3*x^9 + 3*a^7*b^2*x^7 + 3*
a^8*b*x^5 + a^9*x^3)*sqrt(b*x^2 + a))
```

Fricas [A] time = 0.30433, size = 163, normalized size = 1.07

$$\frac{\left(256\,b^{5}x^{10}+896\,ab^{4}x^{8}+1120\,a^{2}b^{3}x^{6}+560\,a^{3}b^{2}x^{4}+70\,a^{4}bx^{2}-7\,a^{5}\right)\sqrt{bx^{3}+ax}\sqrt{x}}{21\,(a^{6}b^{4}x^{12}+4\,a^{7}b^{3}x^{10}+6\,a^{8}b^{2}x^{8}+4\,a^{9}bx^{6}+a^{10}x^{4})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/(b*x^3 + a*x)^(9/2),x, algorithm="fricas")
```

```
[Out] 1/21*(256*b^5*x^10 + 896*a*b^4*x^8 + 1120*a^2*b^3*x^6 + 560*a^3*b
^2*x^4 + 70*a^4*b*x^2 - 7*a^5)*sqrt(b*x^3 + a*x)*sqrt(x)/(a^6*b^4
*x^12 + 4*a^7*b^3*x^10 + 6*a^8*b^2*x^8 + 4*a^9*b*x^6 + a^10*x^4)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(1/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.286665, size = 116, normalized size = 0.76

$$\frac{\left(\left(x^{2}\left(\frac{158\,b^{5}x^{2}}{a^{6}}+\frac{511\,b^{4}}{a^{5}}\right)+\frac{560\,b^{3}}{a^{4}}\right)x^{2}+\frac{210\,b^{2}}{a^{3}}\right)x}{21\,(bx^{2}+a)^{\frac{7}{2}}}-\frac{\left(b+\frac{a}{x^{2}}\right)^{\frac{3}{2}}-15\,\sqrt{b+\frac{a}{x^{2}}}b}{3\,a^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/(b*x^3 + a*x)^(9/2),x, algorithm="giac")
```

```
[Out] 1/21*((x^2*(158*b^5*x^2/a^6 + 511*b^4/a^5) + 560*b^3/a^4)*x^2 + 2
10*b^2/a^3)*x/(b*x^2 + a)^(7/2) - 1/3*((b + a/x^2)^(3/2) - 15*sqr
t(b + a/x^2)*b)/a^6
```

3.90 $\int \frac{1}{\sqrt{x}(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=189

$$-\frac{99b^2\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{8a^{13/2}}+\frac{99b\sqrt{ax+bx^3}}{8a^6x^{5/2}}-\frac{33\sqrt{ax+bx^3}}{4a^5x^{9/2}}+\frac{33}{5a^4x^{7/2}\sqrt{ax+bx^3}}+\frac{33}{35a^3x^{5/2}\left(ax+bx^3\right)^{3/2}}+\frac{11}{35a^2x^{3/2}\left(ax+bx^3\right)^{5/2}}+\frac{1}{7a\sqrt{x}\left(ax+bx^3\right)^{7/2}}$$

```
[Out] 1/(7*a*Sqrt[x]*(a*x + b*x^3)^(7/2)) + 11/(35*a^2*x^(3/2)*(a*x + b
*x^3)^(5/2)) + 33/(35*a^3*x^(5/2)*(a*x + b*x^3)^(3/2)) + 33/(5*a^
4*x^(7/2)*Sqrt[a*x + b*x^3]) - (33*Sqrt[a*x + b*x^3])/(4*a^5*x^(9
/2)) + (99*b*Sqrt[a*x + b*x^3])/(8*a^6*x^(5/2)) - (99*b^2*ArcTanh
[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^3]])/(8*a^(13/2))
```

Rubi [A] time = 0.478459, antiderivative size = 189, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$-\frac{99b^2\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{8a^{13/2}}+\frac{99b\sqrt{ax+bx^3}}{8a^6x^{5/2}}-\frac{33\sqrt{ax+bx^3}}{4a^5x^{9/2}}+\frac{33}{5a^4x^{7/2}\sqrt{ax+bx^3}}+\frac{33}{35a^3x^{5/2}\left(ax+bx^3\right)^{3/2}}+\frac{11}{35a^2x^{3/2}\left(ax+bx^3\right)^{5/2}}+\frac{1}{7a\sqrt{x}\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[x]*(a*x + b*x^3)^(9/2)),x]
```

```
[Out] 1/(7*a*Sqrt[x]*(a*x + b*x^3)^(7/2)) + 11/(35*a^2*x^(3/2)*(a*x + b
*x^3)^(5/2)) + 33/(35*a^3*x^(5/2)*(a*x + b*x^3)^(3/2)) + 33/(5*a^
4*x^(7/2)*Sqrt[a*x + b*x^3]) - (33*Sqrt[a*x + b*x^3])/(4*a^5*x^(9
/2)) + (99*b*Sqrt[a*x + b*x^3])/(8*a^6*x^(5/2)) - (99*b^2*ArcTanh
[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^3]])/(8*a^(13/2))
```

Rubi in Sympy [A] time = 54.8449, size = 177, normalized size = 0.94

$$\frac{1}{7a\sqrt{x}\left(ax+bx^3\right)^{\frac{7}{2}}}+\frac{11}{35a^2x^{\frac{3}{2}}\left(ax+bx^3\right)^{\frac{5}{2}}}+\frac{33}{35a^3x^{\frac{5}{2}}\left(ax+bx^3\right)^{\frac{3}{2}}}+\frac{33}{5a^4x^{\frac{7}{2}}\sqrt{ax+bx^3}}-\frac{33\sqrt{ax+bx^3}}{4a^5x^{\frac{9}{2}}}+\frac{99b\sqrt{ax+bx^3}}{8a^6x^{\frac{5}{2}}}-\frac{99b^2\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^3}}\right)}{8a^{\frac{13}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(1/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] 1/(7*a*sqrt(x)*(a*x + b*x**3)**(7/2)) + 11/(35*a**2*x**(3/2)*(a*x
 + b*x**3)**(5/2)) + 33/(35*a**3*x**(5/2)*(a*x + b*x**3)**(3/2))
+ 33/(5*a**4*x**(7/2)*sqrt(a*x + b*x**3)) - 33*sqrt(a*x + b*x**3)
/(4*a**5*x**(9/2)) + 99*b*sqrt(a*x + b*x**3)/(8*a**6*x**(5/2)) -
99*b**2*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*x**3))/(8*a**(13/2))
```

Mathematica [A] time = 0.235467, size = 157, normalized size = 0.83

$$\frac{\sqrt{x\left(a+bx^2\right)}\left(\sqrt{a}\left(-70a^5+385a^4bx^2+5808a^3b^2x^4+13398a^2b^3x^6+11550ab^4x^8+3465b^5x^{10}\right)+3465b^2x^4\log(x)\left(a+bx^2\right)\right.}{280a^{13/2}x^{9/2}\left(a+bx^2\right)^4}$$

Antiderivative was successfully verified.

```
[In]   Integrate[1/(Sqrt[x]*(a*x + b*x^3)^(9/2)),x]
```

```
[Out] (Sqrt[x*(a + b*x^2)]*(Sqrt[a]*(-70*a^5 + 385*a^4*b*x^2 + 5808*a^3
*b^2*x^4 + 13398*a^2*b^3*x^6 + 11550*a*b^4*x^8 + 3465*b^5*x^10) +
 3465*b^2*x^4*(a + b*x^2)^(7/2)*Log[x] - 3465*b^2*x^4*(a + b*x^2)
^(7/2)*Log[a + Sqrt[a]*Sqrt[a + b*x^2]]))/(280*a^(13/2)*x^(9/2)*(
a + b*x^2)^4)
```

Maple [A] time = 0.024, size = 247, normalized size = 1.3

$$-\frac{1}{280\,(bx^2+a)^4}\sqrt{x\,(bx^2+a)}\left(3465\,\ln\left(2\,\frac{\sqrt{a}\sqrt{bx^2+a}+a}{x}\right)x^{10}b^5\sqrt{bx^2+a}-3465\,\sqrt{a}x^{10}b^5+10395\,\ln\left(2\,\frac{\sqrt{a}\sqrt{bx^2+a}+a}{x}\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^(1/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/280*(x*(b*x^2+a))^(1/2)/a^(13/2)*(3465*ln(2*(a^(1/2)*(b*x^2+a)
^(1/2)+a)/x)*x^10*b^5*(b*x^2+a)^(1/2)-3465*a^(1/2)*x^10*b^5+10395
*ln(2*(a^(1/2)*(b*x^2+a)^(1/2)+a)/x)*x^8*a*b^4*(b*x^2+a)^(1/2)-11
550*a^(3/2)*x^8*b^4+10395*ln(2*(a^(1/2)*(b*x^2+a)^(1/2)+a)/x)*x^6
*a^2*b^3*(b*x^2+a)^(1/2)-13398*a^(5/2)*x^6*b^3+3465*ln(2*(a^(1/2)
*(b*x^2+a)^(1/2)+a)/x)*x^4*a^3*b^2*(b*x^2+a)^(1/2)-5808*a^(7/2)*x
^4*b^2-385*a^(9/2)*x^2*b+70*a^(11/2))/x^(9/2)/(b*x^2+a)^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^3+ax)^{\frac{9}{2}}\sqrt{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((b*x^3 + a*x)^(9/2)*sqrt(x)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^3 + a*x)^(9/2)*sqrt(x)), x)
```

Fricas [A] time = 0.226551, size = 1, normalized size = 0.01

$$\left[\frac{3465\left(b^5x^9+3\,ab^4x^7+3\,a^2b^3x^5+a^3b^2x^3\right)\sqrt{bx^3+ax}\sqrt{x}\log\left(-\frac{2\sqrt{bx^3+ax}a\sqrt{x}-(bx^3+2\,ax)\sqrt{a}}{x^3}\right)+2\left(3465\,b^5x^{10}+11550\,ab^4x^8\right.}{560\,(a^6b^3x^9+3\,a^7b^2x^7+3\,a^8bx^5+a^9x^3)\sqrt{bx^3+ax}\sqrt{a}\sqrt{x}}\right.$$

$$-\frac{3465\left(b^5x^9+3\,ab^4x^7+3\,a^2b^3x^5+a^3b^2x^3\right)\sqrt{bx^3+ax}\sqrt{x}\arctan\left(\frac{\sqrt{bx^3+ax}\sqrt{-a}}{a\sqrt{x}}\right)-\left(3465\,b^5x^{10}+11550\,ab^4x^8+13398\,a^2b^3x\right.}{280\,(a^6b^3x^9+3\,a^7b^2x^7+3\,a^8bx^5+a^9x^3)\sqrt{bx^3+ax}\sqrt{-a}\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((b*x^3 + a*x)^(9/2)*sqrt(x)),x, algorithm="fricas")
```

```
[Out] [1/560*(3465*(b^5*x^9 + 3*a*b^4*x^7 + 3*a^2*b^3*x^5 + a^3*b^2*x^3
)*sqrt(b*x^3 + a*x)*sqrt(x)*log(-(2*sqrt(b*x^3 + a*x)*a*sqrt(x) -
 (b*x^3 + 2*a*x)*sqrt(a))/x^3) + 2*(3465*b^5*x^10 + 11550*a*b^4*x
^8 + 13398*a^2*b^3*x^6 + 5808*a^3*b^2*x^4 + 385*a^4*b*x^2 - 70*a^
```

```
5)*sqrt(a))/((a^6*b^3*x^9 + 3*a^7*b^2*x^7 + 3*a^8*b*x^5 + a^9*x^3
)*sqrt(b*x^3 + a*x)*sqrt(a)*sqrt(x)), -1/280*(3465*(b^5*x^9 + 3*a
*b^4*x^7 + 3*a^2*b^3*x^5 + a^3*b^2*x^3)*sqrt(b*x^3 + a*x)*sqrt(x)
*arctan(sqrt(b*x^3 + a*x)*sqrt(-a)/(a*sqrt(x))) - (3465*b^5*x^10
+ 11550*a*b^4*x^8 + 13398*a^2*b^3*x^6 + 5808*a^3*b^2*x^4 + 385*a^
4*b*x^2 - 70*a^5)*sqrt(-a))/((a^6*b^3*x^9 + 3*a^7*b^2*x^7 + 3*a^8
*b*x^5 + a^9*x^3)*sqrt(b*x^3 + a*x)*sqrt(-a)*sqrt(x))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(1/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 1.99767, size = 165, normalized size = 0.87

$$\frac{1}{280}\,b^2\left(\frac{3465\,\arctan\left(\frac{\sqrt{bx^2+a}}{\sqrt{-a}}\right)}{\sqrt{-a}a^6}+\frac{8\left(350\left(bx^2+a\right)^3+70\left(bx^2+a\right)^2a+21\left(bx^2+a\right)a^2+5\,a^3\right)}{\left(bx^2+a\right)^{\frac{7}{2}}a^6}+\frac{35\left(19\left(bx^2+a\right)^{\frac{3}{2}}-21\,\sqrt{b\right.}{a^6b^2x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(9/2)*sqrt(x)),x, algorithm="giac")
```

```
[Out] 1/280*b^2*(3465*arctan(sqrt(b*x^2 + a)/sqrt(-a))/(sqrt(-a)*a^6) +
 8*(350*(b*x^2 + a)^3 + 70*(b*x^2 + a)^2*a + 21*(b*x^2 + a)*a^2 +
 5*a^3)/((b*x^2 + a)^(7/2)*a^6) + 35*(19*(b*x^2 + a)^(3/2) - 21*s
qrt(b*x^2 + a)*a)/(a^6*b^2*x^4))
```

3.91 $\int \frac{1}{x^{3/2}(ax+bx^3)^{9/2}}\,dx$

Optimal. Leaf size=180

$$-\frac{1024b^2\sqrt{ax+bx^3}}{35a^7x^{3/2}}+\frac{512b\sqrt{ax+bx^3}}{35a^6x^{7/2}}-\frac{384\sqrt{ax+bx^3}}{35a^5x^{11/2}}+\frac{64}{7a^4x^{9/2}\sqrt{ax+bx^3}}+\frac{8}{7a^3x^{7/2}\left(ax+bx^3\right)^{3/2}}+\frac{12}{35a^2x^{5/2}\left(ax+bx^3\right)^{5/2}}+\frac{1}{7ax^{3/2}\left(ax+bx^3\right)^{7/2}}$$

```
[Out] 1/(7*a*x^(3/2)*(a*x + b*x^3)^(7/2)) + 12/(35*a^2*x^(5/2)*(a*x + b
*x^3)^(5/2)) + 8/(7*a^3*x^(7/2)*(a*x + b*x^3)^(3/2)) + 64/(7*a^4*
x^(9/2)*Sqrt[a*x + b*x^3]) - (384*Sqrt[a*x + b*x^3])/(35*a^5*x^(1
1/2)) + (512*b*Sqrt[a*x + b*x^3])/(35*a^6*x^(7/2)) - (1024*b^2*Sq
rt[a*x + b*x^3])/(35*a^7*x^(3/2))
```

Rubi [A] time = 0.455312, antiderivative size = 180, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{1024b^2\sqrt{ax+bx^3}}{35a^7x^{3/2}}+\frac{512b\sqrt{ax+bx^3}}{35a^6x^{7/2}}-\frac{384\sqrt{ax+bx^3}}{35a^5x^{11/2}}+\frac{64}{7a^4x^{9/2}\sqrt{ax+bx^3}}+\frac{8}{7a^3x^{7/2}\left(ax+bx^3\right)^{3/2}}+\frac{12}{35a^2x^{5/2}\left(ax+bx^3\right)^{5/2}}+\frac{1}{7ax^{3/2}\left(ax+bx^3\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(3/2)*(a*x + b*x^3)^(9/2)),x]
```

```
[Out] 1/(7*a*x^(3/2)*(a*x + b*x^3)^(7/2)) + 12/(35*a^2*x^(5/2)*(a*x + b
*x^3)^(5/2)) + 8/(7*a^3*x^(7/2)*(a*x + b*x^3)^(3/2)) + 64/(7*a^4*
x^(9/2)*Sqrt[a*x + b*x^3]) - (384*Sqrt[a*x + b*x^3])/(35*a^5*x^(1
1/2)) + (512*b*Sqrt[a*x + b*x^3])/(35*a^6*x^(7/2)) - (1024*b^2*Sq
rt[a*x + b*x^3])/(35*a^7*x^(3/2))
```

Rubi in Sympy [A] time = 52.0867, size = 168, normalized size = 0.93

$$\frac{1}{7ax^{\frac{3}{2}}\left(ax+bx^3\right)^{\frac{7}{2}}}+\frac{12}{35a^2x^{\frac{5}{2}}\left(ax+bx^3\right)^{\frac{5}{2}}}+\frac{8}{7a^3x^{\frac{7}{2}}\left(ax+bx^3\right)^{\frac{3}{2}}}+\frac{64}{7a^4x^{\frac{9}{2}}\sqrt{ax+bx^3}}-\frac{384\sqrt{ax+bx^3}}{35a^5x^{\frac{11}{2}}}+\frac{512b\sqrt{ax+bx^3}}{35a^6x^{\frac{7}{2}}}-\frac{1024b^2\sqrt{ax+bx^3}}{35a^7x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(3/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] 1/(7*a*x**(3/2)*(a*x + b*x**3)**(7/2)) + 12/(35*a**2*x**(5/2)*(a*
x + b*x**3)**(5/2)) + 8/(7*a**3*x**(7/2)*(a*x + b*x**3)**(3/2)) +
 64/(7*a**4*x**(9/2)*sqrt(a*x + b*x**3)) - 384*sqrt(a*x + b*x**3)
/(35*a**5*x**(11/2)) + 512*b*sqrt(a*x + b*x**3)/(35*a**6*x**(7/2)
) - 1024*b**2*sqrt(a*x + b*x**3)/(35*a**7*x**(3/2))
```

Mathematica [A] time = 0.0850435, size = 99, normalized size = 0.55

$$-\frac{\sqrt{x\left(a+bx^2\right)}\left(7a^6-28a^5bx^2+280a^4b^2x^4+2240a^3b^3x^6+4480a^2b^4x^8+3584ab^5x^{10}+1024b^6x^{12}\right)}{35a^7x^{11/2}\left(a+bx^2\right)^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(3/2)*(a*x + b*x^3)^(9/2)),x]
```

```
[Out] -(Sqrt[x*(a + b*x^2)]*(7*a^6 - 28*a^5*b*x^2 + 280*a^4*b^2*x^4 + 2
240*a^3*b^3*x^6 + 4480*a^2*b^4*x^8 + 3584*a*b^5*x^10 + 1024*b^6*x
^12))/(35*a^7*x^(11/2)*(a + b*x^2)^4)
```

Maple [A] time = 0.01, size = 92, normalized size = 0.5

$$-\frac{\left(bx^2+a\right)\left(1024\,b^6x^{12}+3584\,b^5x^{10}a+4480\,b^4x^8a^2+2240\,b^3x^6a^3+280\,b^2x^4a^4-28\,bx^2a^5+7\,a^6\right)}{35\,a^7}\frac{1}{\sqrt{x}}\left(bx^3+ax\right)^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(3/2)/(b*x^3+a*x)^(9/2),x)
```

```
[Out] -1/35*(b*x^2+a)*(1024*b^6*x^12+3584*a*b^5*x^10+4480*a^2*b^4*x^8+2
240*a^3*b^3*x^6+280*a^4*b^2*x^4-28*a^5*b*x^2+7*a^6)/x^(1/2)/a^7/(
b*x^3+a*x)^(9/2)
```

Maxima [A] time = 1.45131, size = 157, normalized size = 0.87

$$-\frac{1024\,b^6x^{12}+3584\,ab^5x^{10}+4480\,a^2b^4x^8+2240\,a^3b^3x^6+280\,a^4b^2x^4-28\,a^5bx^2+7\,a^6}{35\,\left(a^7b^3x^{11}+3\,a^8b^2x^9+3\,a^9bx^7+a^{10}x^5\right)\sqrt{bx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(9/2)*x^(3/2)),x, algorithm="maxima")
```

```
[Out] -1/35*(1024*b^6*x^12 + 3584*a*b^5*x^10 + 4480*a^2*b^4*x^8 + 2240*
a^3*b^3*x^6 + 280*a^4*b^2*x^4 - 28*a^5*b*x^2 + 7*a^6)/((a^7*b^3*x
^11 + 3*a^8*b^2*x^9 + 3*a^9*b*x^7 + a^10*x^5)*sqrt(b*x^2 + a))
```

Fricas [A] time = 0.35377, size = 178, normalized size = 0.99

$$-\frac{\left(1024\,b^6x^{12}+3584\,ab^5x^{10}+4480\,a^2b^4x^8+2240\,a^3b^3x^6+280\,a^4b^2x^4-28\,a^5bx^2+7\,a^6\right)\sqrt{bx^3+ax}\sqrt{x}}{35\,\left(a^7b^4x^{14}+4\,a^8b^3x^{12}+6\,a^9b^2x^{10}+4\,a^{10}bx^8+a^{11}x^6\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(9/2)*x^(3/2)),x, algorithm="fricas")
```

```
[Out] -1/35*(1024*b^6*x^12 + 3584*a*b^5*x^10 + 4480*a^2*b^4*x^8 + 2240*
a^3*b^3*x^6 + 280*a^4*b^2*x^4 - 28*a^5*b*x^2 + 7*a^6)*sqrt(b*x^3
+ a*x)*sqrt(x)/(a^7*b^4*x^14 + 4*a^8*b^3*x^12 + 6*a^9*b^2*x^10 +
4*a^10*b*x^8 + a^11*x^6)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(3/2)/(b*x**3+a*x)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.284415, size = 136, normalized size = 0.76

$$-\frac{\left(\left(2\,x^{2}\left(\frac{281\,b^{6}x^{2}}{a^{7}}+\frac{896\,b^{5}}{a^{6}}\right)+\frac{1925\,b^{4}}{a^{5}}\right)x^{2}+\frac{700\,b^{3}}{a^{4}}\right)x}{35\,(bx^{2}+a)^{\frac{7}{2}}}-\frac{\left(b+\frac{a}{x^{2}}\right)^{\frac{5}{2}}-10\left(b+\frac{a}{x^{2}}\right)^{\frac{3}{2}}b+75\,\sqrt{b+\frac{a}{x^{2}}}b^{2}}{5\,a^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x)^(9/2)*x^(3/2)),x, algorithm="giac")
```

```
[Out] -1/35*((2*x^2*(281*b^6*x^2/a^7 + 896*b^5/a^6) + 1925*b^4/a^5)*x^2
 + 700*b^3/a^4)*x/(b*x^2 + a)^(7/2) - 1/5*((b + a/x^2)^(5/2) - 10
*(b + a/x^2)^(3/2)*b + 75*sqrt(b + a/x^2)*b^2)/a^7
```

3.92 $\int \frac{x^4}{\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=55

$$\frac{x\sqrt{ax+bx^4}}{3b}-\frac{a\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax+bx^4}}\right)}{3b^{3/2}}$$

```
[Out] (x*Sqrt[a*x + b*x^4])/(3*b) - (a*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x +
 b*x^4]])/(3*b^(3/2))
```

Rubi [A] time = 0.123298, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$\frac{x\sqrt{ax+bx^4}}{3b}-\frac{a\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax+bx^4}}\right)}{3b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/Sqrt[a*x + b*x^4],x]
```

```
[Out] (x*Sqrt[a*x + b*x^4])/(3*b) - (a*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x +
 b*x^4]])/(3*b^(3/2))
```

Rubi in Sympy [A] time = 12.868, size = 46, normalized size = 0.84

$$-\frac{a\,\text{atanh}\left(\frac{\sqrt{b}x^2}{\sqrt{ax+bx^4}}\right)}{3b^{\frac{3}{2}}}+\frac{x\sqrt{ax+bx^4}}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**4+a*x)**(1/2),x)
```

```
[Out] -a*atanh(sqrt(b)*x**2/sqrt(a*x + b*x**4))/(3*b**(3/2)) + x*sqrt(a
*x + b*x**4)/(3*b)
```

Mathematica [A] time = 0.0694853, size = 81, normalized size = 1.47

$$\frac{\sqrt{b}x^2\left(a+bx^3\right)-a\sqrt{x}\sqrt{a+bx^3}\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)}{3b^{3/2}\sqrt{x\left(a+bx^3\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/Sqrt[a*x + b*x^4],x]
```

```
[Out] (Sqrt[b]*x^2*(a + b*x^3) - a*Sqrt[x]*Sqrt[a + b*x^3]*ArcTanh[(Sqr
t[b]*x^(3/2))/Sqrt[a + b*x^3]])/(3*b^(3/2)*Sqrt[x*(a + b*x^3)])
```

Maple [C] time = 0.048, size = 997, normalized size = 18.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^4+a*x)^(1/2),x)
```

```
[Out] 1/3*x*(b*x^4+a*x)^(1/2)/b-a*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3))*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/
(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(x-1/b*(-a*b^2)^(1/3))^2*(1/b*(-a*b
^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
/(-1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-
a*b^2)^(1/3)))^(1/2)*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)-
1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)/(-3/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-a*b^2)^(1/3)/(b*x*(x-
1/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
))^(1/2)*(1/b*(-a*b^2)^(1/3)*EllipticF(((-3/2/b*(-a*b^2)^(1/3)+1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2),((3/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3))/(3/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3)))^(1/2))-1/b*(-a*b^2)^(1/3)*EllipticPi(((-3/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2),(-1/2
/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)),((3/2/b*(-a*b^2)^(1/3)+1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3))/(3/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1
/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^4 + a*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.331985, size = 1, normalized size = 0.02

$$\left[\frac{4\sqrt{bx^4+ax}\sqrt{b}x + a\log\left(4\left(2b^2x^4+abx\right)\sqrt{bx^4+ax} - \left(8b^2x^6+8abx^3+a^2\right)\sqrt{b}\right)}{12b^{\frac{3}{2}}}, \frac{2\sqrt{bx^4+ax}\sqrt{-b}x - a\arctan\left(\frac{2\sqrt{bx^4+ax}\sqrt{-b}x}{2bx^3+a}\right)}{6\sqrt{-b}b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^4 + a*x),x, algorithm="fricas")
```

```
[Out] [1/12*(4*sqrt(b*x^4 + a*x)*sqrt(b)*x + a*log(4*(2*b^2*x^4 + a*b*x
)*sqrt(b*x^4 + a*x) - (8*b^2*x^6 + 8*a*b*x^3 + a^2)*sqrt(b)))/b^(
3/2), 1/6*(2*sqrt(b*x^4 + a*x)*sqrt(-b)*x - a*arctan(2*sqrt(b*x^4
 + a*x)*sqrt(-b)*x/(2*b*x^3 + a)))/(sqrt(-b)*b)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{x\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(x**4/sqrt(x*(a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.241321, size = 61, normalized size = 1.11

$$\frac{\sqrt{bx^4 + axx}}{3\,b} + \frac{a\arctan\left(\frac{\sqrt{b+\frac{a}{x^3}}}{\sqrt{-b}}\right)}{3\,\sqrt{-b}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^4 + a*x),x, algorithm="giac")
```

```
[Out] 1/3*sqrt(b*x^4 + a*x)*x/b + 1/3*a*arctan(sqrt(b + a/x^3)/sqrt(-b)
)/(sqrt(-b)*b)
```

3.93 $\int \frac{x}{\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=32

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax+bx^4}}\right)}{3\sqrt{b}}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x + b*x^4]])/(3*Sqrt[b])
```

Rubi [A] time = 0.0555286, antiderivative size = 32, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax+bx^4}}\right)}{3\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In] Int[x/Sqrt[a*x + b*x^4],x]
```

```
[Out] (2*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x + b*x^4]])/(3*Sqrt[b])
```

Rubi in Sympy [A] time = 6.76153, size = 29, normalized size = 0.91

$$\frac{2\,\text{atanh}\left(\frac{\sqrt{b}x^2}{\sqrt{ax+bx^4}}\right)}{3\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x/(b*x**4+a*x)**(1/2),x)
```

```
[Out] 2*atanh(sqrt(b)*x**2/sqrt(a*x + b*x**4))/(3*sqrt(b))
```

Mathematica [A] time = 0.029608, size = 61, normalized size = 1.91

$$\frac{2\sqrt{x}\sqrt{a+bx^3}\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)}{3\sqrt{b}\sqrt{x\left(a+bx^3\right)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/Sqrt[a*x + b*x^4],x]
```

```
[Out] (2*Sqrt[x]*Sqrt[a + b*x^3]*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a + b*x
^3]])/(3*Sqrt[b]*Sqrt[x*(a + b*x^3)])
```

Maple [C] time = 0.028, size = 979, normalized size = 30.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/(b*x^4+a*x)^(1/2),x)
```

```
[Out] 2*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*((-3/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1
/2)*(x-1/b*(-a*b^2)^(1/3))^2*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)-1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(1/b*
(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1
/b*(-a*b^2)^(1/3)))^(1/2)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*b/(-a*b^2)^(1/3)/(b*x*(x-1/b*(-a*b^2)^(1/3))*(x+1
/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*(1/b*(-a*b^2)^(
1/3)*EllipticF(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x
-1/b*(-a*b^2)^(1/3)))^(1/2),((3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/
b*(-a*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^
(1/3))/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(3/2
/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))-1/b*(-a
*b^2)^(1/3)*EllipticPi(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2),(-1/2/b*(-a*b^2)^(1/3)+1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3)),((3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(1/2/
b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(3/2/b*(-a*b^2)^
(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^4 + a*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.326466, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(-4\left(2\,b^{2}x^{4}+abx\right)\sqrt{bx^{4}+ax}-\left(8\,b^{2}x^{6}+8\,abx^{3}+a^{2}\right)\sqrt{b}\right)}{6\,\sqrt{b}}, \frac{\arctan\left(\frac{2\,\sqrt{bx^{4}+ax}\sqrt{-b}x}{2\,bx^{3}+a}\right)}{3\,\sqrt{-b}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^4 + a*x),x, algorithm="fricas")
```

```
[Out] [1/6*log(-4*(2*b^2*x^4 + a*b*x)*sqrt(b*x^4 + a*x) - (8*b^2*x^6 +
8*a*b*x^3 + a^2)*sqrt(b))/sqrt(b), 1/3*arctan(2*sqrt(b*x^4 + a*x)
*sqrt(-b)*x/(2*b*x^3 + a))/sqrt(-b)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{x\left(a+bx^{3}\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(x/sqrt(x*(a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.224635, size = 31, normalized size = 0.97

$$-\frac{2\arctan\left(\frac{\sqrt{b+\frac{a}{x^3}}}{\sqrt{-b}}\right)}{3\sqrt{-b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^4 + a*x),x, algorithm="giac")
```

```
[Out] -2/3*arctan(sqrt(b + a/x^3)/sqrt(-b))/sqrt(-b)
```

3.94 $\int \frac{1}{x^2\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=23

$$-\frac{2\sqrt{ax+bx^4}}{3ax^2}$$

```
[Out] (-2*Sqrt[a*x + b*x^4])/(3*a*x^2)
```

Rubi [A] time = 0.0592455, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059

$$-\frac{2\sqrt{ax+bx^4}}{3ax^2}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*Sqrt[a*x + b*x^4]),x]

[Out] (-2*Sqrt[a*x + b*x^4])/(3*a*x^2)
```

Rubi in Sympy [A] time = 7.04297, size = 20, normalized size = 0.87

$$-\frac{2\sqrt{ax+bx^4}}{3ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**2/(b*x**4+a*x)**(1/2),x)

[Out] -2*sqrt(a*x + b*x**4)/(3*a*x**2)
```

Mathematica [A] time = 0.0260469, size = 23, normalized size = 1.

$$-\frac{2\sqrt{x\left(a+bx^3\right)}}{3ax^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*Sqrt[a*x + b*x^4]),x]

[Out] (-2*Sqrt[x*(a + b*x^3)])/(3*a*x^2)
```

Maple [A] time = 0.006, size = 27, normalized size = 1.2

$$-\frac{2\,bx^3+2\,a}{3\,ax}\frac{1}{\sqrt{bx^4+ax}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(b*x^4+a*x)^(1/2),x)

[Out] -2/3/x*(b*x^3+a)/a/(b*x^4+a*x)^(1/2)
```

Maxima [A] time = 1.40652, size = 35, normalized size = 1.52

$$-\frac{2\left(bx^4 + ax\right)}{3\sqrt{bx^3 + a}ax^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^2),x, algorithm="maxima")
```

```
[Out] -2/3*(b*x^4 + a*x)/(sqrt(b*x^3 + a)*a*x^(5/2))
```

Fricas [A] time = 0.212743, size = 26, normalized size = 1.13

$$-\frac{2\sqrt{bx^4 + ax}}{3\,ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^2),x, algorithm="fricas")
```

```
[Out] -2/3*sqrt(b*x^4 + a*x)/(a*x^2)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{x\left(a + bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(x*(a + b*x**3))), x)
```

GIAC/XCAS [A] time = 0.219528, size = 19, normalized size = 0.83

$$-\frac{2\sqrt{b + \frac{a}{x^3}}}{3\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^2),x, algorithm="giac")
```

```
[Out] -2/3*sqrt(b + a/x^3)/a
```

3.95 $\int \frac{1}{x^5\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=48

$$\frac{4b\sqrt{ax+bx^4}}{9a^2x^2}-\frac{2\sqrt{ax+bx^4}}{9ax^5}$$

```
[Out] (-2*Sqrt[a*x + b*x^4])/(9*a*x^5) + (4*b*Sqrt[a*x + b*x^4])/(9*a^2
*x^2)
```

Rubi [A] time = 0.117729, antiderivative size = 48, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{4b\sqrt{ax+bx^4}}{9a^2x^2}-\frac{2\sqrt{ax+bx^4}}{9ax^5}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^5*Sqrt[a*x + b*x^4]),x]
```

```
[Out] (-2*Sqrt[a*x + b*x^4])/(9*a*x^5) + (4*b*Sqrt[a*x + b*x^4])/(9*a^2
*x^2)
```

Rubi in Sympy [A] time = 12.2708, size = 42, normalized size = 0.88

$$-\frac{2\sqrt{ax+bx^4}}{9ax^5}+\frac{4b\sqrt{ax+bx^4}}{9a^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**5/(b*x**4+a*x)**(1/2),x)
```

```
[Out] -2*sqrt(a*x + b*x**4)/(9*a*x**5) + 4*b*sqrt(a*x + b*x**4)/(9*a**2
*x**2)
```

Mathematica [A] time = 0.0349873, size = 31, normalized size = 0.65

$$-\frac{2\left(a-2bx^3\right)\sqrt{x\left(a+bx^3\right)}}{9a^2x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^5*Sqrt[a*x + b*x^4]),x]
```

```
[Out] (-2*(a - 2*b*x^3)*Sqrt[x*(a + b*x^3)])/(9*a^2*x^5)
```

Maple [A] time = 0.007, size = 35, normalized size = 0.7

$$-\frac{\left(2\,bx^3+2\,a\right)\left(-2\,bx^3+a\right)}{9\,a^2x^4}\frac{1}{\sqrt{bx^4+ax}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^5/(b*x^4+a*x)^(1/2),x)
```

```
[Out] -2/9*(b*x^3+a)*(-2*b*x^3+a)/x^4/a^2/(b*x^4+a*x)^(1/2)
```

Maxima [A] time = 1.41109, size = 51, normalized size = 1.06

$$\frac{2\left(2\,b^2x^7+abx^4-a^2x\right)}{9\,\sqrt{bx^3+a}a^2x^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^5),x, algorithm="maxima")
```

```
[Out] 2/9*(2*b^2*x^7 + a*b*x^4 - a^2*x)/(sqrt(b*x^3 + a)*a^2*x^(11/2))
```

Fricas [A] time = 0.215991, size = 39, normalized size = 0.81

$$\frac{2\,\sqrt{bx^4+ax}\left(2\,bx^3-a\right)}{9\,a^2x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^5),x, algorithm="fricas")
```

```
[Out] 2/9*sqrt(b*x^4 + a*x)*(2*b*x^3 - a)/(a^2*x^5)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^5\sqrt{x\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**5/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**5*sqrt(x*(a + b*x**3))), x)
```

GIAC/XCAS [A] time = 0.223347, size = 36, normalized size = 0.75

$$-\frac{2\left(\left(b+\frac{a}{x^3}\right)^{\frac{3}{2}}-3\,\sqrt{b+\frac{a}{x^3}}b\right)}{9\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^5),x, algorithm="giac")
```

```
[Out] -2/9*((b + a/x^3)^(3/2) - 3*sqrt(b + a/x^3)*b)/a^2
```

3.96 $\int \frac{1}{x^8\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=74

$$-\frac{16b^2\sqrt{ax+bx^4}}{45a^3x^2}+\frac{8b\sqrt{ax+bx^4}}{45a^2x^5}-\frac{2\sqrt{ax+bx^4}}{15ax^8}$$

```
[Out] (-2*Sqrt[a*x + b*x^4])/(15*a*x^8) + (8*b*Sqrt[a*x + b*x^4])/(45*a
^2*x^5) - (16*b^2*Sqrt[a*x + b*x^4])/(45*a^3*x^2)
```

Rubi [A] time = 0.182134, antiderivative size = 74, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$-\frac{16b^2\sqrt{ax+bx^4}}{45a^3x^2}+\frac{8b\sqrt{ax+bx^4}}{45a^2x^5}-\frac{2\sqrt{ax+bx^4}}{15ax^8}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^8*Sqrt[a*x + b*x^4]),x]
```

```
[Out] (-2*Sqrt[a*x + b*x^4])/(15*a*x^8) + (8*b*Sqrt[a*x + b*x^4])/(45*a
^2*x^5) - (16*b^2*Sqrt[a*x + b*x^4])/(45*a^3*x^2)
```

Rubi in Sympy [A] time = 18.4667, size = 68, normalized size = 0.92

$$-\frac{2\sqrt{ax+bx^4}}{15ax^8}+\frac{8b\sqrt{ax+bx^4}}{45a^2x^5}-\frac{16b^2\sqrt{ax+bx^4}}{45a^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**8/(b*x**4+a*x)**(1/2),x)
```

```
[Out] -2*sqrt(a*x + b*x**4)/(15*a*x**8) + 8*b*sqrt(a*x + b*x**4)/(45*a*
*2*x**5) - 16*b**2*sqrt(a*x + b*x**4)/(45*a**3*x**2)
```

Mathematica [A] time = 0.0440021, size = 44, normalized size = 0.59

$$-\frac{2\sqrt{x(a+bx^3)}\left(3a^2-4abx^3+8b^2x^6\right)}{45a^3x^8}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^8*Sqrt[a*x + b*x^4]),x]
```

```
[Out] (-2*Sqrt[x*(a + b*x^3)]*(3*a^2 - 4*a*b*x^3 + 8*b^2*x^6))/(45*a^3*
x^8)
```

Maple [A] time = 0.008, size = 48, normalized size = 0.7

$$-\frac{\left(2\,bx^3+2\,a\right)\left(8\,b^2x^6-4\,abx^3+3\,a^2\right)}{45\,x^7a^3}\frac{1}{\sqrt{bx^4+ax}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^8/(b*x^4+a*x)^(1/2),x)
```

```
[Out] -2/45*(b*x^3+a)*(8*b^2*x^6-4*a*b*x^3+3*a^2)/x^7/a^3/(b*x^4+a*x)^(
1/2)
```

Maxima [A] time = 1.41687, size = 68, normalized size = 0.92

$$-\frac{2\,\left(8\,b^{3}x^{10}+4\,ab^{2}x^{7}-a^{2}bx^{4}+3\,a^{3}x\right)}{45\,\sqrt{bx^{3}+a}a^{3}x^{\frac{17}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^8),x, algorithm="maxima")
```

```
[Out] -2/45*(8*b^3*x^10 + 4*a*b^2*x^7 - a^2*b*x^4 + 3*a^3*x)/(sqrt(b*x^
3 + a)*a^3*x^(17/2))
```

Fricas [A] time = 0.213678, size = 54, normalized size = 0.73

$$-\frac{2\,\left(8\,b^{2}x^{6}-4\,abx^{3}+3\,a^{2}\right)\sqrt{bx^{4}+ax}}{45\,a^{3}x^{8}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^8),x, algorithm="fricas")
```

```
[Out] -2/45*(8*b^2*x^6 - 4*a*b*x^3 + 3*a^2)*sqrt(b*x^4 + a*x)/(a^3*x^8)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{8}\sqrt{x\,(a+bx^{3})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**8/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**8*sqrt(x*(a + b*x**3))), x)
```

GIAC/XCAS [A] time = 0.221533, size = 58, normalized size = 0.78

$$-\frac{2\left(3\left(b+\frac{a}{x^{3}}\right)^{\frac{5}{2}}-10\left(b+\frac{a}{x^{3}}\right)^{\frac{3}{2}}b+15\,\sqrt{b+\frac{a}{x^{3}}}b^{2}\right)}{45\,a^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^8),x, algorithm="giac")
```

```
[Out] -2/45*(3*(b + a/x^3)^(5/2) - 10*(b + a/x^3)^(3/2)*b + 15*sqrt(b +
 a/x^3)*b^2)/a^3
```

3.97 $\int \frac{x^3}{\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=224

$$\frac{\sqrt{ax+bx^4}}{2b}-\frac{a^{2/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{4\sqrt[4]{3}b\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}$$

```
[Out] Sqrt[a*x + b*x^4]/(2*b) - (a^(2/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(
a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3
])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3
)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(4*3
^(1/4)*b*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4])
```

Rubi [A] time = 0.415984, antiderivative size = 224, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$\frac{\sqrt{ax+bx^4}}{2b}-\frac{a^{2/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{4\sqrt[4]{3}b\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/Sqrt[a*x + b*x^4],x]
```

```
[Out] Sqrt[a*x + b*x^4]/(2*b) - (a^(2/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(
a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3
])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3
)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(4*3
^(1/4)*b*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4])
```

Rubi in Sympy [A] time = 21.8196, size = 199, normalized size = 0.89

$$-\frac{3^{\frac{3}{4}}a^{\frac{2}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{12b\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}+\frac{\sqrt{ax+bx^4}}{2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**4+a*x)**(1/2),x)
```

```
[Out] -3**(3/4)*a**(2/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**
(1/3)*x)*sqrt(a*x + b*x**4)*elliptic_f(acos((a**(1/3) + b**(1/3)*
x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)
/4 + 1/2)/(12*b*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3)
 + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) + sqrt(a*x + b*x**
```

```
4)/(2*b)
```

Mathematica [C] time = 0.355584, size = 174, normalized size = 0.78

$$\frac{3\sqrt[3]{-a}x\left(a+bx^3\right)+i3^{3/4}a\sqrt[3]{b}x^2\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{6\sqrt[3]{-a}b\sqrt{x\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[x^3/Sqrt[a*x + b*x^4],x]
```

```
[Out] (3*(-a)^(1/3)*x*(a + b*x^3) + I*3^(3/4)*a*b^(1/3)*Sqrt[(-1)^(5/6)
*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*x^2*Sqrt[((-a)^(2/3)/b^(2/3) + ((
-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6
) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)])/(6*(-a)^(1
/3)*b*Sqrt[x*(a + b*x^3)])
```

Maple [C] time = 0.029, size = 688, normalized size = 3.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^3/(b*x^4+a*x)^(1/2),x)
```

```
[Out] 1/2*(b*x^4+a*x)^(1/2)/b-1/2*a*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(x-1/b*(-a*b^2)^(1/3))^2*(1/b*(-a
*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
))/(-1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*
(-a*b^2)^(1/3)))^(1/2)*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3
)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)/(-3/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-a*b^2)^(1/3)/(b*x*(
x-1/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2)*EllipticF(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2),((3/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3))/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)/(3/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{bx^4+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^3/sqrt(b*x^4 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^3/sqrt(b*x^4 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\sqrt{bx^4 + ax}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^4 + a*x),x, algorithm="fricas")
```

```
[Out] integral(x^3/sqrt(b*x^4 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{x\,(a + bx^3)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(x**3/sqrt(x*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{bx^4 + ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^4 + a*x),x, algorithm="giac")
```

```
[Out] integrate(x^3/sqrt(b*x^4 + a*x), x)
```

3.98 $\int \frac{1}{\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=197

$$\frac{x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}$$

```
[Out] (x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2
/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[
(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1
/3)*x)], (2 + Sqrt[3])/4])/(3^(1/4)*a^(1/3)*Sqrt[(b^(1/3)*x*(a^(1
/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x
 + b*x^4])
```

Rubi [A] time = 0.260026, antiderivative size = 197, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[a*x + b*x^4],x]
```

```
[Out] (x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2
/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[
(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1
/3)*x)], (2 + Sqrt[3])/4])/(3^(1/4)*a^(1/3)*Sqrt[(b^(1/3)*x*(a^(1
/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x
 + b*x^4])
```

Rubi in Sympy [A] time = 12.4324, size = 182, normalized size = 0.92

$$\frac{3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{3\sqrt[3]{a}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**4+a*x)**(1/2),x)
```

```
[Out] 3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*s
qrt(a*x + b*x**4)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3
) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/
(3*a**(1/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b
**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3))
```

Mathematica [C] time = 0.189962, size = 147, normalized size = 0.75

$$-\frac{2i\sqrt[3]{b}x^2\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{(-a)^{2/3}}{b^{2/3}x^2}+\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}+1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{\sqrt[4]{3}\sqrt[3]{-a}\sqrt{x\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/Sqrt[a*x + b*x^4],x]
```

```
[Out] ((-2*I)*b^(1/3)*Sqrt[(-1)^(5/6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*Sq
rt[1 + (-a)^(2/3)/(b^(2/3)*x^2) + (-a)^(1/3)/(b^(1/3)*x)]*x^2*Ell
ipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1
/4)], (-1)^(1/3)])/(3^(1/4)*(-a)^(1/3)*Sqrt[x*(a + b*x^3)])
```

Maple [C] time = 0.028, size = 671, normalized size = 3.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^4+a*x)^(1/2),x)
```

```
[Out] 2*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*((-3/2/b*
(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)
^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1
/2)*(x-1/b*(-a*b^2)^(1/3))^2*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)-1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(1/b*
(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1
/b*(-a*b^2)^(1/3)))^(1/2)/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))*b/(-a*b^2)^(1/3)/(b*x*(x-1/b*(-a*b^2)^(1/3))*(x+1
/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)*EllipticF(((-3/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*
b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3))
)^(1/2),((3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(1
/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(1/2/b*(-a*b^
2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(3/2/b*(-a*b^2)^(1/3)-1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^4+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^4 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(1/sqrt(b*x^4 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^4+ax}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^4 + a*x),x, algorithm="fricas")
```

```
[Out] integral(1/sqrt(b*x^4 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax + bx^4}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(1/sqrt(a*x + b*x**4), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^4 + ax}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^4 + a*x),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt(b*x^4 + a*x), x)
```

3.99 $\int \frac{1}{x^3\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=225

$$-\frac{2bx\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{5\sqrt[4]{3}a^{4/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}-\frac{2\sqrt{ax+bx^4}}{5ax^3}$$

```
[Out] (-2*Sqrt[a*x + b*x^4])/(5*a*x^3) - (2*b*x*(a^(1/3) + b^(1/3)*x)*S
qrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b
^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])
/(5*3^(1/4)*a^(4/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4])
```

Rubi [A] time = 0.364562, antiderivative size = 225, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$-\frac{2bx\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{5\sqrt[4]{3}a^{4/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}-\frac{2\sqrt{ax+bx^4}}{5ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[a*x + b*x^4]),x]
```

```
[Out] (-2*Sqrt[a*x + b*x^4])/(5*a*x^3) - (2*b*x*(a^(1/3) + b^(1/3)*x)*S
qrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + S
qrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b
^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])
/(5*3^(1/4)*a^(4/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4])
```

Rubi in Sympy [A] time = 21.6407, size = 207, normalized size = 0.92

$$-\frac{2\sqrt{ax+bx^4}}{5ax^3}-\frac{2\cdot 3^{\frac{3}{4}}b\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{15a^{\frac{4}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**4+a*x)**(1/2),x)
```

```
[Out] -2*sqrt(a*x + b*x**4)/(5*a*x**3) - 2*3**(3/4)*b*sqrt((a**(2/3) -
a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 +
sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x + b*x**4)*elliptic
_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/
3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(15*a**(4/3)*sqrt(b**(1/3)
*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))*
```

```
*2)*(a + b*x**3))
```

Mathematica [C] time = 0.525653, size = 172, normalized size = 0.76

$$-\frac{-6\sqrt[3]{-a}\left(a+bx^3\right)+4i3^{3/4}b^{4/3}x^4\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{15(-a)^{4/3}x^2\sqrt{x\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^3*Sqrt[a*x + b*x^4]),x]
```

```
[Out] -(-6*(-a)^(1/3)*(a + b*x^3) + (4*I)*3^(3/4)*b^(4/3)*Sqrt[(-1)^(5/
6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*x^4*Sqrt[((-a)^(2/3)/b^(2/3) +
((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5
/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)])/(15*(-a)
^(4/3)*x^2*Sqrt[x*(a + b*x^3)])
```

Maple [C] time = 0.035, size = 696, normalized size = 3.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^4+a*x)^(1/2),x)
```

```
[Out] -2/5*(b*x^4+a*x)^(1/2)/a/x^3-4/5*b^2/a*(1/2/b*(-a*b^2)^(1/3)-1/2*
I*3^(1/2)/b*(-a*b^2)^(1/3))*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(x-1/b*(-a*b^2)^(1/3))^2
*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*
b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)
+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)/(-
3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-a*b^2)^(1/
3)/(b*x*(x-1/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3)))^(1/2)*EllipticF(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2),((3/2/b*(-a*b^2)^(1/3)
+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))/(3/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))
^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^4 + axx^3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^4 + a*x)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^4 + axx^3}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^4 + a*x)*x^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\sqrt{x\,(a + bx^3)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(x*(a + b*x**3))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^4 + axx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^4 + a*x)*x^3), x)
```

3.100 $\int \frac{x^5}{\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=503

$$\frac{5\left(1-\sqrt{3}\right)a^{4/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{16\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}+\frac{5\sqrt[4]{3}a^{4/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{8b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}-\frac{5\left(1+\sqrt{3}\right)ax\left(a+bx^3\right)}{8b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax+bx^4}}+\frac{x^2\sqrt{ax+bx^4}}{4b}$$

```
[Out] (-5*(1 + Sqrt[3])*a*x*(a + b*x^3))/(8*b^(5/3)*(a^(1/3) + (1 + Sqr
t[3])*b^(1/3)*x)*Sqrt[a*x + b*x^4]) + (x^2*Sqrt[a*x + b*x^4])/(4*
b) + (5*3^(1/4)*a^(4/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*
x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(8*b^(5/3)*Sqrt
[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*Sqrt[a*x + b*x^4]) + (5*(1 - Sqrt[3])*a^(4/3)*x*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a
^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) +
(1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2
 + Sqrt[3])/4])/(16*3^(1/4)*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^
(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4
])
```

Rubi [A] time = 0.972083, antiderivative size = 503, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.353$

$$\frac{5\left(1-\sqrt{3}\right)a^{4/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{16\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}+\frac{5\sqrt[4]{3}a^{4/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{8b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}-\frac{5\left(1+\sqrt{3}\right)ax\left(a+bx^3\right)}{8b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax+bx^4}}+\frac{x^2\sqrt{ax+bx^4}}{4b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/Sqrt[a*x + b*x^4],x]
```


```
[Out] (-5*(1 + Sqrt[3])*a*x*(a + b*x^3))/(8*b^(5/3)*(a^(1/3) + (1 + Sqr
t[3])*b^(1/3)*x)*Sqrt[a*x + b*x^4]) + (x^2*Sqrt[a*x + b*x^4])/(4*
```

```
b) + (5*3^(1/4)*a^(4/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a
^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*
x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4]])/(8*b^(5/3)*Sqrt
[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*Sqrt[a*x + b*x^4]) + (5*(1 - Sqrt[3])*a^(4/3)*x*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a
^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) +
(1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2
 + Sqrt[3])/4]])/(16*3^(1/4)*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^
(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4
])
```

Rubi in Sympy [A] time = 59.8058, size = 454, normalized size = 0.9

$$\frac{5\sqrt[4]{3}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{8b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$
$$+\frac{5\cdot 3^{\frac{3}{4}}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{48b^{\frac{5}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$
$$-\frac{a\left(\frac{5}{8}+\frac{5\sqrt{3}}{8}\right)\sqrt{ax+bx^4}}{b^{\frac{5}{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}+\frac{x^2\sqrt{ax+bx^4}}{4b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**4+a*x)**(1/2),x)
```

```
[Out] 5*3**(1/4)*a**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/
3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b*
*(1/3)*x)*sqrt(a*x + b*x**4)*elliptic_e(acos((a**(1/3) + b**(1/3)
*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3
)/4 + 1/2)/(8*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) + 5*3**(3/4
)*a**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3
) + b**(1/3)*x)*sqrt(a*x + b*x**4)*elliptic_f(acos((a**(1/3) + b*
*(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))),
sqrt(3)/4 + 1/2)/(48*b**(5/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3
)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) - a*
(5/8 + 5*sqrt(3)/8)*sqrt(a*x + b*x**4)/(b**(5/3)*(a**(1/3) + b**(
1/3)*x*(1 + sqrt(3)))) + x**2*sqrt(a*x + b*x**4)/(4*b)
```

Mathematica [C] time = 1.48631, size = 355, normalized size = 0.71

$$\frac{5ax\left(-\frac{a^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{a}x}{\sqrt[3]{b}}-x^2\right)-\frac{5(-1)^{2/3}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\left(1+i\sqrt{3}\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{\left(3+i\sqrt{3}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}}{\sqrt{2}}\right)\middle|\cdots\right.\right.}{2\left((-1)^{2/3}-1\right)b}}{8b\sqrt{x\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^5/Sqrt[a*x + b*x^4],x]
```

```
[Out] (5*a*x*(-(a^(2/3)/b^(2/3)) + (a^(1/3)*x)/b^(1/3) - x^2) + 2*x^3*(
a + b*x^3) - (5*(-1)^(2/3)*a^(4/3)*(a^(1/3) + b^(1/3)*x)^2*Sqrt[(
(1 + (-1)^(1/3))*b^(1/3)*x*(a^(1/3) - (-1)^(1/3)*b^(1/3)*x))/(a^(
1/3) + b^(1/3)*x)^2]*Sqrt[(a^(1/3) + (-1)^(2/3)*b^(1/3)*x)/(a^(1/
3) + b^(1/3)*x)]*((-3 - I*Sqrt[3])*EllipticE[ArcSin[Sqrt[((3 + I*
Sqrt[3])*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3
])/(I + Sqrt[3])] + (1 + I*Sqrt[3])*EllipticF[ArcSin[Sqrt[((3 + I
*Sqrt[3])*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[
3])/(I + Sqrt[3])]))/(2*(-1 + (-1)^(2/3))*b))/(8*b*Sqrt[x*(a + b*
x^3)])
```

Maple [C] time = 0.028, size = 1079, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^4+a*x)^(1/2),x)
```

```
[Out] 1/4*x^2*(b*x^4+a*x)^(1/2)/b-5/8*a/b*(x*(x+1/2/b*(-a*b^2)^(1/3)+1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3))+(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^
2)^(1/3))*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*
(-a*b^2)^(1/3)))^(1/2)*(x-1/b*(-a*b^2)^(1/3))^2*(1/b*(-a*b^2)^(1/
3)*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/
b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^
(1/3)))^(1/2)*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(((-1/2/b*(-a*b^2)^(
1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/b*(-a*b^2)^(1/3)+1/b^2*(-a*b
^2)^(2/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*b/(-a*b^2)^(1/3)*EllipticF(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)
/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b
^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2),((3/2/b*(-a*b^2)^(1/3)+1
/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3))/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2
)^(1/3))/(3/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(
1/2))+(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*Ellip
ticE(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*x/(-
1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b
^2)^(1/3)))^(1/2),((3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)
^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(1/
2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(3/2/b*(-a*b^2
)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))*b/(-a*b^2)^(1/3))
)/(b*x*(x-1/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/
2)/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*
b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\sqrt{bx^4 + ax}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/sqrt(b*x^4 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^5/sqrt(b*x^4 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^5}{\sqrt{bx^4+ax}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/sqrt(b*x^4 + a*x),x, algorithm="fricas")
```

```
[Out] integral(x^5/sqrt(b*x^4 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^5}{\sqrt{x\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(x**5/sqrt(x*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^5}{\sqrt{bx^4+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/sqrt(b*x^4 + a*x),x, algorithm="giac")
```

```
[Out] integrate(x^5/sqrt(b*x^4 + a*x), x)
```

3.101 $\int \frac{x^2}{\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=474

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)\middle|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{2\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}-\frac{\sqrt[4]{3}\sqrt[3]{a}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)\middle|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}+\frac{\left(1+\sqrt{3}\right)x\left(a+bx^3\right)}{b^{2/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax+bx^4}}$$

```
[Out] ((1 + Sqrt[3])*x*(a + b*x^3))/(b^(2/3)*(a^(1/3) + (1 + Sqrt[3])*b
^(1/3)*x)*Sqrt[a*x + b*x^4]) - (3^(1/4)*a^(1/3)*x*(a^(1/3) + b^(1
/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3)
+ (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sq
rt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt
[3])/4])/(b^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3)
 + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4]) - ((1 - Sqrt[3]
)*a^(1/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)
*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Elliptic
F[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt
[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(2*3^(1/4)*b^(2/3)*Sqrt[(b^(1
/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^
2]*Sqrt[a*x + b*x^4])
```

Rubi [A] time = 0.783605, antiderivative size = 474, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)\middle|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{2\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}-\frac{\sqrt[4]{3}\sqrt[3]{a}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)\middle|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}+\frac{\left(1+\sqrt{3}\right)x\left(a+bx^3\right)}{b^{2/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax+bx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/Sqrt[a*x + b*x^4],x]
```

```
[Out] ((1 + Sqrt[3])*x*(a + b*x^3))/(b^(2/3)*(a^(1/3) + (1 + Sqrt[3])*b
^(1/3)*x)*Sqrt[a*x + b*x^4]) - (3^(1/4)*a^(1/3)*x*(a^(1/3) + b^(1
```

```
/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3)
+ (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sq
rt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt
[3])/4])/(b^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3)
 + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4]) - ((1 - Sqrt[3]
)*a^(1/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)
*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Elliptic
F[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt
[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(2*3^(1/4)*b^(2/3)*Sqrt[(b^(1
/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^
2]*Sqrt[a*x + b*x^4])
```

Rubi in Sympy [A] time = 45.2792, size = 423, normalized size = 0.89

$$-\frac{\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$
$$-\frac{3^{\frac{3}{4}}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{6b^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$
$$+\frac{\left(1+\sqrt{3}\right)\sqrt{ax+bx^4}}{b^{\frac{2}{3}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**4+a*x)**(1/2),x)
```

```
[Out] -3**(1/4)*a**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**
(1/3)*x)*sqrt(a*x + b*x**4)*elliptic_e(acos((a**(1/3) + b**(1/3)*
x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)
/4 + 1/2)/(b**(2/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(
1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) - 3**(3/4)*a**
(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(
1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3) + b
**(1/3)*x)*sqrt(a*x + b*x**4)*elliptic_f(acos((a**(1/3) + b**(1/3
)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(
3)/4 + 1/2)/(6*b**(2/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(
a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) + (1 + sqr
t(3))*sqrt(a*x + b*x**4)/(b**(2/3)*(a**(1/3) + b**(1/3)*x*(1 + sq
rt(3))))
```

Mathematica [C] time = 1.33352, size = 333, normalized size = 0.7

$$\frac{x\left(\frac{a^{2/3}}{b^{2/3}}-\frac{\sqrt[3]{a}x}{\sqrt[3]{b}}+x^2\right)+\frac{(-1)^{2/3}\sqrt[3]{a}\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\left(\left(1+i\sqrt{3}\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{\left(3+i\sqrt{3}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}}{\sqrt{2}}\right)\middle|\frac{-i+\sqrt{3}}{i+\sqrt{3}}\right)+\cdots\right)}{2\left((-1)^{2/3}-1\right)b}}{\sqrt{x\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^2/Sqrt[a*x + b*x^4],x]
```

```
[Out] (x*(a^(2/3)/b^(2/3) - (a^(1/3)*x)/b^(1/3) + x^2) + ((-1)^(2/3)*a^
(1/3)*(a^(1/3) + b^(1/3)*x)^2*Sqrt[((1 + (-1)^(1/3))*b^(1/3)*x*(a
^(1/3) - (-1)^(1/3)*b^(1/3)*x))/(a^(1/3) + b^(1/3)*x)^2]*Sqrt[(a^
(1/3) + (-1)^(2/3)*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]*((-3 - I*Sqr
t[3])*EllipticE[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/(a^(1/3)
+ b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])] + (1 + I*Sq
rt[3])*EllipticF[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/(a^(1/3)
 + b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])]))/(2*(-1 +
 (-1)^(2/3))*b))/Sqrt[x*(a + b*x^3)]
```

Maple [C]   time = 0.027, size = 1054, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^4+a*x)^(1/2),x)
```

```
[Out] (x*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(x+1/2
/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))+(1/2/b*(-a*b^2)
^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*((-3/2/b*(-a*b^2)^(1/3)+1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1
/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(x-1/b*(-a*b^
2)^(1/3))^2*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(
1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(1/b*(-a*b^2)^(1/3)*(x
+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a
*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)
))^(1/2)*(((-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
/b*(-a*b^2)^(1/3)+1/b^2*(-a*b^2)^(2/3))/(-3/2/b*(-a*b^2)^(1/3)+1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))*b/(-a*b^2)^(1/3)*EllipticF(((-3/2/b
*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2
)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(
1/2),((3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(1/2/
b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(1/2/b*(-a*b^2)^
(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(3/2/b*(-a*b^2)^(1/3)-1/2*I
*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))+(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*EllipticE(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2),((3/2/b*(-a*b^2)^(
1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3))/(3/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/
3)))^(1/2))*b/(-a*b^2)^(1/3)))/(b*x*(x-1/b*(-a*b^2)^(1/3))*(x+1/2
/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^
2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{bx^4 + ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^4 + a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^2/sqrt(b*x^4 + a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{\sqrt{bx^4+ax}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^4 + a*x),x, algorithm="fricas")
```

```
[Out] integral(x^2/sqrt(b*x^4 + a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{x\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(x*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{bx^4+ax}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^4 + a*x),x, algorithm="giac")
```

```
[Out] integrate(x^2/sqrt(b*x^4 + a*x), x)
```

3.102 $\int \frac{1}{x\sqrt{ax+bx^4}}\,dx$

Optimal. Leaf size=497

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{\sqrt[4]{3}a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}$$
$$-\frac{2\sqrt[4]{3}\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}$$
$$-\frac{2\sqrt{ax+bx^4}}{ax}+\frac{2\left(1+\sqrt{3}\right)\sqrt[3]{b}x\left(a+bx^3\right)}{a\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax+bx^4}}$$

```
[Out] (2*(1 + Sqrt[3])*b^(1/3)*x*(a + b*x^3))/(a*(a^(1/3) + (1 + Sqrt[3
])*b^(1/3)*x)*Sqrt[a*x + b*x^4]) - (2*Sqrt[a*x + b*x^4])/(a*x) -
(2*3^(1/4)*b^(1/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3
)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]
*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) +
(1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(a^(2/3)*Sqrt[(b^(1/
3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*Sqrt[a*x + b*x^4]) - ((1 - Sqrt[3])*b^(1/3)*x*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) +
(1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt
[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3
])/4])/(3^(1/4)*a^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a
^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4])
```

Rubi [A] time = 0.935867, antiderivative size = 497, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.353

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{\sqrt[4]{3}a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}$$
$$-\frac{2\sqrt[4]{3}\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax+bx^4}}$$
$$-\frac{2\sqrt{ax+bx^4}}{ax}+\frac{2\left(1+\sqrt{3}\right)\sqrt[3]{b}x\left(a+bx^3\right)}{a\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax+bx^4}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[a*x + b*x^4]),x]
```

```
[Out] (2*(1 + Sqrt[3])*b^(1/3)*x*(a + b*x^3))/(a*(a^(1/3) + (1 + Sqrt[3
])*b^(1/3)*x)*Sqrt[a*x + b*x^4]) - (2*Sqrt[a*x + b*x^4])/(a*x) -
```

```
(2*3^(1/4)*b^(1/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3
)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]
*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) +
(1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(a^(2/3)*Sqrt[(b^(1/
3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*Sqrt[a*x + b*x^4]) - ((1 - Sqrt[3])*b^(1/3)*x*(a^(1/3) + b^(1/3
)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) +
(1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt
[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3
])/4])/(3^(1/4)*a^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a
^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x + b*x^4])
```

Rubi in Sympy [A] time = 55.9265, size = 445, normalized size = 0.9

$$\frac{\sqrt[3]{b}\left(2+2\sqrt{3}\right)\sqrt{ax+bx^4}}{a\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}-\frac{2\sqrt{ax+bx^4}}{ax}-\frac{2\sqrt[4]{3}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{a^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}-\frac{3^{\frac{3}{4}}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax+bx^4}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{3a^{\frac{2}{3}}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**4+a*x)**(1/2),x)
```

```
[Out] b**(1/3)*(2 + 2*sqrt(3))*sqrt(a*x + b*x**4)/(a*(a**(1/3) + b**(1/
3)*x*(1 + sqrt(3)))) - 2*sqrt(a*x + b*x**4)/(a*x) - 2*3**(1/4)*b*
*(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**
(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*sqr
t(a*x + b*x**4)*elliptic_e(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3)
+ 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(a
**(2/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1
/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) - 3**(3/4)*b**(1/3)*sqrt((
a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1
/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a**(1/3) + b**(1/3)*x)*s
qrt(a*x + b*x**4)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3
) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/
(3*a**(2/3)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b
**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3))
```

Mathematica [C] time = 1.27303, size = 334, normalized size = 0.67

$$\frac{2\left(a^{2/3}\sqrt[3]{b}x-\sqrt[3]{a}b^{2/3}x^2+\frac{(-1)^{2/3}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\left(1+i\sqrt{3}\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{\left(3+i\sqrt{3}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}}{\sqrt{2}}\right)\middle|\frac{-i+\sqrt{3}}{i+\sqrt{3}}\right.\right.}{2\left((-1)^{2/3}-1\right)}\right.}{a\sqrt{x\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*Sqrt[a*x + b*x^4]),x]
```

```
[Out] (2*(-a + a^(2/3)*b^(1/3)*x - a^(1/3)*b^(2/3)*x^2 + ((-1)^(2/3)*a^
(1/3)*(a^(1/3) + b^(1/3)*x)^2*Sqrt[((1 + (-1)^(1/3))*b^(1/3)*x*(a
^(1/3) - (-1)^(1/3)*b^(1/3)*x))/(a^(1/3) + b^(1/3)*x)^2]*Sqrt[(a^
(1/3) + (-1)^(2/3)*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]*((-3 - I*Sqr
t[3])*EllipticE[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/(a^(1/3)
+ b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])] + (1 + I*Sq
rt[3])*EllipticF[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/(a^(1/3)
 + b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])]))/(2*(-1 +
 (-1)^(2/3)))))/(a*Sqrt[x*(a + b*x^3)])
```

Maple [C] time = 0.031, size = 1083, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^4+a*x)^(1/2),x)
```

```
[Out] -2*(b*x^3+a)/a/(x*(b*x^3+a))^(1/2)+2*b/a*(x*(x+1/2/b*(-a*b^2)^(1/
3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))+(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(
-a*b^2)^(1/3))*((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x
-1/b*(-a*b^2)^(1/3)))^(1/2)*(x-1/b*(-a*b^2)^(1/3))^2*(1/b*(-a*b^2
)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(
-1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*
b^2)^(1/3)))^(1/2)*(1/b*(-a*b^2)^(1/3)*(x+1/2/b*(-a*b^2)^(1/3)-1/
2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2
)/b*(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2)*(((-1/2/b*(-a*b
^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/b*(-a*b^2)^(1/3)+1/b^2*
(-a*b^2)^(2/3))/(-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(
1/3))*b/(-a*b^2)^(1/3)*EllipticF(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^
(1/2)/b*(-a*b^2)^(1/3))*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*
(-a*b^2)^(1/3))/(x-1/b*(-a*b^2)^(1/3)))^(1/2),((3/2/b*(-a*b^2)^(1
/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3
^(1/2)/b*(-a*b^2)^(1/3))/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-
a*b^2)^(1/3))/(3/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3
)))^(1/2))+(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))*
EllipticE(((-3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))
*x/(-1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(x-1/b*
(-a*b^2)^(1/3)))^(1/2),((3/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a
*b^2)^(1/3))*(1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)
)/(1/2/b*(-a*b^2)^(1/3)+1/2*I*3^(1/2)/b*(-a*b^2)^(1/3))/(3/2/b*(-
a*b^2)^(1/3)-1/2*I*3^(1/2)/b*(-a*b^2)^(1/3)))^(1/2))*b/(-a*b^2)^(
1/3)))/(b*x*(x-1/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)+1/2*I*
3^(1/2)/b*(-a*b^2)^(1/3))*(x+1/2/b*(-a*b^2)^(1/3)-1/2*I*3^(1/2)/b
*(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^4 + ax}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^4 + a*x)*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^4+axx}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^4 + a*x)*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{x\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**4+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(x*(a + b*x**3))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^4+axx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x)*x),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^4 + a*x)*x), x)
```

3.103 $\int \frac{x^2}{\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=174

$$-\frac{63b^5\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{64a^{11/2}}+\frac{63b^4\sqrt{ax+b\sqrt{x}}}{64a^5}-\frac{21b^3\sqrt{x}\sqrt{ax+b\sqrt{x}}}{32a^4}+\frac{21b^2x\sqrt{ax+b\sqrt{x}}}{40a^3}-\frac{9bx^{3/2}\sqrt{ax+b\sqrt{x}}}{20a^2}+\frac{2x^2\sqrt{ax+b\sqrt{x}}}{5a}$$

```
[Out] (63*b^4*Sqrt[b*Sqrt[x] + a*x])/(64*a^5) - (21*b^3*Sqrt[x]*Sqrt[b*
Sqrt[x] + a*x])/(32*a^4) + (21*b^2*x*Sqrt[b*Sqrt[x] + a*x])/(40*a
^3) - (9*b*x^(3/2)*Sqrt[b*Sqrt[x] + a*x])/(20*a^2) + (2*x^2*Sqrt[
b*Sqrt[x] + a*x])/(5*a) - (63*b^5*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[
b*Sqrt[x] + a*x]])/(64*a^(11/2))
```

Rubi [A] time = 0.334354, antiderivative size = 174, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$-\frac{63b^5\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{64a^{11/2}}+\frac{63b^4\sqrt{ax+b\sqrt{x}}}{64a^5}-\frac{21b^3\sqrt{x}\sqrt{ax+b\sqrt{x}}}{32a^4}+\frac{21b^2x\sqrt{ax+b\sqrt{x}}}{40a^3}-\frac{9bx^{3/2}\sqrt{ax+b\sqrt{x}}}{20a^2}+\frac{2x^2\sqrt{ax+b\sqrt{x}}}{5a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (63*b^4*Sqrt[b*Sqrt[x] + a*x])/(64*a^5) - (21*b^3*Sqrt[x]*Sqrt[b*
Sqrt[x] + a*x])/(32*a^4) + (21*b^2*x*Sqrt[b*Sqrt[x] + a*x])/(40*a
^3) - (9*b*x^(3/2)*Sqrt[b*Sqrt[x] + a*x])/(20*a^2) + (2*x^2*Sqrt[
b*Sqrt[x] + a*x])/(5*a) - (63*b^5*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[
b*Sqrt[x] + a*x]])/(64*a^(11/2))
```

Rubi in Sympy [A] time = 33.2406, size = 163, normalized size = 0.94

$$\frac{2x^2\sqrt{ax+b\sqrt{x}}}{5a}-\frac{9bx^{\frac{3}{2}}\sqrt{ax+b\sqrt{x}}}{20a^2}+\frac{21b^2x\sqrt{ax+b\sqrt{x}}}{40a^3}-\frac{21b^3\sqrt{x}\sqrt{ax+b\sqrt{x}}}{32a^4}+\frac{63b^4\sqrt{ax+b\sqrt{x}}}{64a^5}-\frac{63b^5\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{64a^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] 2*x**2*sqrt(a*x + b*sqrt(x))/(5*a) - 9*b*x**(3/2)*sqrt(a*x + b*sq
rt(x))/(20*a**2) + 21*b**2*x*sqrt(a*x + b*sqrt(x))/(40*a**3) - 21
*b**3*sqrt(x)*sqrt(a*x + b*sqrt(x))/(32*a**4) + 63*b**4*sqrt(a*x
+ b*sqrt(x))/(64*a**5) - 63*b**5*atanh(sqrt(a)*sqrt(x)/sqrt(a*x +
 b*sqrt(x)))/(64*a**(11/2))
```

Mathematica [A] time = 0.163727, size = 115, normalized size = 0.66

$$\frac{2\sqrt{a}\sqrt{ax+b\sqrt{x}}\left(128a^4x^2-144a^3bx^{3/2}+168a^2b^2x-210ab^3\sqrt{x}+315b^4\right)-315b^5\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{640a^{11/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]*(315*b^4 - 210*a*b^3*Sqrt[x] + 1
68*a^2*b^2*x - 144*a^3*b*x^(3/2) + 128*a^4*x^2) - 315*b^5*Log[b +
 2*a*Sqrt[x] + 2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]])/(640*a^(11/2))
```

Maple [A] time = 0.023, size = 227, normalized size = 1.3

$$\frac{1}{640}\sqrt{b\sqrt{x}+ax}\left(-544\,b\sqrt{x}\left(b\sqrt{x}+ax\right)^{3/2}a^{15/2}+256\,x\left(b\sqrt{x}+ax\right)^{3/2}a^{17/2}+880\,b^2\left(b\sqrt{x}+ax\right)^{3/2}a^{13/2}-1300\,b^3\sqrt{b\sqrt{x}+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] 1/640*(b*x^(1/2)+a*x)^(1/2)*(-544*b*x^(1/2)*(b*x^(1/2)+a*x)^(3/2)
*a^(15/2)+256*x*(b*x^(1/2)+a*x)^(3/2)*a^(17/2)+880*b^2*(b*x^(1/2)
+a*x)^(3/2)*a^(13/2)-1300*b^3*(b*x^(1/2)+a*x)^(1/2)*x^(1/2)*a^(13
/2)+1280*b^4*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(11/2)-650*b^4*(b*x^
(1/2)+a*x)^(1/2)*a^(11/2)+325*b^5*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)
*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^5-640*b^5*ln(1/2*(2*(x^(1/2)*(
b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^5)/(x^(1/2)
*(b+x^(1/2)*a))^(1/2)/a^(21/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(a*x + b*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(a*x + b*sqrt(x)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(a*x + b*sqrt(x)), x)
```

GIAC/XCAS [A] time = 0.279174, size = 150, normalized size = 0.86

$$\frac{1}{320}\sqrt{ax+b\sqrt{x}}\left(2\left(4\left(2\sqrt{x}\left(\frac{8\sqrt{x}}{a}-\frac{9b}{a^2}\right)+\frac{21b^2}{a^3}\right)\sqrt{x}-\frac{105b^3}{a^4}\right)\sqrt{x}+\frac{315b^4}{a^5}\right)+\frac{63b^5\ln\left(\left|-2\sqrt{a}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)-b\right|\right)}{128a^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(a*x + b*sqrt(x)),x, algorithm="giac")
```

```
[Out] 1/320*sqrt(a*x + b*sqrt(x))*(2*(4*(2*sqrt(x)*(8*sqrt(x)/a - 9*b/a
^2) + 21*b^2/a^3)*sqrt(x) - 105*b^3/a^4)*sqrt(x) + 315*b^4/a^5) +
 63/128*b^5*ln(abs(-2*sqrt(a)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqr
t(x))) - b))/a^(11/2)
```

3.104 $\int \frac{x}{\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=116

$$-\frac{5b^3\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{4a^{7/2}}+\frac{5b^2\sqrt{ax+b\sqrt{x}}}{4a^3}-\frac{5b\sqrt{x}\sqrt{ax+b\sqrt{x}}}{6a^2}+\frac{2x\sqrt{ax+b\sqrt{x}}}{3a}$$

```
[Out] (5*b^2*Sqrt[b*Sqrt[x] + a*x])/(4*a^3) - (5*b*Sqrt[x]*Sqrt[b*Sqrt[
x] + a*x])/(6*a^2) + (2*x*Sqrt[b*Sqrt[x] + a*x])/(3*a) - (5*b^3*A
rcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/(4*a^(7/2))
```

Rubi [A] time = 0.198641, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.294$

$$-\frac{5b^3\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{4a^{7/2}}+\frac{5b^2\sqrt{ax+b\sqrt{x}}}{4a^3}-\frac{5b\sqrt{x}\sqrt{ax+b\sqrt{x}}}{6a^2}+\frac{2x\sqrt{ax+b\sqrt{x}}}{3a}$$

Antiderivative was successfully verified.

```
[In]  Int[x/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (5*b^2*Sqrt[b*Sqrt[x] + a*x])/(4*a^3) - (5*b*Sqrt[x]*Sqrt[b*Sqrt[
x] + a*x])/(6*a^2) + (2*x*Sqrt[b*Sqrt[x] + a*x])/(3*a) - (5*b^3*A
rcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/(4*a^(7/2))
```

Rubi in Sympy [A] time = 19.5623, size = 107, normalized size = 0.92

$$\frac{2x\sqrt{ax+b\sqrt{x}}}{3a}-\frac{5b\sqrt{x}\sqrt{ax+b\sqrt{x}}}{6a^2}+\frac{5b^2\sqrt{ax+b\sqrt{x}}}{4a^3}-\frac{5b^3\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{4a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] 2*x*sqrt(a*x + b*sqrt(x))/(3*a) - 5*b*sqrt(x)*sqrt(a*x + b*sqrt(x
))/(6*a**2) + 5*b**2*sqrt(a*x + b*sqrt(x))/(4*a**3) - 5*b**3*atan
h(sqrt(a)*sqrt(x)/sqrt(a*x + b*sqrt(x)))/(4*a**(7/2))
```

Mathematica [A] time = 0.104773, size = 89, normalized size = 0.77

$$\frac{\sqrt{ax+b\sqrt{x}}\left(8a^2x-10ab\sqrt{x}+15b^2\right)}{12a^3}-\frac{5b^3\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{8a^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (Sqrt[b*Sqrt[x] + a*x]*(15*b^2 - 10*a*b*Sqrt[x] + 8*a^2*x))/(12*a
^3) - (5*b^3*Log[b + 2*a*Sqrt[x] + 2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x
]])/(8*a^(7/2))
```

Maple [B] time = 0.01, size = 185, normalized size = 1.6

$$\frac{1}{24}\sqrt{b\sqrt{x}+ax}\left(-36\,b\sqrt{b\sqrt{x}+ax}\sqrt{x}a^{9/2}+16\,\left(b\sqrt{x}+ax\right)^{3/2}a^{9/2}+48\,b^{2}\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}a^{7/2}-18\,\sqrt{b\sqrt{x}+ax}b^{2}a^{7/2}+9\,b^{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] 1/24*(b*x^(1/2)+a*x)^(1/2)*(-36*b*(b*x^(1/2)+a*x)^(1/2)*x^(1/2)*a
^(9/2)+16*(b*x^(1/2)+a*x)^(3/2)*a^(9/2)+48*b^2*(x^(1/2)*(b+x^(1/2
)*a))^(1/2)*a^(7/2)-18*(b*x^(1/2)+a*x)^(1/2)*b^2*a^(7/2)+9*b^3*ln
(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^3
-24*b^3*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)
*a+b)/a^(1/2))*a^3)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/a^(13/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(a*x + b*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(a*x + b*sqrt(x)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(x/sqrt(a*x + b*sqrt(x)), x)
```

GIAC/XCAS [A] time = 0.277766, size = 112, normalized size = 0.97

$$\frac{1}{12}\sqrt{ax+b\sqrt{x}}\left(2\sqrt{x}\left(\frac{4\sqrt{x}}{a}-\frac{5\,b}{a^{2}}\right)+\frac{15\,b^{2}}{a^{3}}\right)+\frac{5\,b^{3}\ln\left(\left|-2\,\sqrt{a}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)-b\right|\right)}{8\,a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(a*x + b*sqrt(x)),x, algorithm="giac")
```

```
[Out] 1/12*sqrt(a*x + b*sqrt(x))*(2*sqrt(x)*(4*sqrt(x)/a - 5*b/a^2) + 1
5*b^2/a^3) + 5/8*b^3*ln(abs(-2*sqrt(a)*(sqrt(a)*sqrt(x) - sqrt(a*
x + b*sqrt(x))) - b))/a^(7/2)
```

3.105 $\int \frac{1}{\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=56

$$\frac{2\sqrt{ax+b\sqrt{x}}}{a}-\frac{2b\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{3/2}}$$

```
[Out] (2*Sqrt[b*Sqrt[x] + a*x])/a - (2*b*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt
[b*Sqrt[x] + a*x]])/a^(3/2)
```

Rubi [A] time = 0.106577, antiderivative size = 56, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.267

$$\frac{2\sqrt{ax+b\sqrt{x}}}{a}-\frac{2b\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (2*Sqrt[b*Sqrt[x] + a*x])/a - (2*b*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt
[b*Sqrt[x] + a*x]])/a^(3/2)
```

Rubi in Sympy [A] time = 9.47211, size = 49, normalized size = 0.88

$$\frac{2\sqrt{ax+b\sqrt{x}}}{a}-\frac{2b\,\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] 2*sqrt(a*x + b*sqrt(x))/a - 2*b*atanh(sqrt(a)*sqrt(x)/sqrt(a*x +
b*sqrt(x)))/a**(3/2)
```

Mathematica [A] time = 0.0471505, size = 62, normalized size = 1.11

$$\frac{2\sqrt{ax+b\sqrt{x}}}{a}-\frac{b\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{a^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (2*Sqrt[b*Sqrt[x] + a*x])/a - (b*Log[b + 2*a*Sqrt[x] + 2*Sqrt[a]*
Sqrt[b*Sqrt[x] + a*x]])/a^(3/2)
```

Maple [A] time = 0.005, size = 83, normalized size = 1.5

$$-1\sqrt{b\sqrt{x}+ax}\left(b\ln\left(\frac{1}{2}\left(2\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\sqrt{x}a+b\right)\frac{1}{\sqrt{a}}\right)-2\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}\right)\frac{1}{\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}}a^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] -(b*x^(1/2)+a*x)^(1/2)*(b*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)
*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))-2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*
a^(1/2))/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/a^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*sqrt(x)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax + b\sqrt{x}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/sqrt(a*x + b*sqrt(x)), x)
```

GIAC/XCAS [A] time = 0.274202, size = 73, normalized size = 1.3

$$\frac{b\ln\left(\left|-2\sqrt{a}\left(\sqrt{a}\sqrt{x} - \sqrt{ax + b\sqrt{x}}\right) - b\right|\right)}{a^{\frac{3}{2}}} + \frac{2\sqrt{ax + b\sqrt{x}}}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*sqrt(x)),x, algorithm="giac")
```

```
[Out] b*ln(abs(-2*sqrt(a)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) - b
))/a^(3/2) + 2*sqrt(a*x + b*sqrt(x))/a
```

3.106 $\int \frac{1}{x\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=25

$$-\frac{4\sqrt{ax+b\sqrt{x}}}{b\sqrt{x}}$$

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(b*Sqrt[x])
```

Rubi [A] time = 0.0678783, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.053$

$$-\frac{4\sqrt{ax+b\sqrt{x}}}{b\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sqrt[b*Sqrt[x] + a*x]),x]

[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(b*Sqrt[x])
```

Rubi in Sympy [A] time = 6.64273, size = 22, normalized size = 0.88

$$-\frac{4\sqrt{ax+b\sqrt{x}}}{b\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x/(b*x**(1/2)+a*x)**(1/2),x)

[Out] -4*sqrt(a*x + b*sqrt(x))/(b*sqrt(x))
```

Mathematica [A] time = 0.0264786, size = 25, normalized size = 1.

$$-\frac{4\sqrt{ax+b\sqrt{x}}}{b\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sqrt[b*Sqrt[x] + a*x]),x]

[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(b*Sqrt[x])
```

Maple [C] time = 0.016, size = 153, normalized size = 6.1

$$\frac{1}{xb^2}\sqrt{b\sqrt{x}+ax}\left(\sqrt{a}\ln\left(\frac{1}{2}\left(2\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\sqrt{x}a+b\right)\frac{1}{\sqrt{a}}\right)xb-\sqrt{a}\ln\left(\frac{1}{2}\left(2\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\sqrt{x}a+b\right)\frac{1}{\sqrt{a}}\right)xb$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] (b*x^(1/2)+a*x)^(1/2)*(a^(1/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^
(1/2)+2*x^(1/2)*a+b)/a^(1/2))*x*b-a^(1/2)*ln(1/2*(2*(x^(1/2)*(b+x
^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*x*b+2*a*(x^(1/2)
*(b+x^(1/2)*a))^(1/2)*x-4*(b*x^(1/2)+a*x)^(3/2)+2*a*(b*x^(1/2)+a*
x)^(1/2)*x)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/x/b^2
```

Maxima [A] time = 1.45397, size = 23, normalized size = 0.92

$$-\frac{4\sqrt{a\sqrt{x}+b}}{bx^{\frac{1}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x),x, algorithm="maxima")
```

```
[Out] -4*sqrt(a*sqrt(x) + b)/(b*x^(1/4))
```

Fricas [A] time = 0.267641, size = 26, normalized size = 1.04

$$-\frac{4\sqrt{ax+b\sqrt{x}}}{b\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x),x, algorithm="fricas")
```

```
[Out] -4*sqrt(a*x + b*sqrt(x))/(b*sqrt(x))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(a*x + b*sqrt(x))), x)
```

GIAC/XCAS [A] time = 0.223669, size = 34, normalized size = 1.36

$$\frac{4}{\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x),x, algorithm="giac")
```

```
[Out] 4/(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))
```

3.107 $\int \frac{1}{x^2\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=84

$$-\frac{32a^2\sqrt{ax+b\sqrt{x}}}{15b^3\sqrt{x}}+\frac{16a\sqrt{ax+b\sqrt{x}}}{15b^2x}-\frac{4\sqrt{ax+b\sqrt{x}}}{5bx^{3/2}}$$

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(5*b*x^(3/2)) + (16*a*Sqrt[b*Sqrt[x] +
 a*x])/(15*b^2*x) - (32*a^2*Sqrt[b*Sqrt[x] + a*x])/(15*b^3*Sqrt[x
])
```

Rubi [A] time = 0.200318, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$-\frac{32a^2\sqrt{ax+b\sqrt{x}}}{15b^3\sqrt{x}}+\frac{16a\sqrt{ax+b\sqrt{x}}}{15b^2x}-\frac{4\sqrt{ax+b\sqrt{x}}}{5bx^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(5*b*x^(3/2)) + (16*a*Sqrt[b*Sqrt[x] +
 a*x])/(15*b^2*x) - (32*a^2*Sqrt[b*Sqrt[x] + a*x])/(15*b^3*Sqrt[x
])
```

Rubi in Sympy [A] time = 17.8377, size = 75, normalized size = 0.89

$$-\frac{32a^2\sqrt{ax+b\sqrt{x}}}{15b^3\sqrt{x}}+\frac{16a\sqrt{ax+b\sqrt{x}}}{15b^2x}-\frac{4\sqrt{ax+b\sqrt{x}}}{5bx^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] -32*a**2*sqrt(a*x + b*sqrt(x))/(15*b**3*sqrt(x)) + 16*a*sqrt(a*x
+ b*sqrt(x))/(15*b**2*x) - 4*sqrt(a*x + b*sqrt(x))/(5*b*x**(3/2))
```

Mathematica [A] time = 0.0350196, size = 48, normalized size = 0.57

$$-\frac{4\sqrt{ax+b\sqrt{x}}\left(8a^2x-4ab\sqrt{x}+3b^2\right)}{15b^3x^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x]*(3*b^2 - 4*a*b*Sqrt[x] + 8*a^2*x))/(15*
b^3*x^(3/2))
```

Maple [C] time = 0.015, size = 210, normalized size = 2.5

$$\frac{1}{15\,b^4}\sqrt{b\sqrt{x}+ax}\left(15\,a^{5/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)bx^{7/2}-15\,a^{5/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^2/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] 1/15*(b*x^(1/2)+a*x)^(1/2)*(15*a^(5/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^
(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b*x^(7/2)-15*a^(5/2)*ln(1/2
*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))
*b*x^(7/2)+30*a^3*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(7/2)-60*a^2*(b
*x^(1/2)+a*x)^(3/2)*x^(5/2)+30*a^3*(b*x^(1/2)+a*x)^(1/2)*x^(7/2)-
12*x^(3/2)*(b*x^(1/2)+a*x)^(3/2)*b^2+28*a*(b*x^(1/2)+a*x)^(3/2)*b
*x^2)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/b^4/x^(7/2)
```

Maxima [A] time = 6.68085, size = 70, normalized size = 0.83

$$-\frac{4\left(\frac{15\sqrt{a\sqrt{x}+b}a^2}{x^{\frac{1}{4}}}-\frac{10\left(a\sqrt{x}+b\right)^{\frac{3}{2}}a}{x^{\frac{3}{4}}}+\frac{3\left(a\sqrt{x}+b\right)^{\frac{5}{2}}}{x^{\frac{5}{4}}}\right)}{15\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(a*x + b*sqrt(x))*x^2),x, algorithm="maxima")
```

```
[Out] -4/15*(15*sqrt(a*sqrt(x) + b)*a^2/x^(1/4) - 10*(a*sqrt(x) + b)^(3
/2)*a/x^(3/4) + 3*(a*sqrt(x) + b)^(5/2)/x^(5/4))/b^3
```

Fricas [A] time = 0.266412, size = 57, normalized size = 0.68

$$\frac{4\left(4\,abx-\left(8\,a^2x+3\,b^2\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{15\,b^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(a*x + b*sqrt(x))*x^2),x, algorithm="fricas")
```

```
[Out] 4/15*(4*a*b*x - (8*a^2*x + 3*b^2)*sqrt(x))*sqrt(a*x + b*sqrt(x))/
(b^3*x^2)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^2\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x**2/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(a*x + b*sqrt(x))), x)
```

GIAC/XCAS [A] time = 0.226476, size = 113, normalized size = 1.35

$$\frac{4\left(20\,a\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^2+15\,\sqrt{a}b\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)+3\,b^2\right)}{15\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^2),x, algorithm="giac")
```

```
[Out] 4/15*(20*a*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^2 + 15*sqrt(
a)*b*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) + 3*b^2)/(sqrt(a)*
sqrt(x) - sqrt(a*x + b*sqrt(x)))^5
```

3.108 $\int \frac{1}{x^3\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=142

$$-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{315b^5\sqrt{x}}+\frac{256a^3\sqrt{ax+b\sqrt{x}}}{315b^4x}-\frac{64a^2\sqrt{ax+b\sqrt{x}}}{105b^3x^{3/2}}+\frac{32a\sqrt{ax+b\sqrt{x}}}{63b^2x^2}-\frac{4\sqrt{ax+b\sqrt{x}}}{9bx^{5/2}}$$

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(9*b*x^(5/2)) + (32*a*Sqrt[b*Sqrt[x] +
 a*x])/(63*b^2*x^2) - (64*a^2*Sqrt[b*Sqrt[x] + a*x])/(105*b^3*x^(
3/2)) + (256*a^3*Sqrt[b*Sqrt[x] + a*x])/(315*b^4*x) - (512*a^4*Sq
rt[b*Sqrt[x] + a*x])/(315*b^5*Sqrt[x])
```

Rubi [A] time = 0.348738, antiderivative size = 142, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$

$$-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{315b^5\sqrt{x}}+\frac{256a^3\sqrt{ax+b\sqrt{x}}}{315b^4x}-\frac{64a^2\sqrt{ax+b\sqrt{x}}}{105b^3x^{3/2}}+\frac{32a\sqrt{ax+b\sqrt{x}}}{63b^2x^2}-\frac{4\sqrt{ax+b\sqrt{x}}}{9bx^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(9*b*x^(5/2)) + (32*a*Sqrt[b*Sqrt[x] +
 a*x])/(63*b^2*x^2) - (64*a^2*Sqrt[b*Sqrt[x] + a*x])/(105*b^3*x^(
3/2)) + (256*a^3*Sqrt[b*Sqrt[x] + a*x])/(315*b^4*x) - (512*a^4*Sq
rt[b*Sqrt[x] + a*x])/(315*b^5*Sqrt[x])
```

Rubi in Sympy [A] time = 32.0236, size = 131, normalized size = 0.92

$$-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{315b^5\sqrt{x}}+\frac{256a^3\sqrt{ax+b\sqrt{x}}}{315b^4x}-\frac{64a^2\sqrt{ax+b\sqrt{x}}}{105b^3x^{\frac{3}{2}}}+\frac{32a\sqrt{ax+b\sqrt{x}}}{63b^2x^2}-\frac{4\sqrt{ax+b\sqrt{x}}}{9bx^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] -512*a**4*sqrt(a*x + b*sqrt(x))/(315*b**5*sqrt(x)) + 256*a**3*sqr
t(a*x + b*sqrt(x))/(315*b**4*x) - 64*a**2*sqrt(a*x + b*sqrt(x))/(
105*b**3*x**(3/2)) + 32*a*sqrt(a*x + b*sqrt(x))/(63*b**2*x**2) -
4*sqrt(a*x + b*sqrt(x))/(9*b*x**(5/2))
```

Mathematica [A] time = 0.0443692, size = 72, normalized size = 0.51

$$-\frac{4\sqrt{ax+b\sqrt{x}}\left(128a^4x^2-64a^3bx^{3/2}+48a^2b^2x-40ab^3\sqrt{x}+35b^4\right)}{315b^5x^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x]*(35*b^4 - 40*a*b^3*Sqrt[x] + 48*a^2*b^2
*x - 64*a^3*b*x^(3/2) + 128*a^4*x^2))/(315*b^5*x^(5/2))
```

Maple [C] time = 0.016, size = 254, normalized size = 1.8

$$\frac{1}{315\,b^6}\sqrt{b\sqrt{x}+ax}\left(315\,a^{9/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)bx^{11/2}-315\,a^{9/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\,(b+\sqrt{x}a)}\sqrt{a}+2\,\sqrt{x}a+}{\sqrt{a}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] 1/315*(b*x^(1/2)+a*x)^(1/2)*(315*a^(9/2)*ln(1/2*(2*(b*x^(1/2)+a*x
)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b*x^(11/2)-315*a^(9/2)*ln
(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1
/2))*b*x^(11/2)+630*a^5*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(11/2)-12
60*a^4*(b*x^(1/2)+a*x)^(3/2)*x^(9/2)+630*a^5*(b*x^(1/2)+a*x)^(1/2
)*x^(11/2)-492*(b*x^(1/2)+a*x)^(3/2)*x^(7/2)*a^2*b^2-140*(b*x^(1/
2)+a*x)^(3/2)*x^(5/2)*b^4+748*a^3*(b*x^(1/2)+a*x)^(3/2)*b*x^4+300
*(b*x^(1/2)+a*x)^(3/2)*x^3*a*b^3)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/b
^6/x^(11/2)
```

Maxima [A] time = 5.31708, size = 116, normalized size = 0.82

$$-\frac{4\left(\frac{315\,\sqrt{a\sqrt{x}+b}a^4}{x^{\frac{1}{4}}}-\frac{420\,(a\sqrt{x}+b)^{\frac{3}{2}}a^3}{x^{\frac{3}{4}}}+\frac{378\,(a\sqrt{x}+b)^{\frac{5}{2}}a^2}{x^{\frac{5}{4}}}-\frac{180\,(a\sqrt{x}+b)^{\frac{7}{2}}a}{x^{\frac{7}{4}}}+\frac{35\,(a\sqrt{x}+b)^{\frac{9}{2}}}{x^{\frac{9}{4}}}\right)}{315\,b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^3),x, algorithm="maxima")
```

```
[Out] -4/315*(315*sqrt(a*sqrt(x) + b)*a^4/x^(1/4) - 420*(a*sqrt(x) + b)
^(3/2)*a^3/x^(3/4) + 378*(a*sqrt(x) + b)^(5/2)*a^2/x^(5/4) - 180*
(a*sqrt(x) + b)^(7/2)*a/x^(7/4) + 35*(a*sqrt(x) + b)^(9/2)/x^(9/4
))/b^5
```

Fricas [A] time = 0.269194, size = 86, normalized size = 0.61

$$\frac{4\,\left(64\,a^3bx^2+40\,ab^3x-\left(128\,a^4x^2+48\,a^2b^2x+35\,b^4\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{315\,b^5x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^3),x, algorithm="fricas")
```

```
[Out] 4/315*(64*a^3*b*x^2 + 40*a*b^3*x - (128*a^4*x^2 + 48*a^2*b^2*x +
35*b^4)*sqrt(x))*sqrt(a*x + b*sqrt(x))/(b^5*x^3)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^3\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(a*x + b*sqrt(x))), x)
```

GIAC/XCAS [A] time = 0.226749, size = 197, normalized size = 1.39

$$\frac{4\left(1008\,a^2\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^4+1680\,a^{\frac{3}{2}}b\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^3+1080\,ab^2\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^2+315\,\sqrt{a}b^3\left(\sqrt{a}\sqrt{\right.\right.}{315\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^3),x, algorithm="giac")
```

```
[Out] 4/315*(1008*a^2*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^4 + 168
0*a^(3/2)*b*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^3 + 1080*a*
b^2*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^2 + 315*sqrt(a)*b^3
*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) + 35*b^4)/(sqrt(a)*sqr
t(x) - sqrt(a*x + b*sqrt(x)))^9
```

3.109 $\int \frac{1}{x^4\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=200

$$-\frac{4096a^6\sqrt{ax+b\sqrt{x}}}{3003b^7\sqrt{x}}+\frac{2048a^5\sqrt{ax+b\sqrt{x}}}{3003b^6x}-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{1001b^5x^{3/2}}+\frac{1280a^3\sqrt{ax+b\sqrt{x}}}{3003b^4x^2}-\frac{160a^2\sqrt{ax+b\sqrt{x}}}{429b^3x^{5/2}}+\frac{48a\sqrt{ax+b\sqrt{x}}}{143b^2x^3}-\frac{4\sqrt{ax+b\sqrt{x}}}{13bx^{7/2}}$$

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(13*b*x^(7/2)) + (48*a*Sqrt[b*Sqrt[x]
+ a*x])/(143*b^2*x^3) - (160*a^2*Sqrt[b*Sqrt[x] + a*x])/(429*b^3*
x^(5/2)) + (1280*a^3*Sqrt[b*Sqrt[x] + a*x])/(3003*b^4*x^2) - (512
*a^4*Sqrt[b*Sqrt[x] + a*x])/(1001*b^5*x^(3/2)) + (2048*a^5*Sqrt[b
*Sqrt[x] + a*x])/(3003*b^6*x) - (4096*a^6*Sqrt[b*Sqrt[x] + a*x])/
(3003*b^7*Sqrt[x])
```

Rubi [A] time = 0.51757, antiderivative size = 200, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$-\frac{4096a^6\sqrt{ax+b\sqrt{x}}}{3003b^7\sqrt{x}}+\frac{2048a^5\sqrt{ax+b\sqrt{x}}}{3003b^6x}-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{1001b^5x^{3/2}}+\frac{1280a^3\sqrt{ax+b\sqrt{x}}}{3003b^4x^2}-\frac{160a^2\sqrt{ax+b\sqrt{x}}}{429b^3x^{5/2}}+\frac{48a\sqrt{ax+b\sqrt{x}}}{143b^2x^3}-\frac{4\sqrt{ax+b\sqrt{x}}}{13bx^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(13*b*x^(7/2)) + (48*a*Sqrt[b*Sqrt[x]
+ a*x])/(143*b^2*x^3) - (160*a^2*Sqrt[b*Sqrt[x] + a*x])/(429*b^3*
x^(5/2)) + (1280*a^3*Sqrt[b*Sqrt[x] + a*x])/(3003*b^4*x^2) - (512
*a^4*Sqrt[b*Sqrt[x] + a*x])/(1001*b^5*x^(3/2)) + (2048*a^5*Sqrt[b
*Sqrt[x] + a*x])/(3003*b^6*x) - (4096*a^6*Sqrt[b*Sqrt[x] + a*x])/
(3003*b^7*Sqrt[x])
```

Rubi in Sympy [A] time = 49.3499, size = 187, normalized size = 0.94

$$-\frac{4096a^6\sqrt{ax+b\sqrt{x}}}{3003b^7\sqrt{x}}+\frac{2048a^5\sqrt{ax+b\sqrt{x}}}{3003b^6x}-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{1001b^5x^{\frac{3}{2}}}+\frac{1280a^3\sqrt{ax+b\sqrt{x}}}{3003b^4x^2}-\frac{160a^2\sqrt{ax+b\sqrt{x}}}{429b^3x^{\frac{5}{2}}}+\frac{48a\sqrt{ax+b\sqrt{x}}}{143b^2x^3}-\frac{4\sqrt{ax+b\sqrt{x}}}{13bx^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] -4096*a**6*sqrt(a*x + b*sqrt(x))/(3003*b**7*sqrt(x)) + 2048*a**5*
sqrt(a*x + b*sqrt(x))/(3003*b**6*x) - 512*a**4*sqrt(a*x + b*sqrt(
x))/(1001*b**5*x**(3/2)) + 1280*a**3*sqrt(a*x + b*sqrt(x))/(3003*
b**4*x**2) - 160*a**2*sqrt(a*x + b*sqrt(x))/(429*b**3*x**(5/2)) +
 48*a*sqrt(a*x + b*sqrt(x))/(143*b**2*x**3) - 4*sqrt(a*x + b*sqrt
(x))/(13*b*x**(7/2))
```

Mathematica [A] time = 0.0538285, size = 96, normalized size = 0.48

$$-\frac{4\sqrt{ax+b\sqrt{x}}\left(1024a^6x^3-512a^5bx^{5/2}+384a^4b^2x^2-320a^3b^3x^{3/2}+280a^2b^4x-252ab^5\sqrt{x}+231b^6\right)}{3003b^7x^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^4*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x]*(231*b^6 - 252*a*b^5*Sqrt[x] + 280*a^2*
b^4*x - 320*a^3*b^3*x^(3/2) + 384*a^4*b^2*x^2 - 512*a^5*b*x^(5/2)
 + 1024*a^6*x^3))/(3003*b^7*x^(7/2))
```

Maple [C] time = 0.02, size = 298, normalized size = 1.5

$$\frac{1}{3003\,b^8}\sqrt{b\sqrt{x}+ax}\left(3003\,a^{13/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)bx^{15/2}-3003\,a^{13/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\,\cdots}{\sqrt{a}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] 1/3003*(b*x^(1/2)+a*x)^(1/2)*(3003*a^(13/2)*ln(1/2*(2*(b*x^(1/2)+
a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b*x^(15/2)-3003*a^(13/
2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)
/a^(1/2))*b*x^(15/2)+6006*a^7*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(15
/2)-12012*a^6*(b*x^(1/2)+a*x)^(3/2)*x^(13/2)+6006*a^7*(b*x^(1/2)+
a*x)^(1/2)*x^(15/2)-5868*(b*x^(1/2)+a*x)^(3/2)*x^(11/2)*a^4*b^2-3
052*(b*x^(1/2)+a*x)^(3/2)*x^(9/2)*a^2*b^4+7916*a^5*(b*x^(1/2)+a*x
)^(3/2)*b*x^6-924*(b*x^(1/2)+a*x)^(3/2)*x^(7/2)*b^6+4332*(b*x^(1/
2)+a*x)^(3/2)*x^5*a^3*b^3+1932*(b*x^(1/2)+a*x)^(3/2)*x^4*a*b^5)/(
x^(1/2)*(b+x^(1/2)*a))^(1/2)/b^8/x^(15/2)
```

Maxima [A] time = 1.45266, size = 162, normalized size = 0.81

$$-\frac{4\left(\frac{3003\,\sqrt{a\sqrt{x}+b}a^6}{x^{\frac{1}{4}}}-\frac{6006\,\left(a\sqrt{x}+b\right)^{\frac{3}{2}}a^5}{x^{\frac{3}{4}}}+\frac{9009\,\left(a\sqrt{x}+b\right)^{\frac{5}{2}}a^4}{x^{\frac{5}{4}}}-\frac{8580\,\left(a\sqrt{x}+b\right)^{\frac{7}{2}}a^3}{x^{\frac{7}{4}}}+\frac{5005\,\left(a\sqrt{x}+b\right)^{\frac{9}{2}}a^2}{x^{\frac{9}{4}}}-\frac{1638\,\left(a\sqrt{x}+b\right)^{\frac{11}{2}}a}{x^{\frac{11}{4}}}+\frac{231\,\left(a\sqrt{x}+b\right)^{\frac{13}{2}}}{x^{\frac{13}{4}}}\right)}{3003\,b^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^4),x, algorithm="maxima")
```

```
[Out] -4/3003*(3003*sqrt(a*sqrt(x) + b)*a^6/x^(1/4) - 6006*(a*sqrt(x) +
 b)^(3/2)*a^5/x^(3/4) + 9009*(a*sqrt(x) + b)^(5/2)*a^4/x^(5/4) -
8580*(a*sqrt(x) + b)^(7/2)*a^3/x^(7/4) + 5005*(a*sqrt(x) + b)^(9/
2)*a^2/x^(9/4) - 1638*(a*sqrt(x) + b)^(11/2)*a/x^(11/4) + 231*(a*
sqrt(x) + b)^(13/2)/x^(13/4))/b^7
```

Fricas [A] time = 0.276484, size = 116, normalized size = 0.58

$$\frac{4\left(512\,a^5bx^3+320\,a^3b^3x^2+252\,ab^5x-\left(1024\,a^6x^3+384\,a^4b^2x^2+280\,a^2b^4x+231\,b^6\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{3003\,b^7x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^4),x, algorithm="fricas")
```

```
[Out] 4/3003*(512*a^5*b*x^3 + 320*a^3*b^3*x^2 + 252*a*b^5*x - (1024*a^6
*x^3 + 384*a^4*b^2*x^2 + 280*a^2*b^4*x + 231*b^6)*sqrt(x))*sqrt(a
*x + b*sqrt(x))/(b^7*x^4)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^4\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**4*sqrt(a*x + b*sqrt(x))), x)
```

GIAC/XCAS [A] time = 0.227653, size = 281, normalized size = 1.4

$$\frac{4\left(27456\,a^{3}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^{6}+72072\,a^{\frac{5}{2}}b\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^{5}+80080\,a^{2}b^{2}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^{4}+48048\,a^{\frac{3}{2}}b^{3}\cdots}{3003\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\cdots}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^4),x, algorithm="giac")
```

```
[Out] 4/3003*(27456*a^3*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^6 + 7
2072*a^(5/2)*b*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^5 + 8008
0*a^2*b^2*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^4 + 48048*a^(
3/2)*b^3*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^3 + 16380*a*b^
4*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^2 + 3003*sqrt(a)*b^5*
(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) + 231*b^6)/(sqrt(a)*sqr
t(x) - sqrt(a*x + b*sqrt(x)))^13
```

3.110 $\int \frac{x^3}{\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=197

$$-\frac{693b^5\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{64a^{13/2}}+\frac{693b^4\sqrt{ax+b\sqrt{x}}}{64a^6}-\frac{231b^3\sqrt{x}\sqrt{ax+b\sqrt{x}}}{32a^5}+\frac{231b^2x\sqrt{ax+b\sqrt{x}}}{40a^4}-\frac{99bx^{3/2}\sqrt{ax+b\sqrt{x}}}{20a^3}+\frac{22x^2\sqrt{ax+b\sqrt{x}}}{5a^2}-\frac{4x^3}{a\sqrt{ax+b\sqrt{x}}}$$

```
[Out] (-4*x^3)/(a*Sqrt[b*Sqrt[x] + a*x]) + (693*b^4*Sqrt[b*Sqrt[x] + a*
x])/(64*a^6) - (231*b^3*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x])/(32*a^5) +
 (231*b^2*x*Sqrt[b*Sqrt[x] + a*x])/(40*a^4) - (99*b*x^(3/2)*Sqrt[
b*Sqrt[x] + a*x])/(20*a^3) + (22*x^2*Sqrt[b*Sqrt[x] + a*x])/(5*a^
2) - (693*b^5*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/(
64*a^(13/2))
```

Rubi [A] time = 0.392294, antiderivative size = 197, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.316

$$-\frac{693b^5\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{64a^{13/2}}+\frac{693b^4\sqrt{ax+b\sqrt{x}}}{64a^6}-\frac{231b^3\sqrt{x}\sqrt{ax+b\sqrt{x}}}{32a^5}+\frac{231b^2x\sqrt{ax+b\sqrt{x}}}{40a^4}-\frac{99bx^{3/2}\sqrt{ax+b\sqrt{x}}}{20a^3}+\frac{22x^2\sqrt{ax+b\sqrt{x}}}{5a^2}-\frac{4x^3}{a\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (-4*x^3)/(a*Sqrt[b*Sqrt[x] + a*x]) + (693*b^4*Sqrt[b*Sqrt[x] + a*
x])/(64*a^6) - (231*b^3*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x])/(32*a^5) +
 (231*b^2*x*Sqrt[b*Sqrt[x] + a*x])/(40*a^4) - (99*b*x^(3/2)*Sqrt[
b*Sqrt[x] + a*x])/(20*a^3) + (22*x^2*Sqrt[b*Sqrt[x] + a*x])/(5*a^
2) - (693*b^5*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/(
64*a^(13/2))
```

Rubi in Sympy [A] time = 40.7722, size = 185, normalized size = 0.94

$$-\frac{4x^3}{a\sqrt{ax+b\sqrt{x}}}+\frac{22x^2\sqrt{ax+b\sqrt{x}}}{5a^2}-\frac{99bx^{\frac{3}{2}}\sqrt{ax+b\sqrt{x}}}{20a^3}+\frac{231b^2x\sqrt{ax+b\sqrt{x}}}{40a^4}-\frac{231b^3\sqrt{x}\sqrt{ax+b\sqrt{x}}}{32a^5}+\frac{693b^4\sqrt{ax+b\sqrt{x}}}{64a^6}-\frac{693b^5\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{64a^{\frac{13}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -4*x**3/(a*sqrt(a*x + b*sqrt(x))) + 22*x**2*sqrt(a*x + b*sqrt(x))
/(5*a**2) - 99*b*x**(3/2)*sqrt(a*x + b*sqrt(x))/(20*a**3) + 231*b
**2*x*sqrt(a*x + b*sqrt(x))/(40*a**4) - 231*b**3*sqrt(x)*sqrt(a*x
 + b*sqrt(x))/(32*a**5) + 693*b**4*sqrt(a*x + b*sqrt(x))/(64*a**6
) - 693*b**5*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*sqrt(x)))/(64*a**
(13/2))
```

Mathematica [A] time = 0.220319, size = 137, normalized size = 0.7

$$\frac{\sqrt{ax+b\sqrt{x}}\left(128a^5x^{5/2}-176a^4bx^2+264a^3b^2x^{3/2}-462a^2b^3x+1155ab^4\sqrt{x}+3465b^5\right)}{320a^6\left(a\sqrt{x}+b\right)}-\frac{693b^5\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{128a^{13/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (Sqrt[b*Sqrt[x] + a*x]*(3465*b^5 + 1155*a*b^4*Sqrt[x] - 462*a^2*b
^3*x + 264*a^3*b^2*x^(3/2) - 176*a^4*b*x^2 + 128*a^5*x^(5/2)))/(3
20*a^6*(b + a*Sqrt[x])) - (693*b^5*Log[b + 2*a*Sqrt[x] + 2*Sqrt[a
]*Sqrt[b*Sqrt[x] + a*x]])/(128*a^(13/2))
```

Maple [B] time = 0.016, size = 553, normalized size = 2.8

$$-\frac{1}{640}\sqrt{b\sqrt{x}+ax}\left(352\left(b\sqrt{x}+ax\right)^{3/2}x^{3/2}a^{21/2}b-256\left(b\sqrt{x}+ax\right)^{3/2}x^2a^{23/2}-528\left(b\sqrt{x}+ax\right)^{3/2}xa^{19/2}b^2+4060\sqrt{b\sqrt{x}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] -1/640*(b*x^(1/2)+a*x)^(1/2)/a^(25/2)*(352*(b*x^(1/2)+a*x)^(3/2)*
x^(3/2)*a^(21/2)*b-256*(b*x^(1/2)+a*x)^(3/2)*x^2*a^(23/2)-528*(b*
x^(1/2)+a*x)^(3/2)*x*a^(19/2)*b^2+4060*(b*x^(1/2)+a*x)^(1/2)*x^(3
/2)*a^(19/2)*b^3-8960*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x*a^(17/2)*b^
4-3136*(b*x^(1/2)+a*x)^(3/2)*x^(1/2)*a^(17/2)*b^3+10150*(b*x^(1/2
)+a*x)^(1/2)*x*a^(17/2)*b^4+2560*b^4*a^(15/2)*(x^(1/2)*(b+x^(1/2)
*a))^(3/2)-17920*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(1/2)*a^(15/2)*b
^5-2000*(b*x^(1/2)+a*x)^(3/2)*a^(15/2)*b^4+8120*(b*x^(1/2)+a*x)^(
1/2)*x^(1/2)*a^(15/2)*b^5-8960*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1
3/2)*b^6+2030*(b*x^(1/2)+a*x)^(1/2)*a^(13/2)*b^6-1015*x*ln(1/2*(2
*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^8*b^5+44
80*x*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+
b)/a^(1/2))*a^8*b^5-2030*x^(1/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*
a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^7*b^6+8960*x^(1/2)*ln(1/2*(2*(x
^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^7*b
^6-1015*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^
(1/2))*a^6*b^7+4480*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/
2)+2*x^(1/2)*a+b)/a^(1/2))*a^6*b^7)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)
/(b+x^(1/2)*a)^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^3}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(a*x + b*sqrt(x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^3/(a*x + b*sqrt(x))^(3/2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(a*x + b*sqrt(x))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(x**3/(a*x + b*sqrt(x))**(3/2), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(a*x + b*sqrt(x))^(3/2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.111 $\int \frac{x^2}{\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=139

$$-\frac{35b^3\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{4a^{9/2}}+\frac{35b^2\sqrt{ax+b\sqrt{x}}}{4a^4}-\frac{35b\sqrt{x}\sqrt{ax+b\sqrt{x}}}{6a^3}+\frac{14x\sqrt{ax+b\sqrt{x}}}{3a^2}-\frac{4x^2}{a\sqrt{ax+b\sqrt{x}}}$$

```
[Out] (-4*x^2)/(a*Sqrt[b*Sqrt[x] + a*x]) + (35*b^2*Sqrt[b*Sqrt[x] + a*x
])/(4*a^4) - (35*b*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x])/(6*a^3) + (14*x
*Sqrt[b*Sqrt[x] + a*x])/(3*a^2) - (35*b^3*ArcTanh[(Sqrt[a]*Sqrt[x
])/Sqrt[b*Sqrt[x] + a*x]])/(4*a^(9/2))
```

Rubi [A] time = 0.269441, antiderivative size = 139, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.316

$$-\frac{35b^3\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{4a^{9/2}}+\frac{35b^2\sqrt{ax+b\sqrt{x}}}{4a^4}-\frac{35b\sqrt{x}\sqrt{ax+b\sqrt{x}}}{6a^3}+\frac{14x\sqrt{ax+b\sqrt{x}}}{3a^2}-\frac{4x^2}{a\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (-4*x^2)/(a*Sqrt[b*Sqrt[x] + a*x]) + (35*b^2*Sqrt[b*Sqrt[x] + a*x
])/(4*a^4) - (35*b*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x])/(6*a^3) + (14*x
*Sqrt[b*Sqrt[x] + a*x])/(3*a^2) - (35*b^3*ArcTanh[(Sqrt[a]*Sqrt[x
])/Sqrt[b*Sqrt[x] + a*x]])/(4*a^(9/2))
```

Rubi in Sympy [A] time = 26.9052, size = 129, normalized size = 0.93

$$-\frac{4x^2}{a\sqrt{ax+b\sqrt{x}}}+\frac{14x\sqrt{ax+b\sqrt{x}}}{3a^2}-\frac{35b\sqrt{x}\sqrt{ax+b\sqrt{x}}}{6a^3}+\frac{35b^2\sqrt{ax+b\sqrt{x}}}{4a^4}-\frac{35b^3\,\mathrm{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{4a^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -4*x**2/(a*sqrt(a*x + b*sqrt(x))) + 14*x*sqrt(a*x + b*sqrt(x))/(3
*a**2) - 35*b*sqrt(x)*sqrt(a*x + b*sqrt(x))/(6*a**3) + 35*b**2*sq
rt(a*x + b*sqrt(x))/(4*a**4) - 35*b**3*atanh(sqrt(a)*sqrt(x)/sqrt
(a*x + b*sqrt(x)))/(4*a**(9/2))
```

Mathematica [A] time = 0.158524, size = 113, normalized size = 0.81

$$\frac{\sqrt{ax+b\sqrt{x}}\left(8a^3x^{3/2}-14a^2bx+35ab^2\sqrt{x}+105b^3\right)}{12a^4\left(a\sqrt{x}+b\right)}-\frac{35b^3\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{8a^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (Sqrt[b*Sqrt[x] + a*x]*(105*b^3 + 35*a*b^2*Sqrt[x] - 14*a^2*b*x +
 8*a^3*x^(3/2)))/(12*a^4*(b + a*Sqrt[x])) - (35*b^3*Log[b + 2*a*S
```

```
qrt[x] + 2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]])/(8*a^(9/2))
```

Maple [B] time = 0.013, size = 507, normalized size = 3.7

$$-\frac{1}{24}\sqrt{b\sqrt{x}+ax}\left(-16\,\left(b\sqrt{x}+ax\right)^{3/2}xa^{15/2}+60\,\sqrt{b\sqrt{x}+ax}x^{3/2}a^{15/2}b-240\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}xa^{13/2}b^{2}-32\,\left(b\sqrt{x}+ax\right)^{3/2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] -1/24*(b*x^(1/2)+a*x)^(1/2)/a^(17/2)*(-16*(b*x^(1/2)+a*x)^(3/2)*x
*a^(15/2)+60*(b*x^(1/2)+a*x)^(1/2)*x^(3/2)*a^(15/2)*b-240*(x^(1/2
)*(b+x^(1/2)*a))^(1/2)*x*a^(13/2)*b^2-32*(b*x^(1/2)+a*x)^(3/2)*x^
(1/2)*a^(13/2)*b+150*(b*x^(1/2)+a*x)^(1/2)*x*a^(13/2)*b^2+96*b^2*
a^(11/2)*(x^(1/2)*(b+x^(1/2)*a))^(3/2)-480*(x^(1/2)*(b+x^(1/2)*a)
)^(1/2)*x^(1/2)*a^(11/2)*b^3-16*(b*x^(1/2)+a*x)^(3/2)*a^(11/2)*b^
2+120*(b*x^(1/2)+a*x)^(1/2)*x^(1/2)*a^(11/2)*b^3-240*(x^(1/2)*(b+
x^(1/2)*a))^(1/2)*a^(9/2)*b^4+30*(b*x^(1/2)+a*x)^(1/2)*a^(9/2)*b^
4-15*x*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(
1/2))*a^6*b^3+120*x*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/
2)+2*x^(1/2)*a+b)/a^(1/2))*a^6*b^3-30*x^(1/2)*ln(1/2*(2*(b*x^(1/2
)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^5*b^4+240*x^(1/2)*
ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^
(1/2))*a^5*b^4-15*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/
2)*a+b)/a^(1/2))*a^4*b^5+120*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1
/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^4*b^5)/(x^(1/2)*(b+x^(1/2)*
a))^(1/2)/(b+x^(1/2)*a)^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^2}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(a*x + b*sqrt(x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/(a*x + b*sqrt(x))^(3/2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(a*x + b*sqrt(x))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^2}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(x**2/(a*x + b*sqrt(x))**(3/2), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(a*x + b*sqrt(x))^(3/2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.112 $\int \frac{x}{\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=77

$$-\frac{6b\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{5/2}}+\frac{6\sqrt{ax+b\sqrt{x}}}{a^2}-\frac{4x}{a\sqrt{ax+b\sqrt{x}}}$$

```
[Out] (-4*x)/(a*Sqrt[b*Sqrt[x] + a*x]) + (6*Sqrt[b*Sqrt[x] + a*x])/a^2
- (6*b*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/a^(5/2)
```

Rubi [A] time = 0.145861, antiderivative size = 77, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.294$

$$-\frac{6b\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{5/2}}+\frac{6\sqrt{ax+b\sqrt{x}}}{a^2}-\frac{4x}{a\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (-4*x)/(a*Sqrt[b*Sqrt[x] + a*x]) + (6*Sqrt[b*Sqrt[x] + a*x])/a^2
- (6*b*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/a^(5/2)
```

Rubi in Sympy [A] time = 14.6532, size = 70, normalized size = 0.91

$$-\frac{4x}{a\sqrt{ax+b\sqrt{x}}}+\frac{6\sqrt{ax+b\sqrt{x}}}{a^2}-\frac{6b\,\mathrm{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -4*x/(a*sqrt(a*x + b*sqrt(x))) + 6*sqrt(a*x + b*sqrt(x))/a**2 - 6
*b*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*sqrt(x)))/a**(5/2)
```

Mathematica [A] time = 0.10963, size = 84, normalized size = 1.09

$$\frac{2\left(a\sqrt{x}+3b\right)\sqrt{ax+b\sqrt{x}}}{a^2\left(a\sqrt{x}+b\right)}-\frac{3b\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{a^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (2*(3*b + a*Sqrt[x])*Sqrt[b*Sqrt[x] + a*x])/(a^2*(b + a*Sqrt[x]))
 - (3*b*Log[b + 2*a*Sqrt[x] + 2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]])/a
^(5/2)
```

Maple [B] time = 0.011, size = 242, normalized size = 3.1

$$-1\sqrt{b\sqrt{x}+ax}\left(-6\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}xa^{9/2}+4a^{7/2}\left(\sqrt{x}\left(b+\sqrt{x}a\right)\right)^{3/2}-12\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{x}a^{7/2}b+3\ln\left(1/2\frac{2\sqrt{\sqrt{x}\left(b+\right.}}{}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] -(b*x^(1/2)+a*x)^(1/2)/a^(9/2)*(-6*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*
x*a^(9/2)+4*a^(7/2)*(x^(1/2)*(b+x^(1/2)*a))^(3/2)-12*(x^(1/2)*(b+
x^(1/2)*a))^(1/2)*x^(1/2)*a^(7/2)*b+3*ln(1/2*(2*(x^(1/2)*(b+x^(1/
2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*x*a^4*b-6*(x^(1/2)*(
b+x^(1/2)*a))^(1/2)*a^(5/2)*b^2+6*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a
))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*x^(1/2)*a^3*b^2+3*ln(1/2
*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))
*a^2*b^3)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/(b+x^(1/2)*a)^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(a*x + b*sqrt(x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x/(a*x + b*sqrt(x))^(3/2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(a*x + b*sqrt(x))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(x/(a*x + b*sqrt(x))**(3/2), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(a*x + b*sqrt(x))^(3/2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.113 $\int \frac{1}{\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=25

$$\frac{4\sqrt{x}}{b\sqrt{ax+b\sqrt{x}}}$$

```
[Out] (4*Sqrt[x])/(b*Sqrt[b*Sqrt[x] + a*x])
```

Rubi [A] time = 0.0144188, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067

$$\frac{4\sqrt{x}}{b\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*Sqrt[x] + a*x)^(-3/2),x]

[Out] (4*Sqrt[x])/(b*Sqrt[b*Sqrt[x] + a*x])
```

Rubi in Sympy [A] time = 1.36247, size = 20, normalized size = 0.8

$$\frac{4\sqrt{x}}{b\sqrt{ax+b\sqrt{x}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**(1/2)+a*x)**(3/2),x)

[Out] 4*sqrt(x)/(b*sqrt(a*x + b*sqrt(x)))
```

Mathematica [A] time = 0.0214933, size = 31, normalized size = 1.24

$$\frac{4\sqrt{ax+b\sqrt{x}}}{b\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*Sqrt[x] + a*x)^(-3/2),x]

[Out] (4*Sqrt[b*Sqrt[x] + a*x])/(b*(b + a*Sqrt[x]))
```

Maple [C] time = 0.014, size = 405, normalized size = 16.2

$$-\frac{1}{b^2}\sqrt{b\sqrt{x}+ax}\left(-2\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}xa^{5/2}-2x\sqrt{b\sqrt{x}+ax}a^{5/2}-x\ln\left(\frac{1}{2}\left(2\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\sqrt{x}a+b\right)\frac{1}{\sqrt{a}}\right)a^2b+x\ln\left(\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] -(b*x^(1/2)+a*x)^(1/2)*(-2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x*a^(5/2
)-2*x*(b*x^(1/2)+a*x)^(1/2)*a^(5/2)-x*ln(1/2*(2*(b*x^(1/2)+a*x)^(
1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^2*b+x*ln(1/2*(2*(x^(1/2)*(
b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^2*b+4*a^(3/
2)*(x^(1/2)*(b+x^(1/2)*a))^(3/2)-4*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*
x^(1/2)*a^(3/2)*b-4*x^(1/2)*(b*x^(1/2)+a*x)^(1/2)*a^(3/2)*b-2*x^(
1/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/
2))*a*b^2+2*x^(1/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/
2)+2*x^(1/2)*a+b)/a^(1/2))*a*b^2-2*a^(1/2)*b^2*(x^(1/2)*(b+x^(1/2
)*a))^(1/2)-2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)*b^2-ln(1/2*(2*(b*x^(1
/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b^3+ln(1/2*(2*(x^(
1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b^3)/(x
^(1/2)*(b+x^(1/2)*a))^(1/2)/b^2/a^(1/2)/(b+x^(1/2)*a)^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*sqrt(x))^(-3/2),x, algorithm="maxima")
```

```
[Out] integrate((a*x + b*sqrt(x))^(-3/2), x)
```

Fricas [A] time = 0.251863, size = 49, normalized size = 1.96

$$\frac{4\sqrt{ax + b\sqrt{x}}\left(a\sqrt{x} - b\right)}{a^2bx - b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*sqrt(x))^(-3/2),x, algorithm="fricas")
```

```
[Out] 4*sqrt(a*x + b*sqrt(x))*(a*sqrt(x) - b)/(a^2*b*x - b^3)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral((a*x + b*sqrt(x))**(-3/2), x)
```

GIAC/XCAS [A] time = 0.221967, size = 46, normalized size = 1.84

$$\frac{4}{\left(\sqrt{a}\left(\sqrt{a}\sqrt{x} - \sqrt{ax + b\sqrt{x}}\right) + b\right)\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*sqrt(x))^(-3/2),x, algorithm="giac")
```

```
[Out] 4/((sqrt(a)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) + b)*sqrt(a
))
```

3.114 $\int \frac{1}{x\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=79

$$\frac{32a\sqrt{ax+b\sqrt{x}}}{3b^3\sqrt{x}}-\frac{16\sqrt{ax+b\sqrt{x}}}{3b^2x}+\frac{4}{b\sqrt{x}\sqrt{ax+b\sqrt{x}}}$$

```
[Out] 4/(b*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x]) - (16*Sqrt[b*Sqrt[x] + a*x])/
(3*b^2*x) + (32*a*Sqrt[b*Sqrt[x] + a*x])/(3*b^3*Sqrt[x])
```

Rubi [A] time = 0.199243, antiderivative size = 79, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{32a\sqrt{ax+b\sqrt{x}}}{3b^3\sqrt{x}}-\frac{16\sqrt{ax+b\sqrt{x}}}{3b^2x}+\frac{4}{b\sqrt{x}\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] 4/(b*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x]) - (16*Sqrt[b*Sqrt[x] + a*x])/
(3*b^2*x) + (32*a*Sqrt[b*Sqrt[x] + a*x])/(3*b^3*Sqrt[x])
```

Rubi in Sympy [A] time = 18.3145, size = 70, normalized size = 0.89

$$\frac{32a\sqrt{ax+b\sqrt{x}}}{3b^3\sqrt{x}}+\frac{4}{b\sqrt{x}\sqrt{ax+b\sqrt{x}}}-\frac{16\sqrt{ax+b\sqrt{x}}}{3b^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] 32*a*sqrt(a*x + b*sqrt(x))/(3*b**3*sqrt(x)) + 4/(b*sqrt(x)*sqrt(a
*x + b*sqrt(x))) - 16*sqrt(a*x + b*sqrt(x))/(3*b**2*x)
```

Mathematica [A] time = 0.0431302, size = 57, normalized size = 0.72

$$\frac{4\sqrt{ax+b\sqrt{x}}\left(8a^2x+4ab\sqrt{x}-b^2\right)}{3b^3x\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] (4*Sqrt[b*Sqrt[x] + a*x]*(-b^2 + 4*a*b*Sqrt[x] + 8*a^2*x))/(3*b^3
*(b + a*Sqrt[x])*x)
```

Maple [C] time = 0.018, size = 516, normalized size = 6.5

$$-\frac{1}{3\,b^4}\sqrt{b\sqrt{x}+ax}\left(-3\,x^{7/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)a^{7/2}b+3\,x^{7/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)a\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] -1/3*(b*x^(1/2)+a*x)^(1/2)*(-3*x^(7/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1
/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(7/2)*b+3*x^(7/2)
*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*
a^(7/2)*b-6*x^3*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2
*x^(1/2)*a+b)/a^(1/2))*a^(5/2)*b^2+6*x^3*ln(1/2*(2*(b*x^(1/2)+a*x
)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(5/2)*b^2+6*(x^(1/2)*(b
+x^(1/2)*a))^(1/2)*x^(7/2)*a^4-24*x^(5/2)*(b*x^(1/2)+a*x)^(3/2)*a
^3+6*x^(7/2)*(b*x^(1/2)+a*x)^(1/2)*a^4-3*x^(5/2)*ln(1/2*(2*(x^(1/
2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(3/2)*b
^3+3*x^(5/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+
b)/a^(1/2))*a^(3/2)*b^3+12*a^3*(x^(1/2)*(b+x^(1/2)*a))^(3/2)*x^(5
/2)+12*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^3*a^3*b-44*x^2*(b*x^(1/2)+
a*x)^(3/2)*a^2*b+12*x^3*(b*x^(1/2)+a*x)^(1/2)*a^3*b+6*(x^(1/2)*(b
+x^(1/2)*a))^(1/2)*x^(5/2)*a^2*b^2-16*x^(3/2)*(b*x^(1/2)+a*x)^(3/
2)*a*b^2+6*x^(5/2)*(b*x^(1/2)+a*x)^(1/2)*a^2*b^2+4*(b*x^(1/2)+a*x
)^(3/2)*x*b^3)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/b^4/x^(5/2)/(b+x^(1/
2)*a)^2
```

Maxima [A] time = 1.49068, size = 49, normalized size = 0.62

$$\frac{4\left(8\,a^2x+4\,ab\sqrt{x}-b^2\right)}{3\,\sqrt{a\sqrt{x}+b}b^3x^{\frac{3}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((a*x + b*sqrt(x))^(3/2)*x),x, algorithm="maxima")
```

```
[Out] 4/3*(8*a^2*x + 4*a*b*sqrt(x) - b^2)/(sqrt(a*sqrt(x) + b)*b^3*x^(3
/4))
```

Fricas [A] time = 0.255438, size = 85, normalized size = 1.08

$$-\frac{4\left(4\,a^2bx-b^3-\left(8\,a^3x-5\,ab^2\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{3\left(a^2b^3x^2-b^5x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((a*x + b*sqrt(x))^(3/2)*x),x, algorithm="fricas")
```

```
[Out] -4/3*(4*a^2*b*x - b^3 - (8*a^3*x - 5*a*b^2)*sqrt(x))*sqrt(a*x + b
*sqrt(x))/(a^2*b^3*x^2 - b^5*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x*(a*x + b*sqrt(x))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}} x} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x),x, algorithm="giac")

[Out] integrate(1/((a*x + b*sqrt(x))^(3/2)*x), x)
```

3.115 $\int \frac{1}{x^2\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=137

$$\frac{512a^3\sqrt{ax+b\sqrt{x}}}{35b^5\sqrt{x}}-\frac{256a^2\sqrt{ax+b\sqrt{x}}}{35b^4x}+\frac{192a\sqrt{ax+b\sqrt{x}}}{35b^3x^{3/2}}-\frac{32\sqrt{ax+b\sqrt{x}}}{7b^2x^2}+\frac{4}{bx^{3/2}\sqrt{ax+b\sqrt{x}}}$$

```
[Out] 4/(b*x^(3/2)*Sqrt[b*Sqrt[x] + a*x]) - (32*Sqrt[b*Sqrt[x] + a*x])/
(7*b^2*x^2) + (192*a*Sqrt[b*Sqrt[x] + a*x])/(35*b^3*x^(3/2)) - (2
56*a^2*Sqrt[b*Sqrt[x] + a*x])/(35*b^4*x) + (512*a^3*Sqrt[b*Sqrt[x
] + a*x])/(35*b^5*Sqrt[x])
```

Rubi [A] time = 0.344037, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{512a^3\sqrt{ax+b\sqrt{x}}}{35b^5\sqrt{x}}-\frac{256a^2\sqrt{ax+b\sqrt{x}}}{35b^4x}+\frac{192a\sqrt{ax+b\sqrt{x}}}{35b^3x^{3/2}}-\frac{32\sqrt{ax+b\sqrt{x}}}{7b^2x^2}+\frac{4}{bx^{3/2}\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] 4/(b*x^(3/2)*Sqrt[b*Sqrt[x] + a*x]) - (32*Sqrt[b*Sqrt[x] + a*x])/
(7*b^2*x^2) + (192*a*Sqrt[b*Sqrt[x] + a*x])/(35*b^3*x^(3/2)) - (2
56*a^2*Sqrt[b*Sqrt[x] + a*x])/(35*b^4*x) + (512*a^3*Sqrt[b*Sqrt[x
] + a*x])/(35*b^5*Sqrt[x])
```

Rubi in Sympy [A] time = 33.1533, size = 126, normalized size = 0.92

$$\frac{512a^3\sqrt{ax+b\sqrt{x}}}{35b^5\sqrt{x}}-\frac{256a^2\sqrt{ax+b\sqrt{x}}}{35b^4x}+\frac{192a\sqrt{ax+b\sqrt{x}}}{35b^3x^{\frac{3}{2}}}+\frac{4}{bx^{\frac{3}{2}}\sqrt{ax+b\sqrt{x}}}-\frac{32\sqrt{ax+b\sqrt{x}}}{7b^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] 512*a**3*sqrt(a*x + b*sqrt(x))/(35*b**5*sqrt(x)) - 256*a**2*sqrt(
a*x + b*sqrt(x))/(35*b**4*x) + 192*a*sqrt(a*x + b*sqrt(x))/(35*b*
*3*x**(3/2)) + 4/(b*x**(3/2)*sqrt(a*x + b*sqrt(x))) - 32*sqrt(a*x
 + b*sqrt(x))/(7*b**2*x**2)
```

Mathematica [A] time = 0.0487053, size = 81, normalized size = 0.59

$$\frac{4\sqrt{ax+b\sqrt{x}}\left(128a^4x^2+64a^3bx^{3/2}-16a^2b^2x+8ab^3\sqrt{x}-5b^4\right)}{35b^5x^2\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] (4*Sqrt[b*Sqrt[x] + a*x]*(-5*b^4 + 8*a*b^3*Sqrt[x] - 16*a^2*b^2*x
 + 64*a^3*b*x^(3/2) + 128*a^4*x^2))/(35*b^5*(b + a*Sqrt[x])*x^2)
```

Maple [C] time = 0.017, size = 562, normalized size = 4.1

$$-\frac{1}{35\,b^{6}}\sqrt{b\sqrt{x}+ax}\left(-105\,x^{11/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\,(b+\sqrt{x}a)}\,\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)a^{11/2}b+105\,x^{11/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^2/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] -1/35*(b*x^(1/2)+a*x)^(1/2)*(-105*x^(11/2)*ln(1/2*(2*(x^(1/2)*(b+
x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(11/2)*b+105*
x^(11/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a
^(1/2))*a^(11/2)*b-210*x^5*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2
)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(9/2)*b^2+210*x^5*ln(1/2*(2*(
b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(9/2)*b^2-
105*x^(9/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(
1/2)*a+b)/a^(1/2))*a^(7/2)*b^3+105*x^(9/2)*ln(1/2*(2*(b*x^(1/2)+a
*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(7/2)*b^3+210*(x^(1/2
)*(b+x^(1/2)*a))^(1/2)*x^(11/2)*a^6-560*(b*x^(1/2)+a*x)^(3/2)*x^(
9/2)*a^5+210*(b*x^(1/2)+a*x)^(1/2)*x^(11/2)*a^6+140*a^5*(x^(1/2)*
(b+x^(1/2)*a))^(3/2)*x^(9/2)+420*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^
5*a^5*b-256*(b*x^(1/2)+a*x)^(3/2)*x^(7/2)*a^3*b^2-932*(b*x^(1/2)+
a*x)^(3/2)*x^4*a^4*b+420*(b*x^(1/2)+a*x)^(1/2)*x^5*a^5*b+210*(x^(
1/2)*(b+x^(1/2)*a))^(1/2)*x^(9/2)*a^4*b^2+64*(b*x^(1/2)+a*x)^(3/2
)*x^3*a^2*b^3+210*(b*x^(1/2)+a*x)^(1/2)*x^(9/2)*a^4*b^2-32*(b*x^(
1/2)+a*x)^(3/2)*x^(5/2)*a*b^4+20*(b*x^(1/2)+a*x)^(3/2)*x^2*b^5)/(
x^(1/2)*(b+x^(1/2)*a))^(1/2)/b^6/x^(9/2)/(b+x^(1/2)*a)^2
```

Maxima [A] time = 1.46145, size = 78, normalized size = 0.57

$$\frac{4\left(128\,a^{4}x^{2}+64\,a^{3}bx^{\frac{3}{2}}-16\,a^{2}b^{2}x+8\,ab^{3}\sqrt{x}-5\,b^{4}\right)}{35\,\sqrt{a\sqrt{x}+b}b^{5}x^{\frac{7}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((a*x + b*sqrt(x))^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] 4/35*(128*a^4*x^2 + 64*a^3*b*x^(3/2) - 16*a^2*b^2*x + 8*a*b^3*sqr
t(x) - 5*b^4)/(sqrt(a*sqrt(x) + b)*b^5*x^(7/4))
```

Fricas [A] time = 0.262559, size = 117, normalized size = 0.85

$$-\frac{4\left(64\,a^{4}bx^{2}-24\,a^{2}b^{3}x-5\,b^{5}-\left(128\,a^{5}x^{2}-80\,a^{3}b^{2}x-13\,ab^{4}\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{35\left(a^{2}b^{5}x^{3}-b^{7}x^{2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((a*x + b*sqrt(x))^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] -4/35*(64*a^4*b*x^2 - 24*a^2*b^3*x - 5*b^5 - (128*a^5*x^2 - 80*a^
3*b^2*x - 13*a*b^4)*sqrt(x))*sqrt(a*x + b*sqrt(x))/(a^2*b^5*x^3 -
 b^7*x^2)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^{2}\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x**2*(a*x + b*sqrt(x))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}} x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*sqrt(x))^(3/2)*x^2), x)
```

3.116 $\int \frac{1}{x^3\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=195

$$\frac{4096a^5\sqrt{ax+b\sqrt{x}}}{231b^7\sqrt{x}}-\frac{2048a^4\sqrt{ax+b\sqrt{x}}}{231b^6x}+\frac{512a^3\sqrt{ax+b\sqrt{x}}}{77b^5x^{3/2}}-\frac{1280a^2\sqrt{ax+b\sqrt{x}}}{231b^4x^2}+\frac{160a\sqrt{ax+b\sqrt{x}}}{33b^3x^{5/2}}-\frac{48\sqrt{ax+b\sqrt{x}}}{11b^2x^3}+\frac{4}{bx^{5/2}\sqrt{ax+b\sqrt{x}}}$$

```
[Out] 4/(b*x^(5/2)*Sqrt[b*Sqrt[x] + a*x]) - (48*Sqrt[b*Sqrt[x] + a*x])/
(11*b^2*x^3) + (160*a*Sqrt[b*Sqrt[x] + a*x])/(33*b^3*x^(5/2)) - (
1280*a^2*Sqrt[b*Sqrt[x] + a*x])/(231*b^4*x^2) + (512*a^3*Sqrt[b*S
qrt[x] + a*x])/(77*b^5*x^(3/2)) - (2048*a^4*Sqrt[b*Sqrt[x] + a*x]
)/(231*b^6*x) + (4096*a^5*Sqrt[b*Sqrt[x] + a*x])/(231*b^7*Sqrt[x]
)
```

Rubi [A] time = 0.523051, antiderivative size = 195, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{4096a^5\sqrt{ax+b\sqrt{x}}}{231b^7\sqrt{x}}-\frac{2048a^4\sqrt{ax+b\sqrt{x}}}{231b^6x}+\frac{512a^3\sqrt{ax+b\sqrt{x}}}{77b^5x^{3/2}}-\frac{1280a^2\sqrt{ax+b\sqrt{x}}}{231b^4x^2}+\frac{160a\sqrt{ax+b\sqrt{x}}}{33b^3x^{5/2}}-\frac{48\sqrt{ax+b\sqrt{x}}}{11b^2x^3}+\frac{4}{bx^{5/2}\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] 4/(b*x^(5/2)*Sqrt[b*Sqrt[x] + a*x]) - (48*Sqrt[b*Sqrt[x] + a*x])/
(11*b^2*x^3) + (160*a*Sqrt[b*Sqrt[x] + a*x])/(33*b^3*x^(5/2)) - (
1280*a^2*Sqrt[b*Sqrt[x] + a*x])/(231*b^4*x^2) + (512*a^3*Sqrt[b*S
qrt[x] + a*x])/(77*b^5*x^(3/2)) - (2048*a^4*Sqrt[b*Sqrt[x] + a*x]
)/(231*b^6*x) + (4096*a^5*Sqrt[b*Sqrt[x] + a*x])/(231*b^7*Sqrt[x]
)
```

Rubi in Sympy [A] time = 49.577, size = 182, normalized size = 0.93

$$\frac{4096a^5\sqrt{ax+b\sqrt{x}}}{231b^7\sqrt{x}}-\frac{2048a^4\sqrt{ax+b\sqrt{x}}}{231b^6x}+\frac{512a^3\sqrt{ax+b\sqrt{x}}}{77b^5x^{\frac{3}{2}}}-\frac{1280a^2\sqrt{ax+b\sqrt{x}}}{231b^4x^2}+\frac{160a\sqrt{ax+b\sqrt{x}}}{33b^3x^{\frac{5}{2}}}+\frac{4}{bx^{\frac{5}{2}}\sqrt{ax+b\sqrt{x}}}-\frac{48\sqrt{ax+b\sqrt{x}}}{11b^2x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] 4096*a**5*sqrt(a*x + b*sqrt(x))/(231*b**7*sqrt(x)) - 2048*a**4*sq
rt(a*x + b*sqrt(x))/(231*b**6*x) + 512*a**3*sqrt(a*x + b*sqrt(x))
/(77*b**5*x**(3/2)) - 1280*a**2*sqrt(a*x + b*sqrt(x))/(231*b**4*x
**2) + 160*a*sqrt(a*x + b*sqrt(x))/(33*b**3*x**(5/2)) + 4/(b*x**(
5/2)*sqrt(a*x + b*sqrt(x))) - 48*sqrt(a*x + b*sqrt(x))/(11*b**2*x
**3)
```

Mathematica [A] time = 0.0626732, size = 105, normalized size = 0.54

$$\frac{4\sqrt{ax+b\sqrt{x}}\left(1024a^6x^3+512a^5bx^{5/2}-128a^4b^2x^2+64a^3b^3x^{3/2}-40a^2b^4x+28ab^5\sqrt{x}-21b^6\right)}{231b^7x^3\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] (4*Sqrt[b*Sqrt[x] + a*x]*(-21*b^6 + 28*a*b^5*Sqrt[x] - 40*a^2*b^4
*x + 64*a^3*b^3*x^(3/2) - 128*a^4*b^2*x^2 + 512*a^5*b*x^(5/2) + 1
024*a^6*x^3))/(231*b^7*(b + a*Sqrt[x])*x^3)
```

Maple [C] time = 0.02, size = 606, normalized size = 3.1

$$-\frac{1}{231\,b^{8}}\sqrt{b\sqrt{x}+ax}\left(1155\,x^{15/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)a^{15/2}b+2310\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}x^{15/2}a^{8}-5544\,\left(b\sqrt{x}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] -1/231*(b*x^(1/2)+a*x)^(1/2)*(1155*x^(15/2)*ln(1/2*(2*(b*x^(1/2)+
a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(15/2)*b+2310*(x^(1/
2)*(b+x^(1/2)*a))^(1/2)*x^(15/2)*a^8-5544*(b*x^(1/2)+a*x)^(3/2)*x
^(13/2)*a^7+2310*(b*x^(1/2)+a*x)^(1/2)*x^(15/2)*a^8+924*a^7*(x^(1
/2)*(b+x^(1/2)*a))^(3/2)*x^(13/2)-256*(b*x^(1/2)+a*x)^(3/2)*x^(9/
2)*a^3*b^4+160*(b*x^(1/2)+a*x)^(3/2)*x^4*a^2*b^5-112*(b*x^(1/2)+a
*x)^(3/2)*x^(7/2)*a*b^6+2310*x^7*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*
a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(13/2)*b^2+2310*(x^(1/2)*(b+x^(
1/2)*a))^(1/2)*x^(13/2)*a^6*b^2+2310*(b*x^(1/2)+a*x)^(1/2)*x^(13/
2)*a^6*b^2-1155*x^(13/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*
a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(11/2)*b^3+1155*x^(13/2)*ln(1/2
*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(11/2
)*b^3+4620*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^7*a^7*b-2048*(b*x^(1/2
)+a*x)^(3/2)*x^(11/2)*a^5*b^2-8716*(b*x^(1/2)+a*x)^(3/2)*x^6*a^6*
b+4620*(b*x^(1/2)+a*x)^(1/2)*x^7*a^7*b-2310*x^7*ln(1/2*(2*(x^(1/2
)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(13/2)*b
^2+84*(b*x^(1/2)+a*x)^(3/2)*x^3*b^7+512*(b*x^(1/2)+a*x)^(3/2)*x^5
*a^4*b^3-1155*x^(15/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^
(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(15/2)*b)/(x^(1/2)*(b+x^(1/2)*a))
^(1/2)/b^8/x^(13/2)/(b+x^(1/2)*a)^2
```

Maxima [A] time = 1.46671, size = 108, normalized size = 0.55

$$\frac{4\left(1024\,a^{6}x^{3}+512\,a^{5}bx^{\frac{5}{2}}-128\,a^{4}b^{2}x^{2}+64\,a^{3}b^{3}x^{\frac{3}{2}}-40\,a^{2}b^{4}x+28\,ab^{5}\sqrt{x}-21\,b^{6}\right)}{231\,\sqrt{a\sqrt{x}+b}b^{7}x^{\frac{11}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^3),x, algorithm="maxima")
```

```
[Out] 4/231*(1024*a^6*x^3 + 512*a^5*b*x^(5/2) - 128*a^4*b^2*x^2 + 64*a^
3*b^3*x^(3/2) - 40*a^2*b^4*x + 28*a*b^5*sqrt(x) - 21*b^6)/(sqrt(a
*sqrt(x) + b)*b^7*x^(11/4))
```

Fricas [A] time = 0.263453, size = 147, normalized size = 0.75

$$-\frac{4\left(512\,a^{6}bx^{3}-192\,a^{4}b^{3}x^{2}-68\,a^{2}b^{5}x-21\,b^{7}-\left(1024\,a^{7}x^{3}-640\,a^{5}b^{2}x^{2}-104\,a^{3}b^{4}x-49\,ab^{6}\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{231\left(a^{2}b^{7}x^{4}-b^{9}x^{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^3),x, algorithm="fricas")
```

```
[Out] -4/231*(512*a^6*b*x^3 - 192*a^4*b^3*x^2 - 68*a^2*b^5*x - 21*b^7 -
 (1024*a^7*x^3 - 640*a^5*b^2*x^2 - 104*a^3*b^4*x - 49*a*b^6)*sqrt
(x))*sqrt(a*x + b*sqrt(x))/(a^2*b^7*x^4 - b^9*x^3)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3 \left(ax + b\sqrt{x}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x**3*(a*x + b*sqrt(x))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}} x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*sqrt(x))^(3/2)*x^3), x)
```

3.117 $\int \frac{x^{5/2}}{\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=204

$$\frac{231b^6\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{256a^{13/2}}-\frac{231b^5\sqrt{ax+b\sqrt{x}}}{256a^6}+\frac{77b^4\sqrt{x}\sqrt{ax+b\sqrt{x}}}{128a^5}-\frac{77b^3x\sqrt{ax+b\sqrt{x}}}{160a^4}+\frac{33b^2x^{3/2}\sqrt{ax+b\sqrt{x}}}{80a^3}-\frac{11bx^2\sqrt{ax+b\sqrt{x}}}{30a^2}+\frac{x^{5/2}\sqrt{ax+b\sqrt{x}}}{3a}$$

```
[Out] (-231*b^5*Sqrt[b*Sqrt[x] + a*x])/(256*a^6) + (77*b^4*Sqrt[x]*Sqrt
[b*Sqrt[x] + a*x])/(128*a^5) - (77*b^3*x*Sqrt[b*Sqrt[x] + a*x])/(
160*a^4) + (33*b^2*x^(3/2)*Sqrt[b*Sqrt[x] + a*x])/(80*a^3) - (11*
b*x^2*Sqrt[b*Sqrt[x] + a*x])/(30*a^2) + (x^(5/2)*Sqrt[b*Sqrt[x] +
 a*x])/(3*a) + (231*b^6*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x]
+ a*x]])/(256*a^(13/2))
```

Rubi [A] time = 0.388035, antiderivative size = 204, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238

$$\frac{231b^6\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{256a^{13/2}}-\frac{231b^5\sqrt{ax+b\sqrt{x}}}{256a^6}+\frac{77b^4\sqrt{x}\sqrt{ax+b\sqrt{x}}}{128a^5}-\frac{77b^3x\sqrt{ax+b\sqrt{x}}}{160a^4}+\frac{33b^2x^{3/2}\sqrt{ax+b\sqrt{x}}}{80a^3}-\frac{11bx^2\sqrt{ax+b\sqrt{x}}}{30a^2}+\frac{x^{5/2}\sqrt{ax+b\sqrt{x}}}{3a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(5/2)/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (-231*b^5*Sqrt[b*Sqrt[x] + a*x])/(256*a^6) + (77*b^4*Sqrt[x]*Sqrt
[b*Sqrt[x] + a*x])/(128*a^5) - (77*b^3*x*Sqrt[b*Sqrt[x] + a*x])/(
160*a^4) + (33*b^2*x^(3/2)*Sqrt[b*Sqrt[x] + a*x])/(80*a^3) - (11*
b*x^2*Sqrt[b*Sqrt[x] + a*x])/(30*a^2) + (x^(5/2)*Sqrt[b*Sqrt[x] +
 a*x])/(3*a) + (231*b^6*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x]
+ a*x]])/(256*a^(13/2))
```

Rubi in Sympy [A] time = 40.8057, size = 190, normalized size = 0.93

$$\frac{x^{\frac{5}{2}}\sqrt{ax+b\sqrt{x}}}{3a}-\frac{11bx^2\sqrt{ax+b\sqrt{x}}}{30a^2}+\frac{33b^2x^{\frac{3}{2}}\sqrt{ax+b\sqrt{x}}}{80a^3}-\frac{77b^3x\sqrt{ax+b\sqrt{x}}}{160a^4}+\frac{77b^4\sqrt{x}\sqrt{ax+b\sqrt{x}}}{128a^5}-\frac{231b^5\sqrt{ax+b\sqrt{x}}}{256a^6}+\frac{231b^6\,\mathrm{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{256a^{\frac{13}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] x**(5/2)*sqrt(a*x + b*sqrt(x))/(3*a) - 11*b*x**2*sqrt(a*x + b*sqr
t(x))/(30*a**2) + 33*b**2*x**(3/2)*sqrt(a*x + b*sqrt(x))/(80*a**3
) - 77*b**3*x*sqrt(a*x + b*sqrt(x))/(160*a**4) + 77*b**4*sqrt(x)*
sqrt(a*x + b*sqrt(x))/(128*a**5) - 231*b**5*sqrt(a*x + b*sqrt(x))
/(256*a**6) + 231*b**6*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*sqrt(x)
))/(256*a**(13/2))
```

Mathematica [A] time = 0.173418, size = 128, normalized size = 0.63

$$\frac{2\sqrt{a}\sqrt{ax+b\sqrt{x}}\left(1280a^5x^{5/2}-1408a^4bx^2+1584a^3b^2x^{3/2}-1848a^2b^3x+2310ab^4\sqrt{x}-3465b^5\right)+3465b^6\log\left(2\sqrt{a}\sqrt{ax+b\right.}{7680a^{13/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(5/2)/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]*(-3465*b^5 + 2310*a*b^4*Sqrt[x]
- 1848*a^2*b^3*x + 1584*a^3*b^2*x^(3/2) - 1408*a^4*b*x^2 + 1280*a
^5*x^(5/2)) + 3465*b^6*Log[b + 2*a*Sqrt[x] + 2*Sqrt[a]*Sqrt[b*Sqr
t[x] + a*x]])/(7680*a^(13/2))
```

Maple [A] time = 0.013, size = 249, normalized size = 1.2

$$-\frac{1}{7680}\sqrt{b\sqrt{x}+ax}\left(-2560\,x^{3/2}\left(b\sqrt{x}+ax\right)^{3/2}a^{21/2}-8544\,b^2\sqrt{x}\left(b\sqrt{x}+ax\right)^{3/2}a^{17/2}+5376\,bx\left(b\sqrt{x}+ax\right)^{3/2}a^{19/2}+1224\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] -1/7680*(b*x^(1/2)+a*x)^(1/2)*(-2560*x^(3/2)*(b*x^(1/2)+a*x)^(3/2
)*a^(21/2)-8544*b^2*x^(1/2)*(b*x^(1/2)+a*x)^(3/2)*a^(17/2)+5376*b
*x*(b*x^(1/2)+a*x)^(3/2)*a^(19/2)+12240*b^3*(b*x^(1/2)+a*x)^(3/2)
*a^(15/2)-16860*b^4*(b*x^(1/2)+a*x)^(1/2)*x^(1/2)*a^(15/2)+15360*
b^5*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(13/2)-8430*b^5*(b*x^(1/2)+a*
x)^(1/2)*a^(13/2)+4215*b^6*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2
)+2*x^(1/2)*a+b)/a^(1/2))*a^6-7680*b^6*ln(1/2*(2*(x^(1/2)*(b+x^(1
/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^6)/(x^(1/2)*(b+x^
(1/2)*a))^(1/2)/a^(25/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(a*x + b*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(a*x + b*sqrt(x)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{5}{2}}}{\sqrt{ax + b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(x**(5/2)/sqrt(a*x + b*sqrt(x)), x)
```

GIAC/XCAS [A] time = 0.279129, size = 169, normalized size = 0.83

$$\frac{1}{3840}\sqrt{ax + b\sqrt{x}}\left(2\left(4\left(2\left(8\sqrt{x}\left(\frac{10\sqrt{x}}{a} - \frac{11\,b}{a^2}\right) + \frac{99\,b^2}{a^3}\right)\sqrt{x} - \frac{231\,b^3}{a^4}\right)\sqrt{x} + \frac{1155\,b^4}{a^5}\right)\sqrt{x} - \frac{3465\,b^5}{a^6}\right) - \frac{231\,b^6\ln\left(\left|-2\sqrt{a}\left(\sqrt{a}\sqrt{x} - \sqrt{ax + b\sqrt{x}}\right) - b\right|\right)}{512\,a^{\frac{13}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(a*x + b*sqrt(x)),x, algorithm="giac")
```

```
[Out] 1/3840*sqrt(a*x + b*sqrt(x))*(2*(4*(2*(8*sqrt(x)*(10*sqrt(x)/a -
11*b/a^2) + 99*b^2/a^3)*sqrt(x) - 231*b^3/a^4)*sqrt(x) + 1155*b^4
/a^5)*sqrt(x) - 3465*b^5/a^6) - 231/512*b^6*ln(abs(-2*sqrt(a)*(sq
rt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) - b))/a^(13/2)
```

3.118 $\int \frac{x^{3/2}}{\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=146

$$\frac{35b^4\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{32a^{9/2}}-\frac{35b^3\sqrt{ax+b\sqrt{x}}}{32a^4}+\frac{35b^2\sqrt{x}\sqrt{ax+b\sqrt{x}}}{48a^3}-\frac{7bx\sqrt{ax+b\sqrt{x}}}{12a^2}+\frac{x^{3/2}\sqrt{ax+b\sqrt{x}}}{2a}$$

```
[Out] (-35*b^3*Sqrt[b*Sqrt[x] + a*x])/(32*a^4) + (35*b^2*Sqrt[x]*Sqrt[b
*Sqrt[x] + a*x])/(48*a^3) - (7*b*x*Sqrt[b*Sqrt[x] + a*x])/(12*a^2
) + (x^(3/2)*Sqrt[b*Sqrt[x] + a*x])/(2*a) + (35*b^4*ArcTanh[(Sqrt
[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/(32*a^(9/2))
```

Rubi [A] time = 0.271665, antiderivative size = 146, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238

$$\frac{35b^4\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{32a^{9/2}}-\frac{35b^3\sqrt{ax+b\sqrt{x}}}{32a^4}+\frac{35b^2\sqrt{x}\sqrt{ax+b\sqrt{x}}}{48a^3}-\frac{7bx\sqrt{ax+b\sqrt{x}}}{12a^2}+\frac{x^{3/2}\sqrt{ax+b\sqrt{x}}}{2a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(3/2)/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (-35*b^3*Sqrt[b*Sqrt[x] + a*x])/(32*a^4) + (35*b^2*Sqrt[x]*Sqrt[b
*Sqrt[x] + a*x])/(48*a^3) - (7*b*x*Sqrt[b*Sqrt[x] + a*x])/(12*a^2
) + (x^(3/2)*Sqrt[b*Sqrt[x] + a*x])/(2*a) + (35*b^4*ArcTanh[(Sqrt
[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/(32*a^(9/2))
```

Rubi in Sympy [A] time = 26.8735, size = 134, normalized size = 0.92

$$\frac{x^{\frac{3}{2}}\sqrt{ax+b\sqrt{x}}}{2a}-\frac{7bx\sqrt{ax+b\sqrt{x}}}{12a^2}+\frac{35b^2\sqrt{x}\sqrt{ax+b\sqrt{x}}}{48a^3}-\frac{35b^3\sqrt{ax+b\sqrt{x}}}{32a^4}+\frac{35b^4\,\mathrm{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{32a^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] x**(3/2)*sqrt(a*x + b*sqrt(x))/(2*a) - 7*b*x*sqrt(a*x + b*sqrt(x)
)/(12*a**2) + 35*b**2*sqrt(x)*sqrt(a*x + b*sqrt(x))/(48*a**3) - 3
5*b**3*sqrt(a*x + b*sqrt(x))/(32*a**4) + 35*b**4*atanh(sqrt(a)*sq
rt(x)/sqrt(a*x + b*sqrt(x)))/(32*a**(9/2))
```

Mathematica [A] time = 0.134613, size = 102, normalized size = 0.7

$$\frac{35b^4\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{64a^{9/2}}+\frac{\sqrt{ax+b\sqrt{x}}\left(48a^3x^{3/2}-56a^2bx+70ab^2\sqrt{x}-105b^3\right)}{96a^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(3/2)/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (Sqrt[b*Sqrt[x] + a*x]*(-105*b^3 + 70*a*b^2*Sqrt[x] - 56*a^2*b*x
+ 48*a^3*x^(3/2)))/(96*a^4) + (35*b^4*Log[b + 2*a*Sqrt[x] + 2*Sqr
```

```
t[a]*Sqrt[b*Sqrt[x] + a*x]])/(64*a^(9/2))
```

Maple [A] time = 0.009, size = 207, normalized size = 1.4

$$-\frac{1}{192}\sqrt{b\sqrt{x}+ax}\left(-96\sqrt{x}\left(b\sqrt{x}+ax\right)^{3/2}a^{13/2}-348\,b^{2}\sqrt{b\sqrt{x}+ax}\sqrt{x}a^{11/2}+208\,b\left(b\sqrt{x}+ax\right)^{3/2}a^{11/2}+384\,b^{3}\sqrt{\sqrt{x}\left(b+\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] -1/192*(b*x^(1/2)+a*x)^(1/2)*(-96*x^(1/2)*(b*x^(1/2)+a*x)^(3/2)*a
^(13/2)-348*b^2*(b*x^(1/2)+a*x)^(1/2)*x^(1/2)*a^(11/2)+208*b*(b*x
^(1/2)+a*x)^(3/2)*a^(11/2)+384*b^3*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*
a^(9/2)-174*b^3*(b*x^(1/2)+a*x)^(1/2)*a^(9/2)+87*b^4*ln(1/2*(2*(b
*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^4-192*b^4*l
n(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(
1/2))*a^4)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/a^(17/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(a*x + b*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(a*x + b*sqrt(x)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{3}{2}}}{\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(x**(3/2)/sqrt(a*x + b*sqrt(x)), x)
```

GIAC/XCAS [A] time = 0.280955, size = 131, normalized size = 0.9

$$\frac{1}{96}\sqrt{ax+b\sqrt{x}}\left(2\left(4\sqrt{x}\left(\frac{6\sqrt{x}}{a}-\frac{7b}{a^2}\right)+\frac{35b^2}{a^3}\right)\sqrt{x}-\frac{105b^3}{a^4}\right)-\frac{35b^4\ln\left(\left|-2\sqrt{a}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)-b\right|\right)}{64a^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(a*x + b*sqrt(x)),x, algorithm="giac")
```

```
[Out] 1/96*sqrt(a*x + b*sqrt(x))*(2*(4*sqrt(x)*(6*sqrt(x)/a - 7*b/a^2)
+ 35*b^2/a^3)*sqrt(x) - 105*b^3/a^4) - 35/64*b^4*ln(abs(-2*sqrt(a
)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) - b))/a^(9/2)
```

3.119 $\int \frac{\sqrt{x}}{\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=87

$$\frac{3b^2\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{2a^{5/2}}-\frac{3b\sqrt{ax+b\sqrt{x}}}{2a^2}+\frac{\sqrt{x}\sqrt{ax+b\sqrt{x}}}{a}$$

```
[Out] (-3*b*Sqrt[b*Sqrt[x] + a*x])/(2*a^2) + (Sqrt[x]*Sqrt[b*Sqrt[x] +
a*x])/a + (3*b^2*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]]
)/(2*a^(5/2))
```

Rubi [A] time = 0.162198, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238

$$\frac{3b^2\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{2a^{5/2}}-\frac{3b\sqrt{ax+b\sqrt{x}}}{2a^2}+\frac{\sqrt{x}\sqrt{ax+b\sqrt{x}}}{a}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x]/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] (-3*b*Sqrt[b*Sqrt[x] + a*x])/(2*a^2) + (Sqrt[x]*Sqrt[b*Sqrt[x] +
a*x])/a + (3*b^2*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]]
)/(2*a^(5/2))
```

Rubi in Sympy [A] time = 16.2908, size = 78, normalized size = 0.9

$$\frac{\sqrt{x}\sqrt{ax+b\sqrt{x}}}{a}-\frac{3b\sqrt{ax+b\sqrt{x}}}{2a^2}+\frac{3b^2\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{2a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(1/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] sqrt(x)*sqrt(a*x + b*sqrt(x))/a - 3*b*sqrt(a*x + b*sqrt(x))/(2*a*
*2) + 3*b**2*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*sqrt(x)))/(2*a**(
5/2))
```

Mathematica [A] time = 0.0844058, size = 80, normalized size = 0.92

$$\frac{3b^2\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{4a^{5/2}}+\frac{\left(2a\sqrt{x}-3b\right)\sqrt{ax+b\sqrt{x}}}{2a^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x]/Sqrt[b*Sqrt[x] + a*x],x]
```

```
[Out] ((-3*b + 2*a*Sqrt[x])*Sqrt[b*Sqrt[x] + a*x])/(2*a^2) + (3*b^2*Log
[b + 2*a*Sqrt[x] + 2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]])/(4*a^(5/2))
```

Maple [B] time = 0.009, size = 163, normalized size = 1.9

$$-\frac{1}{4}\sqrt{b\sqrt{x}+ax}\left(-4\sqrt{b\sqrt{x}+ax}\sqrt{x}a^{7/2}+8b\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}a^{5/2}-2\sqrt{b\sqrt{x}+ax}ba^{5/2}+b^2\ln\left(\frac{1}{2}\left(2\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\sqrt{x}a\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1/2)/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] -1/4*(b*x^(1/2)+a*x)^(1/2)*(-4*(b*x^(1/2)+a*x)^(1/2)*x^(1/2)*a^(7
/2)+8*b*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(5/2)-2*(b*x^(1/2)+a*x)^(
1/2)*b*a^(5/2)+b^2*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1
/2)*a+b)/a^(1/2))*a^2-4*b^2*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/
2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^2)/(x^(1/2)*(b+x^(1/2)*a))^(
1/2)/a^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(a*x + b*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(a*x + b*sqrt(x)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(1/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(sqrt(x)/sqrt(a*x + b*sqrt(x)), x)
```

GIAC/XCAS [A] time = 0.277376, size = 93, normalized size = 1.07

$$\frac{1}{2}\sqrt{ax+b\sqrt{x}}\left(\frac{2\sqrt{x}}{a}-\frac{3b}{a^2}\right)-\frac{3b^2\ln\left(\left|-2\sqrt{a}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)-b\right|\right)}{4a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(a*x + b*sqrt(x)),x, algorithm="giac")
```

```
[Out] 1/2*sqrt(a*x + b*sqrt(x))*(2*sqrt(x)/a - 3*b/a^2) - 3/4*b^2*ln(ab
s(-2*sqrt(a)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) - b))/a^(5
/2)
```

3.120 $\int \frac{1}{\sqrt{x}\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=34

$$\frac{4\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{\sqrt{a}}$$

```
[Out] (4*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/Sqrt[a]
```

Rubi [A] time = 0.0867439, antiderivative size = 34, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{4\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{\sqrt{a}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[x]*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (4*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/Sqrt[a]
```

Rubi in Sympy [A] time = 8.3649, size = 31, normalized size = 0.91

$$\frac{4\,\text{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(1/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] 4*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*sqrt(x)))/sqrt(a)
```

Mathematica [A] time = 0.0330552, size = 40, normalized size = 1.18

$$\frac{2\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{\sqrt{a}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(Sqrt[x]*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (2*Log[b + 2*a*Sqrt[x] + 2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]])/Sqrt[a
]
```

Maple [B] time = 0.012, size = 136, normalized size = 4.

$$-\frac{1}{b}\sqrt{b\sqrt{x}+ax}\left(2\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}-2\sqrt{b\sqrt{x}+ax}\sqrt{a}-\ln\left(\frac{1}{2}\left(2\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\sqrt{x}a+b\right)\frac{1}{\sqrt{a}}\right)b-b\ln\left(\frac{1}{2}\left(2\sqrt{\sqrt{x}\left(\right.\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(1/2)/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] -(b*x^(1/2)+a*x)^(1/2)*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)-2
*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)-ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^
(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b-b*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a
))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2)))/(x^(1/2)*(b+x^(1/2)*a))
^(1/2)/b/a^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*sqrt(x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*sqrt(x)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x}\sqrt{ax + b\sqrt{x}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(1/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(sqrt(x)*sqrt(a*x + b*sqrt(x))), x)
```

GIAC/XCAS [A] time = 0.272275, size = 50, normalized size = 1.47

$$-\frac{2\ln\left(\left|-2\,\sqrt{a}\left(\sqrt{a}\sqrt{x} - \sqrt{ax + b\sqrt{x}}\right) - b\right|\right)}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*sqrt(x)),x, algorithm="giac")
```

```
[Out] -2*ln(abs(-2*sqrt(a)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) -
b))/sqrt(a)
```

3.121 $\int \frac{1}{x^{3/2}\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=54

$$\frac{8a\sqrt{ax+b\sqrt{x}}}{3b^2\sqrt{x}} - \frac{4\sqrt{ax+b\sqrt{x}}}{3bx}$$

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(3*b*x) + (8*a*Sqrt[b*Sqrt[x] + a*x])/
(3*b^2*Sqrt[x])
```

Rubi [A] time = 0.132069, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$

$$\frac{8a\sqrt{ax+b\sqrt{x}}}{3b^2\sqrt{x}} - \frac{4\sqrt{ax+b\sqrt{x}}}{3bx}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^(3/2)*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(3*b*x) + (8*a*Sqrt[b*Sqrt[x] + a*x])/
(3*b^2*Sqrt[x])
```

Rubi in Sympy [A] time = 11.8927, size = 46, normalized size = 0.85

$$\frac{8a\sqrt{ax+b\sqrt{x}}}{3b^2\sqrt{x}} - \frac{4\sqrt{ax+b\sqrt{x}}}{3bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**(3/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] 8*a*sqrt(a*x + b*sqrt(x))/(3*b**2*sqrt(x)) - 4*sqrt(a*x + b*sqrt(
x))/(3*b*x)
```

Mathematica [A] time = 0.0286484, size = 37, normalized size = 0.69

$$\frac{4\left(2a\sqrt{x}-b\right)\sqrt{ax+b\sqrt{x}}}{3b^2x}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^(3/2)*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (4*(-b + 2*a*Sqrt[x])*Sqrt[b*Sqrt[x] + a*x])/(3*b^2*x)
```

Maple [C] time = 0.014, size = 186, normalized size = 3.4

$$-\frac{1}{3\,b^3}\sqrt{b\sqrt{x}+ax}\left(3\,a^{3/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)bx^{5/2}-3\,a^{3/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)bx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(3/2)/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] -1/3*(b*x^(1/2)+a*x)^(1/2)*(3*a^(3/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(
1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b*x^(5/2)-3*a^(3/2)*ln(1/2*(
2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b
*x^(5/2)+6*a^2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(5/2)-12*a*(b*x^(1
/2)+a*x)^(3/2)*x^(3/2)+6*a^2*(b*x^(1/2)+a*x)^(1/2)*x^(5/2)+4*(b*x
^(1/2)+a*x)^(3/2)*b*x)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/b^3/x^(5/2)
```

Maxima [A] time = 1.43693, size = 47, normalized size = 0.87

$$\frac{4\left(\frac{3\sqrt{a\sqrt{x}+b}a}{x^{\frac{1}{4}}}-\frac{\left(a\sqrt{x}+b\right)^{\frac{3}{2}}}{x^{\frac{3}{4}}}\right)}{3\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^(3/2)),x, algorithm="maxima")
```

```
[Out] 4/3*(3*sqrt(a*sqrt(x) + b)*a/x^(1/4) - (a*sqrt(x) + b)^(3/2)/x^(3
/4))/b^2
```

Fricas [A] time = 0.261755, size = 39, normalized size = 0.72

$$\frac{4\sqrt{ax+b\sqrt{x}}\left(2\,a\sqrt{x}-b\right)}{3\,b^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^(3/2)),x, algorithm="fricas")
```

```
[Out] 4/3*sqrt(a*x + b*sqrt(x))*(2*a*sqrt(x) - b)/(b^2*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{\frac{3}{2}}\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(3/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**(3/2)*sqrt(a*x + b*sqrt(x))), x)
```

GIAC/XCAS [A] time = 0.231215, size = 72, normalized size = 1.33

$$\frac{4\left(3\sqrt{a}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)+b\right)}{3\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^(3/2)),x, algorithm="giac")
```

```
[Out] 4/3*(3*sqrt(a)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) + b)/(sq
rt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^3
```

3.122 $\int \frac{1}{x^{5/2}\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=112

$$\frac{64a^3\sqrt{ax+b\sqrt{x}}}{35b^4\sqrt{x}}-\frac{32a^2\sqrt{ax+b\sqrt{x}}}{35b^3x}+\frac{24a\sqrt{ax+b\sqrt{x}}}{35b^2x^{3/2}}-\frac{4\sqrt{ax+b\sqrt{x}}}{7bx^2}$$

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(7*b*x^2) + (24*a*Sqrt[b*Sqrt[x] + a*x
])/(35*b^2*x^(3/2)) - (32*a^2*Sqrt[b*Sqrt[x] + a*x])/(35*b^3*x) +
 (64*a^3*Sqrt[b*Sqrt[x] + a*x])/(35*b^4*Sqrt[x])
```

Rubi [A] time = 0.26779, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{64a^3\sqrt{ax+b\sqrt{x}}}{35b^4\sqrt{x}}-\frac{32a^2\sqrt{ax+b\sqrt{x}}}{35b^3x}+\frac{24a\sqrt{ax+b\sqrt{x}}}{35b^2x^{3/2}}-\frac{4\sqrt{ax+b\sqrt{x}}}{7bx^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(5/2)*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(7*b*x^2) + (24*a*Sqrt[b*Sqrt[x] + a*x
])/(35*b^2*x^(3/2)) - (32*a^2*Sqrt[b*Sqrt[x] + a*x])/(35*b^3*x) +
 (64*a^3*Sqrt[b*Sqrt[x] + a*x])/(35*b^4*Sqrt[x])
```

Rubi in Sympy [A] time = 24.654, size = 102, normalized size = 0.91

$$\frac{64a^3\sqrt{ax+b\sqrt{x}}}{35b^4\sqrt{x}}-\frac{32a^2\sqrt{ax+b\sqrt{x}}}{35b^3x}+\frac{24a\sqrt{ax+b\sqrt{x}}}{35b^2x^{\frac{3}{2}}}-\frac{4\sqrt{ax+b\sqrt{x}}}{7bx^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(5/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] 64*a**3*sqrt(a*x + b*sqrt(x))/(35*b**4*sqrt(x)) - 32*a**2*sqrt(a*
x + b*sqrt(x))/(35*b**3*x) + 24*a*sqrt(a*x + b*sqrt(x))/(35*b**2*
x**(3/2)) - 4*sqrt(a*x + b*sqrt(x))/(7*b*x**2)
```

Mathematica [A] time = 0.0379007, size = 59, normalized size = 0.53

$$\frac{4\sqrt{ax+b\sqrt{x}}\left(16a^3x^{3/2}-8a^2bx+6ab^2\sqrt{x}-5b^3\right)}{35b^4x^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(5/2)*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (4*Sqrt[b*Sqrt[x] + a*x]*(-5*b^3 + 6*a*b^2*Sqrt[x] - 8*a^2*b*x +
16*a^3*x^(3/2)))/(35*b^4*x^2)
```

Maple [C] time = 0.015, size = 232, normalized size = 2.1

$$-\frac{1}{35\,b^5}\sqrt{b\sqrt{x}+ax}\left(35\,a^{7/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)bx^{9/2}-35\,a^{7/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^(5/2)/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] -1/35*(b*x^(1/2)+a*x)^(1/2)*(35*a^(7/2)*ln(1/2*(2*(b*x^(1/2)+a*x)
^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b*x^(9/2)-35*a^(7/2)*ln(1/
2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2)
)*b*x^(9/2)+70*a^4*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(9/2)-140*a^3*
(b*x^(1/2)+a*x)^(3/2)*x^(7/2)+70*a^4*(b*x^(1/2)+a*x)^(1/2)*x^(9/2
)-44*x^(5/2)*(b*x^(1/2)+a*x)^(3/2)*a*b^2+76*a^2*(b*x^(1/2)+a*x)^(
3/2)*b*x^3+20*(b*x^(1/2)+a*x)^(3/2)*x^2*b^3)/(x^(1/2)*(b+x^(1/2)*
a))^(1/2)/b^5/x^(9/2)
```

Maxima [A] time = 1.46194, size = 93, normalized size = 0.83

$$\frac{4\left(\frac{35\sqrt{a\sqrt{x}+b}a^3}{x^{\frac{1}{4}}}-\frac{35\left(a\sqrt{x}+b\right)^{\frac{3}{2}}a^2}{x^{\frac{3}{4}}}+\frac{21\left(a\sqrt{x}+b\right)^{\frac{5}{2}}a}{x^{\frac{5}{4}}}-\frac{5\left(a\sqrt{x}+b\right)^{\frac{7}{2}}}{x^{\frac{7}{4}}}\right)}{35\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(a*x + b*sqrt(x))*x^(5/2)),x, algorithm="maxima")
```

```
[Out] 4/35*(35*sqrt(a*sqrt(x) + b)*a^3/x^(1/4) - 35*(a*sqrt(x) + b)^(3/
2)*a^2/x^(3/4) + 21*(a*sqrt(x) + b)^(5/2)*a/x^(5/4) - 5*(a*sqrt(x
) + b)^(7/2)/x^(7/4))/b^4
```

Fricas [A] time = 0.262855, size = 68, normalized size = 0.61

$$-\frac{4\left(8\,a^2bx+5\,b^3-2\left(8\,a^3x+3\,ab^2\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{35\,b^4x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(a*x + b*sqrt(x))*x^(5/2)),x, algorithm="fricas")
```

```
[Out] -4/35*(8*a^2*b*x + 5*b^3 - 2*(8*a^3*x + 3*a*b^2)*sqrt(x))*sqrt(a*
x + b*sqrt(x))/(b^4*x^2)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^{\frac{5}{2}}\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x**(5/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**(5/2)*sqrt(a*x + b*sqrt(x))), x)
```

GIAC/XCAS [A] time = 0.225601, size = 155, normalized size = 1.38

$$\frac{4\left(70\,a^{\frac{3}{2}}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^3+84\,ab\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^2+35\,\sqrt{a}b^2\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)+5\,b^3\right)}{35\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^(5/2)),x, algorithm="giac")
```

```
[Out] 4/35*(70*a^(3/2)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^3 + 84
*a*b*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^2 + 35*sqrt(a)*b^2
*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) + 5*b^3)/(sqrt(a)*sqrt
(x) - sqrt(a*x + b*sqrt(x)))^7
```

3.123 $\int \frac{1}{x^{7/2}\sqrt{b\sqrt{x}+ax}}\,dx$

Optimal. Leaf size=170

$$\frac{1024a^5\sqrt{ax+b\sqrt{x}}}{693b^6\sqrt{x}}-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{693b^5x}+\frac{128a^3\sqrt{ax+b\sqrt{x}}}{231b^4x^{3/2}}-\frac{320a^2\sqrt{ax+b\sqrt{x}}}{693b^3x^2}+\frac{40a\sqrt{ax+b\sqrt{x}}}{99b^2x^{5/2}}-\frac{4\sqrt{ax+b\sqrt{x}}}{11bx^3}$$

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(11*b*x^3) + (40*a*Sqrt[b*Sqrt[x] + a*
x])/(99*b^2*x^(5/2)) - (320*a^2*Sqrt[b*Sqrt[x] + a*x])/(693*b^3*x
^2) + (128*a^3*Sqrt[b*Sqrt[x] + a*x])/(231*b^4*x^(3/2)) - (512*a^
4*Sqrt[b*Sqrt[x] + a*x])/(693*b^5*x) + (1024*a^5*Sqrt[b*Sqrt[x] +
 a*x])/(693*b^6*Sqrt[x])
```

Rubi [A] time = 0.421505, antiderivative size = 170, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{1024a^5\sqrt{ax+b\sqrt{x}}}{693b^6\sqrt{x}}-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{693b^5x}+\frac{128a^3\sqrt{ax+b\sqrt{x}}}{231b^4x^{3/2}}-\frac{320a^2\sqrt{ax+b\sqrt{x}}}{693b^3x^2}+\frac{40a\sqrt{ax+b\sqrt{x}}}{99b^2x^{5/2}}-\frac{4\sqrt{ax+b\sqrt{x}}}{11bx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(7/2)*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(11*b*x^3) + (40*a*Sqrt[b*Sqrt[x] + a*
x])/(99*b^2*x^(5/2)) - (320*a^2*Sqrt[b*Sqrt[x] + a*x])/(693*b^3*x
^2) + (128*a^3*Sqrt[b*Sqrt[x] + a*x])/(231*b^4*x^(3/2)) - (512*a^
4*Sqrt[b*Sqrt[x] + a*x])/(693*b^5*x) + (1024*a^5*Sqrt[b*Sqrt[x] +
 a*x])/(693*b^6*Sqrt[x])
```

Rubi in Sympy [A] time = 40.5895, size = 158, normalized size = 0.93

$$\frac{1024a^5\sqrt{ax+b\sqrt{x}}}{693b^6\sqrt{x}}-\frac{512a^4\sqrt{ax+b\sqrt{x}}}{693b^5x}+\frac{128a^3\sqrt{ax+b\sqrt{x}}}{231b^4x^{\frac{3}{2}}}-\frac{320a^2\sqrt{ax+b\sqrt{x}}}{693b^3x^2}+\frac{40a\sqrt{ax+b\sqrt{x}}}{99b^2x^{\frac{5}{2}}}-\frac{4\sqrt{ax+b\sqrt{x}}}{11bx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(7/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] 1024*a**5*sqrt(a*x + b*sqrt(x))/(693*b**6*sqrt(x)) - 512*a**4*sqr
t(a*x + b*sqrt(x))/(693*b**5*x) + 128*a**3*sqrt(a*x + b*sqrt(x))/
(231*b**4*x**(3/2)) - 320*a**2*sqrt(a*x + b*sqrt(x))/(693*b**3*x*
*2) + 40*a*sqrt(a*x + b*sqrt(x))/(99*b**2*x**(5/2)) - 4*sqrt(a*x
+ b*sqrt(x))/(11*b*x**3)
```

Mathematica [A] time = 0.0493759, size = 83, normalized size = 0.49

$$\frac{4\sqrt{ax+b\sqrt{x}}\left(256a^5x^{5/2}-128a^4bx^2+96a^3b^2x^{3/2}-80a^2b^3x+70ab^4\sqrt{x}-63b^5\right)}{693b^6x^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(7/2)*Sqrt[b*Sqrt[x] + a*x]),x]
```

```
[Out] (4*Sqrt[b*Sqrt[x] + a*x]*(-63*b^5 + 70*a*b^4*Sqrt[x] - 80*a^2*b^3
*x + 96*a^3*b^2*x^(3/2) - 128*a^4*b*x^2 + 256*a^5*x^(5/2)))/(693*
b^6*x^3)
```

Maple [C] time = 0.016, size = 276, normalized size = 1.6

$$-\frac{1}{693\,b^{7}}\sqrt{b\sqrt{x}+ax}\left(693\,a^{11/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)bx^{13/2}-693\,a^{11/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\,\sqrt{x}}{\sqrt{a}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(7/2)/(b*x^(1/2)+a*x)^(1/2),x)
```

```
[Out] -1/693*(b*x^(1/2)+a*x)^(1/2)*(693*a^(11/2)*ln(1/2*(2*(b*x^(1/2)+a
*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*b*x^(13/2)-693*a^(11/2)
*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a
^(1/2))*b*x^(13/2)+1386*a^6*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(13/2
)-2772*a^5*(b*x^(1/2)+a*x)^(3/2)*x^(11/2)+1386*a^6*(b*x^(1/2)+a*x
)^(1/2)*x^(13/2)-1236*x^(9/2)*(b*x^(1/2)+a*x)^(3/2)*a^3*b^2-532*x
^(7/2)*(b*x^(1/2)+a*x)^(3/2)*a*b^4+1748*a^4*(b*x^(1/2)+a*x)^(3/2)
*b*x^5+852*x^4*(b*x^(1/2)+a*x)^(3/2)*a^2*b^3+252*(b*x^(1/2)+a*x)^
(3/2)*x^3*b^5)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/b^7/x^(13/2)
```

Maxima [A] time = 1.50457, size = 139, normalized size = 0.82

$$\frac{4\left(\frac{693\,\sqrt{a\sqrt{x}+b}a^{5}}{x^{\frac{1}{4}}}-\frac{1155\,\left(a\sqrt{x}+b\right)^{\frac{3}{2}}a^{4}}{x^{\frac{3}{4}}}+\frac{1386\,\left(a\sqrt{x}+b\right)^{\frac{5}{2}}a^{3}}{x^{\frac{5}{4}}}-\frac{990\,\left(a\sqrt{x}+b\right)^{\frac{7}{2}}a^{2}}{x^{\frac{7}{4}}}+\frac{385\,\left(a\sqrt{x}+b\right)^{\frac{9}{2}}a}{x^{\frac{9}{4}}}-\frac{63\,\left(a\sqrt{x}+b\right)^{\frac{11}{2}}}{x^{\frac{11}{4}}}\right)}{693\,b^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^(7/2)),x, algorithm="maxima")
```

```
[Out] 4/693*(693*sqrt(a*sqrt(x) + b)*a^5/x^(1/4) - 1155*(a*sqrt(x) + b)
^(3/2)*a^4/x^(3/4) + 1386*(a*sqrt(x) + b)^(5/2)*a^3/x^(5/4) - 990
*(a*sqrt(x) + b)^(7/2)*a^2/x^(7/4) + 385*(a*sqrt(x) + b)^(9/2)*a/
x^(9/4) - 63*(a*sqrt(x) + b)^(11/2)/x^(11/4))/b^6
```

Fricas [A] time = 0.265501, size = 97, normalized size = 0.57

$$-\frac{4\left(128\,a^{4}bx^{2}+80\,a^{2}b^{3}x+63\,b^{5}-2\left(128\,a^{5}x^{2}+48\,a^{3}b^{2}x+35\,ab^{4}\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{693\,b^{6}x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^(7/2)),x, algorithm="fricas")
```

```
[Out] -4/693*(128*a^4*b*x^2 + 80*a^2*b^3*x + 63*b^5 - 2*(128*a^5*x^2 +
48*a^3*b^2*x + 35*a*b^4)*sqrt(x))*sqrt(a*x + b*sqrt(x))/(b^6*x^3)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^{\frac{7}{2}}\sqrt{ax+b\sqrt{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(7/2)/(b*x**(1/2)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**(7/2)*sqrt(a*x + b*sqrt(x))), x)
```

GIAC/XCAS [A] time = 0.227053, size = 239, normalized size = 1.41

$$\frac{4\left(3696\,a^{\frac{5}{2}}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^{5}+7920\,a^{2}b\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^{4}+6930\,a^{\frac{3}{2}}b^{2}\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^{3}+3080\,ab^{3}\left(\sqrt{a}\sqrt{\right.}\right.}{693\left(\sqrt{a}\sqrt{x}-\sqrt{ax+b\sqrt{x}}\right)^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*sqrt(x))*x^(7/2)),x, algorithm="giac")
```

```
[Out] 4/693*(3696*a^(5/2)*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^5 +
 7920*a^2*b*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^4 + 6930*a^
(3/2)*b^2*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^3 + 3080*a*b^
3*(sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x)))^2 + 693*sqrt(a)*b^4*(
sqrt(a)*sqrt(x) - sqrt(a*x + b*sqrt(x))) + 63*b^5)/(sqrt(a)*sqrt(
x) - sqrt(a*x + b*sqrt(x)))^11
```

3.124 $\int \frac{x^{5/2}}{\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=171

$$\frac{315b^4\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{32a^{11/2}}-\frac{315b^3\sqrt{ax+b\sqrt{x}}}{32a^5}+\frac{105b^2\sqrt{x}\sqrt{ax+b\sqrt{x}}}{16a^4}-\frac{21bx\sqrt{ax+b\sqrt{x}}}{4a^3}+\frac{9x^{3/2}\sqrt{ax+b\sqrt{x}}}{2a^2}-\frac{4x^{5/2}}{a\sqrt{ax+b\sqrt{x}}}$$

```
[Out] (-4*x^(5/2))/(a*Sqrt[b*Sqrt[x] + a*x]) - (315*b^3*Sqrt[b*Sqrt[x]
+ a*x])/(32*a^5) + (105*b^2*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x])/(16*a^
4) - (21*b*x*Sqrt[b*Sqrt[x] + a*x])/(4*a^3) + (9*x^(3/2)*Sqrt[b*S
qrt[x] + a*x])/(2*a^2) + (315*b^4*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[
b*Sqrt[x] + a*x]])/(32*a^(11/2))
```

Rubi [A] time = 0.319789, antiderivative size = 171, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286

$$\frac{315b^4\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{32a^{11/2}}-\frac{315b^3\sqrt{ax+b\sqrt{x}}}{32a^5}+\frac{105b^2\sqrt{x}\sqrt{ax+b\sqrt{x}}}{16a^4}-\frac{21bx\sqrt{ax+b\sqrt{x}}}{4a^3}+\frac{9x^{3/2}\sqrt{ax+b\sqrt{x}}}{2a^2}-\frac{4x^{5/2}}{a\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(5/2)/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (-4*x^(5/2))/(a*Sqrt[b*Sqrt[x] + a*x]) - (315*b^3*Sqrt[b*Sqrt[x]
+ a*x])/(32*a^5) + (105*b^2*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x])/(16*a^
4) - (21*b*x*Sqrt[b*Sqrt[x] + a*x])/(4*a^3) + (9*x^(3/2)*Sqrt[b*S
qrt[x] + a*x])/(2*a^2) + (315*b^4*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[
b*Sqrt[x] + a*x]])/(32*a^(11/2))
```

Rubi in Sympy [A] time = 33.5602, size = 160, normalized size = 0.94

$$-\frac{4x^{\frac{5}{2}}}{a\sqrt{ax+b\sqrt{x}}}+\frac{9x^{\frac{3}{2}}\sqrt{ax+b\sqrt{x}}}{2a^2}-\frac{21bx\sqrt{ax+b\sqrt{x}}}{4a^3}+\frac{105b^2\sqrt{x}\sqrt{ax+b\sqrt{x}}}{16a^4}-\frac{315b^3\sqrt{ax+b\sqrt{x}}}{32a^5}+\frac{315b^4\,\mathrm{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{32a^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -4*x**(5/2)/(a*sqrt(a*x + b*sqrt(x))) + 9*x**(3/2)*sqrt(a*x + b*s
qrt(x))/(2*a**2) - 21*b*x*sqrt(a*x + b*sqrt(x))/(4*a**3) + 105*b*
*2*sqrt(x)*sqrt(a*x + b*sqrt(x))/(16*a**4) - 315*b**3*sqrt(a*x +
b*sqrt(x))/(32*a**5) + 315*b**4*atanh(sqrt(a)*sqrt(x)/sqrt(a*x +
b*sqrt(x)))/(32*a**(11/2))
```

Mathematica [A] time = 0.189856, size = 124, normalized size = 0.73

$$\frac{315b^4\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{64a^{11/2}}+\frac{\sqrt{ax+b\sqrt{x}}\left(16a^4x^2-24a^3bx^{3/2}+42a^2b^2x-105ab^3\sqrt{x}-315b^4\right)}{32a^5\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(5/2)/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (Sqrt[b*Sqrt[x] + a*x]*(-315*b^4 - 105*a*b^3*Sqrt[x] + 42*a^2*b^2
*x - 24*a^3*b*x^(3/2) + 16*a^4*x^2))/(32*a^5*(b + a*Sqrt[x])) + (
315*b^4*Log[b + 2*a*Sqrt[x] + 2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]])/(
64*a^(11/2))
```

Maple [B] time = 0.014, size = 531, normalized size = 3.1

$$\frac{1}{64}\sqrt{b\sqrt{x}+ax}\left(32\,x^{3/2}\left(b\sqrt{x}+ax\right)^{3/2}a^{19/2}+276\,x^{3/2}\sqrt{b\sqrt{x}+ax}a^{17/2}b^{2}-48\,x\left(b\sqrt{x}+ax\right)^{3/2}a^{17/2}b-768\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] 1/64*(b*x^(1/2)+a*x)^(1/2)/a^(21/2)*(32*x^(3/2)*(b*x^(1/2)+a*x)^(
3/2)*a^(19/2)+276*x^(3/2)*(b*x^(1/2)+a*x)^(1/2)*a^(17/2)*b^2-48*x
*(b*x^(1/2)+a*x)^(3/2)*a^(17/2)*b-768*(x^(1/2)*(b+x^(1/2)*a))^(1/
2)*x*a^(15/2)*b^3+690*x*(b*x^(1/2)+a*x)^(1/2)*a^(15/2)*b^3-192*x^
(1/2)*(b*x^(1/2)+a*x)^(3/2)*a^(15/2)*b^2+256*b^3*a^(13/2)*(x^(1/2
)*(b+x^(1/2)*a))^(3/2)-1536*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(1/2)
*a^(13/2)*b^4+552*x^(1/2)*(b*x^(1/2)+a*x)^(1/2)*a^(13/2)*b^4-112*
(b*x^(1/2)+a*x)^(3/2)*a^(13/2)*b^3-768*(x^(1/2)*(b+x^(1/2)*a))^(1
/2)*a^(11/2)*b^5+138*(b*x^(1/2)+a*x)^(1/2)*a^(11/2)*b^5-69*x*ln(1
/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^7*b
^4+384*x*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2
)*a+b)/a^(1/2))*a^7*b^4-138*x^(1/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/
2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^6*b^5+768*x^(1/2)*ln(1/2*(2*
(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^6
*b^5-69*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^
(1/2))*a^5*b^6+384*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2
)+2*x^(1/2)*a+b)/a^(1/2))*a^5*b^6)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/
(b+x^(1/2)*a)^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{5}{2}}}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/(a*x + b*sqrt(x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(5/2)/(a*x + b*sqrt(x))^(3/2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/(a*x + b*sqrt(x))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{5}{2}}}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(x**(5/2)/(a*x + b*sqrt(x))**(3/2), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/(a*x + b*sqrt(x))^(3/2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.125 $\int \frac{x^{3/2}}{\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=113

$$\frac{15b^2\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{2a^{7/2}}-\frac{15b\sqrt{ax+b\sqrt{x}}}{2a^3}+\frac{5\sqrt{x}\sqrt{ax+b\sqrt{x}}}{a^2}-\frac{4x^{3/2}}{a\sqrt{ax+b\sqrt{x}}}$$

```
[Out] (-4*x^(3/2))/(a*Sqrt[b*Sqrt[x] + a*x]) - (15*b*Sqrt[b*Sqrt[x] + a
*x])/(2*a^3) + (5*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x])/a^2 + (15*b^2*Ar
cTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/(2*a^(7/2))
```

Rubi [A] time = 0.228329, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286

$$\frac{15b^2\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{2a^{7/2}}-\frac{15b\sqrt{ax+b\sqrt{x}}}{2a^3}+\frac{5\sqrt{x}\sqrt{ax+b\sqrt{x}}}{a^2}-\frac{4x^{3/2}}{a\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(3/2)/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (-4*x^(3/2))/(a*Sqrt[b*Sqrt[x] + a*x]) - (15*b*Sqrt[b*Sqrt[x] + a
*x])/(2*a^3) + (5*Sqrt[x]*Sqrt[b*Sqrt[x] + a*x])/a^2 + (15*b^2*Ar
cTanh[(Sqrt[a]*Sqrt[x])/Sqrt[b*Sqrt[x] + a*x]])/(2*a^(7/2))
```

Rubi in Sympy [A] time = 21.295, size = 104, normalized size = 0.92

$$-\frac{4x^{\frac{3}{2}}}{a\sqrt{ax+b\sqrt{x}}}+\frac{5\sqrt{x}\sqrt{ax+b\sqrt{x}}}{a^2}-\frac{15b\sqrt{ax+b\sqrt{x}}}{2a^3}+\frac{15b^2\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{2a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -4*x**(3/2)/(a*sqrt(a*x + b*sqrt(x))) + 5*sqrt(x)*sqrt(a*x + b*sq
rt(x))/a**2 - 15*b*sqrt(a*x + b*sqrt(x))/(2*a**3) + 15*b**2*atanh
(sqrt(a)*sqrt(x)/sqrt(a*x + b*sqrt(x)))/(2*a**(7/2))
```

Mathematica [A] time = 0.142887, size = 100, normalized size = 0.88

$$\frac{15b^2\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{4a^{7/2}}+\frac{\sqrt{ax+b\sqrt{x}}\left(2a^2x-5ab\sqrt{x}-15b^2\right)}{2a^3\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(3/2)/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (Sqrt[b*Sqrt[x] + a*x]*(-15*b^2 - 5*a*b*Sqrt[x] + 2*a^2*x))/(2*a^
3*(b + a*Sqrt[x])) + (15*b^2*Log[b + 2*a*Sqrt[x] + 2*Sqrt[a]*Sqrt
[b*Sqrt[x] + a*x]])/(4*a^(7/2))
```

Maple [B] time = 0.014, size = 444, normalized size = 3.9

$$\frac{1}{4}\sqrt{b\sqrt{x}+ax}\left(4\,x^{3/2}\sqrt{b\sqrt{x}+ax}a^{13/2}-32\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}xa^{11/2}b+10\,x\sqrt{b\sqrt{x}+ax}a^{11/2}b+16\,ba^{9/2}\left(\sqrt{x}\left(b+\sqrt{x}a\right)\right)^{3/2}-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] 1/4*(b*x^(1/2)+a*x)^(1/2)/a^(13/2)*(4*x^(3/2)*(b*x^(1/2)+a*x)^(1/
2)*a^(13/2)-32*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x*a^(11/2)*b+10*x*(b
*x^(1/2)+a*x)^(1/2)*a^(11/2)*b+16*b*a^(9/2)*(x^(1/2)*(b+x^(1/2)*a
))^(3/2)-64*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(1/2)*a^(9/2)*b^2+8*x
^(1/2)*(b*x^(1/2)+a*x)^(1/2)*a^(9/2)*b^2-32*(x^(1/2)*(b+x^(1/2)*a
))^(1/2)*a^(7/2)*b^3+2*(b*x^(1/2)+a*x)^(1/2)*a^(7/2)*b^3-x*ln(1/2
*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^5*b^2
+16*x*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a
+b)/a^(1/2))*a^5*b^2-2*x^(1/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^
(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^4*b^3+32*x^(1/2)*ln(1/2*(2*(x^(1/
2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^4*b^3-l
n(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^
3*b^4+16*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2
)*a+b)/a^(1/2))*a^3*b^4)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/(b+x^(1/2)
*a)^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{3}{2}}}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/(a*x + b*sqrt(x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^(3/2)/(a*x + b*sqrt(x))^(3/2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/(a*x + b*sqrt(x))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{3}{2}}}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(x**(3/2)/(a*x + b*sqrt(x))**(3/2), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/(a*x + b*sqrt(x))^(3/2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.126 $\int \frac{\sqrt{x}}{\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=60

$$\frac{4\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{3/2}}-\frac{4\sqrt{x}}{a\sqrt{ax+b\sqrt{x}}}$$

```
[Out] (-4*Sqrt[x])/(a*Sqrt[b*Sqrt[x] + a*x]) + (4*ArcTanh[(Sqrt[a]*Sqrt
[x])/Sqrt[b*Sqrt[x] + a*x]])/a^(3/2)
```

Rubi [A] time = 0.140339, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.19

$$\frac{4\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{3/2}}-\frac{4\sqrt{x}}{a\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x]/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (-4*Sqrt[x])/(a*Sqrt[b*Sqrt[x] + a*x]) + (4*ArcTanh[(Sqrt[a]*Sqrt
[x])/Sqrt[b*Sqrt[x] + a*x]])/a^(3/2)
```

Rubi in Sympy [A] time = 12.2549, size = 53, normalized size = 0.88

$$-\frac{4\sqrt{x}}{a\sqrt{ax+b\sqrt{x}}}+\frac{4\,\text{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+b\sqrt{x}}}\right)}{a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(1/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -4*sqrt(x)/(a*sqrt(a*x + b*sqrt(x))) + 4*atanh(sqrt(a)*sqrt(x)/sq
rt(a*x + b*sqrt(x)))/a**(3/2)
```

Mathematica [A] time = 0.0732259, size = 72, normalized size = 1.2

$$\frac{2\log\left(2\sqrt{a}\sqrt{ax+b\sqrt{x}}+2a\sqrt{x}+b\right)}{a^{3/2}}-\frac{4\sqrt{ax+b\sqrt{x}}}{a\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x]/(b*Sqrt[x] + a*x)^(3/2),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x])/(a*(b + a*Sqrt[x])) + (2*Log[b + 2*a*S
qrt[x] + 2*Sqrt[a]*Sqrt[b*Sqrt[x] + a*x]])/a^(3/2)
```

Maple [B] time = 0.006, size = 238, normalized size = 4.

$$2\,\frac{\sqrt{b\sqrt{x}+ax}}{a^{3/2}\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\,b\left(b+\sqrt{x}a\right)^{2}}\left(x\ln\left(1/2\,\frac{2\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\sqrt{x}a+b}{\sqrt{a}}\right)a^{2}b-2\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\,xa^{5/2}+2\sqrt{x}\ln\left(1\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1/2)/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] 2*(b*x^(1/2)+a*x)^(1/2)/a^(3/2)*(x*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*
a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^2*b-2*(x^(1/2)*(b+x^(
1/2)*a))^(1/2)*x*a^(5/2)+2*x^(1/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*
a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a*b^2+2*a^(3/2)*(x^(1/2
)*(b+x^(1/2)*a))^(3/2)-4*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(1/2)*a^
(3/2)*b+ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)
*a+b)/a^(1/2))*b^3-2*a^(1/2)*b^2*(x^(1/2)*(b+x^(1/2)*a))^(1/2))/(
x^(1/2)*(b+x^(1/2)*a))^(1/2)/b/(b+x^(1/2)*a)^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{x}}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/(a*x + b*sqrt(x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(x)/(a*x + b*sqrt(x))^(3/2), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/(a*x + b*sqrt(x))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{x}}{\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(1/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(sqrt(x)/(a*x + b*sqrt(x))**(3/2), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/(a*x + b*sqrt(x))^(3/2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.127 $\int \frac{1}{\sqrt{x}\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=30

$$-\frac{4\left(2a\sqrt{x}+b\right)}{b^2\sqrt{ax+b\sqrt{x}}}$$

```
[Out] (-4*(b + 2*a*Sqrt[x]))/(b^2*Sqrt[b*Sqrt[x] + a*x])
```

Rubi [A] time = 0.0808706, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$-\frac{4\left(2a\sqrt{x}+b\right)}{b^2\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[x]*(b*Sqrt[x] + a*x)^(3/2)),x]

[Out] (-4*(b + 2*a*Sqrt[x]))/(b^2*Sqrt[b*Sqrt[x] + a*x])
```

Rubi in Sympy [A] time = 7.46269, size = 29, normalized size = 0.97

$$-\frac{2\left(4a\sqrt{x}+2b\right)}{b^2\sqrt{ax+b\sqrt{x}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(1/2)/(b*x**(1/2)+a*x)**(3/2),x)

[Out] -2*(4*a*sqrt(x) + 2*b)/(b**2*sqrt(a*x + b*sqrt(x)))
```

Mathematica [A] time = 0.0398779, size = 45, normalized size = 1.5

$$-\frac{4\left(2a\sqrt{x}+b\right)\sqrt{ax+b\sqrt{x}}}{ab^2x+b^3\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(Sqrt[x]*(b*Sqrt[x] + a*x)^(3/2)),x]

[Out] (-4*(b + 2*a*Sqrt[x])*Sqrt[b*Sqrt[x] + a*x])/(b^3*Sqrt[x] + a*b^2
*x)
```

Maple [B] time = 0.015, size = 112, normalized size = 3.7

$$4\,\frac{\sqrt{b\sqrt{x}+ax}\left(-x\left(b\sqrt{x}+ax\right)^{3/2}a^2+a^2\left(\sqrt{x}\left(b+\sqrt{x}a\right)\right)^{3/2}x-2\sqrt{x}\left(b\sqrt{x}+ax\right)^{3/2}ab-\left(b\sqrt{x}+ax\right)^{3/2}b^2\right)}{\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\,xb^3\left(b+\sqrt{x}a\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(1/2)/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] 4*(b*x^(1/2)+a*x)^(1/2)*(-x*(b*x^(1/2)+a*x)^(3/2)*a^2+a^2*(x^(1/2
)*(b+x^(1/2)*a))^(3/2)*x-2*x^(1/2)*(b*x^(1/2)+a*x)^(3/2)*a*b-(b*x
^(1/2)+a*x)^(3/2)*b^2)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/x/b^3/(b+x^(
1/2)*a)^2
```

Maxima [A] time = 1.49694, size = 34, normalized size = 1.13

$$-\frac{4\left(2\,a\sqrt{x}+b\right)}{\sqrt{a\sqrt{x}+b}b^{2}x^{\frac{1}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((a*x + b*sqrt(x))^(3/2)*sqrt(x)),x, algorithm="maxima")
```

```
[Out] -4*(2*a*sqrt(x) + b)/(sqrt(a*sqrt(x) + b)*b^2*x^(1/4))
```

Fricas [A] time = 0.269941, size = 73, normalized size = 2.43

$$\frac{4\left(abx-\left(2\,a^{2}x-b^{2}\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{a^{2}b^{2}x^{2}-b^{4}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((a*x + b*sqrt(x))^(3/2)*sqrt(x)),x, algorithm="fricas")
```

```
[Out] 4*(a*b*x - (2*a^2*x - b^2)*sqrt(x))*sqrt(a*x + b*sqrt(x))/(a^2*b^
2*x^2 - b^4*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x}\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(1/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(sqrt(x)*(a*x + b*sqrt(x))**(3/2)), x)
```

GIAC/XCAS [A] time = 0.220243, size = 35, normalized size = 1.17

$$-\frac{4\left(\frac{2\,a\sqrt{x}}{b^{2}}+\frac{1}{b}\right)}{\sqrt{ax+b\sqrt{x}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*sqrt(x)),x, algorithm="giac")
```

```
[Out] -4*(2*a*sqrt(x)/b^2 + 1/b)/sqrt(a*x + b*sqrt(x))
```

3.128 $\int \frac{1}{x^{3/2}\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=107

$$-\frac{64a^2\sqrt{ax+b\sqrt{x}}}{5b^4\sqrt{x}}+\frac{32a\sqrt{ax+b\sqrt{x}}}{5b^3x}-\frac{24\sqrt{ax+b\sqrt{x}}}{5b^2x^{3/2}}+\frac{4}{bx\sqrt{ax+b\sqrt{x}}}$$

```
[Out] 4/(b*x*Sqrt[b*Sqrt[x] + a*x]) - (24*Sqrt[b*Sqrt[x] + a*x])/(5*b^2
*x^(3/2)) + (32*a*Sqrt[b*Sqrt[x] + a*x])/(5*b^3*x) - (64*a^2*Sqrt
[b*Sqrt[x] + a*x])/(5*b^4*Sqrt[x])
```

Rubi [A] time = 0.267868, antiderivative size = 107, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$-\frac{64a^2\sqrt{ax+b\sqrt{x}}}{5b^4\sqrt{x}}+\frac{32a\sqrt{ax+b\sqrt{x}}}{5b^3x}-\frac{24\sqrt{ax+b\sqrt{x}}}{5b^2x^{3/2}}+\frac{4}{bx\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(3/2)*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] 4/(b*x*Sqrt[b*Sqrt[x] + a*x]) - (24*Sqrt[b*Sqrt[x] + a*x])/(5*b^2
*x^(3/2)) + (32*a*Sqrt[b*Sqrt[x] + a*x])/(5*b^3*x) - (64*a^2*Sqrt
[b*Sqrt[x] + a*x])/(5*b^4*Sqrt[x])
```

Rubi in Sympy [A] time = 25.0075, size = 95, normalized size = 0.89

$$-\frac{64a^2\sqrt{ax+b\sqrt{x}}}{5b^4\sqrt{x}}+\frac{32a\sqrt{ax+b\sqrt{x}}}{5b^3x}+\frac{4}{bx\sqrt{ax+b\sqrt{x}}}-\frac{24\sqrt{ax+b\sqrt{x}}}{5b^2x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(3/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -64*a**2*sqrt(a*x + b*sqrt(x))/(5*b**4*sqrt(x)) + 32*a*sqrt(a*x +
 b*sqrt(x))/(5*b**3*x) + 4/(b*x*sqrt(a*x + b*sqrt(x))) - 24*sqrt(
a*x + b*sqrt(x))/(5*b**2*x**(3/2))
```

Mathematica [A] time = 0.0505471, size = 70, normalized size = 0.65

$$-\frac{4\sqrt{ax+b\sqrt{x}}\left(16a^3x^{3/2}+8a^2bx-2ab^2\sqrt{x}+b^3\right)}{5b^4x^{3/2}\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(3/2)*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x]*(b^3 - 2*a*b^2*Sqrt[x] + 8*a^2*b*x + 16
*a^3*x^(3/2)))/(5*b^4*(b + a*Sqrt[x])*x^(3/2))
```

Maple [C] time = 0.017, size = 540, normalized size = 5.1

$$\frac{2}{5\,b^5}\sqrt{b\sqrt{x}+ax}\left(-5\,x^{9/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)a^{9/2}b+5\,x^{9/2}\ln\left(1/2\,\frac{2\,\sqrt{b\sqrt{x}+ax}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)a^{9}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^(3/2)/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] 2/5*(b*x^(1/2)+a*x)^(1/2)*(-5*x^(9/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/
2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(9/2)*b+5*x^(9/2)*
ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a
^(9/2)*b-10*x^4*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2
*x^(1/2)*a+b)/a^(1/2))*a^(7/2)*b^2+10*x^4*ln(1/2*(2*(b*x^(1/2)+a*
x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(7/2)*b^2-5*x^(7/2)*ln
(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1
/2))*a^(5/2)*b^3+5*x^(7/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2
)+2*x^(1/2)*a+b)/a^(1/2))*a^(5/2)*b^3+10*(x^(1/2)*(b+x^(1/2)*a))^
(1/2)*x^(9/2)*a^5-30*x^(7/2)*(b*x^(1/2)+a*x)^(3/2)*a^4+10*x^(9/2)
*(b*x^(1/2)+a*x)^(1/2)*a^5+10*a^4*(x^(1/2)*(b+x^(1/2)*a))^(3/2)*x
^(7/2)+20*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^4*a^4*b-16*x^(5/2)*(b*x
^(1/2)+a*x)^(3/2)*a^2*b^2-52*x^3*(b*x^(1/2)+a*x)^(3/2)*a^3*b+20*x
^4*(b*x^(1/2)+a*x)^(1/2)*a^4*b+10*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x
^(7/2)*a^3*b^2+4*x^2*(b*x^(1/2)+a*x)^(3/2)*a*b^3+10*x^(7/2)*(b*x^
(1/2)+a*x)^(1/2)*a^3*b^2-2*x^(3/2)*(b*x^(1/2)+a*x)^(3/2)*b^4)/(x^
(1/2)*(b+x^(1/2)*a))^(1/2)/b^5/x^(7/2)/(b+x^(1/2)*a)^2
```

Maxima [A] time = 1.51746, size = 61, normalized size = 0.57

$$-\frac{4\left(16\,a^3x^{\frac{3}{2}}+8\,a^2bx-2\,ab^2\sqrt{x}+b^3\right)}{5\,\sqrt{a\sqrt{x}+b}b^4x^{\frac{5}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(3/2)),x, algorithm="maxima")
```

```
[Out] -4/5*(16*a^3*x^(3/2) + 8*a^2*b*x - 2*a*b^2*sqrt(x) + b^3)/(sqrt(a
*sqrt(x) + b)*b^4*x^(5/4))
```

Fricas [A] time = 0.25508, size = 107, normalized size = 1.

$$\frac{4\left(8\,a^3bx^2-3\,ab^3x-\left(16\,a^4x^2-10\,a^2b^2x-b^4\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{5\left(a^2b^4x^3-b^6x^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(3/2)),x, algorithm="fricas")
```

```
[Out] 4/5*(8*a^3*b*x^2 - 3*a*b^3*x - (16*a^4*x^2 - 10*a^2*b^2*x - b^4)*
sqrt(x))*sqrt(a*x + b*sqrt(x))/(a^2*b^4*x^3 - b^6*x^2)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^{\frac{3}{2}}\left(ax+b\sqrt{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(3/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x**(3/2)*(a*x + b*sqrt(x))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}} x^{\frac{3}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(3/2)),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(3/2)), x)
```

3.129 $\int \frac{1}{x^{5/2}\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=165

$$-\frac{1024a^4\sqrt{ax+b\sqrt{x}}}{63b^6\sqrt{x}}+\frac{512a^3\sqrt{ax+b\sqrt{x}}}{63b^5x}-\frac{128a^2\sqrt{ax+b\sqrt{x}}}{21b^4x^{3/2}}+\frac{320a\sqrt{ax+b\sqrt{x}}}{63b^3x^2}-\frac{40\sqrt{ax+b\sqrt{x}}}{9b^2x^{5/2}}+\frac{4}{bx^2\sqrt{ax+b\sqrt{x}}}$$

```
[Out] 4/(b*x^2*Sqrt[b*Sqrt[x] + a*x]) - (40*Sqrt[b*Sqrt[x] + a*x])/(9*b
^2*x^(5/2)) + (320*a*Sqrt[b*Sqrt[x] + a*x])/(63*b^3*x^2) - (128*a
^2*Sqrt[b*Sqrt[x] + a*x])/(21*b^4*x^(3/2)) + (512*a^3*Sqrt[b*Sqrt
[x] + a*x])/(63*b^5*x) - (1024*a^4*Sqrt[b*Sqrt[x] + a*x])/(63*b^6
*Sqrt[x])
```

Rubi [A] time = 0.42587, antiderivative size = 165, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$-\frac{1024a^4\sqrt{ax+b\sqrt{x}}}{63b^6\sqrt{x}}+\frac{512a^3\sqrt{ax+b\sqrt{x}}}{63b^5x}-\frac{128a^2\sqrt{ax+b\sqrt{x}}}{21b^4x^{3/2}}+\frac{320a\sqrt{ax+b\sqrt{x}}}{63b^3x^2}-\frac{40\sqrt{ax+b\sqrt{x}}}{9b^2x^{5/2}}+\frac{4}{bx^2\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(5/2)*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] 4/(b*x^2*Sqrt[b*Sqrt[x] + a*x]) - (40*Sqrt[b*Sqrt[x] + a*x])/(9*b
^2*x^(5/2)) + (320*a*Sqrt[b*Sqrt[x] + a*x])/(63*b^3*x^2) - (128*a
^2*Sqrt[b*Sqrt[x] + a*x])/(21*b^4*x^(3/2)) + (512*a^3*Sqrt[b*Sqrt
[x] + a*x])/(63*b^5*x) - (1024*a^4*Sqrt[b*Sqrt[x] + a*x])/(63*b^6
*Sqrt[x])
```

Rubi in Sympy [A] time = 41.1688, size = 153, normalized size = 0.93

$$-\frac{1024a^4\sqrt{ax+b\sqrt{x}}}{63b^6\sqrt{x}}+\frac{512a^3\sqrt{ax+b\sqrt{x}}}{63b^5x}-\frac{128a^2\sqrt{ax+b\sqrt{x}}}{21b^4x^{\frac{3}{2}}}+\frac{320a\sqrt{ax+b\sqrt{x}}}{63b^3x^2}+\frac{4}{bx^2\sqrt{ax+b\sqrt{x}}}-\frac{40\sqrt{ax+b\sqrt{x}}}{9b^2x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(5/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -1024*a**4*sqrt(a*x + b*sqrt(x))/(63*b**6*sqrt(x)) + 512*a**3*sqr
t(a*x + b*sqrt(x))/(63*b**5*x) - 128*a**2*sqrt(a*x + b*sqrt(x))/(
21*b**4*x**(3/2)) + 320*a*sqrt(a*x + b*sqrt(x))/(63*b**3*x**2) +
4/(b*x**2*sqrt(a*x + b*sqrt(x))) - 40*sqrt(a*x + b*sqrt(x))/(9*b*
*2*x**(5/2))
```

Mathematica [A] time = 0.0630114, size = 96, normalized size = 0.58

$$-\frac{4\sqrt{ax+b\sqrt{x}}\left(256a^5x^{5/2}+128a^4bx^2-32a^3b^2x^{3/2}+16a^2b^3x-10ab^4\sqrt{x}+7b^5\right)}{63b^6x^{5/2}\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]   Integrate[1/(x^(5/2)*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x]*(7*b^5 - 10*a*b^4*Sqrt[x] + 16*a^2*b^3*
x - 32*a^3*b^2*x^(3/2) + 128*a^4*b*x^2 + 256*a^5*x^(5/2)))/(63*b^
6*(b + a*Sqrt[x])*x^(5/2))
```

Maple [C] time = 0.017, size = 584, normalized size = 3.5

$$\frac{4}{63\,b^7}\sqrt{b\sqrt{x}+ax}\left(126\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}x^{11/2}a^5b^2-63\,x^{13/2}\ln\left(1/2\,\frac{2\,\sqrt{\sqrt{x}\left(b+\sqrt{x}a\right)}\sqrt{a}+2\,\sqrt{x}a+b}{\sqrt{a}}\right)a^{13/2}b+63\,x^{13/2}\ln\left(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^(5/2)/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] 4/63*(b*x^(1/2)+a*x)^(1/2)*(126*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(
11/2)*a^5*b^2-63*x^(13/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)
*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(13/2)*b+63*x^(13/2)*ln(1/2*(2
*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(13/2)*b
-126*x^6*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2
)*a+b)/a^(1/2))*a^(11/2)*b^2+126*x^6*ln(1/2*(2*(b*x^(1/2)+a*x)^(1
/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(11/2)*b^2+32*(b*x^(1/2)+a*
x)^(3/2)*x^4*a^3*b^3-7*(b*x^(1/2)+a*x)^(3/2)*x^(5/2)*b^6-63*x^(11
/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b
)/a^(1/2))*a^(9/2)*b^3-508*(b*x^(1/2)+a*x)^(3/2)*x^5*a^5*b+63*x^(
11/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1
/2))*a^(9/2)*b^3+252*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^6*a^6*b-128*
(b*x^(1/2)+a*x)^(3/2)*x^(9/2)*a^4*b^2+252*(b*x^(1/2)+a*x)^(1/2)*x
^6*a^6*b+126*(b*x^(1/2)+a*x)^(1/2)*x^(11/2)*a^5*b^2+126*(x^(1/2)*
(b+x^(1/2)*a))^(1/2)*x^(13/2)*a^7-315*(b*x^(1/2)+a*x)^(3/2)*x^(11
/2)*a^6+126*(b*x^(1/2)+a*x)^(1/2)*x^(13/2)*a^7+63*a^6*(x^(1/2)*(b
+x^(1/2)*a))^(3/2)*x^(11/2)-16*(b*x^(1/2)+a*x)^(3/2)*x^(7/2)*a^2*
b^4+10*(b*x^(1/2)+a*x)^(3/2)*x^3*a*b^5)/(x^(1/2)*(b+x^(1/2)*a))^(
1/2)/b^7/x^(11/2)/(b+x^(1/2)*a)^2
```

Maxima [A] time = 1.47846, size = 93, normalized size = 0.56

$$-\frac{4\left(256\,a^5x^{\frac{5}{2}}+128\,a^4bx^2-32\,a^3b^2x^{\frac{3}{2}}+16\,a^2b^3x-10\,ab^4\sqrt{x}+7\,b^5\right)}{63\,\sqrt{a\sqrt{x}+b}b^6x^{\frac{9}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(5/2)),x, algorithm="maxima")
```

```
[Out] -4/63*(256*a^5*x^(5/2) + 128*a^4*b*x^2 - 32*a^3*b^2*x^(3/2) + 16*
a^2*b^3*x - 10*a*b^4*sqrt(x) + 7*b^5)/(sqrt(a*sqrt(x) + b)*b^6*x^
(9/4))
```

Fricas [A] time = 0.258117, size = 136, normalized size = 0.82

$$\frac{4\left(128\,a^5bx^3-48\,a^3b^3x^2-17\,ab^5x-\left(256\,a^6x^3-160\,a^4b^2x^2-26\,a^2b^4x-7\,b^6\right)\sqrt{x}\right)\sqrt{ax+b\sqrt{x}}}{63\left(a^2b^6x^4-b^8x^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(5/2)),x, algorithm="fricas")
```

```
[Out] 4/63*(128*a^5*b*x^3 - 48*a^3*b^3*x^2 - 17*a*b^5*x - (256*a^6*x^3
- 160*a^4*b^2*x^2 - 26*a^2*b^4*x - 7*b^6)*sqrt(x))*sqrt(a*x + b*s
qrt(x))/(a^2*b^6*x^4 - b^8*x^3)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{\frac{5}{2}} \left(ax + b\sqrt{x}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**(5/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x**(5/2)*(a*x + b*sqrt(x))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}} x^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(5/2)),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(5/2)), x)
```

3.130 $\int \frac{1}{x^{7/2}\left(b\sqrt{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=223

$$-\frac{8192a^6\sqrt{ax+b\sqrt{x}}}{429b^8\sqrt{x}}+\frac{4096a^5\sqrt{ax+b\sqrt{x}}}{429b^7x}-\frac{1024a^4\sqrt{ax+b\sqrt{x}}}{143b^6x^{3/2}}+\frac{2560a^3\sqrt{ax+b\sqrt{x}}}{429b^5x^2}-\frac{2240a^2\sqrt{ax+b\sqrt{x}}}{429b^4x^{5/2}}+\frac{672a\sqrt{ax+b\sqrt{x}}}{143b^3x^3}-\frac{56\sqrt{ax+b\sqrt{x}}}{13b^2x^{7/2}}+\frac{4}{bx^3\sqrt{ax+b\sqrt{x}}}$$

```
[Out] 4/(b*x^3*Sqrt[b*Sqrt[x] + a*x]) - (56*Sqrt[b*Sqrt[x] + a*x])/(13*
b^2*x^(7/2)) + (672*a*Sqrt[b*Sqrt[x] + a*x])/(143*b^3*x^3) - (224
0*a^2*Sqrt[b*Sqrt[x] + a*x])/(429*b^4*x^(5/2)) + (2560*a^3*Sqrt[b
*Sqrt[x] + a*x])/(429*b^5*x^2) - (1024*a^4*Sqrt[b*Sqrt[x] + a*x])
/(143*b^6*x^(3/2)) + (4096*a^5*Sqrt[b*Sqrt[x] + a*x])/(429*b^7*x)
 - (8192*a^6*Sqrt[b*Sqrt[x] + a*x])/(429*b^8*Sqrt[x])
```

Rubi [A] time = 0.587026, antiderivative size = 223, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$-\frac{8192a^6\sqrt{ax+b\sqrt{x}}}{429b^8\sqrt{x}}+\frac{4096a^5\sqrt{ax+b\sqrt{x}}}{429b^7x}-\frac{1024a^4\sqrt{ax+b\sqrt{x}}}{143b^6x^{3/2}}+\frac{2560a^3\sqrt{ax+b\sqrt{x}}}{429b^5x^2}-\frac{2240a^2\sqrt{ax+b\sqrt{x}}}{429b^4x^{5/2}}+\frac{672a\sqrt{ax+b\sqrt{x}}}{143b^3x^3}-\frac{56\sqrt{ax+b\sqrt{x}}}{13b^2x^{7/2}}+\frac{4}{bx^3\sqrt{ax+b\sqrt{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(7/2)*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] 4/(b*x^3*Sqrt[b*Sqrt[x] + a*x]) - (56*Sqrt[b*Sqrt[x] + a*x])/(13*
b^2*x^(7/2)) + (672*a*Sqrt[b*Sqrt[x] + a*x])/(143*b^3*x^3) - (224
0*a^2*Sqrt[b*Sqrt[x] + a*x])/(429*b^4*x^(5/2)) + (2560*a^3*Sqrt[b
*Sqrt[x] + a*x])/(429*b^5*x^2) - (1024*a^4*Sqrt[b*Sqrt[x] + a*x])
/(143*b^6*x^(3/2)) + (4096*a^5*Sqrt[b*Sqrt[x] + a*x])/(429*b^7*x)
 - (8192*a^6*Sqrt[b*Sqrt[x] + a*x])/(429*b^8*Sqrt[x])
```

Rubi in Sympy [A] time = 59.1311, size = 209, normalized size = 0.94

$$-\frac{8192a^6\sqrt{ax+b\sqrt{x}}}{429b^8\sqrt{x}}+\frac{4096a^5\sqrt{ax+b\sqrt{x}}}{429b^7x}-\frac{1024a^4\sqrt{ax+b\sqrt{x}}}{143b^6x^{\frac{3}{2}}}+\frac{2560a^3\sqrt{ax+b\sqrt{x}}}{429b^5x^2}-\frac{2240a^2\sqrt{ax+b\sqrt{x}}}{429b^4x^{\frac{5}{2}}}+\frac{672a\sqrt{ax+b\sqrt{x}}}{143b^3x^3}+\frac{4}{bx^3\sqrt{ax+b\sqrt{x}}}-\frac{56\sqrt{ax+b\sqrt{x}}}{13b^2x^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(7/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] -8192*a**6*sqrt(a*x + b*sqrt(x))/(429*b**8*sqrt(x)) + 4096*a**5*s
qrt(a*x + b*sqrt(x))/(429*b**7*x) - 1024*a**4*sqrt(a*x + b*sqrt(x
))/(143*b**6*x**(3/2)) + 2560*a**3*sqrt(a*x + b*sqrt(x))/(429*b**
5*x**2) - 2240*a**2*sqrt(a*x + b*sqrt(x))/(429*b**4*x**(5/2)) + 6
72*a*sqrt(a*x + b*sqrt(x))/(143*b**3*x**3) + 4/(b*x**3*sqrt(a*x +
 b*sqrt(x))) - 56*sqrt(a*x + b*sqrt(x))/(13*b**2*x**(7/2))
```

Mathematica [A] time = 0.0719786, size = 120, normalized size = 0.54

$$-\frac{4\sqrt{ax+b\sqrt{x}}\left(2048a^7x^{7/2}+1024a^6bx^3-256a^5b^2x^{5/2}+128a^4b^3x^2-80a^3b^4x^{3/2}+56a^2b^5x-42ab^6\sqrt{x}+33b^7\right)}{429b^8x^{7/2}\left(a\sqrt{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(7/2)*(b*Sqrt[x] + a*x)^(3/2)),x]
```

```
[Out] (-4*Sqrt[b*Sqrt[x] + a*x]*(33*b^7 - 42*a*b^6*Sqrt[x] + 56*a^2*b^5
*x - 80*a^3*b^4*x^(3/2) + 128*a^4*b^3*x^2 - 256*a^5*b^2*x^(5/2) +
 1024*a^6*b*x^3 + 2048*a^7*x^(7/2)))/(429*b^8*(b + a*Sqrt[x])*x^(
7/2))
```

Maple [C] time = 0.02, size = 628, normalized size = 2.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(7/2)/(b*x^(1/2)+a*x)^(3/2),x)
```

```
[Out] 2/429*(b*x^(1/2)+a*x)^(1/2)*(1287*x^(17/2)*ln(1/2*(2*(b*x^(1/2)+a
*x)^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(17/2)*b-2574*x^8*ln(
1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/
2))*a^(15/2)*b^2+2574*x^8*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)
+2*x^(1/2)*a+b)/a^(1/2))*a^(15/2)*b^2-66*x^(7/2)*(b*x^(1/2)+a*x)^
(3/2)*b^8-1287*x^(17/2)*ln(1/2*(2*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*a
^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(17/2)*b+858*a^8*(x^(1/2)*(b+x^(
1/2)*a))^(3/2)*x^(15/2)-112*x^(9/2)*(b*x^(1/2)+a*x)^(3/2)*a^2*b^6
+84*x^4*(b*x^(1/2)+a*x)^(3/2)*a*b^7+2574*(x^(1/2)*(b+x^(1/2)*a))^
(1/2)*x^(17/2)*a^9-6006*x^(15/2)*(b*x^(1/2)+a*x)^(3/2)*a^8+2574*x
^(17/2)*(b*x^(1/2)+a*x)^(1/2)*a^9-1287*x^(15/2)*ln(1/2*(2*(x^(1/2
)*(b+x^(1/2)*a))^(1/2)*a^(1/2)+2*x^(1/2)*a+b)/a^(1/2))*a^(13/2)*b
^3+1287*x^(15/2)*ln(1/2*(2*(b*x^(1/2)+a*x)^(1/2)*a^(1/2)+2*x^(1/2
)*a+b)/a^(1/2))*a^(13/2)*b^3+5148*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x
^8*a^8*b-2048*x^(13/2)*(b*x^(1/2)+a*x)^(3/2)*a^6*b^2-9244*x^7*(b*
x^(1/2)+a*x)^(3/2)*a^7*b+5148*x^8*(b*x^(1/2)+a*x)^(1/2)*a^8*b+257
4*(x^(1/2)*(b+x^(1/2)*a))^(1/2)*x^(15/2)*a^7*b^2-256*x^(11/2)*(b*
x^(1/2)+a*x)^(3/2)*a^4*b^4+512*x^6*(b*x^(1/2)+a*x)^(3/2)*a^5*b^3+
2574*x^(15/2)*(b*x^(1/2)+a*x)^(1/2)*a^7*b^2+160*x^5*(b*x^(1/2)+a*
x)^(3/2)*a^3*b^5)/(x^(1/2)*(b+x^(1/2)*a))^(1/2)/b^9/x^(15/2)/(b+x
^(1/2)*a)^2
```

Maxima [A] time = 1.53583, size = 123, normalized size = 0.55

$$-\frac{4\left(2048\,a^{7}x^{\frac{7}{2}}+1024\,a^{6}bx^{3}-256\,a^{5}b^{2}x^{\frac{5}{2}}+128\,a^{4}b^{3}x^{2}-80\,a^{3}b^{4}x^{\frac{3}{2}}+56\,a^{2}b^{5}x-42\,ab^{6}\sqrt{x}+33\,b^{7}\right)}{429\,\sqrt{a\sqrt{x}+b}b^{8}x^{\frac{13}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(7/2)),x, algorithm="maxima")
```

```
[Out] -4/429*(2048*a^7*x^(7/2) + 1024*a^6*b*x^3 - 256*a^5*b^2*x^(5/2) +
 128*a^4*b^3*x^2 - 80*a^3*b^4*x^(3/2) + 56*a^2*b^5*x - 42*a*b^6*s
qrt(x) + 33*b^7)/(sqrt(a*sqrt(x) + b)*b^8*x^(13/4))
```

Fricas [A] time = 0.261514, size = 166, normalized size = 0.74

$$\frac{4\left(1024\,a^{7}bx^{4}-384\,a^{5}b^{3}x^{3}-136\,a^{3}b^{5}x^{2}-75\,ab^{7}x-\left(2048\,a^{8}x^{4}-1280\,a^{6}b^{2}x^{3}-208\,a^{4}b^{4}x^{2}-98\,a^{2}b^{6}x-33\,b^{8}\right)\sqrt{x}\right)\sqrt{ax}}{429\left(a^{2}b^{8}x^{5}-b^{10}x^{4}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(7/2)),x, algorithm="fricas")
```

```
[Out] 4/429*(1024*a^7*b*x^4 - 384*a^5*b^3*x^3 - 136*a^3*b^5*x^2 - 75*a*
b^7*x - (2048*a^8*x^4 - 1280*a^6*b^2*x^3 - 208*a^4*b^4*x^2 - 98*a
^2*b^6*x - 33*b^8)*sqrt(x))*sqrt(a*x + b*sqrt(x))/(a^2*b^8*x^5 -
b^10*x^4)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(7/2)/(b*x**(1/2)+a*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt{x}\right)^{\frac{3}{2}} x^{\frac{7}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(7/2)),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*sqrt(x))^(3/2)*x^(7/2)), x)
```

3.131 $\int x^3\sqrt{b\sqrt[3]{x}+ax}\,dx$

Optimal. Leaf size=301

$$\frac{442b^{27/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{14421a^{25/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{884b^6\sqrt{ax+b\sqrt[3]{x}}}{14421a^6}+\frac{884b^5x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{24035a^5}-\frac{6188b^4x^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{216315a^4}+\frac{476b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{19665a^3}-\frac{28b^2x^{8/3}\sqrt{ax+b\sqrt[3]{x}}}{1311a^2}+\frac{4bx^{10/3}\sqrt{ax+b\sqrt[3]{x}}}{207a}+\frac{2}{9}x^4\sqrt{ax+b\sqrt[3]{x}}$$

```
[Out] (-884*b^6*Sqrt[b*x^(1/3) + a*x])/(14421*a^6) + (884*b^5*x^(2/3)*S
qrt[b*x^(1/3) + a*x])/(24035*a^5) - (6188*b^4*x^(4/3)*Sqrt[b*x^(1
/3) + a*x])/(216315*a^4) + (476*b^3*x^2*Sqrt[b*x^(1/3) + a*x])/(1
9665*a^3) - (28*b^2*x^(8/3)*Sqrt[b*x^(1/3) + a*x])/(1311*a^2) + (
4*b*x^(10/3)*Sqrt[b*x^(1/3) + a*x])/(207*a) + (2*x^4*Sqrt[b*x^(1/
3) + a*x])/9 + (442*b^(27/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b
+ a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*A
rcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(14421*a^(25/4)*Sqrt[b*x^
(1/3) + a*x])
```

Rubi [A] time = 0.895757, antiderivative size = 301, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.316

$$\frac{442b^{27/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{14421a^{25/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{884b^6\sqrt{ax+b\sqrt[3]{x}}}{14421a^6}+\frac{884b^5x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{24035a^5}-\frac{6188b^4x^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{216315a^4}+\frac{476b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{19665a^3}-\frac{28b^2x^{8/3}\sqrt{ax+b\sqrt[3]{x}}}{1311a^2}+\frac{4bx^{10/3}\sqrt{ax+b\sqrt[3]{x}}}{207a}+\frac{2}{9}x^4\sqrt{ax+b\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3*Sqrt[b*x^(1/3) + a*x],x]
```


```
[Out] (-884*b^6*Sqrt[b*x^(1/3) + a*x])/(14421*a^6) + (884*b^5*x^(2/3)*S
qrt[b*x^(1/3) + a*x])/(24035*a^5) - (6188*b^4*x^(4/3)*Sqrt[b*x^(1
/3) + a*x])/(216315*a^4) + (476*b^3*x^2*Sqrt[b*x^(1/3) + a*x])/(1
9665*a^3) - (28*b^2*x^(8/3)*Sqrt[b*x^(1/3) + a*x])/(1311*a^2) + (
4*b*x^(10/3)*Sqrt[b*x^(1/3) + a*x])/(207*a) + (2*x^4*Sqrt[b*x^(1/
3) + a*x])/9 + (442*b^(27/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b
+ a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*A
rcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(14421*a^(25/4)*Sqrt[b*x^
(1/3) + a*x])
```

Rubi in Sympy [A] time = 80.9983, size = 289, normalized size = 0.96

$$\frac{2x^4\sqrt{ax+b\sqrt[3]{x}}}{9}+\frac{4bx^{\frac{10}{3}}\sqrt{ax+b\sqrt[3]{x}}}{207a}-\frac{28b^2x^{\frac{8}{3}}\sqrt{ax+b\sqrt[3]{x}}}{1311a^2}+\frac{476b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{19665a^3}-\frac{6188b^4x^{\frac{4}{3}}\sqrt{ax+b\sqrt[3]{x}}}{216315a^4}+\frac{884b^5x^{\frac{2}{3}}\sqrt{ax+b\sqrt[3]{x}}}{24035a^5}-\frac{884b^6\sqrt{ax+b\sqrt[3]{x}}}{14421a^6}+\frac{442b^{\frac{27}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{14421a^{\frac{25}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**4*sqrt(a*x + b*x**(1/3))/9 + 4*b*x**(10/3)*sqrt(a*x + b*x**(
1/3))/(207*a) - 28*b**2*x**(8/3)*sqrt(a*x + b*x**(1/3))/(1311*a**
2) + 476*b**3*x**2*sqrt(a*x + b*x**(1/3))/(19665*a**3) - 6188*b**
4*x**(4/3)*sqrt(a*x + b*x**(1/3))/(216315*a**4) + 884*b**5*x**(2/
3)*sqrt(a*x + b*x**(1/3))/(24035*a**5) - 884*b**6*sqrt(a*x + b*x*
*(1/3))/(14421*a**6) + 442*b**(27/4)*sqrt((a*x**(2/3) + b)/(sqrt(
a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x
+ b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)
/(14421*a**(25/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.127625, size = 155, normalized size = 0.51

$$\frac{2\sqrt[3]{x}\left(24035a^7x^{14/3} + 26125a^6bx^4 - 220a^5b^2x^{10/3} + 308a^4b^3x^{8/3} - 476a^3b^4x^2 + 884a^2b^5x^{4/3} - 6630b^7\sqrt{\frac{b}{ax^{2/3}} + 1}\,{}_2F_1\left(\frac{1}{4}, \frac{1}{2};\right.\right.}{216315a^6\sqrt{ax + b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3*Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(1/3)*(-6630*b^7 - 2652*a*b^6*x^(2/3) + 884*a^2*b^5*x^(4/3)
- 476*a^3*b^4*x^2 + 308*a^4*b^3*x^(8/3) - 220*a^5*b^2*x^(10/3) +
26125*a^6*b*x^4 + 24035*a^7*x^(14/3) - 6630*b^7*Sqrt[1 + b/(a*x^(
2/3))]*Hypergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(2163
15*a^6*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.05, size = 264, normalized size = 0.9

$$\frac{2\,x^4}{9}\sqrt{b\sqrt[3]{x}+ax} + \frac{4\,b}{207\,a}x^{\frac{10}{3}}\sqrt{b\sqrt[3]{x}+ax} - \frac{28\,b^2}{1311\,a^2}x^{\frac{8}{3}}\sqrt{b\sqrt[3]{x}+ax} + \frac{476\,b^3x^2}{19665\,a^3}\sqrt{b\sqrt[3]{x}+ax}$$
$$-\frac{6188\,b^4}{216315\,a^4}x^{\frac{4}{3}}\sqrt{b\sqrt[3]{x}+ax} + \frac{884\,b^5}{24035\,a^5}x^{\frac{2}{3}}\sqrt{b\sqrt[3]{x}+ax} - \frac{884\,b^6}{14421\,a^6}\sqrt{b\sqrt[3]{x}+ax}$$
$$+\frac{442\,b^7}{14421\,a^7}\sqrt{-ab}\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-\frac{\sqrt{-ab}}{a}\right)}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] 2/9*x^4*(b*x^(1/3)+a*x)^(1/2)+4/207*b*x^(10/3)*(b*x^(1/3)+a*x)^(1
/2)/a-28/1311*b^2*x^(8/3)*(b*x^(1/3)+a*x)^(1/2)/a^2+476/19665*b^3
*x^2*(b*x^(1/3)+a*x)^(1/2)/a^3-6188/216315*b^4*x^(4/3)*(b*x^(1/3)
+a*x)^(1/2)/a^4+884/24035*b^5*x^(2/3)*(b*x^(1/3)+a*x)^(1/2)/a^5-8
84/14421*b^6*(b*x^(1/3)+a*x)^(1/2)/a^6+442/14421*b^7/a^7*(-a*b)^(
1/2)*((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2)*(-2*(x^(1/3)
-(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^
(1/2)/(b*x^(1/3)+a*x)^(1/2)*EllipticF(((x^(1/3)+(-a*b)^(1/2)/a)/(
-a*b)^(1/2)*a)^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax + bx^{\frac{1}{3}}}x^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x^3,x, algorithm="maxima")

[Out] integrate(sqrt(a*x + b*x^(1/3))*x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{ax + bx^{\frac{1}{3}}}x^3, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x^3,x, algorithm="fricas")

[Out] integral(sqrt(a*x + b*x^(1/3))*x^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^3\sqrt{ax + b\sqrt[3]{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(b*x**(1/3)+a*x)**(1/2),x)

[Out] Integral(x**3*sqrt(a*x + b*x**(1/3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax + bx^{\frac{1}{3}}}x^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x^3,x, algorithm="giac")

[Out] integrate(sqrt(a*x + b*x^(1/3))*x^3, x)
```

3.132 $\int x^2\sqrt{b\sqrt[3]{x}+ax}\,dx$

Optimal. Leaf size=411

$$\frac{22b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{19/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{44b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{19/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{44b^5\sqrt[3]{x}\left(ax^{2/3}+b\right)}{221a^{9/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{44b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^4} + \frac{220b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^3} - \frac{60b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}{1547a^2} + \frac{4bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}}{119a} + \frac{2}{7}x^3\sqrt{ax+b\sqrt[3]{x}}$$

```
[Out] (44*b^5*(b + a*x^(2/3))*x^(1/3))/(221*a^(9/2)*(Sqrt[b] + Sqrt[a]*
x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (44*b^4*x^(1/3)*Sqrt[b*x^(1/3)
+ a*x])/(663*a^4) + (220*b^3*x*Sqrt[b*x^(1/3) + a*x])/(4641*a^3)
- (60*b^2*x^(5/3)*Sqrt[b*x^(1/3) + a*x])/(1547*a^2) + (4*b*x^(7/3
)*Sqrt[b*x^(1/3) + a*x])/(119*a) + (2*x^3*Sqrt[b*x^(1/3) + a*x])/
7 - (44*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))
/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/
4)*x^(1/6))/b^(1/4)], 1/2])/(221*a^(19/4)*Sqrt[b*x^(1/3) + a*x])
+ (22*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(
Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)
*x^(1/6))/b^(1/4)], 1/2])/(221*a^(19/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 1.06558, antiderivative size = 411, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.421$

$$\frac{22b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{19/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{44b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{19/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{44b^5\sqrt[3]{x}\left(ax^{2/3}+b\right)}{221a^{9/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{44b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^4} + \frac{220b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^3} - \frac{60b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}{1547a^2} + \frac{4bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}}{119a} + \frac{2}{7}x^3\sqrt{ax+b\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*Sqrt[b*x^(1/3) + a*x],x]
```


```
[Out] (44*b^5*(b + a*x^(2/3))*x^(1/3))/(221*a^(9/2)*(Sqrt[b] + Sqrt[a]*
x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (44*b^4*x^(1/3)*Sqrt[b*x^(1/3)
+ a*x])/(663*a^4) + (220*b^3*x*Sqrt[b*x^(1/3) + a*x])/(4641*a^3)
- (60*b^2*x^(5/3)*Sqrt[b*x^(1/3) + a*x])/(1547*a^2) + (4*b*x^(7/3
)*Sqrt[b*x^(1/3) + a*x])/(119*a) + (2*x^3*Sqrt[b*x^(1/3) + a*x])/
7 - (44*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))
/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/
4)*x^(1/6))/b^(1/4)], 1/2])/(221*a^(19/4)*Sqrt[b*x^(1/3) + a*x])
+ (22*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(
Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)
*x^(1/6))/b^(1/4)], 1/2])/(221*a^(19/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 96.9116, size = 382, normalized size = 0.93

$$\frac{2x^3\sqrt{ax+b\sqrt[3]{x}}}{7}+\frac{4bx^{\frac{7}{3}}\sqrt{ax+b\sqrt[3]{x}}}{119a}-\frac{60b^2x^{\frac{5}{3}}\sqrt{ax+b\sqrt[3]{x}}}{1547a^2}+\frac{220b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^3}-\frac{44b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^4}+\frac{44b^5\sqrt{ax+b\sqrt[3]{x}}}{221a^{\frac{9}{2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}-\frac{44b^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{221a^{\frac{19}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{22b^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{221a^{\frac{19}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**3*sqrt(a*x + b*x**(1/3))/7 + 4*b*x**(7/3)*sqrt(a*x + b*x**(1
/3))/(119*a) - 60*b**2*x**(5/3)*sqrt(a*x + b*x**(1/3))/(1547*a**2
) + 220*b**3*x*sqrt(a*x + b*x**(1/3))/(4641*a**3) - 44*b**4*x**(1
/3)*sqrt(a*x + b*x**(1/3))/(663*a**4) + 44*b**5*sqrt(a*x + b*x**(
1/3))/(221*a**(9/2)*(sqrt(a)*x**(1/3) + sqrt(b))) - 44*b**(21/4)*
sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x
**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_e(2*atan(a**(1
/4)*x**(1/6)/b**(1/4)), 1/2)/(221*a**(19/4)*x**(1/6)*(a*x**(2/3)
+ b)) + 22*b**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sq
rt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*el
liptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(221*a**(19/4)*
x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0845267, size = 131, normalized size = 0.32

$$\frac{2x^{2/3}\left(663a^5x^{10/3}+741a^4bx^{8/3}-12a^3b^2x^2+20a^2b^3x^{4/3}+462b^5\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)-44ab^4x^{2/3}-154b^5\right)}{4641a^4\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(2/3)*(-154*b^5 - 44*a*b^4*x^(2/3) + 20*a^2*b^3*x^(4/3) - 12
*a^3*b^2*x^2 + 741*a^4*b*x^(8/3) + 663*a^5*x^(10/3) + 462*b^5*Sqr
t[1 + b/(a*x^(2/3))]*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*x^(
2/3)))]))/(4641*a^4*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.025, size = 273, normalized size = 0.7

$$\frac{2x^3}{7}\sqrt{b\sqrt[3]{x}+ax}+\frac{4b}{119a}x^{\frac{7}{3}}\sqrt{b\sqrt[3]{x}+ax}-\frac{60b^2}{1547a^2}x^{\frac{5}{3}}\sqrt{b\sqrt[3]{x}+ax}+\frac{220b^3x}{4641a^3}\sqrt{b\sqrt[3]{x}+ax}-\frac{44b^4}{663a^4}\sqrt[3]{x}\sqrt{b\sqrt[3]{x}+ax}+\frac{22b^5}{221a^5}\sqrt{-ab}\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-\frac{\sqrt{-ab}}{a}\right)}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{a}EllipticE\left(\sqrt{\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}+\frac{\sqrt{-}}{}\right.}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] 2/7*x^3*(b*x^(1/3)+a*x)^(1/2)+4/119*b*x^(7/3)*(b*x^(1/3)+a*x)^(1/
2)/a-60/1547*b^2*x^(5/3)*(b*x^(1/3)+a*x)^(1/2)/a^2+220/4641*b^3*x
*(b*x^(1/3)+a*x)^(1/2)/a^3-44/663*b^4*x^(1/3)*(b*x^(1/3)+a*x)^(1/
2)/a^4+22/221*b^5/a^5*(-a*b)^(1/2)*((x^(1/3)+(-a*b)^(1/2)/a)/(-a*
b)^(1/2)*a)^(1/2)*(-2*(x^(1/3)-(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1
/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)/(b*x^(1/3)+a*x)^(1/2)*(-2*(-a
*b)^(1/2)/a*EllipticE(((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(
1/2),1/2*2^(1/2))+(-a*b)^(1/2)/a*EllipticF(((x^(1/3)+(-a*b)^(1/2)
/a)/(-a*b)^(1/2)*a)^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax + bx^{\frac{1}{3}}}x^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3))*x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{ax + bx^{\frac{1}{3}}}x^2, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(a*x + b*x^(1/3))*x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2\sqrt{ax + b\sqrt[3]{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x**2*sqrt(a*x + b*x**(1/3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax + bx^{\frac{1}{3}}}x^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3))*x^2, x)
```

3.133 $\int x\sqrt{b\sqrt[3]{x}+ax}\,dx$

Optimal. Leaf size=213

$$-\frac{6b^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77a^{13/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{12b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^3}-\frac{36b^2x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{385a^2}+\frac{4bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{55a}+\frac{2}{5}x^2\sqrt{ax+b\sqrt[3]{x}}$$

```
[Out] (12*b^3*Sqrt[b*x^(1/3) + a*x])/(77*a^3) - (36*b^2*x^(2/3)*Sqrt[b*
x^(1/3) + a*x])/(385*a^2) + (4*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x])/(
55*a) + (2*x^2*Sqrt[b*x^(1/3) + a*x])/5 - (6*b^(15/4)*(Sqrt[b] +
Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))
^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/
(77*a^(13/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.552869, antiderivative size = 213, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.353$

$$-\frac{6b^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77a^{13/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{12b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^3}-\frac{36b^2x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{385a^2}+\frac{4bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{55a}+\frac{2}{5}x^2\sqrt{ax+b\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[x*Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (12*b^3*Sqrt[b*x^(1/3) + a*x])/(77*a^3) - (36*b^2*x^(2/3)*Sqrt[b*
x^(1/3) + a*x])/(385*a^2) + (4*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x])/(
55*a) + (2*x^2*Sqrt[b*x^(1/3) + a*x])/5 - (6*b^(15/4)*(Sqrt[b] +
Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))
^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/
(77*a^(13/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 47.4334, size = 204, normalized size = 0.96

$$\frac{2x^2\sqrt{ax+b\sqrt[3]{x}}}{5}+\frac{4bx^{\frac{4}{3}}\sqrt{ax+b\sqrt[3]{x}}}{55a}-\frac{36b^2x^{\frac{2}{3}}\sqrt{ax+b\sqrt[3]{x}}}{385a^2}+\frac{12b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^3}-\frac{6b^{\frac{15}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{77a^{\frac{13}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**2*sqrt(a*x + b*x**(1/3))/5 + 4*b*x**(4/3)*sqrt(a*x + b*x**(1
/3))/(55*a) - 36*b**2*x**(2/3)*sqrt(a*x + b*x**(1/3))/(385*a**2)
+ 12*b**3*sqrt(a*x + b*x**(1/3))/(77*a**3) - 6*b**(15/4)*sqrt((a*
x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3)
+ sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(
1/6)/b**(1/4)), 1/2)/(77*a**(13/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0839891, size = 118, normalized size = 0.55

$$\frac{2\sqrt[3]{x}\left(77a^4x^{8/3}+91a^3bx^2-4a^2b^2x^{4/3}+30b^4\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+12ab^3x^{2/3}+30b^4\right)}{385a^3\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(1/3)*(30*b^4 + 12*a*b^3*x^(2/3) - 4*a^2*b^2*x^(4/3) + 91*a^
3*b*x^2 + 77*a^4*x^(8/3) + 30*b^4*Sqrt[1 + b/(a*x^(2/3))]*Hyperge
ometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(385*a^3*Sqrt[b*x^(
1/3) + a*x])
```

Maple [A] time = 0.023, size = 198, normalized size = 0.9

$$\frac{2\,x^2}{5}\sqrt{b\sqrt[3]{x}+ax}+\frac{4\,b}{55\,a}x^{\frac{4}{3}}\sqrt{b\sqrt[3]{x}+ax}-\frac{36\,b^2}{385\,a^2}x^{\frac{2}{3}}\sqrt{b\sqrt[3]{x}+ax}+\frac{12\,b^3}{77\,a^3}\sqrt{b\sqrt[3]{x}+ax}$$
$$-\frac{6\,b^4}{77\,a^4}\sqrt{-ab}\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-\frac{\sqrt{-ab}}{a}\right)}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}\mathit{EllipticF}\left(\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] 2/5*x^2*(b*x^(1/3)+a*x)^(1/2)+4/55*b*x^(4/3)*(b*x^(1/3)+a*x)^(1/2
)/a-36/385*b^2*x^(2/3)*(b*x^(1/3)+a*x)^(1/2)/a^2+12/77*b^3*(b*x^(
1/3)+a*x)^(1/2)/a^3-6/77/a^4*b^4*(-a*b)^(1/2)*((x^(1/3)+(-a*b)^(1
/2)/a)/(-a*b)^(1/2)*a)^(1/2)*(-2*(x^(1/3)-(-a*b)^(1/2)/a)/(-a*b)^
(1/2)*a)^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)/(b*x^(1/3)+a*x)^(1
/2)*EllipticF(((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2),1/2
*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{ax+bx^{\frac{1}{3}}}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3))*x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{ax+bx^{\frac{1}{3}}}x,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(a*x + b*x^(1/3))*x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\sqrt{ax+b\sqrt[3]{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x*sqrt(a*x + b*x**(1/3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax+bx^{\frac{1}{3}}}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))*x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3))*x, x)
```

3.134 $\int \sqrt{b\sqrt[3]{x}+ax}\,dx$

Optimal. Leaf size=323

$$-\frac{2b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{7/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{4b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{7/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{4b^2\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5a^{3/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{4b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a}+\frac{2}{3}x\sqrt{ax+b\sqrt[3]{x}}$$

```
[Out] (-4*b^2*(b + a*x^(2/3))*x^(1/3))/(5*a^(3/2)*(Sqrt[b] + Sqrt[a]*x^
(1/3))*Sqrt[b*x^(1/3) + a*x]) + (4*b*x^(1/3)*Sqrt[b*x^(1/3) + a*x
])/(15*a) + (2*x*Sqrt[b*x^(1/3) + a*x])/3 + (4*b^(9/4)*(Sqrt[b] +
 Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3)
)^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])
/(5*a^(7/4)*Sqrt[b*x^(1/3) + a*x]) - (2*b^(9/4)*(Sqrt[b] + Sqrt[a
]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^
(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*a^(
7/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.65427, antiderivative size = 323, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.533

$$-\frac{2b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{7/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{4b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{7/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{4b^2\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5a^{3/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{4b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a}+\frac{2}{3}x\sqrt{ax+b\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(1/3) + a*x],x]
```


```
[Out] (-4*b^2*(b + a*x^(2/3))*x^(1/3))/(5*a^(3/2)*(Sqrt[b] + Sqrt[a]*x^
(1/3))*Sqrt[b*x^(1/3) + a*x]) + (4*b*x^(1/3)*Sqrt[b*x^(1/3) + a*x
])/(15*a) + (2*x*Sqrt[b*x^(1/3) + a*x])/3 + (4*b^(9/4)*(Sqrt[b] +
 Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3)
)^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])
/(5*a^(7/4)*Sqrt[b*x^(1/3) + a*x]) - (2*b^(9/4)*(Sqrt[b] + Sqrt[a
]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^
(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*a^(
7/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 55.3839, size = 298, normalized size = 0.92

$$\frac{2x\sqrt{ax+b\sqrt[3]{x}}}{3}+\frac{4b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a}-\frac{4b^2\sqrt{ax+b\sqrt[3]{x}}}{5a^{\frac{3}{2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}+\frac{4b^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{7}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}-\frac{2b^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{7}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*x*sqrt(a*x + b*x**(1/3))/3 + 4*b*x**(1/3)*sqrt(a*x + b*x**(1/3)
)/(15*a) - 4*b**2*sqrt(a*x + b*x**(1/3))/(5*a**(3/2)*(sqrt(a)*x**
(1/3) + sqrt(b))) + 4*b**(9/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**
(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x*
*(1/3))*elliptic_e(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(5*a*
*(7/4)*x**(1/6)*(a*x**(2/3) + b)) - 2*b**(9/4)*sqrt((a*x**(2/3) +
 b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))
*sqrt(a*x + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1
/4)), 1/2)/(5*a**(7/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0690847, size = 94, normalized size = 0.29

$$\frac{2x^{2/3}\left(5a^2x^{4/3}-6b^2\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+7abx^{2/3}+2b^2\right)}{15a\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(2/3)*(2*b^2 + 7*a*b*x^(2/3) + 5*a^2*x^(4/3) - 6*b^2*Sqrt[1
+ b/(a*x^(2/3))]*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*x^(2/3)
))]))/(15*a*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.023, size = 207, normalized size = 0.6

$$\frac{2x}{3}\sqrt{b\sqrt[3]{x}+ax}+\frac{4b}{15a}\sqrt[3]{x}\sqrt{b\sqrt[3]{x}+ax}-\frac{2b^2}{5a^2}\sqrt{-ab}\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-\frac{\sqrt{-ab}}{a}\right)}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{a}EllipticE\left(\sqrt{\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}+\frac{\sqrt{-}}{a}\right.}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] 2/3*x*(b*x^(1/3)+a*x)^(1/2)+4/15*b*x^(1/3)*(b*x^(1/3)+a*x)^(1/2)/
a-2/5/a^2*b^2*(-a*b)^(1/2)*((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)
*a)^(1/2)*(-2*(x^(1/3)-(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2)*(-x^
(1/3)/(-a*b)^(1/2)*a)^(1/2)/(b*x^(1/3)+a*x)^(1/2)*(-2*(-a*b)^(1/2
)/a*EllipticE(((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2),1/2
```

```
*2^(1/2))+(-a*b)^(1/2)/a*EllipticF(((x^(1/3)+(-a*b)^(1/2)/a)/(-a*
b)^(1/2)*a)^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax + bx^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{ax + bx^{\frac{1}{3}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(a*x + b*x^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax + b\sqrt[3]{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(sqrt(a*x + b*x**(1/3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax + bx^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3)), x)
```

3.135 $\int \frac{\sqrt{b\sqrt[3]{x}+ax}}{x}\,dx$

Optimal. Leaf size=123

$$\frac{2b^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{\sqrt[4]{a}\sqrt{ax+b\sqrt[3]{x}}}+2\sqrt{ax+b\sqrt[3]{x}}$$

```
[Out] 2*Sqrt[b*x^(1/3) + a*x] + (2*b^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*
Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ellip
ticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(a^(1/4)*Sqrt[b*x
^(1/3) + a*x])
```

Rubi [A] time = 0.287112, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$\frac{2b^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{\sqrt[4]{a}\sqrt{ax+b\sqrt[3]{x}}}+2\sqrt{ax+b\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(1/3) + a*x]/x,x]
```

```
[Out] 2*Sqrt[b*x^(1/3) + a*x] + (2*b^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*
Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ellip
ticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(a^(1/4)*Sqrt[b*x
^(1/3) + a*x])
```

Rubi in Sympy [A] time = 24.529, size = 119, normalized size = 0.97

$$2\sqrt{ax+b\sqrt[3]{x}}+\frac{2b^{\frac{3}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{\sqrt[4]{a}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(1/2)/x,x)
```

```
[Out] 2*sqrt(a*x + b*x**(1/3)) + 2*b**(3/4)*sqrt((a*x**(2/3) + b)/(sqrt
(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x
 + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2
)/(a**(1/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.060417, size = 71, normalized size = 0.58

$$\frac{2\sqrt[3]{x}\left(-2b\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+ax^{2/3}+b\right)}{\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(1/3) + a*x]/x,x]
```

```
[Out] (2*x^(1/3)*(b + a*x^(2/3) - 2*b*Sqrt[1 + b/(a*x^(2/3))]*Hypergeom
etric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/Sqrt[b*x^(1/3) + a*x]
```

Maple [A] time = 0.021, size = 132, normalized size = 1.1

$$2\sqrt{b\sqrt[3]{x}+ax}+2\,{\frac{b\sqrt{-ab}}{a\sqrt{b\sqrt[3]{x}+ax}}\sqrt{{\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}+{\frac{\sqrt{-ab}}{a}}\right)}}\sqrt{-2\,{\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-{\frac{\sqrt{-ab}}{a}}\right)}}\sqrt{-{\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}}{\it EllipticF}\left(\sqrt{{\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}+{\frac{\sqrt{-ab}}{a}}\right)}},1/2\,\sqrt{2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(1/2)/x,x)
```

```
[Out] 2*(b*x^(1/3)+a*x)^(1/2)+2*b*(-a*b)^(1/2)/a*((x^(1/3)+(-a*b)^(1/2)
/a)/(-a*b)^(1/2)*a)^(1/2)*(-2*(x^(1/3)-(-a*b)^(1/2)/a)/(-a*b)^(1/
2)*a)^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)/(b*x^(1/3)+a*x)^(1/2)
*EllipticF(((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2),1/2*2^
(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax+bx^{\frac{1}{3}}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3))/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$${\rm integral}\left(\frac{\sqrt{ax+bx^{\frac{1}{3}}}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(a*x + b*x^(1/3))/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax+b\sqrt[3]{x}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(1/2)/x,x)
```

```
[Out] Integral(sqrt(a*x + b*x**(1/3))/x, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax + bx^{\frac{1}{3}}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x,x, algorithm="giac")

[Out] integrate(sqrt(a*x + b*x^(1/3))/x, x)
```

3.136 $\int \frac{\sqrt{b\sqrt[3]{x}+ax}}{x^2}\,dx$

Optimal. Leaf size=325

$$\frac{6a^{5/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{12a^{5/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{12a^{3/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{12a\sqrt{ax+b\sqrt[3]{x}}}{5b\sqrt[3]{x}} - \frac{6\sqrt{ax+b\sqrt[3]{x}}}{5x}$$

```
[Out] (12*a^(3/2)*(b + a*x^(2/3))*x^(1/3))/(5*b*(Sqrt[b] + Sqrt[a]*x^(1
/3))*Sqrt[b*x^(1/3) + a*x]) - (6*Sqrt[b*x^(1/3) + a*x])/(5*x) - (
12*a*Sqrt[b*x^(1/3) + a*x])/(5*b*x^(1/3)) - (12*a^(5/4)*(Sqrt[b]
+ Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3
))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2]
)/(5*b^(3/4)*Sqrt[b*x^(1/3) + a*x]) + (6*a^(5/4)*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x
^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*b^
(3/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.693817, antiderivative size = 325, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421

$$\frac{6a^{5/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{12a^{5/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{12a^{3/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{12a\sqrt{ax+b\sqrt[3]{x}}}{5b\sqrt[3]{x}} - \frac{6\sqrt{ax+b\sqrt[3]{x}}}{5x}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(1/3) + a*x]/x^2,x]
```


```
[Out] (12*a^(3/2)*(b + a*x^(2/3))*x^(1/3))/(5*b*(Sqrt[b] + Sqrt[a]*x^(1
/3))*Sqrt[b*x^(1/3) + a*x]) - (6*Sqrt[b*x^(1/3) + a*x])/(5*x) - (
12*a*Sqrt[b*x^(1/3) + a*x])/(5*b*x^(1/3)) - (12*a^(5/4)*(Sqrt[b]
+ Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3
))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2]
)/(5*b^(3/4)*Sqrt[b*x^(1/3) + a*x]) + (6*a^(5/4)*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x
^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*b^
(3/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 62.8445, size = 296, normalized size = 0.91

$$-\frac{12a^{\frac{5}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{6a^{\frac{5}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{12a^{\frac{3}{2}}\sqrt{ax+b\sqrt[3]{x}}}{5b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{5b\sqrt[3]{x}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{5x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(1/2)/x**2,x)
```

```
[Out] -12*a**(5/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**
2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_e
(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(5*b**(3/4)*x**(1/6)*(a
*x**(2/3) + b)) + 6*a**(5/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1
/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(
1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(5*b**(
3/4)*x**(1/6)*(a*x**(2/3) + b)) + 12*a**(3/2)*sqrt(a*x + b*x**(1/
3))/(5*b*(sqrt(a)*x**(1/3) + sqrt(b))) - 12*a*sqrt(a*x + b*x**(1/
3))/(5*b*x**(1/3)) - 6*sqrt(a*x + b*x**(1/3))/(5*x)
```

Mathematica [C] time = 0.067701, size = 97, normalized size = 0.3

$$-\frac{6\left(-2a^2x^{4/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+2a^2x^{4/3}+3abx^{2/3}+b^2\right)}{5bx^{2/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(1/3) + a*x]/x^2,x]
```

```
[Out] (-6*(b^2 + 3*a*b*x^(2/3) + 2*a^2*x^(4/3) - 2*a^2*Sqrt[1 + b/(a*x^
(2/3))]*x^(4/3)*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*x^(2/3))
)]))/(5*b*x^(2/3)*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.033, size = 213, normalized size = 0.7

$$-\frac{6}{5x}\sqrt{b\sqrt[3]{x}+ax}-\frac{12a}{5b}\left(b+ax^{\frac{2}{3}}\right)\frac{1}{\sqrt{\sqrt[3]{x}\left(b+ax^{\frac{2}{3}}\right)}}+\frac{6a}{5b}\sqrt{-ab}\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-\frac{\sqrt{-ab}}{a}\right)}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{a}EllipticE\left(\sqrt{\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}+\frac{\sqrt{-ab}}{a}\right.}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(1/2)/x^2,x)
```

```
[Out] -6/5*(b*x^(1/3)+a*x)^(1/2)/x-12/5*(b+a*x^(2/3))*a/b/(x^(1/3)*(b+a
*x^(2/3)))^(1/2)+6/5/b*a*(-a*b)^(1/2)*((x^(1/3)+(-a*b)^(1/2)/a)/(
-a*b)^(1/2)*a)^(1/2)*(-2*(x^(1/3)-(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)
^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)/(b*x^(1/3)+a*x)^(1/2)*(-2*
```

```
(-a*b)^(1/2)/a*EllipticE(((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a
)^(1/2),1/2*2^(1/2))+(-a*b)^(1/2)/a*EllipticF(((x^(1/3)+(-a*b)^(1
/2)/a)/(-a*b)^(1/2)*a)^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax + bx^{\frac{1}{3}}}}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^2,x, algorithm="maxima")

[Out] integrate(sqrt(a*x + b*x^(1/3))/x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{ax + bx^{\frac{1}{3}}}}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^2,x, algorithm="fricas")

[Out] integral(sqrt(a*x + b*x^(1/3))/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax + b\sqrt[3]{x}}}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(1/2)/x**2,x)

[Out] Integral(sqrt(a*x + b*x**(1/3))/x**2, x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^2,x, algorithm="giac")

[Out] Exception raised: RuntimeError
```

3.137 $\int \frac{\sqrt{b\sqrt[3]{x}+ax}}{x^3}\,dx$

Optimal. Leaf size=188

$$\frac{10a^{11/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77b^{9/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{20a^2\sqrt{ax+b\sqrt[3]{x}}}{77b^2x^{2/3}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{77bx^{4/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{11x^2}$$

```
[Out] (-6*Sqrt[b*x^(1/3) + a*x])/(11*x^2) - (12*a*Sqrt[b*x^(1/3) + a*x]
)/(77*b*x^(4/3)) + (20*a^2*Sqrt[b*x^(1/3) + a*x])/(77*b^2*x^(2/3)
) + (10*a^(11/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))
/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/
4)*x^(1/6))/b^(1/4)], 1/2])/(77*b^(9/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.470098, antiderivative size = 188, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.316$

$$\frac{10a^{11/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77b^{9/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{20a^2\sqrt{ax+b\sqrt[3]{x}}}{77b^2x^{2/3}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{77bx^{4/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{11x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(1/3) + a*x]/x^3,x]
```

```
[Out] (-6*Sqrt[b*x^(1/3) + a*x])/(11*x^2) - (12*a*Sqrt[b*x^(1/3) + a*x]
)/(77*b*x^(4/3)) + (20*a^2*Sqrt[b*x^(1/3) + a*x])/(77*b^2*x^(2/3)
) + (10*a^(11/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))
/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/
4)*x^(1/6))/b^(1/4)], 1/2])/(77*b^(9/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 40.0056, size = 180, normalized size = 0.96

$$\frac{10a^{\frac{11}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{77b^{\frac{9}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{20a^2\sqrt{ax+b\sqrt[3]{x}}}{77b^2x^{\frac{2}{3}}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{77bx^{\frac{4}{3}}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{11x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(1/2)/x**3,x)
```

```
[Out] 10*a**(11/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**
2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f
(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(77*b**(9/4)*x**(1/6)*(
a*x**(2/3) + b)) + 20*a**2*sqrt(a*x + b*x**(1/3))/(77*b**2*x**(2/
3)) - 12*a*sqrt(a*x + b*x**(1/3))/(77*b*x**(4/3)) - 6*sqrt(a*x +
b*x**(1/3))/(11*x**2)
```

Mathematica [C] time = 0.0794998, size = 108, normalized size = 0.57

$$\frac{-20a^3x^2\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+20a^3x^2+8a^2bx^{4/3}-54ab^2x^{2/3}-42b^3}{77b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(1/3) + a*x]/x^3,x]
```

```
[Out] (-42*b^3 - 54*a*b^2*x^(2/3) + 8*a^2*b*x^(4/3) + 20*a^3*x^2 - 20*a
^3*Sqrt[1 + b/(a*x^(2/3))]*x^2*Hypergeometric2F1[1/4, 1/2, 5/4, -
(b/(a*x^(2/3)))])/(77*b^2*x^(5/3)*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.034, size = 179, normalized size = 1.

$$-\frac{6}{11\,x^2}\sqrt{b\sqrt[3]{x}+ax}-\frac{12\,a}{77\,b}\sqrt{b\sqrt[3]{x}+ax}x^{-\frac{4}{3}}+\frac{20\,a^2}{77\,b^2}\sqrt{b\sqrt[3]{x}+ax}x^{-\frac{2}{3}}+\frac{10\,a^2}{77\,b^2}\sqrt{-ab}\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-\frac{\sqrt{-ab}}{a}\right)}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(1/2)/x^3,x)
```

```
[Out] -6/11*(b*x^(1/3)+a*x)^(1/2)/x^2-12/77*a*(b*x^(1/3)+a*x)^(1/2)/b/x
^(4/3)+20/77*a^2*(b*x^(1/3)+a*x)^(1/2)/b^2/x^(2/3)+10/77*a^2/b^2*
(-a*b)^(1/2)*((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2)*(-2*
(x^(1/3)-(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2)*(-x^(1/3)/(-a*b)^(
1/2)*a)^(1/2)/(b*x^(1/3)+a*x)^(1/2)*EllipticF(((x^(1/3)+(-a*b)^(1
/2)/a)/(-a*b)^(1/2)*a)^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{ax+bx^{\frac{1}{3}}}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^3,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3))/x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{ax+bx^{\frac{1}{3}}}}{x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^3,x, algorithm="fricas")
```

```
[Out] integral(sqrt(a*x + b*x^(1/3))/x^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax + b\sqrt[3]{x}}}{x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(1/2)/x**3,x)
```

```
[Out] Integral(sqrt(a*x + b*x**(1/3))/x**3, x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^3,x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.138 $\int \frac{\sqrt{b\sqrt[3]{x}+ax}}{x^4}\,dx$

Optimal. Leaf size=413

$$-\frac{154a^{17/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{308a^{17/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{308a^{9/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{1105b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{308a^4\sqrt{ax+b\sqrt[3]{x}}}{1105b^4\sqrt[3]{x}}-\frac{308a^3\sqrt{ax+b\sqrt[3]{x}}}{3315b^3x}+\frac{44a^2\sqrt{ax+b\sqrt[3]{x}}}{663b^2x^{5/3}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{221bx^{7/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{17x^3}$$

```
[Out] (-308*a^(9/2)*(b + a*x^(2/3))*x^(1/3))/(1105*b^4*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (6*Sqrt[b*x^(1/3) + a*x])/(1
7*x^3) - (12*a*Sqrt[b*x^(1/3) + a*x])/(221*b*x^(7/3)) + (44*a^2*S
qrt[b*x^(1/3) + a*x])/(663*b^2*x^(5/3)) - (308*a^3*Sqrt[b*x^(1/3)
 + a*x])/(3315*b^3*x) + (308*a^4*Sqrt[b*x^(1/3) + a*x])/(1105*b^4
*x^(1/3)) + (308*a^(17/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a
*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcT
an[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(1105*b^(15/4)*Sqrt[b*x^(1/3
) + a*x]) - (154*a^(17/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a
*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcT
an[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(1105*b^(15/4)*Sqrt[b*x^(1/3
) + a*x])
```

Rubi [A] time = 1.03751, antiderivative size = 413, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421

$$-\frac{154a^{17/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{308a^{17/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{308a^{9/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{1105b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{308a^4\sqrt{ax+b\sqrt[3]{x}}}{1105b^4\sqrt[3]{x}}-\frac{308a^3\sqrt{ax+b\sqrt[3]{x}}}{3315b^3x}+\frac{44a^2\sqrt{ax+b\sqrt[3]{x}}}{663b^2x^{5/3}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{221bx^{7/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{17x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(1/3) + a*x]/x^4,x]
```

```
[Out] (-308*a^(9/2)*(b + a*x^(2/3))*x^(1/3))/(1105*b^4*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (6*Sqrt[b*x^(1/3) + a*x])/(1
7*x^3) - (12*a*Sqrt[b*x^(1/3) + a*x])/(221*b*x^(7/3)) + (44*a^2*S
qrt[b*x^(1/3) + a*x])/(663*b^2*x^(5/3)) - (308*a^3*Sqrt[b*x^(1/3)
 + a*x])/(3315*b^3*x) + (308*a^4*Sqrt[b*x^(1/3) + a*x])/(1105*b^4
*x^(1/3)) + (308*a^(17/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a
*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcT
an[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(1105*b^(15/4)*Sqrt[b*x^(1/3
) + a*x]) - (154*a^(17/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a
*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcT
an[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(1105*b^(15/4)*Sqrt[b*x^(1/3
```

```
) + a*x])
```

Rubi in Sympy [A] time = 103.393, size = 382, normalized size = 0.92

$$\frac{308a^{\frac{17}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{1105b^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)} - \frac{154a^{\frac{17}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{1105b^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)} - \frac{308a^{\frac{9}{2}}\sqrt{ax+b\sqrt[3]{x}}}{1105b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)} + \frac{308a^4\sqrt{ax+b\sqrt[3]{x}}}{1105b^4\sqrt[3]{x}} - \frac{308a^3\sqrt{ax+b\sqrt[3]{x}}}{3315b^3x} + \frac{44a^2\sqrt{ax+b\sqrt[3]{x}}}{663b^2x^{\frac{5}{3}}} - \frac{12a\sqrt{ax+b\sqrt[3]{x}}}{221bx^{\frac{7}{3}}} - \frac{6\sqrt{ax+b\sqrt[3]{x}}}{17x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((b*x**(1/3)+a*x)**(1/2)/x**4,x)
```

```
[Out] 308*a**(17/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))*
*2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_
e(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(1105*b**(15/4)*x**(1/
6)*(a*x**(2/3) + b)) - 154*a**(17/4)*sqrt((a*x**(2/3) + b)/(sqrt(
a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x
+ b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)
/(1105*b**(15/4)*x**(1/6)*(a*x**(2/3) + b)) - 308*a**(9/2)*sqrt(a
*x + b*x**(1/3))/(1105*b**4*(sqrt(a)*x**(1/3) + sqrt(b))) + 308*a
**4*sqrt(a*x + b*x**(1/3))/(1105*b**4*x**(1/3)) - 308*a**3*sqrt(a
*x + b*x**(1/3))/(3315*b**3*x) + 44*a**2*sqrt(a*x + b*x**(1/3))/(
663*b**2*x**(5/3)) - 12*a*sqrt(a*x + b*x**(1/3))/(221*b*x**(7/3))
 - 6*sqrt(a*x + b*x**(1/3))/(17*x**3)
```

Mathematica [C] time = 0.0867621, size = 136, normalized size = 0.33

$$-\frac{2\left(462a^5x^{10/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)-462a^5x^{10/3}-308a^4bx^{8/3}+44a^3b^2x^2-20a^2b^3x^{4/3}+675ab^4x^{2/3}+585b\right.}{3315b^4x^{8/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[Sqrt[b*x^(1/3) + a*x]/x^4,x]
```

```
[Out] (-2*(585*b^5 + 675*a*b^4*x^(2/3) - 20*a^2*b^3*x^(4/3) + 44*a^3*b^
2*x^2 - 308*a^4*b*x^(8/3) - 462*a^5*x^(10/3) + 462*a^5*Sqrt[1 + b
/(a*x^(2/3))]*x^(10/3)*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*x
^(2/3)))]))/(3315*b^4*x^(8/3)*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.033, size = 281, normalized size = 0.7

$$-\frac{6}{17x^3}\sqrt{b\sqrt[3]{x}+ax}-\frac{12a}{221b}\sqrt{b\sqrt[3]{x}+ax}x^{-\frac{7}{3}}+\frac{44a^2}{663b^2}\sqrt{b\sqrt[3]{x}+ax}x^{-\frac{5}{3}} - \frac{308a^3}{3315b^3x}\sqrt{b\sqrt[3]{x}+ax}+\frac{308a^4}{1105b^4}\left(b+ax^{\frac{2}{3}}\right)\frac{1}{\sqrt{\sqrt[3]{x}\left(b+ax^{\frac{2}{3}}\right)}} - \frac{154a^4}{1105b^4}\sqrt{-ab}\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-\frac{\sqrt{-ab}}{a}\right)}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}\left(-2\frac{\sqrt{-ab}}{a}EllipticE\left(\sqrt{\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}+\right.}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(1/2)/x^4,x)
```

```
[Out] -6/17*(b*x^(1/3)+a*x)^(1/2)/x^3-12/221*a*(b*x^(1/3)+a*x)^(1/2)/b/
x^(7/3)+44/663*a^2*(b*x^(1/3)+a*x)^(1/2)/b^2/x^(5/3)-308/3315*a^3
*(b*x^(1/3)+a*x)^(1/2)/b^3/x+308/1105*(b+a*x^(2/3))*a^4/b^4/(x^(1
/3)*(b+a*x^(2/3)))^(1/2)-154/1105*a^4/b^4*(-a*b)^(1/2)*((x^(1/3)+
(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2)*(-2*(x^(1/3)-(-a*b)^(1/2)/a
)/(-a*b)^(1/2)*a)^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)/(b*x^(1/3
)+a*x)^(1/2)*(-2*(-a*b)^(1/2)/a*EllipticE(((x^(1/3)+(-a*b)^(1/2)/
a)/(-a*b)^(1/2)*a)^(1/2),1/2*2^(1/2))+(-a*b)^(1/2)/a*EllipticF(((
x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2),1/2*2^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax + bx^{\frac{1}{3}}}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^4,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3))/x^4, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{ax + bx^{\frac{1}{3}}}}{x^4}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^4,x, algorithm="fricas")
```

```
[Out] integral(sqrt(a*x + b*x^(1/3))/x^4, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(1/2)/x**4,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^4,x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.139 $\int \frac{\sqrt{b\sqrt[3]{x}+ax}}{x^5}\,dx$

Optimal. Leaf size=276

$$-\frac{1326a^{23/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{33649b^{21/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{2652a^5\sqrt{ax+b\sqrt[3]{x}}}{33649b^5x^{2/3}}+\frac{7956a^4\sqrt{ax+b\sqrt[3]{x}}}{168245b^4x^{4/3}}-\frac{884a^3\sqrt{ax+b\sqrt[3]{x}}}{24035b^3x^2}+\frac{68a^2\sqrt{ax+b\sqrt[3]{x}}}{2185b^2x^{8/3}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{437bx^{10/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{23x^4}$$

```
[Out] (-6*Sqrt[b*x^(1/3) + a*x])/(23*x^4) - (12*a*Sqrt[b*x^(1/3) + a*x]
)/(437*b*x^(10/3)) + (68*a^2*Sqrt[b*x^(1/3) + a*x])/(2185*b^2*x^(
8/3)) - (884*a^3*Sqrt[b*x^(1/3) + a*x])/(24035*b^3*x^2) + (7956*a
^4*Sqrt[b*x^(1/3) + a*x])/(168245*b^4*x^(4/3)) - (2652*a^5*Sqrt[b
*x^(1/3) + a*x])/(33649*b^5*x^(2/3)) - (1326*a^(23/4)*(Sqrt[b] +
Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))
^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/
(33649*b^(21/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.763133, antiderivative size = 276, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.316$

$$-\frac{1326a^{23/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{33649b^{21/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{2652a^5\sqrt{ax+b\sqrt[3]{x}}}{33649b^5x^{2/3}}+\frac{7956a^4\sqrt{ax+b\sqrt[3]{x}}}{168245b^4x^{4/3}}-\frac{884a^3\sqrt{ax+b\sqrt[3]{x}}}{24035b^3x^2}+\frac{68a^2\sqrt{ax+b\sqrt[3]{x}}}{2185b^2x^{8/3}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{437bx^{10/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{23x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(1/3) + a*x]/x^5,x]
```

```
[Out] (-6*Sqrt[b*x^(1/3) + a*x])/(23*x^4) - (12*a*Sqrt[b*x^(1/3) + a*x]
)/(437*b*x^(10/3)) + (68*a^2*Sqrt[b*x^(1/3) + a*x])/(2185*b^2*x^(
8/3)) - (884*a^3*Sqrt[b*x^(1/3) + a*x])/(24035*b^3*x^2) + (7956*a
^4*Sqrt[b*x^(1/3) + a*x])/(168245*b^4*x^(4/3)) - (2652*a^5*Sqrt[b
*x^(1/3) + a*x])/(33649*b^5*x^(2/3)) - (1326*a^(23/4)*(Sqrt[b] +
Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))
^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/
(33649*b^(21/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 74.6361, size = 265, normalized size = 0.96

$$-\frac{1326a^{\frac{23}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{33649b^{\frac{21}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}-\frac{2652a^5\sqrt{ax+b\sqrt[3]{x}}}{33649b^5x^{\frac{2}{3}}}+\frac{7956a^4\sqrt{ax+b\sqrt[3]{x}}}{168245b^4x^{\frac{4}{3}}}-\frac{884a^3\sqrt{ax+b\sqrt[3]{x}}}{24035b^3x^2}+\frac{68a^2\sqrt{ax+b\sqrt[3]{x}}}{2185b^2x^{\frac{8}{3}}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{437bx^{\frac{10}{3}}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{23x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(1/2)/x**5,x)
```

```
[Out] -1326*a**(23/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b)
)**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*ellipti
c_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(33649*b**(21/4)*x**
```

```
(1/6)*(a*x**(2/3) + b)) - 2652*a**5*sqrt(a*x + b*x**(1/3))/(33649
*b**5*x**(2/3)) + 7956*a**4*sqrt(a*x + b*x**(1/3))/(168245*b**4*x
**(4/3)) - 884*a**3*sqrt(a*x + b*x**(1/3))/(24035*b**3*x**2) + 68
*a**2*sqrt(a*x + b*x**(1/3))/(2185*b**2*x**(8/3)) - 12*a*sqrt(a*x
 + b*x**(1/3))/(437*b*x**(10/3)) - 6*sqrt(a*x + b*x**(1/3))/(23*x
**4)
```

Mathematica [C] time = 0.0989909, size = 145, normalized size = 0.53

$$-\frac{2\left(-6630a^6x^4\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+6630a^6x^4+2652a^5bx^{10/3}-884a^4b^2x^{8/3}+476a^3b^3x^2-308a^2b^4x^{4/3}+24\ldots}{168245b^5x^{11/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(1/3) + a*x]/x^5,x]
```

```
[Out] (-2*(21945*b^6 + 24255*a*b^5*x^(2/3) - 308*a^2*b^4*x^(4/3) + 476*
a^3*b^3*x^2 - 884*a^4*b^2*x^(8/3) + 2652*a^5*b*x^(10/3) + 6630*a^
6*x^4 - 6630*a^6*Sqrt[1 + b/(a*x^(2/3))]*x^4*Hypergeometric2F1[1/
4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(168245*b^5*x^(11/3)*Sqrt[b*x^(1
/3) + a*x])
```

Maple [A] time = 0.037, size = 245, normalized size = 0.9

$$-\frac{6}{23\,x^4}\sqrt{b\sqrt[3]{x}+ax}-\frac{12\,a}{437\,b}\sqrt{b\sqrt[3]{x}+ax}x^{-\frac{10}{3}}+\frac{68\,a^2}{2185\,b^2}\sqrt{b\sqrt[3]{x}+ax}x^{-\frac{8}{3}}$$
$$-\frac{884\,a^3}{24035\,b^3x^2}\sqrt{b\sqrt[3]{x}+ax}+\frac{7956\,a^4}{168245\,b^4}\sqrt{b\sqrt[3]{x}+ax}x^{-\frac{4}{3}}-\frac{2652\,a^5}{33649\,b^5}\sqrt{b\sqrt[3]{x}+ax}x^{-\frac{2}{3}}$$
$$-\frac{1326\,a^5}{33649\,b^5}\sqrt{-ab}\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\,\frac{a}{\sqrt{-ab}}\left(\sqrt[3]{x}-\frac{\sqrt{-ab}}{a}\right)}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{a\left(\sqrt[3]{x}+\frac{1}{a}\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\ldots\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(1/2)/x^5,x)
```

```
[Out] -6/23*(b*x^(1/3)+a*x)^(1/2)/x^4-12/437*a*(b*x^(1/3)+a*x)^(1/2)/b/
x^(10/3)+68/2185*a^2*(b*x^(1/3)+a*x)^(1/2)/b^2/x^(8/3)-884/24035*
a^3*(b*x^(1/3)+a*x)^(1/2)/b^3/x^2+7956/168245*a^4*(b*x^(1/3)+a*x)
^(1/2)/b^4/x^(4/3)-2652/33649*a^5*(b*x^(1/3)+a*x)^(1/2)/b^5/x^(2/
3)-1326/33649*a^5/b^5*(-a*b)^(1/2)*((x^(1/3)+(-a*b)^(1/2)/a)/(-a*
b)^(1/2)*a)^(1/2)*(-2*(x^(1/3)-(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1
/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)/(b*x^(1/3)+a*x)^(1/2)*Ellipti
cF(((x^(1/3)+(-a*b)^(1/2)/a)/(-a*b)^(1/2)*a)^(1/2),1/2*2^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax+bx^{\frac{1}{3}}}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^5,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x + b*x^(1/3))/x^5, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{ax + bx^{\frac{1}{3}}}}{x^5}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^5,x, algorithm="fricas")
```

```
[Out] integral(sqrt(a*x + b*x^(1/3))/x^5, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(1/2)/x**5,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(1/3))/x^5,x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.140 $\int x^2 \left(b\sqrt[3]{x}+ax\right)^{3/2} dx$

Optimal. Leaf size=298

$$-\frac{884b^{27/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{100947a^{21/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{1768b^6\sqrt{ax+b\sqrt[3]{x}}}{100947a^5}-\frac{1768b^5x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{168245a^4}+\frac{1768b^4x^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{216315a^3}-\frac{136b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{19665a^2}+\frac{8b^2x^{8/3}\sqrt{ax+b\sqrt[3]{x}}}{1311a}+\frac{4}{69}bx^{10/3}\sqrt{ax+b\sqrt[3]{x}}+\frac{2}{9}x^3\left(ax+b\sqrt[3]{x}\right)^{3/2}$$

```
[Out] (1768*b^6*Sqrt[b*x^(1/3) + a*x])/(100947*a^5) - (1768*b^5*x^(2/3)
*Sqrt[b*x^(1/3) + a*x])/(168245*a^4) + (1768*b^4*x^(4/3)*Sqrt[b*x
^(1/3) + a*x])/(216315*a^3) - (136*b^3*x^2*Sqrt[b*x^(1/3) + a*x])
/(19665*a^2) + (8*b^2*x^(8/3)*Sqrt[b*x^(1/3) + a*x])/(1311*a) + (
4*b*x^(10/3)*Sqrt[b*x^(1/3) + a*x])/69 + (2*x^3*(b*x^(1/3) + a*x)
^(3/2))/9 - (884*b^(27/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a
*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcT
an[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(100947*a^(21/4)*Sqrt[b*x^(1
/3) + a*x])
```

Rubi [A] time = 0.880356, antiderivative size = 298, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.316$

$$-\frac{884b^{27/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{100947a^{21/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{1768b^6\sqrt{ax+b\sqrt[3]{x}}}{100947a^5}-\frac{1768b^5x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{168245a^4}+\frac{1768b^4x^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{216315a^3}-\frac{136b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{19665a^2}+\frac{8b^2x^{8/3}\sqrt{ax+b\sqrt[3]{x}}}{1311a}+\frac{4}{69}bx^{10/3}\sqrt{ax+b\sqrt[3]{x}}+\frac{2}{9}x^3\left(ax+b\sqrt[3]{x}\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (1768*b^6*Sqrt[b*x^(1/3) + a*x])/(100947*a^5) - (1768*b^5*x^(2/3)
*Sqrt[b*x^(1/3) + a*x])/(168245*a^4) + (1768*b^4*x^(4/3)*Sqrt[b*x
^(1/3) + a*x])/(216315*a^3) - (136*b^3*x^2*Sqrt[b*x^(1/3) + a*x])
/(19665*a^2) + (8*b^2*x^(8/3)*Sqrt[b*x^(1/3) + a*x])/(1311*a) + (
4*b*x^(10/3)*Sqrt[b*x^(1/3) + a*x])/69 + (2*x^3*(b*x^(1/3) + a*x)
^(3/2))/9 - (884*b^(27/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a
*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcT
an[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(100947*a^(21/4)*Sqrt[b*x^(1
/3) + a*x])
```

Rubi in Sympy [A] time = 87.1221, size = 286, normalized size = 0.96

$$\frac{4bx^{\frac{10}{3}}\sqrt{ax+b\sqrt[3]{x}}}{69}+\frac{2x^3\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{9}+\frac{8b^2x^{\frac{8}{3}}\sqrt{ax+b\sqrt[3]{x}}}{1311a}-\frac{136b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{19665a^2}+\frac{1768b^4x^{\frac{4}{3}}\sqrt{ax+b\sqrt[3]{x}}}{216315a^3}-\frac{1768b^5x^{\frac{2}{3}}\sqrt{ax+b\sqrt[3]{x}}}{168245a^4}+\frac{1768b^6\sqrt{ax+b\sqrt[3]{x}}}{100947a^5}-\frac{884b^{\frac{27}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{100947a^{\frac{21}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] 4*b*x**(10/3)*sqrt(a*x + b*x**(1/3))/69 + 2*x**3*(a*x + b*x**(1/3
))**(3/2)/9 + 8*b**2*x**(8/3)*sqrt(a*x + b*x**(1/3))/(1311*a) - 1
36*b**3*x**2*sqrt(a*x + b*x**(1/3))/(19665*a**2) + 1768*b**4*x**(
4/3)*sqrt(a*x + b*x**(1/3))/(216315*a**3) - 1768*b**5*x**(2/3)*sq
rt(a*x + b*x**(1/3))/(168245*a**4) + 1768*b**6*sqrt(a*x + b*x**(1
/3))/(100947*a**5) - 884*b**(27/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)
*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x +
b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(
100947*a**(21/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.112439, size = 155, normalized size = 0.52

$$\frac{2\sqrt[3]{x}\left(168245a^7x^{14/3}+380380a^6bx^4+216755a^5b^2x^{10/3}-616a^4b^3x^{8/3}+952a^3b^4x^2-1768a^2b^5x^{4/3}+13260b^7\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F\right.}{1514205a^5\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (2*x^(1/3)*(13260*b^7 + 5304*a*b^6*x^(2/3) - 1768*a^2*b^5*x^(4/3)
 + 952*a^3*b^4*x^2 - 616*a^4*b^3*x^(8/3) + 216755*a^5*b^2*x^(10/3
) + 380380*a^6*b*x^4 + 168245*a^7*x^(14/3) + 13260*b^7*Sqrt[1 + b
/(a*x^(2/3))]*Hypergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))])
)/(1514205*a^5*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.042, size = 196, normalized size = 0.7

$$\frac{2}{1514205\,a^6}\left(216755\,x^{11/3}a^6b^2+380380\,x^{13/3}a^7b-616\,a^5b^3x^3-1768\,x^{5/3}a^3b^5+952\,x^{7/3}a^4b^4+168245\,a^8x^5-6630\,b^7\sqrt{-a}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] 2/1514205*(216755*x^(11/3)*a^6*b^2+380380*x^(13/3)*a^7*b-616*a^5*
b^3*x^3-1768*x^(5/3)*a^3*b^5+952*x^(7/3)*a^4*b^4+168245*a^8*x^5-6
630*b^7*(-a*b)^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2
)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*
b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2
))^(1/2),1/2*2^(1/2))+5304*a^2*b^6*x+13260*x^(1/3)*a*b^7)/a^6/(x^
(1/3)*(b+a*x^(2/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}x^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)*x^2,x, algorithm="maxima")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2)*x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(ax^3 + bx^{\frac{7}{3}}\right)\sqrt{ax + bx^{\frac{1}{3}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)*x^2,x, algorithm="fricas")
```

```
[Out] integral((a*x^3 + b*x^(7/3))*sqrt(a*x + b*x^(1/3)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}} x^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)*x^2,x, algorithm="giac")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2)*x^2, x)
```

3.141 $\int x \left(b\sqrt[3]{x}+ax\right)^{3/2} dx$

Optimal. Leaf size=408

$$-\frac{44b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105a^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{88b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105a^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{88b^5\sqrt[3]{x}\left(ax^{2/3}+b\right)}{1105a^{7/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{88b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{3315a^3}-\frac{88b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^2}+\frac{24b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}{1547a}+\frac{12}{119}bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}+\frac{2}{7}x^2\left(ax+b\sqrt[3]{x}\right)^{3/2}$$

```
[Out] (-88*b^5*(b + a*x^(2/3))*x^(1/3))/(1105*a^(7/2)*(Sqrt[b] + Sqrt[a
]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) + (88*b^4*x^(1/3)*Sqrt[b*x^(1/3
) + a*x])/(3315*a^3) - (88*b^3*x*Sqrt[b*x^(1/3) + a*x])/(4641*a^2
) + (24*b^2*x^(5/3)*Sqrt[b*x^(1/3) + a*x])/(1547*a) + (12*b*x^(7/
3)*Sqrt[b*x^(1/3) + a*x])/119 + (2*x^2*(b*x^(1/3) + a*x)^(3/2))/7
 + (88*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/
(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4
)*x^(1/6))/b^(1/4)], 1/2])/(1105*a^(15/4)*Sqrt[b*x^(1/3) + a*x])
- (44*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(
Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)
*x^(1/6))/b^(1/4)], 1/2])/(1105*a^(15/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 1.02375, antiderivative size = 408, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 8, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.471

$$-\frac{44b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105a^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{88b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105a^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{88b^5\sqrt[3]{x}\left(ax^{2/3}+b\right)}{1105a^{7/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{88b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{3315a^3}-\frac{88b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^2}+\frac{24b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}{1547a}+\frac{12}{119}bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}+\frac{2}{7}x^2\left(ax+b\sqrt[3]{x}\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(b*x^(1/3) + a*x)^(3/2),x]
```


```
[Out] (-88*b^5*(b + a*x^(2/3))*x^(1/3))/(1105*a^(7/2)*(Sqrt[b] + Sqrt[a
]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) + (88*b^4*x^(1/3)*Sqrt[b*x^(1/3
) + a*x])/(3315*a^3) - (88*b^3*x*Sqrt[b*x^(1/3) + a*x])/(4641*a^2
) + (24*b^2*x^(5/3)*Sqrt[b*x^(1/3) + a*x])/(1547*a) + (12*b*x^(7/
3)*Sqrt[b*x^(1/3) + a*x])/119 + (2*x^2*(b*x^(1/3) + a*x)^(3/2))/7
 + (88*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/
(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4
)*x^(1/6))/b^(1/4)], 1/2])/(1105*a^(15/4)*Sqrt[b*x^(1/3) + a*x])
- (44*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(
Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)
*x^(1/6))/b^(1/4)], 1/2])/(1105*a^(15/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 94.5039, size = 379, normalized size = 0.93

$$\frac{12bx^{\frac{7}{3}}\sqrt{ax+b\sqrt[3]{x}}}{119}+\frac{2x^2\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{7}+\frac{24b^2x^{\frac{5}{3}}\sqrt{ax+b\sqrt[3]{x}}}{1547a}-\frac{88b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^2}+\frac{88b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{3315a^3}-\frac{88b^5\sqrt{ax+b\sqrt[3]{x}}}{1105a^{\frac{7}{2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}+\frac{88b^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{1105a^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}-\frac{44b^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{1105a^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] 12*b*x**(7/3)*sqrt(a*x + b*x**(1/3))/119 + 2*x**2*(a*x + b*x**(1/
3))**(3/2)/7 + 24*b**2*x**(5/3)*sqrt(a*x + b*x**(1/3))/(1547*a) -
 88*b**3*x*sqrt(a*x + b*x**(1/3))/(4641*a**2) + 88*b**4*x**(1/3)*
sqrt(a*x + b*x**(1/3))/(3315*a**3) - 88*b**5*sqrt(a*x + b*x**(1/3
))/(1105*a**(7/2)*(sqrt(a)*x**(1/3) + sqrt(b))) + 88*b**(21/4)*sq
rt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**
(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_e(2*atan(a**(1/4
)*x**(1/6)/b**(1/4)), 1/2)/(1105*a**(15/4)*x**(1/6)*(a*x**(2/3) +
 b)) - 44*b**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqr
t(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*ell
iptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(1105*a**(15/4)*
x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0957597, size = 131, normalized size = 0.32

$$\frac{2x^{2/3}\left(3315a^5x^{10/3}+7800a^4bx^{8/3}+4665a^3b^2x^2-40a^2b^3x^{4/3}-924b^5\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+88ab^4x^{2/3}+308b\right.}{23205a^3\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (2*x^(2/3)*(308*b^5 + 88*a*b^4*x^(2/3) - 40*a^2*b^3*x^(4/3) + 466
5*a^3*b^2*x^2 + 7800*a^4*b*x^(8/3) + 3315*a^5*x^(10/3) - 924*b^5*
Sqrt[1 + b/(a*x^(2/3))]*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*
x^(2/3)))]))/(23205*a^3*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.03, size = 261, normalized size = 0.6

$$\frac{2}{23205\,a^4}\left(4665\,x^{8/3}a^4b^2+7800\,x^{10/3}a^5b-40\,x^2a^3b^3-924\,b^6\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticE\left(\sqrt{\frac{a\sqrt[3]{}}{}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] 2/23205/a^4*(4665*x^(8/3)*a^4*b^2+7800*x^(10/3)*a^5*b-40*x^2*a^3*
b^3-924*b^6*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*
x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*
a)^(1/2)*EllipticE(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),
1/2*2^(1/2))+462*b^6*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2
)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*
b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2
))^(1/2),1/2*2^(1/2))+3315*x^4*a^6+308*x^(2/3)*a*b^5+88*x^(4/3)*a
^2*b^4)/(x^(1/3)*(b+a*x^(2/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}} x\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)*x,x, algorithm="maxima")

[Out] integrate((a*x + b*x^(1/3))^(3/2)*x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(ax^2 + bx^{\frac{4}{3}}\right)\sqrt{ax + bx^{\frac{1}{3}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)*x,x, algorithm="fricas")

[Out] integral((a*x^2 + b*x^(4/3))*sqrt(a*x + b*x^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\left(ax + b\sqrt[3]{x}\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**(1/3)+a*x)**(3/2),x)

[Out] Integral(x*(a*x + b*x**(1/3))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}} x\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)*x,x, algorithm="giac")

[Out] integrate((a*x + b*x^(1/3))^(3/2)*x, x)
```

3.142 $\int \left(b\sqrt[3]{x}+ax\right)^{3/2}\,dx$

Optimal. Leaf size=208

$$\frac{4b^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77a^{9/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{8b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^2}+\frac{24b^2x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{385a}+\frac{12}{55}bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}+\frac{2}{5}x\left(ax+b\sqrt[3]{x}\right)^{3/2}$$

```
[Out] (-8*b^3*Sqrt[b*x^(1/3) + a*x])/(77*a^2) + (24*b^2*x^(2/3)*Sqrt[b*
x^(1/3) + a*x])/(385*a) + (12*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x])/55
 + (2*x*(b*x^(1/3) + a*x)^(3/2))/5 + (4*b^(15/4)*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x
^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(77*a
^(9/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.498168, antiderivative size = 208, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.467

$$\frac{4b^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77a^{9/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{8b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^2}+\frac{24b^2x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{385a}+\frac{12}{55}bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}+\frac{2}{5}x\left(ax+b\sqrt[3]{x}\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (-8*b^3*Sqrt[b*x^(1/3) + a*x])/(77*a^2) + (24*b^2*x^(2/3)*Sqrt[b*
x^(1/3) + a*x])/(385*a) + (12*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x])/55
 + (2*x*(b*x^(1/3) + a*x)^(3/2))/5 + (4*b^(15/4)*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x
^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(77*a
^(9/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 43.4662, size = 199, normalized size = 0.96

$$\frac{12bx^{\frac{4}{3}}\sqrt{ax+b\sqrt[3]{x}}}{55}+\frac{2x\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{5}+\frac{24b^2x^{\frac{2}{3}}\sqrt{ax+b\sqrt[3]{x}}}{385a}-\frac{8b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^2}+\frac{4b^{\frac{15}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{77a^{\frac{9}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] 12*b*x**(4/3)*sqrt(a*x + b*x**(1/3))/55 + 2*x*(a*x + b*x**(1/3))*
*(3/2)/5 + 24*b**2*x**(2/3)*sqrt(a*x + b*x**(1/3))/(385*a) - 8*b*
*3*sqrt(a*x + b*x**(1/3))/(77*a**2) + 4*b**(15/4)*sqrt((a*x**(2/3
) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(
b))*sqrt(a*x + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b*
*(1/4)), 1/2)/(77*a**(9/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0982553, size = 118, normalized size = 0.57

$$\frac{2\sqrt[3]{x}\left(77a^4x^{8/3}+196a^3bx^2+131a^2b^2x^{4/3}-20b^4\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)-8ab^3x^{2/3}-20b^4\right)}{385a^2\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (2*x^(1/3)*(-20*b^4 - 8*a*b^3*x^(2/3) + 131*a^2*b^2*x^(4/3) + 196
*a^3*b*x^2 + 77*a^4*x^(8/3) - 20*b^4*Sqrt[1 + b/(a*x^(2/3))]*Hype
rgeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(385*a^2*Sqrt[b*
x^(1/3) + a*x])
```

Maple [A] time = 0.029, size = 163, normalized size = 0.8

$$\frac{2}{385\,a^3}\left(131\,a^3b^2x^{5/3}+196\,a^4bx^{7/3}+10\,b^4\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticF\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] 2/385*(131*a^3*b^2*x^(5/3)+196*a^4*b*x^(7/3)+10*b^4*(-a*b)^(1/2)*
((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*
b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*Ell
ipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))
-8*a^2*b^3*x+77*x^3*a^5-20*a*b^4*x^(1/3))/a^3/(x^(1/3)*(b+a*x^(2/
3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2),x, algorithm="fricas")
```

```
[Out] integral((a*x + b*x^(1/3))^(3/2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax + b\sqrt[3]{x}\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Integral((a*x + b*x**(1/3))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2),x, algorithm="giac")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2), x)
```

3.143 $\int \frac{\left(b\sqrt[3]{x}+ax\right)^{3/2}}{x}\,dx$

Optimal. Leaf size=319

$$\frac{4b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{3/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{8b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{3/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{8b^2\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5\sqrt{a}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{4}{5}b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}+\frac{2}{3}\left(ax+b\sqrt[3]{x}\right)^{3/2}$$

```
[Out] (8*b^2*(b + a*x^(2/3))*x^(1/3))/(5*Sqrt[a]*(Sqrt[b] + Sqrt[a]*x^(
1/3))*Sqrt[b*x^(1/3) + a*x]) + (4*b*x^(1/3)*Sqrt[b*x^(1/3) + a*x]
)/5 + (2*(b*x^(1/3) + a*x)^(3/2))/3 - (8*b^(9/4)*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x
^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*a^
(3/4)*Sqrt[b*x^(1/3) + a*x]) + (4*b^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1
/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*
EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*a^(3/4)*S
qrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.633781, antiderivative size = 319, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421

$$\frac{4b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{3/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{8b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{3/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{8b^2\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5\sqrt{a}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{4}{5}b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}+\frac{2}{3}\left(ax+b\sqrt[3]{x}\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1/3) + a*x)^(3/2)/x,x]
```


```
[Out] (8*b^2*(b + a*x^(2/3))*x^(1/3))/(5*Sqrt[a]*(Sqrt[b] + Sqrt[a]*x^(
1/3))*Sqrt[b*x^(1/3) + a*x]) + (4*b*x^(1/3)*Sqrt[b*x^(1/3) + a*x]
)/5 + (2*(b*x^(1/3) + a*x)^(3/2))/3 - (8*b^(9/4)*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x
^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*a^
(3/4)*Sqrt[b*x^(1/3) + a*x]) + (4*b^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1
/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*
EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*a^(3/4)*S
qrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 54.8631, size = 294, normalized size = 0.92

$$\frac{4b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{5}+\frac{2\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{3}+\frac{8b^2\sqrt{ax+b\sqrt[3]{x}}}{5\sqrt{a}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}-\frac{8b^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{4b^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate((b*x**(1/3)+a*x)**(3/2)/x,x)
```

```
[Out] 4*b*x**(1/3)*sqrt(a*x + b*x**(1/3))/5 + 2*(a*x + b*x**(1/3))**(3/
2)/3 + 8*b**2*sqrt(a*x + b*x**(1/3))/(5*sqrt(a)*(sqrt(a)*x**(1/3)
 + sqrt(b))) - 8*b**(9/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3)
 + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3
))*elliptic_e(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(5*a**(3/4
)*x**(1/6)*(a*x**(2/3) + b)) + 4*b**(9/4)*sqrt((a*x**(2/3) + b)/(
sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt
(a*x + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)),
 1/2)/(5*a**(3/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.073246, size = 91, normalized size = 0.29

$$\frac{2x^{2/3}\left(5a^2x^{4/3}+12b^2\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+16abx^{2/3}+11b^2\right)}{15\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[(b*x^(1/3) + a*x)^(3/2)/x,x]
```

```
[Out] (2*x^(2/3)*(11*b^2 + 16*a*b*x^(2/3) + 5*a^2*x^(4/3) + 12*b^2*Sqrt
[1 + b/(a*x^(2/3))]*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*x^(2
/3)))]))/(15*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.028, size = 228, normalized size = 0.7

$$\frac{2}{15\,a}\left(12\,b^3\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)-6\,b^3\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}}{}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^(1/3)+a*x)^(3/2)/x,x)
```

```
[Out] 2/15/a*(12*b^3*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*
(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/
2)*a)^(1/2)*EllipticE(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/
2),1/2*2^(1/2))-6*b^3*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/
2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a
*b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/
2))^(1/2),1/2*2^(1/2))+11*a*b^2*x^(2/3)+16*a^2*b*x^(4/3)+5*x^2*a^
```

```
3)/(x^(1/3)*(b+a*x^(2/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x,x, algorithm="maxima")

[Out] integrate((a*x + b*x^(1/3))^(3/2)/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x,x, algorithm="fricas")

[Out] integral((a*x + b*x^(1/3))^(3/2)/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax + b\sqrt[3]{x}\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(3/2)/x,x)

[Out] Integral((a*x + b*x**(1/3))**(3/2)/x, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x,x, algorithm="giac")

[Out] integrate((a*x + b*x^(1/3))^(3/2)/x, x)
```

3.144 $\int \frac{\left(b\sqrt[3]{x}+ax\right)^{3/2}}{x^2}\,dx$

Optimal. Leaf size=144

$$\frac{4a^{3/4}b^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{\sqrt{ax+b\sqrt[3]{x}}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{x}+4a\sqrt{ax+b\sqrt[3]{x}}$$

```
[Out] 4*a*Sqrt[b*x^(1/3) + a*x] - (2*(b*x^(1/3) + a*x)^(3/2))/x + (4*a^
(3/4)*b^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(S
qrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*
x^(1/6))/b^(1/4)], 1/2])/Sqrt[b*x^(1/3) + a*x]
```

Rubi [A] time = 0.368037, antiderivative size = 144, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.316

$$\frac{4a^{3/4}b^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{\sqrt{ax+b\sqrt[3]{x}}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{x}+4a\sqrt{ax+b\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1/3) + a*x)^(3/2)/x^2,x]
```


```
[Out] 4*a*Sqrt[b*x^(1/3) + a*x] - (2*(b*x^(1/3) + a*x)^(3/2))/x + (4*a^
(3/4)*b^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(S
qrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*
x^(1/6))/b^(1/4)], 1/2])/Sqrt[b*x^(1/3) + a*x]
```

Rubi in Sympy [A] time = 30.5543, size = 138, normalized size = 0.96

$$\frac{4a^{\frac{3}{4}}b^{\frac{3}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+4a\sqrt{ax+b\sqrt[3]{x}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(3/2)/x**2,x)
```

```
[Out] 4*a**(3/4)*b**(3/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqr
t(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*ell
iptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(x**(1/6)*(a*x**
(2/3) + b)) + 4*a*sqrt(a*x + b*x**(1/3)) - 2*(a*x + b*x**(1/3))**
(3/2)/x
```

Mathematica [C] time = 0.0680549, size = 82, normalized size = 0.57

$$-\frac{2\left(a^2\left(-x^{4/3}\right)+4abx^{2/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+b^2\right)}{\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(1/3) + a*x)^(3/2)/x^2,x]
```

```
[Out] (-2*(b^2 - a^2*x^(4/3) + 4*a*b*Sqrt[1 + b/(a*x^(2/3))]*x^(2/3)*Hy
pergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(x^(1/3)*Sqrt[
b*x^(1/3) + a*x])
```

Maple [A] time = 0.033, size = 130, normalized size = 0.9

$$2\,\frac{1}{\sqrt[3]{x}\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}}\left(2\,\sqrt[3]{x}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticF\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\,\sqrt{2}\right)\sqrt{-ab}b+x^{4/3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(3/2)/x^2,x)
```

```
[Out] 2/x^(1/3)*(2*x^(1/3)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2
)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*
b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2
))^(1/2),1/2*2^(1/2))*(-a*b)^(1/2)*b+x^(4/3)*a^2-b^2)/(x^(1/3)*(b
+a*x^(2/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^2,x, algorithm="maxima")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2)/x^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^2,x, algorithm="fricas")
```

```
[Out] integral((a*x + b*x^(1/3))^(3/2)/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(3/2)/x**2,x)
```

```
[Out] Integral((a*x + b*x**(1/3))**(3/2)/x**2, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^2,x, algorithm="giac")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2)/x^2, x)
```

3.145 $\int \frac{\left(b\sqrt[3]{x}+ax\right)^{3/2}}{x^3}\,dx$

Optimal. Leaf size=350

$$\frac{4a^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{8a^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{8a^{5/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{8a^2\sqrt{ax+b\sqrt[3]{x}}}{5b\sqrt[3]{x}} - \frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{3x^2} - \frac{4a\sqrt{ax+b\sqrt[3]{x}}}{5x}$$

```
[Out] (8*a^(5/2)*(b + a*x^(2/3))*x^(1/3))/(5*b*(Sqrt[b] + Sqrt[a]*x^(1/
3))*Sqrt[b*x^(1/3) + a*x]) - (4*a*Sqrt[b*x^(1/3) + a*x])/(5*x) -
(8*a^2*Sqrt[b*x^(1/3) + a*x])/(5*b*x^(1/3)) - (2*(b*x^(1/3) + a*x
)^(3/2))/(3*x^2) - (8*a^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b
 + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*
ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*b^(3/4)*Sqrt[b*x^(1/3
) + a*x]) + (4*a^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^
(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[
(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*b^(3/4)*Sqrt[b*x^(1/3) + a*x
])
```

Rubi [A] time = 0.796356, antiderivative size = 350, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421

$$\frac{4a^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{8a^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{8a^{5/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{8a^2\sqrt{ax+b\sqrt[3]{x}}}{5b\sqrt[3]{x}} - \frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{3x^2} - \frac{4a\sqrt{ax+b\sqrt[3]{x}}}{5x}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1/3) + a*x)^(3/2)/x^3,x]
```

```
[Out] (8*a^(5/2)*(b + a*x^(2/3))*x^(1/3))/(5*b*(Sqrt[b] + Sqrt[a]*x^(1/
3))*Sqrt[b*x^(1/3) + a*x]) - (4*a*Sqrt[b*x^(1/3) + a*x])/(5*x) -
(8*a^2*Sqrt[b*x^(1/3) + a*x])/(5*b*x^(1/3)) - (2*(b*x^(1/3) + a*x
)^(3/2))/(3*x^2) - (8*a^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b
 + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*
ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*b^(3/4)*Sqrt[b*x^(1/3
) + a*x]) + (4*a^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^
(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[
(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*b^(3/4)*Sqrt[b*x^(1/3) + a*x
])
```

Rubi in Sympy [A] time = 72.9508, size = 320, normalized size = 0.91

$$-\frac{8a^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{4a^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{8a^{\frac{5}{2}}\sqrt{ax+b\sqrt[3]{x}}}{5b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}-\frac{8a^2\sqrt{ax+b\sqrt[3]{x}}}{5b\sqrt[3]{x}}-\frac{4a\sqrt{ax+b\sqrt[3]{x}}}{5x}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(3/2)/x**3,x)
```

```
[Out] -8*a**(9/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2
)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_e(
2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(5*b**(3/4)*x**(1/6)*(a*
x**(2/3) + b)) + 4*a**(9/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/
3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1
/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(5*b**(3
/4)*x**(1/6)*(a*x**(2/3) + b)) + 8*a**(5/2)*sqrt(a*x + b*x**(1/3)
)/(5*b*(sqrt(a)*x**(1/3) + sqrt(b))) - 8*a**2*sqrt(a*x + b*x**(1/
3))/(5*b*x**(1/3)) - 4*a*sqrt(a*x + b*x**(1/3))/(5*x) - 2*(a*x +
b*x**(1/3))**(3/2)/(3*x**2)
```

Mathematica [C] time = 0.0869826, size = 108, normalized size = 0.31

$$-\frac{2\left(-12a^3x^2\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+12a^3x^2+23a^2bx^{4/3}+16ab^2x^{2/3}+5b^3\right)}{15bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(1/3) + a*x)^(3/2)/x^3,x]
```

```
[Out] (-2*(5*b^3 + 16*a*b^2*x^(2/3) + 23*a^2*b*x^(4/3) + 12*a^3*x^2 - 1
2*a^3*Sqrt[1 + b/(a*x^(2/3))]*x^2*Hypergeometric2F1[-1/4, 1/2, 3/
4, -(b/(a*x^(2/3)))]))/(15*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.038, size = 339, normalized size = 1.

$$\frac{2}{15\,bx^3}\left(12\,a^2b\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}x^{8/3}\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\,EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\,\sqrt{2}\right)-6\,a^2b$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(3/2)/x^3,x)
```

```
[Out] 2/15*(12*a^2*b*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*
(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/
2)*a)^(1/2)*x^(8/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticE(((a*x
^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-6*a^2*b*((a
*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^
(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*x^(8/3
```

```
)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2
))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-12*(b*x^(1/3)+a*x)^(1/2)*x^(1
0/3)*a^3-12*(b*x^(1/3)+a*x)^(1/2)*x^(8/3)*a^2*b-16*(x^(1/3)*(b+a*
x^(2/3)))^(1/2)*x^2*a*b^2-11*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(8/3
)*a^2*b-5*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(4/3)*b^3)/b/x^3/(b+a*x
^(2/3))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^3,x, algorithm="maxima")

[Out] integrate((a*x + b*x^(1/3))^(3/2)/x^3, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^3,x, algorithm="fricas")

[Out] integral((a*x + b*x^(1/3))^(3/2)/x^3, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(3/2)/x**3,x)

[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^3,x, algorithm="giac")

[Out] Exception raised: RuntimeError
```

3.146 $\int \frac{\left(b\sqrt[3]{x}+ax\right)^{3/2}}{x^4}\,dx$

Optimal. Leaf size=213

$$\frac{4a^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77b^{9/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{8a^3\sqrt{ax+b\sqrt[3]{x}}}{77b^2x^{2/3}}-\frac{24a^2\sqrt{ax+b\sqrt[3]{x}}}{385bx^{4/3}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{5x^3}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{55x^2}$$

```
[Out] (-12*a*Sqrt[b*x^(1/3) + a*x])/(55*x^2) - (24*a^2*Sqrt[b*x^(1/3) +
 a*x])/(385*b*x^(4/3)) + (8*a^3*Sqrt[b*x^(1/3) + a*x])/(77*b^2*x^
(2/3)) - (2*(b*x^(1/3) + a*x)^(3/2))/(5*x^3) + (4*a^(15/4)*(Sqrt[
b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(
1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1
/2])/(77*b^(9/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.549723, antiderivative size = 213, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.316

$$\frac{4a^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77b^{9/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{8a^3\sqrt{ax+b\sqrt[3]{x}}}{77b^2x^{2/3}}-\frac{24a^2\sqrt{ax+b\sqrt[3]{x}}}{385bx^{4/3}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{5x^3}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{55x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1/3) + a*x)^(3/2)/x^4,x]
```

```
[Out] (-12*a*Sqrt[b*x^(1/3) + a*x])/(55*x^2) - (24*a^2*Sqrt[b*x^(1/3) +
 a*x])/(385*b*x^(4/3)) + (8*a^3*Sqrt[b*x^(1/3) + a*x])/(77*b^2*x^
(2/3)) - (2*(b*x^(1/3) + a*x)^(3/2))/(5*x^3) + (4*a^(15/4)*(Sqrt[
b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(
1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1
/2])/(77*b^(9/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 48.7128, size = 204, normalized size = 0.96

$$\frac{4a^{\frac{15}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{77b^{\frac{9}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{8a^3\sqrt{ax+b\sqrt[3]{x}}}{77b^2x^{\frac{2}{3}}}-\frac{24a^2\sqrt{ax+b\sqrt[3]{x}}}{385bx^{\frac{4}{3}}}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{55x^2}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{5x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(3/2)/x**4,x)
```

```
[Out] 4*a**(15/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2
)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f(
2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(77*b**(9/4)*x**(1/6)*(a
*x**(2/3) + b)) + 8*a**3*sqrt(a*x + b*x**(1/3))/(77*b**2*x**(2/3)
) - 24*a**2*sqrt(a*x + b*x**(1/3))/(385*b*x**(4/3)) - 12*a*sqrt(a
*x + b*x**(1/3))/(55*x**2) - 2*(a*x + b*x**(1/3))**(3/2)/(5*x**3)
```

Mathematica [C] time = 0.0851462, size = 123, normalized size = 0.58

$$-\frac{2\left(20a^4x^{8/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)-20a^4x^{8/3}-8a^3bx^2+131a^2b^2x^{4/3}+196ab^3x^{2/3}+77b^4\right)}{385b^2x^{7/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(1/3) + a*x)^(3/2)/x^4,x]
```

```
[Out] (-2*(77*b^4 + 196*a*b^3*x^(2/3) + 131*a^2*b^2*x^(4/3) - 8*a^3*b*x
^2 - 20*a^4*x^(8/3) + 20*a^4*Sqrt[1 + b/(a*x^(2/3))]*x^(8/3)*Hype
rgeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(385*b^2*x^(7/3)
*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.04, size = 168, normalized size = 0.8

$$\frac{2}{385\,b^2}\left(10\,a^3\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticF\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)x^{14/3}-131\,x^{11/3}a^2b^2+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(3/2)/x^4,x)
```

```
[Out] 2/385*(10*a^3*(-a*b)^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2)
)^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3
)/(-a*b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b
)^(1/2))^(1/2),1/2*2^(1/2))*x^(14/3)-131*x^(11/3)*a^2*b^2+8*x^(13
/3)*a^3*b-196*a*b^3*x^3+20*x^5*a^4-77*x^(7/3)*b^4)/b^2/(x^(1/3)*(
b+a*x^(2/3)))^(1/2)/x^(14/3)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^4,x, algorithm="maxima")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2)/x^4, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^4},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^4,x, algorithm="fricas")
```

```
[Out] integral((a*x + b*x^(1/3))^(3/2)/x^4, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(3/2)/x**4,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^4,x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.147 $\int \frac{\left(b\sqrt[3]{x}+ax\right)^{3/2}}{x^5}\,dx$

Optimal. Leaf size=438

$$-\frac{44a^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{88a^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{88a^{11/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{1105b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{88a^5\sqrt{ax+b\sqrt[3]{x}}}{1105b^4\sqrt[3]{x}}-\frac{88a^4\sqrt{ax+b\sqrt[3]{x}}}{3315b^3x}+\frac{88a^3\sqrt{ax+b\sqrt[3]{x}}}{4641b^2x^{5/3}}-\frac{24a^2\sqrt{ax+b\sqrt[3]{x}}}{1547bx^{7/3}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{7x^4}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{119x^3}$$

```
[Out] (-88*a^(11/2)*(b + a*x^(2/3))*x^(1/3))/(1105*b^4*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (12*a*Sqrt[b*x^(1/3) + a*x])
/(119*x^3) - (24*a^2*Sqrt[b*x^(1/3) + a*x])/(1547*b*x^(7/3)) + (8
8*a^3*Sqrt[b*x^(1/3) + a*x])/(4641*b^2*x^(5/3)) - (88*a^4*Sqrt[b*
x^(1/3) + a*x])/(3315*b^3*x) + (88*a^5*Sqrt[b*x^(1/3) + a*x])/(11
05*b^4*x^(1/3)) - (2*(b*x^(1/3) + a*x)^(3/2))/(7*x^4) + (88*a^(21
/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + S
qrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b
^(1/4)], 1/2])/(1105*b^(15/4)*Sqrt[b*x^(1/3) + a*x]) - (44*a^(21/
4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sq
rt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^
(1/4)], 1/2])/(1105*b^(15/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 1.15219, antiderivative size = 438, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421

$$-\frac{44a^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{88a^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1105b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{88a^{11/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{1105b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{88a^5\sqrt{ax+b\sqrt[3]{x}}}{1105b^4\sqrt[3]{x}}-\frac{88a^4\sqrt{ax+b\sqrt[3]{x}}}{3315b^3x}+\frac{88a^3\sqrt{ax+b\sqrt[3]{x}}}{4641b^2x^{5/3}}-\frac{24a^2\sqrt{ax+b\sqrt[3]{x}}}{1547bx^{7/3}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{7x^4}-\frac{12a\sqrt{ax+b\sqrt[3]{x}}}{119x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1/3) + a*x)^(3/2)/x^5,x]
```


```
[Out] (-88*a^(11/2)*(b + a*x^(2/3))*x^(1/3))/(1105*b^4*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (12*a*Sqrt[b*x^(1/3) + a*x])
/(119*x^3) - (24*a^2*Sqrt[b*x^(1/3) + a*x])/(1547*b*x^(7/3)) + (8
8*a^3*Sqrt[b*x^(1/3) + a*x])/(4641*b^2*x^(5/3)) - (88*a^4*Sqrt[b*
x^(1/3) + a*x])/(3315*b^3*x) + (88*a^5*Sqrt[b*x^(1/3) + a*x])/(11
05*b^4*x^(1/3)) - (2*(b*x^(1/3) + a*x)^(3/2))/(7*x^4) + (88*a^(21
/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + S
qrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b
^(1/4)], 1/2])/(1105*b^(15/4)*Sqrt[b*x^(1/3) + a*x]) - (44*a^(21/
4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sq
rt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^
```

```
(1/4)], 1/2])/(1105*b^(15/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 109.694, size = 406, normalized size = 0.93

$$\frac{88a^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{1105b^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)} - \frac{44a^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{1105b^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)} - \frac{88a^{\frac{11}{2}}\sqrt{ax+b\sqrt[3]{x}}}{1105b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)} + \frac{88a^5\sqrt{ax+b\sqrt[3]{x}}}{1105b^4\sqrt[3]{x}} - \frac{88a^4\sqrt{ax+b\sqrt[3]{x}}}{3315b^3x} + \frac{88a^3\sqrt{ax+b\sqrt[3]{x}}}{4641b^2x^{\frac{5}{3}}} - \frac{24a^2\sqrt{ax+b\sqrt[3]{x}}}{1547bx^{\frac{7}{3}}} - \frac{12a\sqrt{ax+b\sqrt[3]{x}}}{119x^3} - \frac{2\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{7x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(3/2)/x**5,x)
```

```
[Out] 88*a**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**
2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_e
(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(1105*b**(15/4)*x**(1/6
)*(a*x**(2/3) + b)) - 44*a**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)
*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x +
b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(
1105*b**(15/4)*x**(1/6)*(a*x**(2/3) + b)) - 88*a**(11/2)*sqrt(a*x
 + b*x**(1/3))/(1105*b**4*(sqrt(a)*x**(1/3) + sqrt(b))) + 88*a**5
*sqrt(a*x + b*x**(1/3))/(1105*b**4*x**(1/3)) - 88*a**4*sqrt(a*x +
 b*x**(1/3))/(3315*b**3*x) + 88*a**3*sqrt(a*x + b*x**(1/3))/(4641
*b**2*x**(5/3)) - 24*a**2*sqrt(a*x + b*x**(1/3))/(1547*b*x**(7/3
)) - 12*a*sqrt(a*x + b*x**(1/3))/(119*x**3) - 2*(a*x + b*x**(1/3))
**(3/2)/(7*x**4)
```

Mathematica [C] time = 0.0984591, size = 145, normalized size = 0.33

$$-\frac{2\left(924a^6x^4\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)-924a^6x^4-616a^5bx^{10/3}+88a^4b^2x^{8/3}-40a^3b^3x^2+4665a^2b^4x^{4/3}+7800ab\right.}{23205b^4x^{10/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(1/3) + a*x)^(3/2)/x^5,x]
```

```
[Out] (-2*(3315*b^6 + 7800*a*b^5*x^(2/3) + 4665*a^2*b^4*x^(4/3) - 40*a^
3*b^3*x^2 + 88*a^4*b^2*x^(8/3) - 616*a^5*b*x^(10/3) - 924*a^6*x^4
 + 924*a^6*Sqrt[1 + b/(a*x^(2/3))]*x^4*Hypergeometric2F1[-1/4, 1/
2, 3/4, -(b/(a*x^(2/3)))]))/(23205*b^4*x^(10/3)*Sqrt[b*x^(1/3) +
a*x])
```

Maple [A] time = 0.043, size = 411, normalized size = 0.9

$$-\frac{2}{23205\,b^4x^7}\left(924\,a^5b\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}x^{\frac{20}{3}}\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\,EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^(1/3)+a*x)^(3/2)/x^5,x)
```

```
[Out] -2/23205*(924*a^5*b*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)
*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b
)^(1/2)*a)^(1/2)*x^(20/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticE
(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-462*a
^5*b*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)
-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2
)*x^(20/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticF(((a*x^(1/3)+(-
a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-924*(b*x^(1/3)+a*x)^
(1/2)*x^(22/3)*a^6-924*(b*x^(1/3)+a*x)^(1/2)*x^(20/3)*a^5*b+88*(x
^(1/3)*(b+a*x^(2/3)))^(1/2)*x^6*a^4*b^2+308*(x^(1/3)*(b+a*x^(2/3)
))^(1/2)*x^(20/3)*a^5*b+4665*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(14/
3)*a^2*b^4-40*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(16/3)*a^3*b^3+7800
*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^4*a*b^5+3315*(x^(1/3)*(b+a*x^(2/
3)))^(1/2)*x^(10/3)*b^6)/b^4/x^7/(b+a*x^(2/3))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a*x + b*x^(1/3))^(3/2)/x^5,x, algorithm="maxima")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2)/x^5, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^5}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((a*x + b*x^(1/3))^(3/2)/x^5,x, algorithm="fricas")
```

```
[Out] integral((a*x + b*x^(1/3))^(3/2)/x^5, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x**(1/3)+a*x)**(3/2)/x**5,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^5,x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.148 $\int \frac{\left(b\sqrt[3]{x}+ax\right)^{3/2}}{x^6}\,dx$

Optimal. Leaf size=301

$$-\frac{884a^{27/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{100947b^{21/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{1768a^6\sqrt{ax+b\sqrt[3]{x}}}{100947b^5x^{2/3}}+\frac{1768a^5\sqrt{ax+b\sqrt[3]{x}}}{168245b^4x^{4/3}}-\frac{1768a^4\sqrt{ax+b\sqrt[3]{x}}}{216315b^3x^2}+\frac{136a^3\sqrt{ax+b\sqrt[3]{x}}}{19665b^2x^{8/3}}-\frac{8a^2\sqrt{ax+b\sqrt[3]{x}}}{1311bx^{10/3}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{9x^5}-\frac{4a\sqrt{ax+b\sqrt[3]{x}}}{69x^4}$$

```
[Out] (-4*a*Sqrt[b*x^(1/3) + a*x])/(69*x^4) - (8*a^2*Sqrt[b*x^(1/3) + a
*x])/(1311*b*x^(10/3)) + (136*a^3*Sqrt[b*x^(1/3) + a*x])/(19665*b
^2*x^(8/3)) - (1768*a^4*Sqrt[b*x^(1/3) + a*x])/(216315*b^3*x^2) +
 (1768*a^5*Sqrt[b*x^(1/3) + a*x])/(168245*b^4*x^(4/3)) - (1768*a^
6*Sqrt[b*x^(1/3) + a*x])/(100947*b^5*x^(2/3)) - (2*(b*x^(1/3) + a
*x)^(3/2))/(9*x^5) - (884*a^(27/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sq
rt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ellipti
cF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(100947*b^(21/4)*Sq
rt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.854703, antiderivative size = 301, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.316$

$$-\frac{884a^{27/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{100947b^{21/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{1768a^6\sqrt{ax+b\sqrt[3]{x}}}{100947b^5x^{2/3}}+\frac{1768a^5\sqrt{ax+b\sqrt[3]{x}}}{168245b^4x^{4/3}}-\frac{1768a^4\sqrt{ax+b\sqrt[3]{x}}}{216315b^3x^2}+\frac{136a^3\sqrt{ax+b\sqrt[3]{x}}}{19665b^2x^{8/3}}-\frac{8a^2\sqrt{ax+b\sqrt[3]{x}}}{1311bx^{10/3}}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{3/2}}{9x^5}-\frac{4a\sqrt{ax+b\sqrt[3]{x}}}{69x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1/3) + a*x)^(3/2)/x^6,x]
```

```
[Out] (-4*a*Sqrt[b*x^(1/3) + a*x])/(69*x^4) - (8*a^2*Sqrt[b*x^(1/3) + a
*x])/(1311*b*x^(10/3)) + (136*a^3*Sqrt[b*x^(1/3) + a*x])/(19665*b
^2*x^(8/3)) - (1768*a^4*Sqrt[b*x^(1/3) + a*x])/(216315*b^3*x^2) +
 (1768*a^5*Sqrt[b*x^(1/3) + a*x])/(168245*b^4*x^(4/3)) - (1768*a^
6*Sqrt[b*x^(1/3) + a*x])/(100947*b^5*x^(2/3)) - (2*(b*x^(1/3) + a
*x)^(3/2))/(9*x^5) - (884*a^(27/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sq
rt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ellipti
cF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(100947*b^(21/4)*Sq
rt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 79.4054, size = 289, normalized size = 0.96

$$-\frac{884a^{\frac{27}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{100947b^{\frac{21}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}-\frac{1768a^6\sqrt{ax+b\sqrt[3]{x}}}{100947b^5x^{\frac{2}{3}}}+\frac{1768a^5\sqrt{ax+b\sqrt[3]{x}}}{168245b^4x^{\frac{4}{3}}}-\frac{1768a^4\sqrt{ax+b\sqrt[3]{x}}}{216315b^3x^2}+\frac{136a^3\sqrt{ax+b\sqrt[3]{x}}}{19665b^2x^{\frac{8}{3}}}-\frac{8a^2\sqrt{ax+b\sqrt[3]{x}}}{1311bx^{\frac{10}{3}}}-\frac{4a\sqrt{ax+b\sqrt[3]{x}}}{69x^4}-\frac{2\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}{9x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(1/3)+a*x)**(3/2)/x**6,x)
```

```
[Out] -884*a**(27/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))
**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic
_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(100947*b**(21/4)*x**
(1/6)*(a*x**(2/3) + b)) - 1768*a**6*sqrt(a*x + b*x**(1/3))/(10094
7*b**5*x**(2/3)) + 1768*a**5*sqrt(a*x + b*x**(1/3))/(168245*b**4*
x**(4/3)) - 1768*a**4*sqrt(a*x + b*x**(1/3))/(216315*b**3*x**2) +
 136*a**3*sqrt(a*x + b*x**(1/3))/(19665*b**2*x**(8/3)) - 8*a**2*s
qrt(a*x + b*x**(1/3))/(1311*b*x**(10/3)) - 4*a*sqrt(a*x + b*x**(1
/3))/(69*x**4) - 2*(a*x + b*x**(1/3))**(3/2)/(9*x**5)
```

Mathematica [C] time = 0.113067, size = 160, normalized size = 0.53

$$-\frac{2\left(-13260a^7x^{14/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+13260a^7x^{14/3}+5304a^6bx^4-1768a^5b^2x^{10/3}+952a^4b^3x^{8/3}-616a^3b^4x\right.}{1514205b^5x^{13/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(1/3) + a*x)^(3/2)/x^6,x]
```

```
[Out] (-2*(168245*b^7 + 380380*a*b^6*x^(2/3) + 216755*a^2*b^5*x^(4/3) -
 616*a^3*b^4*x^2 + 952*a^4*b^3*x^(8/3) - 1768*a^5*b^2*x^(10/3) +
5304*a^6*b*x^4 + 13260*a^7*x^(14/3) - 13260*a^7*Sqrt[1 + b/(a*x^(
2/3))]*x^(14/3)*Hypergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))
]))/(1514205*b^5*x^(13/3)*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.044, size = 201, normalized size = 0.7

$$-\frac{2}{1514205\,b^5}\left(6630\,a^6\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}\mathit{EllipticF}\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)x^{\frac{26}{3}}-1768\,x^{\frac{23}{3}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(1/3)+a*x)^(3/2)/x^6,x)
```

```
[Out] -2/1514205*(6630*a^6*(-a*b)^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b
)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(
-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2)
)/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))*x^(26/3)-1768*x^(23/3)*a^5*b^2
+5304*x^(25/3)*a^6*b+952*x^7*a^4*b^3+216755*x^(17/3)*a^2*b^5-616*
x^(19/3)*a^3*b^4+380380*x^5*a*b^6+13260*x^9*a^7+168245*x^(13/3)*b
^7)/b^5/(x^(1/3)*(b+a*x^(2/3)))^(1/2)/x^(26/3)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^6,x, algorithm="maxima")
```

```
[Out] integrate((a*x + b*x^(1/3))^(3/2)/x^6, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}{x^6},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^6,x, algorithm="fricas")
```

```
[Out] integral((a*x + b*x^(1/3))^(3/2)/x^6, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(1/3)+a*x)**(3/2)/x**6,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(3/2)/x^6,x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.149 $\int \frac{x^4}{\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=304

$$-\frac{5525b^{27/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{14421a^{29/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{11050b^6\sqrt{ax+b\sqrt[3]{x}}}{14421a^7}-\frac{2210b^5x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{4807a^6}+\frac{15470b^4x^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{43263a^5}-\frac{1190b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{3933a^4}+\frac{350b^2x^{8/3}\sqrt{ax+b\sqrt[3]{x}}}{1311a^3}-\frac{50bx^{10/3}\sqrt{ax+b\sqrt[3]{x}}}{207a^2}+\frac{2x^4\sqrt{ax+b\sqrt[3]{x}}}{9a}$$

```
[Out] (11050*b^6*Sqrt[b*x^(1/3) + a*x])/(14421*a^7) - (2210*b^5*x^(2/3)
*Sqrt[b*x^(1/3) + a*x])/(4807*a^6) + (15470*b^4*x^(4/3)*Sqrt[b*x^
(1/3) + a*x])/(43263*a^5) - (1190*b^3*x^2*Sqrt[b*x^(1/3) + a*x])/
(3933*a^4) + (350*b^2*x^(8/3)*Sqrt[b*x^(1/3) + a*x])/(1311*a^3) -
 (50*b*x^(10/3)*Sqrt[b*x^(1/3) + a*x])/(207*a^2) + (2*x^4*Sqrt[b*
x^(1/3) + a*x])/(9*a) - (5525*b^(27/4)*(Sqrt[b] + Sqrt[a]*x^(1/3)
)*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ell
ipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(14421*a^(29/4)
*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.900077, antiderivative size = 304, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$-\frac{5525b^{27/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{14421a^{29/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{11050b^6\sqrt{ax+b\sqrt[3]{x}}}{14421a^7}-\frac{2210b^5x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{4807a^6}+\frac{15470b^4x^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{43263a^5}-\frac{1190b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{3933a^4}+\frac{350b^2x^{8/3}\sqrt{ax+b\sqrt[3]{x}}}{1311a^3}-\frac{50bx^{10/3}\sqrt{ax+b\sqrt[3]{x}}}{207a^2}+\frac{2x^4\sqrt{ax+b\sqrt[3]{x}}}{9a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (11050*b^6*Sqrt[b*x^(1/3) + a*x])/(14421*a^7) - (2210*b^5*x^(2/3)
*Sqrt[b*x^(1/3) + a*x])/(4807*a^6) + (15470*b^4*x^(4/3)*Sqrt[b*x^
(1/3) + a*x])/(43263*a^5) - (1190*b^3*x^2*Sqrt[b*x^(1/3) + a*x])/
(3933*a^4) + (350*b^2*x^(8/3)*Sqrt[b*x^(1/3) + a*x])/(1311*a^3) -
 (50*b*x^(10/3)*Sqrt[b*x^(1/3) + a*x])/(207*a^2) + (2*x^4*Sqrt[b*
x^(1/3) + a*x])/(9*a) - (5525*b^(27/4)*(Sqrt[b] + Sqrt[a]*x^(1/3)
)*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ell
ipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(14421*a^(29/4)
*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 81.7957, size = 292, normalized size = 0.96

$$\frac{2x^4\sqrt{ax+b\sqrt[3]{x}}}{9a}-\frac{50bx^{\frac{10}{3}}\sqrt{ax+b\sqrt[3]{x}}}{207a^2}+\frac{350b^2x^{\frac{8}{3}}\sqrt{ax+b\sqrt[3]{x}}}{1311a^3}-\frac{1190b^3x^2\sqrt{ax+b\sqrt[3]{x}}}{3933a^4}+\frac{15470b^4x^{\frac{4}{3}}\sqrt{ax+b\sqrt[3]{x}}}{43263a^5}-\frac{2210b^5x^{\frac{2}{3}}\sqrt{ax+b\sqrt[3]{x}}}{4807a^6}+\frac{11050b^6\sqrt{ax+b\sqrt[3]{x}}}{14421a^7}-\frac{5525b^{\frac{27}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{14421a^{\frac{29}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**4*sqrt(a*x + b*x**(1/3))/(9*a) - 50*b*x**(10/3)*sqrt(a*x + b
*x**(1/3))/(207*a**2) + 350*b**2*x**(8/3)*sqrt(a*x + b*x**(1/3))/
(1311*a**3) - 1190*b**3*x**2*sqrt(a*x + b*x**(1/3))/(3933*a**4) +
 15470*b**4*x**(4/3)*sqrt(a*x + b*x**(1/3))/(43263*a**5) - 2210*b
**5*x**(2/3)*sqrt(a*x + b*x**(1/3))/(4807*a**6) + 11050*b**6*sqrt
(a*x + b*x**(1/3))/(14421*a**7) - 5525*b**(27/4)*sqrt((a*x**(2/3)
 + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b
))*sqrt(a*x + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**
(1/4)), 1/2)/(14421*a**(29/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.11924, size = 155, normalized size = 0.51

$$\frac{2\sqrt[3]{x}\left(4807a^7x^{14/3}-418a^6bx^4+550a^5b^2x^{10/3}-770a^4b^3x^{8/3}+1190a^3b^4x^2-2210a^2b^5x^{4/3}+16575b^7\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\right.\right.}{43263a^7\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(1/3)*(16575*b^7 + 6630*a*b^6*x^(2/3) - 2210*a^2*b^5*x^(4/3)
 + 1190*a^3*b^4*x^2 - 770*a^4*b^3*x^(8/3) + 550*a^5*b^2*x^(10/3)
- 418*a^6*b*x^4 + 4807*a^7*x^(14/3) + 16575*b^7*Sqrt[1 + b/(a*x^(
2/3))]*Hypergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(4326
3*a^7*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.054, size = 196, normalized size = 0.6

$$-\frac{1}{43263\,a^8}\left(-1100\,x^{11/3}a^6b^2+836\,x^{13/3}a^7b+1540\,a^5b^3x^3+4420\,x^{5/3}a^3b^5-2380\,x^{7/3}a^4b^4-9614\,a^8x^5+16575\,b^7\sqrt{-ab}\sqrt{\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] -1/43263*(-1100*x^(11/3)*a^6*b^2+836*x^(13/3)*a^7*b+1540*a^5*b^3*
x^3+4420*x^(5/3)*a^3*b^5-2380*x^(7/3)*a^4*b^4-9614*a^8*x^5+16575*
b^7*(-a*b)^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-
2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(
1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(
1/2),1/2*2^(1/2))-13260*a^2*b^6*x-33150*x^(1/3)*a*b^7)/(x^(1/3)*(
b+a*x^(2/3)))^(1/2)/a^8
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{ax+bx^{\frac{1}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(a*x + b*x^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(x^4/sqrt(a*x + b*x^(1/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{\sqrt{ax+bx^{\frac{1}{3}}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(a*x + b*x^(1/3)),x, algorithm="fricas")
```

```
[Out] integral(x^4/sqrt(a*x + b*x^(1/3)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{ax+bx^{\frac{1}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(a*x + b*x^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(x^4/sqrt(a*x + b*x^(1/3)), x)
```

3.150 $\int \frac{x^3}{\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=414

$$-\frac{209b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{23/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{418b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{23/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{418b^5\sqrt[3]{x}\left(ax^{2/3}+b\right)}{221a^{11/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{418b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^5}-\frac{2090b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^4}+\frac{570b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}{1547a^3}-\frac{38bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}}{119a^2}+\frac{2x^3\sqrt{ax+b\sqrt[3]{x}}}{7a}$$

```
[Out] (-418*b^5*(b + a*x^(2/3))*x^(1/3))/(221*a^(11/2)*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) + (418*b^4*x^(1/3)*Sqrt[b*x^(1
/3) + a*x])/(663*a^5) - (2090*b^3*x*Sqrt[b*x^(1/3) + a*x])/(4641*
a^4) + (570*b^2*x^(5/3)*Sqrt[b*x^(1/3) + a*x])/(1547*a^3) - (38*b
*x^(7/3)*Sqrt[b*x^(1/3) + a*x])/(119*a^2) + (2*x^3*Sqrt[b*x^(1/3)
 + a*x])/(7*a) + (418*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(
b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2
*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(221*a^(23/4)*Sqrt[b*x^
(1/3) + a*x]) - (209*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b
 + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*
ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(221*a^(23/4)*Sqrt[b*x^(
1/3) + a*x])
```

Rubi [A] time = 1.07465, antiderivative size = 414, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 7, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.368$

$$-\frac{209b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{23/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{418b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{23/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{418b^5\sqrt[3]{x}\left(ax^{2/3}+b\right)}{221a^{11/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{418b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^5}-\frac{2090b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^4}+\frac{570b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}{1547a^3}-\frac{38bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}}{119a^2}+\frac{2x^3\sqrt{ax+b\sqrt[3]{x}}}{7a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (-418*b^5*(b + a*x^(2/3))*x^(1/3))/(221*a^(11/2)*(Sqrt[b] + Sqrt[
a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) + (418*b^4*x^(1/3)*Sqrt[b*x^(1
/3) + a*x])/(663*a^5) - (2090*b^3*x*Sqrt[b*x^(1/3) + a*x])/(4641*
a^4) + (570*b^2*x^(5/3)*Sqrt[b*x^(1/3) + a*x])/(1547*a^3) - (38*b
*x^(7/3)*Sqrt[b*x^(1/3) + a*x])/(119*a^2) + (2*x^3*Sqrt[b*x^(1/3)
 + a*x])/(7*a) + (418*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(
b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2
*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(221*a^(23/4)*Sqrt[b*x^
(1/3) + a*x]) - (209*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b
 + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*
ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(221*a^(23/4)*Sqrt[b*x^(
```

```
1/3) + a*x])
```

Rubi in Sympy [A] time = 97.5854, size = 386, normalized size = 0.93

$$\frac{2x^3\sqrt{ax+b\sqrt[3]{x}}}{7a}-\frac{38bx^{\frac{7}{3}}\sqrt{ax+b\sqrt[3]{x}}}{119a^2}+\frac{570b^2x^{\frac{5}{3}}\sqrt{ax+b\sqrt[3]{x}}}{1547a^3}-\frac{2090b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^4}+\frac{418b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^5}-\frac{418b^5\sqrt{ax+b\sqrt[3]{x}}}{221a^{\frac{11}{2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}+\frac{418b^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{221a^{\frac{23}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}-\frac{209b^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{221a^{\frac{23}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**3*sqrt(a*x + b*x**(1/3))/(7*a) - 38*b*x**(7/3)*sqrt(a*x + b*
x**(1/3))/(119*a**2) + 570*b**2*x**(5/3)*sqrt(a*x + b*x**(1/3))/(
1547*a**3) - 2090*b**3*x*sqrt(a*x + b*x**(1/3))/(4641*a**4) + 418
*b**4*x**(1/3)*sqrt(a*x + b*x**(1/3))/(663*a**5) - 418*b**5*sqrt(
a*x + b*x**(1/3))/(221*a**(11/2)*(sqrt(a)*x**(1/3) + sqrt(b))) +
418*b**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))*
*2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_
e(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(221*a**(23/4)*x**(1/6
)*(a*x**(2/3) + b)) - 209*b**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt(a
)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x +
 b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/
(221*a**(23/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0945828, size = 131, normalized size = 0.32

$$\frac{2x^{2/3}\left(663a^5x^{10/3}-78a^4bx^{8/3}+114a^3b^2x^2-190a^2b^3x^{4/3}-4389b^5\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+418ab^4x^{2/3}+1463b\right.}{4641a^5\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(2/3)*(1463*b^5 + 418*a*b^4*x^(2/3) - 190*a^2*b^3*x^(4/3) +
114*a^3*b^2*x^2 - 78*a^4*b*x^(8/3) + 663*a^5*x^(10/3) - 4389*b^5*
Sqrt[1 + b/(a*x^(2/3))]*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*
x^(2/3)))]))/(4641*a^5*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.042, size = 261, normalized size = 0.6

$$-\frac{1}{4641\,a^6}\left(-228\,x^{8/3}a^4b^2+156\,x^{10/3}a^5b+380\,x^2a^3b^3+8778\,b^6\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticE\left(\sqrt{a\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] -1/4641/a^6*(-228*x^(8/3)*a^4*b^2+156*x^(10/3)*a^5*b+380*x^2*a^3*
b^3+8778*b^6*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a
*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)
*a)^(1/2)*EllipticE(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)
,1/2*2^(1/2))-4389*b^6*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1
/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-
a*b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1
/2))^(1/2),1/2*2^(1/2))-1326*x^4*a^6-2926*x^(2/3)*a*b^5-836*x^(4/
3)*a^2*b^4)/(x^(1/3)*(b+a*x^(2/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{ax + bx^{\frac{1}{3}}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(a*x + b*x^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(x^3/sqrt(a*x + b*x^(1/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\sqrt{ax + bx^{\frac{1}{3}}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(a*x + b*x^(1/3)),x, algorithm="fricas")
```

```
[Out] integral(x^3/sqrt(a*x + b*x^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{ax + b\sqrt[3]{x}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x**3/sqrt(a*x + b*x**(1/3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{ax + bx^{\frac{1}{3}}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(a*x + b*x^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(x^3/sqrt(a*x + b*x^(1/3)), x)
```

3.151 $\int \frac{x^2}{\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=216

$$\frac{39b^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77a^{17/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{78b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^4}+\frac{234b^2x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{385a^3}-\frac{26bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{55a^2}+\frac{2x^2\sqrt{ax+b\sqrt[3]{x}}}{5a}$$

```
[Out] (-78*b^3*Sqrt[b*x^(1/3) + a*x])/(77*a^4) + (234*b^2*x^(2/3)*Sqrt[
b*x^(1/3) + a*x])/(385*a^3) - (26*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x]
)/(55*a^2) + (2*x^2*Sqrt[b*x^(1/3) + a*x])/(5*a) + (39*b^(15/4)*(
Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a
]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4
)], 1/2])/(77*a^(17/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.587421, antiderivative size = 216, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.263$

$$\frac{39b^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{77a^{17/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{78b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^4}+\frac{234b^2x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{385a^3}-\frac{26bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{55a^2}+\frac{2x^2\sqrt{ax+b\sqrt[3]{x}}}{5a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (-78*b^3*Sqrt[b*x^(1/3) + a*x])/(77*a^4) + (234*b^2*x^(2/3)*Sqrt[
b*x^(1/3) + a*x])/(385*a^3) - (26*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x]
)/(55*a^2) + (2*x^2*Sqrt[b*x^(1/3) + a*x])/(5*a) + (39*b^(15/4)*(
Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a
]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4
)], 1/2])/(77*a^(17/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 49.2454, size = 207, normalized size = 0.96

$$\frac{2x^2\sqrt{ax+b\sqrt[3]{x}}}{5a}-\frac{26bx^{\frac{4}{3}}\sqrt{ax+b\sqrt[3]{x}}}{55a^2}+\frac{234b^2x^{\frac{2}{3}}\sqrt{ax+b\sqrt[3]{x}}}{385a^3}-\frac{78b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^4}+\frac{39b^{\frac{15}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{77a^{\frac{17}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**2*sqrt(a*x + b*x**(1/3))/(5*a) - 26*b*x**(4/3)*sqrt(a*x + b*
x**(1/3))/(55*a**2) + 234*b**2*x**(2/3)*sqrt(a*x + b*x**(1/3))/(3
85*a**3) - 78*b**3*sqrt(a*x + b*x**(1/3))/(77*a**4) + 39*b**(15/4
)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)
*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f(2*atan(a**
(1/4)*x**(1/6)/b**(1/4)), 1/2)/(77*a**(17/4)*x**(1/6)*(a*x**(2/3)
 + b))
```

Mathematica [C] time = 0.0857378, size = 118, normalized size = 0.55

$$\frac{2\sqrt[3]{x}\left(77a^4x^{8/3}-14a^3bx^2+26a^2b^2x^{4/3}-195b^4\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)-78ab^3x^{2/3}-195b^4\right)}{385a^4\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(1/3)*(-195*b^4 - 78*a*b^3*x^(2/3) + 26*a^2*b^2*x^(4/3) - 14
*a^3*b*x^2 + 77*a^4*x^(8/3) - 195*b^4*Sqrt[1 + b/(a*x^(2/3))]*Hyp
ergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(385*a^4*Sqrt[b
*x^(1/3) + a*x])
```

Maple [A] time = 0.011, size = 163, normalized size = 0.8

$$\frac{1}{385\,a^5}\left(52\,a^3b^2x^{5/3}-28\,a^4bx^{7/3}+195\,b^4\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}\mathit{EllipticF}\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] 1/385*(52*a^3*b^2*x^(5/3)-28*a^4*b*x^(7/3)+195*b^4*(-a*b)^(1/2)*(
(a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b
)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*Elli
pticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-
156*a^2*b^3*x+154*x^3*a^5-390*a*b^4*x^(1/3))/(x^(1/3)*(b+a*x^(2/3
)))^(1/2)/a^5
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{ax+bx^{\frac{1}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(a*x + b*x^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(x^2/sqrt(a*x + b*x^(1/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^2}{\sqrt{ax+bx^{\frac{1}{3}}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(a*x + b*x^(1/3)),x, algorithm="fricas")
```

```
[Out] integral(x^2/sqrt(a*x + b*x^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{ax + b\sqrt[3]{x}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(a*x + b*x**(1/3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{ax + bx^{\frac{1}{3}}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(a*x + b*x^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(x^2/sqrt(a*x + b*x^(1/3)), x)
```

3.152 $\int \frac{x}{\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=326

$$\frac{7b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{11/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{14b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{11/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{14b^2\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5a^{5/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{14b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a^2} + \frac{2x\sqrt{ax+b\sqrt[3]{x}}}{3a}$$

```
[Out] (14*b^2*(b + a*x^(2/3))*x^(1/3))/(5*a^(5/2)*(Sqrt[b] + Sqrt[a]*x^
(1/3))*Sqrt[b*x^(1/3) + a*x]) - (14*b*x^(1/3)*Sqrt[b*x^(1/3) + a*
x])/(15*a^2) + (2*x*Sqrt[b*x^(1/3) + a*x])/(3*a) - (14*b^(9/4)*(S
qrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]
*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)
], 1/2])/(5*a^(11/4)*Sqrt[b*x^(1/3) + a*x]) + (7*b^(9/4)*(Sqrt[b]
 + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/
3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2
])/(5*a^(11/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.684039, antiderivative size = 326, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.412

$$\frac{7b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{11/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{14b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{11/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{14b^2\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5a^{5/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{14b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a^2} + \frac{2x\sqrt{ax+b\sqrt[3]{x}}}{3a}$$

Antiderivative was successfully verified.

```
[In]  Int[x/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (14*b^2*(b + a*x^(2/3))*x^(1/3))/(5*a^(5/2)*(Sqrt[b] + Sqrt[a]*x^
(1/3))*Sqrt[b*x^(1/3) + a*x]) - (14*b*x^(1/3)*Sqrt[b*x^(1/3) + a*
x])/(15*a^2) + (2*x*Sqrt[b*x^(1/3) + a*x])/(3*a) - (14*b^(9/4)*(S
qrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]
*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)
], 1/2])/(5*a^(11/4)*Sqrt[b*x^(1/3) + a*x]) + (7*b^(9/4)*(Sqrt[b]
 + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/
3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2
])/(5*a^(11/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 59.4459, size = 301, normalized size = 0.92

$$\frac{2x\sqrt{ax+b\sqrt[3]{x}}}{3a}-\frac{14b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a^2}+\frac{14b^2\sqrt{ax+b\sqrt[3]{x}}}{5a^{\frac{5}{2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}-\frac{14b^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{11}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{7b^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{11}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(x/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*x*sqrt(a*x + b*x**(1/3))/(3*a) - 14*b*x**(1/3)*sqrt(a*x + b*x**
(1/3))/(15*a**2) + 14*b**2*sqrt(a*x + b*x**(1/3))/(5*a**(5/2)*(sq
rt(a)*x**(1/3) + sqrt(b))) - 14*b**(9/4)*sqrt((a*x**(2/3) + b)/(s
qrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(
a*x + b*x**(1/3))*elliptic_e(2*atan(a**(1/4)*x**(1/6)/b**(1/4)),
1/2)/(5*a**(11/4)*x**(1/6)*(a*x**(2/3) + b)) + 7*b**(9/4)*sqrt((a
*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3)
 + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**
(1/6)/b**(1/4)), 1/2)/(5*a**(11/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0744242, size = 94, normalized size = 0.29

$$\frac{2x^{2/3}\left(5a^2x^{4/3}+21b^2\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)-2abx^{2/3}-7b^2\right)}{15a^2\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[x/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(2/3)*(-7*b^2 - 2*a*b*x^(2/3) + 5*a^2*x^(4/3) + 21*b^2*Sqrt[
1 + b/(a*x^(2/3))]*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*x^(2/
3)))]))/(15*a^2*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.013, size = 228, normalized size = 0.7

$$-\frac{1}{15\,a^3}\left(-42\,b^3\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)+21\,b^3\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] -1/15/a^3*(-42*b^3*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*
(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)
^(1/2)*a)^(1/2)*EllipticE(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))
^(1/2),1/2*2^(1/2))+21*b^3*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2)
)^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3
)/(-a*b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b
)^(1/2))^(1/2),1/2*2^(1/2))+14*a*b^2*x^(2/3)+4*a^2*b*x^(4/3)-10*x
```

```
^2*a^3)/(x^(1/3)*(b+a*x^(2/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{ax + bx^{\frac{1}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(a*x + b*x^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(x/sqrt(a*x + b*x^(1/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\sqrt{ax + bx^{\frac{1}{3}}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(a*x + b*x^(1/3)),x, algorithm="fricas")
```

```
[Out] integral(x/sqrt(a*x + b*x^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{ax + b\sqrt[3]{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x/sqrt(a*x + b*x**(1/3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{ax + bx^{\frac{1}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(a*x + b*x^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(x/sqrt(a*x + b*x^(1/3)), x)
```

3.153 $\int \frac{1}{\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=126

$$\frac{2\sqrt{ax+b\sqrt[3]{x}}}{a}-\frac{b^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{a^{5/4}\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] (2*Sqrt[b*x^(1/3) + a*x])/a - (b^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3)
)*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ell
ipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(a^(5/4)*Sqrt[b
*x^(1/3) + a*x])
```

Rubi [A] time = 0.241544, antiderivative size = 126, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$

$$\frac{2\sqrt{ax+b\sqrt[3]{x}}}{a}-\frac{b^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{a^{5/4}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(1/3) + a*x])/a - (b^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3)
)*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ell
ipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(a^(5/4)*Sqrt[b
*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 18.2961, size = 119, normalized size = 0.94

$$\frac{2\sqrt{ax+b\sqrt[3]{x}}}{a}-\frac{b^{\frac{3}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\text{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{a^{\frac{5}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 2*sqrt(a*x + b*x**(1/3))/a - b**(3/4)*sqrt((a*x**(2/3) + b)/(sqrt
(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x
 + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2
)/(a**(5/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0633995, size = 73, normalized size = 0.58

$$\frac{2\sqrt[3]{x}\left(b\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+ax^{2/3}+b\right)}{a\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[b*x^(1/3) + a*x],x]
```

```
[Out] (2*x^(1/3)*(b + a*x^(2/3) + b*Sqrt[1 + b/(a*x^(2/3))]*Hypergeomet
ric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(a*Sqrt[b*x^(1/3) + a*x
])
```

Maple [A] time = 0.006, size = 127, normalized size = 1.

$$-\frac{1}{a^2}\left(b\sqrt{-ab}\sqrt{1\left(a\sqrt[3]{x}+\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}}\sqrt{-2\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-a\sqrt[3]{x}\frac{1}{\sqrt{-ab}}}EllipticF\left(\sqrt{1\left(a\sqrt[3]{x}+\sqrt{-ab}\right)\frac{1}{\sqrt{-ab}}},\frac{\sqrt{2}}{2}\right)-2ab$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] -(b*(-a*b)^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-
2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(
1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(
1/2),1/2*2^(1/2))-2*a*b*x^(1/3)-2*a^2*x)/(x^(1/3)*(b+a*x^(2/3)))^
(1/2)/a^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax+bx^{\frac{1}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*x^(1/3)),x, algorithm="maxima")
```

```
[Out] integrate(1/sqrt(a*x + b*x^(1/3)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{ax+bx^{\frac{1}{3}}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*x^(1/3)),x, algorithm="fricas")
```

```
[Out] integral(1/sqrt(a*x + b*x^(1/3)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax+b\sqrt[3]{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(1/sqrt(a*x + b*x**(1/3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax + bx^{\frac{1}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*x^(1/3)),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt(a*x + b*x^(1/3)), x)
```

3.154 $\int \frac{1}{x\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=294

$$\frac{3\sqrt[4]{a}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{6\sqrt[4]{a}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{6\sqrt{a}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{6\sqrt{ax+b\sqrt[3]{x}}}{b\sqrt[3]{x}}$$

```
[Out] (6*Sqrt[a]*(b + a*x^(2/3))*x^(1/3))/(b*(Sqrt[b] + Sqrt[a]*x^(1/3)
)*Sqrt[b*x^(1/3) + a*x]) - (6*Sqrt[b*x^(1/3) + a*x])/(b*x^(1/3))
- (6*a^(1/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sq
rt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x
^(1/6))/b^(1/4)], 1/2])/(b^(3/4)*Sqrt[b*x^(1/3) + a*x]) + (3*a^(1
/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + S
qrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b
^(1/4)], 1/2])/(b^(3/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.594521, antiderivative size = 294, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.368

$$\frac{3\sqrt[4]{a}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{6\sqrt[4]{a}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{b^{3/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{6\sqrt{a}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{6\sqrt{ax+b\sqrt[3]{x}}}{b\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[b*x^(1/3) + a*x]),x]
```


```
[Out] (6*Sqrt[a]*(b + a*x^(2/3))*x^(1/3))/(b*(Sqrt[b] + Sqrt[a]*x^(1/3)
)*Sqrt[b*x^(1/3) + a*x]) - (6*Sqrt[b*x^(1/3) + a*x])/(b*x^(1/3))
- (6*a^(1/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sq
rt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x
^(1/6))/b^(1/4)], 1/2])/(b^(3/4)*Sqrt[b*x^(1/3) + a*x]) + (3*a^(1
/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + S
qrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b
^(1/4)], 1/2])/(b^(3/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 50.3053, size = 269, normalized size = 0.91

$$-\frac{6\sqrt[4]{a}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{b^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{3\sqrt[4]{a}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{b^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{6\sqrt{a}\sqrt{ax+b\sqrt[3]{x}}}{b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{b\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] -6*a**(1/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2
)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_e(
2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(b**(3/4)*x**(1/6)*(a*x*
*(2/3) + b)) + 3*a**(1/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3)
 + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3
))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(b**(3/4)*
x**(1/6)*(a*x**(2/3) + b)) + 6*sqrt(a)*sqrt(a*x + b*x**(1/3))/(b*
(sqrt(a)*x**(1/3) + sqrt(b))) - 6*sqrt(a*x + b*x**(1/3))/(b*x**(1
/3))
```

Mathematica [C] time = 0.0658071, size = 74, normalized size = 0.25

$$-\frac{6\left(ax^{2/3}\left(-\sqrt{\frac{b}{ax^{2/3}}+1}\right){}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+ax^{2/3}+b\right)}{b\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*Sqrt[b*x^(1/3) + a*x]),x]
```

```
[Out] (-6*(b + a*x^(2/3) - a*Sqrt[1 + b/(a*x^(2/3))]*x^(2/3)*Hypergeome
tric2F1[-1/4, 1/2, 3/4, -(b/(a*x^(2/3)))]))/(b*Sqrt[b*x^(1/3) + a
*x])
```

Maple [A] time = 0.03, size = 254, normalized size = 0.9

$$3\frac{1}{\sqrt[3]{x}\left(b+ax^{2/3}\right)b}\left(2\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)b-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] 3*(2*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*
b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*
(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*EllipticE(((a*x^(1/3)+(-a*b)^(1/2
))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))*b-(x^(1/3)*(b+a*x^(2/3)))^(1/
2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(
-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*
EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/
2))*b-2*x^(2/3)*(b*x^(1/3)+a*x)^(1/2)*a-2*(b*x^(1/3)+a*x)^(1/2)*b
```

```
)/x^(1/3)/(b+a*x^(2/3))/b
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax + bx^{\frac{1}{3}}}x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(1/3))*x),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(a*x + b*x^(1/3))*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{ax + bx^{\frac{1}{3}}}x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(1/3))*x),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(a*x + b*x^(1/3))*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{ax + b\sqrt[3]{x}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(a*x + b*x**(1/3))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax + bx^{\frac{1}{3}}}x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(1/3))*x),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(a*x + b*x^(1/3))*x), x)
```

3.155 $\int \frac{1}{x^2\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=163

$$\frac{5a^{7/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{7b^{9/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{10a\sqrt{ax+b\sqrt[3]{x}}}{7b^2x^{2/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{7bx^{4/3}}$$

```
[Out] (-6*Sqrt[b*x^(1/3) + a*x])/(7*b*x^(4/3)) + (10*a*Sqrt[b*x^(1/3) +
 a*x])/(7*b^2*x^(2/3)) + (5*a^(7/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*S
qrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ellipt
icF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(7*b^(9/4)*Sqrt[b*
x^(1/3) + a*x])
```

Rubi [A] time = 0.389966, antiderivative size = 163, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$\frac{5a^{7/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{7b^{9/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{10a\sqrt{ax+b\sqrt[3]{x}}}{7b^2x^{2/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{7bx^{4/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*Sqrt[b*x^(1/3) + a*x]),x]
```

```
[Out] (-6*Sqrt[b*x^(1/3) + a*x])/(7*b*x^(4/3)) + (10*a*Sqrt[b*x^(1/3) +
 a*x])/(7*b^2*x^(2/3)) + (5*a^(7/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*S
qrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ellipt
icF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(7*b^(9/4)*Sqrt[b*
x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 30.9826, size = 156, normalized size = 0.96

$$\frac{5a^{\frac{7}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{7b^{\frac{9}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{10a\sqrt{ax+b\sqrt[3]{x}}}{7b^2x^{\frac{2}{3}}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{7bx^{\frac{4}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 5*a**(7/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)
*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f(2
*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(7*b**(9/4)*x**(1/6)*(a*x
**(2/3) + b)) + 10*a*sqrt(a*x + b*x**(1/3))/(7*b**2*x**(2/3)) - 6
*sqrt(a*x + b*x**(1/3))/(7*b*x**(4/3))
```

Mathematica [C] time = 0.0781411, size = 97, normalized size = 0.6

$$\frac{-10a^2x^{4/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+10a^2x^{4/3}+4abx^{2/3}-6b^2}{7b^2x\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[1/(x^2*Sqrt[b*x^(1/3) + a*x]),x]
```

```
[Out] (-6*b^2 + 4*a*b*x^(2/3) + 10*a^2*x^(4/3) - 10*a^2*Sqrt[1 + b/(a*x
^(2/3))]*x^(4/3)*Hypergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3))
)])/(7*b^2*x*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.035, size = 142, normalized size = 0.9

$$\frac{1}{7\,b^2}\left(5\,a\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticF\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)x^{4/3}+4\,abx+10\,x^{5/3}a^2-6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^2/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] 1/7*(5*a*(-a*b)^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/
2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a
*b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/
2))^(1/2),1/2*2^(1/2))*x^(4/3)+4*a*b*x+10*x^(5/3)*a^2-6*b^2*x^(1/
3))/b^2/(x^(1/3)*(b+a*x^(2/3)))^(1/2)/x^(4/3)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax+bx^{\frac{1}{3}}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(a*x + b*x^(1/3))*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(a*x + b*x^(1/3))*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\sqrt{ax+bx^{\frac{1}{3}}}x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(a*x + b*x^(1/3))*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(a*x + b*x^(1/3))*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{ax+b\sqrt[3]{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x**2/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(a*x + b*x**(1/3))), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(a*x + b*x^(1/3))*x^2),x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.156 $\int \frac{1}{x^3\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=388

$$-\frac{77a^{13/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{65b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{154a^{13/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{65b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{154a^{7/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{65b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{154a^3\sqrt{ax+b\sqrt[3]{x}}}{65b^4\sqrt[3]{x}}-\frac{154a^2\sqrt{ax+b\sqrt[3]{x}}}{195b^3x}+\frac{22a\sqrt{ax+b\sqrt[3]{x}}}{39b^2x^{5/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{13bx^{7/3}}$$

```
[Out] (-154*a^(7/2)*(b + a*x^(2/3))*x^(1/3))/(65*b^4*(Sqrt[b] + Sqrt[a]
*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (6*Sqrt[b*x^(1/3) + a*x])/(13*
b*x^(7/3)) + (22*a*Sqrt[b*x^(1/3) + a*x])/(39*b^2*x^(5/3)) - (154
*a^2*Sqrt[b*x^(1/3) + a*x])/(195*b^3*x) + (154*a^3*Sqrt[b*x^(1/3)
 + a*x])/(65*b^4*x^(1/3)) + (154*a^(13/4)*(Sqrt[b] + Sqrt[a]*x^(1
/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*
EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(65*b^(15/4)
*Sqrt[b*x^(1/3) + a*x]) - (77*a^(13/4)*(Sqrt[b] + Sqrt[a]*x^(1/3)
)*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ell
ipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(65*b^(15/4)*Sq
rt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.932464, antiderivative size = 388, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.368

$$-\frac{77a^{13/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{65b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{154a^{13/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{65b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{154a^{7/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{65b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{154a^3\sqrt{ax+b\sqrt[3]{x}}}{65b^4\sqrt[3]{x}}-\frac{154a^2\sqrt{ax+b\sqrt[3]{x}}}{195b^3x}+\frac{22a\sqrt{ax+b\sqrt[3]{x}}}{39b^2x^{5/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{13bx^{7/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[b*x^(1/3) + a*x]),x]
```

```
[Out] (-154*a^(7/2)*(b + a*x^(2/3))*x^(1/3))/(65*b^4*(Sqrt[b] + Sqrt[a]
*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (6*Sqrt[b*x^(1/3) + a*x])/(13*
b*x^(7/3)) + (22*a*Sqrt[b*x^(1/3) + a*x])/(39*b^2*x^(5/3)) - (154
*a^2*Sqrt[b*x^(1/3) + a*x])/(195*b^3*x) + (154*a^3*Sqrt[b*x^(1/3)
 + a*x])/(65*b^4*x^(1/3)) + (154*a^(13/4)*(Sqrt[b] + Sqrt[a]*x^(1
/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*
EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(65*b^(15/4)
*Sqrt[b*x^(1/3) + a*x]) - (77*a^(13/4)*(Sqrt[b] + Sqrt[a]*x^(1/3)
)*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ell
ipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(65*b^(15/4)*Sq
rt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 82.6471, size = 359, normalized size = 0.93

$$\frac{154a^{\frac{13}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{65b^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)} - \frac{77a^{\frac{13}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{65b^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)} - \frac{154a^{\frac{7}{2}}\sqrt{ax+b\sqrt[3]{x}}}{65b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)} + \frac{154a^3\sqrt{ax+b\sqrt[3]{x}}}{65b^4\sqrt[3]{x}} - \frac{154a^2\sqrt{ax+b\sqrt[3]{x}}}{195b^3x} + \frac{22a\sqrt{ax+b\sqrt[3]{x}}}{39b^2x^{\frac{5}{3}}} - \frac{6\sqrt{ax+b\sqrt[3]{x}}}{13bx^{\frac{7}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] 154*a**(13/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))*
*2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_
e(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(65*b**(15/4)*x**(1/6)
*(a*x**(2/3) + b)) - 77*a**(13/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*
x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b
*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(6
5*b**(15/4)*x**(1/6)*(a*x**(2/3) + b)) - 154*a**(7/2)*sqrt(a*x +
b*x**(1/3))/(65*b**4*(sqrt(a)*x**(1/3) + sqrt(b))) + 154*a**3*sqr
t(a*x + b*x**(1/3))/(65*b**4*x**(1/3)) - 154*a**2*sqrt(a*x + b*x*
*(1/3))/(195*b**3*x) + 22*a*sqrt(a*x + b*x**(1/3))/(39*b**2*x**(5
/3)) - 6*sqrt(a*x + b*x**(1/3))/(13*b*x**(7/3))
```

Mathematica [C] time = 0.092773, size = 121, normalized size = 0.31

$$\frac{-462a^4x^{8/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+462a^4x^{8/3}+308a^3bx^2-44a^2b^2x^{4/3}+20ab^3x^{2/3}-90b^4}{195b^4x^2\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*Sqrt[b*x^(1/3) + a*x]),x]
```

```
[Out] (-90*b^4 + 20*a*b^3*x^(2/3) - 44*a^2*b^2*x^(4/3) + 308*a^3*b*x^2
+ 462*a^4*x^(8/3) - 462*a^4*Sqrt[1 + b/(a*x^(2/3))]*x^(8/3)*Hyper
geometric2F1[-1/4, 1/2, 3/4, -(b/(a*x^(2/3)))])/(195*b^4*x^2*Sqrt
[b*x^(1/3) + a*x])
```

Maple [A] time = 0.042, size = 363, normalized size = 0.9

$$-\frac{1}{195\,b^4}\left(462\,a^3b\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}x^{10/3}\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\,EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)-2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] -1/195*(462*a^3*b*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(
-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^
(1/2)*a)^(1/2)*x^(10/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticE((
(a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-231*a^3
*b*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(
-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*
```

```
x^(10/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticF(((a*x^(1/3)+(-a*
b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-462*(b*x^(1/3)+a*x)^(1
/2)*x^(10/3)*a^3*b+44*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(8/3)*a^2*b
^2+154*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(10/3)*a^3*b-20*(x^(1/3)*(
b+a*x^(2/3)))^(1/2)*x^2*a*b^3-462*(b*x^(1/3)+a*x)^(1/2)*x^4*a^4+9
0*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(4/3)*b^4)/x^(11/3)/(b+a*x^(2/3
))/b^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax + bx^{\frac{1}{3}}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(1/3))*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(a*x + b*x^(1/3))*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\sqrt{ax + bx^{\frac{1}{3}}}x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(1/3))*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(a*x + b*x^(1/3))*x^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\sqrt{ax + b\sqrt[3]{x}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(a*x + b*x**(1/3))), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(1/3))*x^3),x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.157 $\int \frac{1}{x^4\sqrt{b\sqrt[3]{x}+ax}}\,dx$

Optimal. Leaf size=251

$$-\frac{663a^{19/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1463b^{21/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{1326a^4\sqrt{ax+b\sqrt[3]{x}}}{1463b^5x^{2/3}}+\frac{3978a^3\sqrt{ax+b\sqrt[3]{x}}}{7315b^4x^{4/3}}-\frac{442a^2\sqrt{ax+b\sqrt[3]{x}}}{1045b^3x^2}+\frac{34a\sqrt{ax+b\sqrt[3]{x}}}{95b^2x^{8/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{19bx^{10/3}}$$

```
[Out] (-6*Sqrt[b*x^(1/3) + a*x])/(19*b*x^(10/3)) + (34*a*Sqrt[b*x^(1/3)
 + a*x])/(95*b^2*x^(8/3)) - (442*a^2*Sqrt[b*x^(1/3) + a*x])/(1045
*b^3*x^2) + (3978*a^3*Sqrt[b*x^(1/3) + a*x])/(7315*b^4*x^(4/3)) -
 (1326*a^4*Sqrt[b*x^(1/3) + a*x])/(1463*b^5*x^(2/3)) - (663*a^(19
/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + S
qrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b
^(1/4)], 1/2])/(1463*b^(21/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.676909, antiderivative size = 251, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$-\frac{663a^{19/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{1463b^{21/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{1326a^4\sqrt{ax+b\sqrt[3]{x}}}{1463b^5x^{2/3}}+\frac{3978a^3\sqrt{ax+b\sqrt[3]{x}}}{7315b^4x^{4/3}}-\frac{442a^2\sqrt{ax+b\sqrt[3]{x}}}{1045b^3x^2}+\frac{34a\sqrt{ax+b\sqrt[3]{x}}}{95b^2x^{8/3}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{19bx^{10/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*Sqrt[b*x^(1/3) + a*x]),x]
```

```
[Out] (-6*Sqrt[b*x^(1/3) + a*x])/(19*b*x^(10/3)) + (34*a*Sqrt[b*x^(1/3)
 + a*x])/(95*b^2*x^(8/3)) - (442*a^2*Sqrt[b*x^(1/3) + a*x])/(1045
*b^3*x^2) + (3978*a^3*Sqrt[b*x^(1/3) + a*x])/(7315*b^4*x^(4/3)) -
 (1326*a^4*Sqrt[b*x^(1/3) + a*x])/(1463*b^5*x^(2/3)) - (663*a^(19
/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + S
qrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b
^(1/4)], 1/2])/(1463*b^(21/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 57.6885, size = 241, normalized size = 0.96

$$-\frac{663a^{\frac{19}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{1463b^{\frac{21}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}-\frac{1326a^4\sqrt{ax+b\sqrt[3]{x}}}{1463b^5x^{\frac{2}{3}}}+\frac{3978a^3\sqrt{ax+b\sqrt[3]{x}}}{7315b^4x^{\frac{4}{3}}}-\frac{442a^2\sqrt{ax+b\sqrt[3]{x}}}{1045b^3x^2}+\frac{34a\sqrt{ax+b\sqrt[3]{x}}}{95b^2x^{\frac{8}{3}}}-\frac{6\sqrt{ax+b\sqrt[3]{x}}}{19bx^{\frac{10}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] -663*a**(19/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))
**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic
_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(1463*b**(21/4)*x**(1
/6)*(a*x**(2/3) + b)) - 1326*a**4*sqrt(a*x + b*x**(1/3))/(1463*b*
*5*x**(2/3)) + 3978*a**3*sqrt(a*x + b*x**(1/3))/(7315*b**4*x**(4/
```

```
3)) - 442*a**2*sqrt(a*x + b*x**(1/3))/(1045*b**3*x**2) + 34*a*sqr
t(a*x + b*x**(1/3))/(95*b**2*x**(8/3)) - 6*sqrt(a*x + b*x**(1/3))
/(19*b*x**(10/3))
```

Mathematica [C] time = 0.102234, size = 134, normalized size = 0.53

$$\frac{6630a^5x^{10/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)-6630a^5x^{10/3}-2652a^4bx^{8/3}+884a^3b^2x^2-476a^2b^3x^{4/3}+308ab^4x^{2/3}-2310\ldots}{7315b^5x^3\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^4*Sqrt[b*x^(1/3) + a*x]),x]
```

```
[Out] (-2310*b^5 + 308*a*b^4*x^(2/3) - 476*a^2*b^3*x^(4/3) + 884*a^3*b^
2*x^2 - 2652*a^4*b*x^(8/3) - 6630*a^5*x^(10/3) + 6630*a^5*Sqrt[1
+ b/(a*x^(2/3))]*x^(10/3)*Hypergeometric2F1[1/4, 1/2, 5/4, -(b/(a
*x^(2/3)))])/(7315*b^5*x^3*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.041, size = 179, normalized size = 0.7

$$-\frac{1}{7315\,b^5}\left(3315\,a^4\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticF\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)x^{16/3}+2652\,x^5ba^4\ldots\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^(1/3)+a*x)^(1/2),x)
```

```
[Out] -1/7315*(3315*a^4*(-a*b)^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(
1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^
(1/3)/(-a*b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(
-a*b)^(1/2))^(1/2),1/2*2^(1/2))*x^(16/3)+2652*x^5*b*a^4+6630*x^(1
7/3)*a^5+476*x^(11/3)*a^2*b^3-884*x^(13/3)*a^3*b^2-308*a*b^4*x^3+
2310*x^(7/3)*b^5)/b^5/(x^(1/3)*(b+a*x^(2/3)))^(1/2)/x^(16/3)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax+bx^{\frac{1}{3}}}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(1/3))*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(a*x + b*x^(1/3))*x^4), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{ax+bx^{\frac{1}{3}}}x^4},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(1/3))*x^4),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(a*x + b*x^(1/3))*x^4), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(b*x**(1/3)+a*x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(a*x + b*x^(1/3))*x^4),x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError
```

3.158 $\int \frac{x^4}{\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=437

$$-\frac{4807b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{442a^{27/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{4807b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{27/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{4807b^5\sqrt[3]{x}\left(ax^{2/3}+b\right)}{221a^{13/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{4807b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^6}-\frac{24035b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^5}+\frac{6555b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}{1547a^4}-\frac{437bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}}{119a^3}+\frac{23x^3\sqrt{ax+b\sqrt[3]{x}}}{7a^2}-\frac{3x^4}{a\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] (-4807*b^5*(b + a*x^(2/3))*x^(1/3))/(221*a^(13/2)*(Sqrt[b] + Sqrt
[a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (3*x^4)/(a*Sqrt[b*x^(1/3) +
 a*x]) + (4807*b^4*x^(1/3)*Sqrt[b*x^(1/3) + a*x])/(663*a^6) - (24
035*b^3*x*Sqrt[b*x^(1/3) + a*x])/(4641*a^5) + (6555*b^2*x^(5/3)*S
qrt[b*x^(1/3) + a*x])/(1547*a^4) - (437*b*x^(7/3)*Sqrt[b*x^(1/3)
+ a*x])/(119*a^3) + (23*x^3*Sqrt[b*x^(1/3) + a*x])/(7*a^2) + (480
7*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt
[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(
1/6))/b^(1/4)], 1/2])/(221*a^(27/4)*Sqrt[b*x^(1/3) + a*x]) - (480
7*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt
[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(
1/6))/b^(1/4)], 1/2])/(442*a^(27/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 1.20333, antiderivative size = 437, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.421$

$$-\frac{4807b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{442a^{27/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{4807b^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221a^{27/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{4807b^5\sqrt[3]{x}\left(ax^{2/3}+b\right)}{221a^{13/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{4807b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^6}-\frac{24035b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^5}+\frac{6555b^2x^{5/3}\sqrt{ax+b\sqrt[3]{x}}}{1547a^4}-\frac{437bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}}{119a^3}+\frac{23x^3\sqrt{ax+b\sqrt[3]{x}}}{7a^2}-\frac{3x^4}{a\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/(b*x^(1/3) + a*x)^(3/2),x]
```


```
[Out] (-4807*b^5*(b + a*x^(2/3))*x^(1/3))/(221*a^(13/2)*(Sqrt[b] + Sqrt
[a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x]) - (3*x^4)/(a*Sqrt[b*x^(1/3) +
 a*x]) + (4807*b^4*x^(1/3)*Sqrt[b*x^(1/3) + a*x])/(663*a^6) - (24
035*b^3*x*Sqrt[b*x^(1/3) + a*x])/(4641*a^5) + (6555*b^2*x^(5/3)*S
qrt[b*x^(1/3) + a*x])/(1547*a^4) - (437*b*x^(7/3)*Sqrt[b*x^(1/3)
+ a*x])/(119*a^3) + (23*x^3*Sqrt[b*x^(1/3) + a*x])/(7*a^2) + (480
7*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt
[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(
1/6))/b^(1/4)], 1/2])/(221*a^(27/4)*Sqrt[b*x^(1/3) + a*x]) - (480
7*b^(21/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt
[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(
```

```
1/6))/b^(1/4)], 1/2])/(442*a^(27/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 110.803, size = 408, normalized size = 0.93

$$-\frac{3x^4}{a\sqrt{ax+b\sqrt[3]{x}}}+\frac{23x^3\sqrt{ax+b\sqrt[3]{x}}}{7a^2}-\frac{437bx^{\frac{7}{3}}\sqrt{ax+b\sqrt[3]{x}}}{119a^3}+\frac{6555b^2x^{\frac{5}{3}}\sqrt{ax+b\sqrt[3]{x}}}{1547a^4}-\frac{24035b^3x\sqrt{ax+b\sqrt[3]{x}}}{4641a^5}+\frac{4807b^4\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{663a^6}-\frac{4807b^5\sqrt{ax+b\sqrt[3]{x}}}{221a^{\frac{13}{2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}+\frac{4807b^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{221a^{\frac{27}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}-\frac{4807b^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{442a^{\frac{27}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] -3*x**4/(a*sqrt(a*x + b*x**(1/3))) + 23*x**3*sqrt(a*x + b*x**(1/3
))/(7*a**2) - 437*b*x**(7/3)*sqrt(a*x + b*x**(1/3))/(119*a**3) +
6555*b**2*x**(5/3)*sqrt(a*x + b*x**(1/3))/(1547*a**4) - 24035*b**
3*x*sqrt(a*x + b*x**(1/3))/(4641*a**5) + 4807*b**4*x**(1/3)*sqrt(
a*x + b*x**(1/3))/(663*a**6) - 4807*b**5*sqrt(a*x + b*x**(1/3))/(
221*a**(13/2)*(sqrt(a)*x**(1/3) + sqrt(b))) + 4807*b**(21/4)*sqrt
((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1
/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_e(2*atan(a**(1/4)*
x**(1/6)/b**(1/4)), 1/2)/(221*a**(27/4)*x**(1/6)*(a*x**(2/3) + b)
) - 4807*b**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt
(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elli
ptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(442*a**(27/4)*x*
*(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.108636, size = 131, normalized size = 0.3

$$\frac{x^{2/3}\left(1326a^5x^{10/3}-1794a^4bx^{8/3}+2622a^3b^2x^2-4370a^2b^3x^{4/3}-100947b^5\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)+9614ab^4x^{2/3}\right.}{4641a^6\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (x^(2/3)*(33649*b^5 + 9614*a*b^4*x^(2/3) - 4370*a^2*b^3*x^(4/3) +
 2622*a^3*b^2*x^2 - 1794*a^4*b*x^(8/3) + 1326*a^5*x^(10/3) - 1009
47*b^5*Sqrt[1 + b/(a*x^(2/3))]*Hypergeometric2F1[-1/4, 1/2, 3/4,
-(b/(a*x^(2/3)))]))/(4641*a^6*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.044, size = 384, normalized size = 0.9

$$-\frac{1}{9282\,a^7}\left(-5244\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}x^{8/3}a^4b^2+3588\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}x^{10/3}a^5b+8740\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}x^2a^3b^3-100947\,b^6\sqrt{\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] -1/9282/a^7*(-5244*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(8/3)*a^4*b^2+
3588*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(10/3)*a^5*b+8740*(x^(1/3)*(
b+a*x^(2/3)))^(1/2)*x^2*a^3*b^3-100947*b^6*((a*x^(1/3)+(-a*b)^(1/
2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2)
)^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*(x^(1/3)*(b+a*x^(2/3)))^(
1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*
2^(1/2))+201894*b^6*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)
*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b
)^(1/2)*a)^(1/2)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticE(((a*x^(1
/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-2652*(x^(1/3)*
(b+a*x^(2/3)))^(1/2)*x^4*a^6-39452*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*
x^(2/3)*a*b^5-19228*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(4/3)*a^2*b^4
-27846*(b*x^(1/3)+a*x)^(1/2)*x^(2/3)*a*b^5)/x^(1/3)/(b+a*x^(2/3))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(a*x + b*x^(1/3))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^4/(a*x + b*x^(1/3))^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(a*x + b*x^(1/3))^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x^4/(a*x + b*x^(1/3))^(3/2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(a*x + b*x^(1/3))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^4/(a*x + b*x^(1/3))^(3/2), x)
```

3.159 $\int \frac{x^3}{\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=239

$$\frac{663b^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{154a^{21/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{663b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^5}+\frac{1989b^2x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{385a^4}-\frac{221bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{55a^3}+\frac{17x^2\sqrt{ax+b\sqrt[3]{x}}}{5a^2}-\frac{3x^3}{a\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] (-3*x^3)/(a*Sqrt[b*x^(1/3) + a*x]) - (663*b^3*Sqrt[b*x^(1/3) + a*
x])/(77*a^5) + (1989*b^2*x^(2/3)*Sqrt[b*x^(1/3) + a*x])/(385*a^4)
 - (221*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x])/(55*a^3) + (17*x^2*Sqrt[
b*x^(1/3) + a*x])/(5*a^2) + (663*b^(15/4)*(Sqrt[b] + Sqrt[a]*x^(1
/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*
EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(154*a^(21/4
)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.684, antiderivative size = 239, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.316

$$\frac{663b^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{154a^{21/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{663b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^5}+\frac{1989b^2x^{2/3}\sqrt{ax+b\sqrt[3]{x}}}{385a^4}-\frac{221bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}{55a^3}+\frac{17x^2\sqrt{ax+b\sqrt[3]{x}}}{5a^2}-\frac{3x^3}{a\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (-3*x^3)/(a*Sqrt[b*x^(1/3) + a*x]) - (663*b^3*Sqrt[b*x^(1/3) + a*
x])/(77*a^5) + (1989*b^2*x^(2/3)*Sqrt[b*x^(1/3) + a*x])/(385*a^4)
 - (221*b*x^(4/3)*Sqrt[b*x^(1/3) + a*x])/(55*a^3) + (17*x^2*Sqrt[
b*x^(1/3) + a*x])/(5*a^2) + (663*b^(15/4)*(Sqrt[b] + Sqrt[a]*x^(1
/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*
EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(154*a^(21/4
)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 59.2346, size = 230, normalized size = 0.96

$$-\frac{3x^3}{a\sqrt{ax+b\sqrt[3]{x}}}+\frac{17x^2\sqrt{ax+b\sqrt[3]{x}}}{5a^2}-\frac{221bx^{\frac{4}{3}}\sqrt{ax+b\sqrt[3]{x}}}{55a^3}+\frac{1989b^2x^{\frac{2}{3}}\sqrt{ax+b\sqrt[3]{x}}}{385a^4}-\frac{663b^3\sqrt{ax+b\sqrt[3]{x}}}{77a^5}+\frac{663b^{\frac{15}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{154a^{\frac{21}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] -3*x**3/(a*sqrt(a*x + b*x**(1/3))) + 17*x**2*sqrt(a*x + b*x**(1/3
))/(5*a**2) - 221*b*x**(4/3)*sqrt(a*x + b*x**(1/3))/(55*a**3) + 1
989*b**2*x**(2/3)*sqrt(a*x + b*x**(1/3))/(385*a**4) - 663*b**3*sq
rt(a*x + b*x**(1/3))/(77*a**5) + 663*b**(15/4)*sqrt((a*x**(2/3) +
```

```
b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))
*sqrt(a*x + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1
/4)), 1/2)/(154*a**(21/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0902771, size = 118, normalized size = 0.49

$$\frac{\sqrt[3]{x}\left(154a^4x^{8/3}-238a^3bx^2+442a^2b^2x^{4/3}-3315b^4\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)-1326ab^3x^{2/3}-3315b^4\right)}{385a^5\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[x^3/(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (x^(1/3)*(-3315*b^4 - 1326*a*b^3*x^(2/3) + 442*a^2*b^2*x^(4/3) -
238*a^3*b*x^2 + 154*a^4*x^(8/3) - 3315*b^4*Sqrt[1 + b/(a*x^(2/3))
]*Hypergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(385*a^5*S
qrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.039, size = 260, normalized size = 1.1

$$-\frac{1}{770\,a^6}\left(-884\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}x^{5/3}a^3b^2+476\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}x^{7/3}a^4b-3315\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}}{}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^3/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] -1/770*(-884*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(5/3)*a^3*b^2+476*(x
^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(7/3)*a^4*b-3315*(x^(1/3)*(b+a*x^(2
/3)))^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*
x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*
a)^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),
1/2*2^(1/2))*(-a*b)^(1/2)*b^4+2652*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*
x*a^2*b^3-308*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^3*a^5+4320*(x^(1/3)
*(b+a*x^(2/3)))^(1/2)*x^(1/3)*a*b^4+2310*x^(1/3)*(b*x^(1/3)+a*x)^
(1/2)*a*b^4)/x^(1/3)/(b+a*x^(2/3))/a^6
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^3}{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^3/(a*x + b*x^(1/3))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^3/(a*x + b*x^(1/3))^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(a*x + b*x^(1/3))^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x^3/(a*x + b*x^(1/3))^(3/2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\left(ax + b\sqrt[3]{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Integral(x**3/(a*x + b*x**(1/3))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(a*x + b*x^(1/3))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^3/(a*x + b*x^(1/3))^(3/2), x)
```

3.160 $\int \frac{x^2}{\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=349

$$\frac{77b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{10a^{15/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{77b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{15/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{77b^2\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5a^{7/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{77b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a^3} + \frac{11x\sqrt{ax+b\sqrt[3]{x}}}{3a^2} - \frac{3x^2}{a\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] (77*b^2*(b + a*x^(2/3))*x^(1/3))/(5*a^(7/2)*(Sqrt[b] + Sqrt[a]*x^
(1/3))*Sqrt[b*x^(1/3) + a*x]) - (3*x^2)/(a*Sqrt[b*x^(1/3) + a*x])
 - (77*b*x^(1/3)*Sqrt[b*x^(1/3) + a*x])/(15*a^3) + (11*x*Sqrt[b*x
^(1/3) + a*x])/(3*a^2) - (77*b^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*
Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ellip
ticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*a^(15/4)*Sqrt[
b*x^(1/3) + a*x]) + (77*b^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[
(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[
2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(10*a^(15/4)*Sqrt[b*x^
(1/3) + a*x])
```

Rubi [A] time = 0.842271, antiderivative size = 349, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421

$$\frac{77b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{10a^{15/4}\sqrt{ax+b\sqrt[3]{x}}} - \frac{77b^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5a^{15/4}\sqrt{ax+b\sqrt[3]{x}}} + \frac{77b^2\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5a^{7/2}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}} - \frac{77b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a^3} + \frac{11x\sqrt{ax+b\sqrt[3]{x}}}{3a^2} - \frac{3x^2}{a\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (77*b^2*(b + a*x^(2/3))*x^(1/3))/(5*a^(7/2)*(Sqrt[b] + Sqrt[a]*x^
(1/3))*Sqrt[b*x^(1/3) + a*x]) - (3*x^2)/(a*Sqrt[b*x^(1/3) + a*x])
 - (77*b*x^(1/3)*Sqrt[b*x^(1/3) + a*x])/(15*a^3) + (11*x*Sqrt[b*x
^(1/3) + a*x])/(3*a^2) - (77*b^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*
Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*Ellip
ticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*a^(15/4)*Sqrt[
b*x^(1/3) + a*x]) + (77*b^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[
(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[
2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(10*a^(15/4)*Sqrt[b*x^
(1/3) + a*x])
```

Rubi in Sympy [A] time = 72.2189, size = 323, normalized size = 0.93

$$-\frac{3x^2}{a\sqrt{ax+b\sqrt[3]{x}}}+\frac{11x\sqrt{ax+b\sqrt[3]{x}}}{3a^2}-\frac{77b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}{15a^3}+\frac{77b^2\sqrt{ax+b\sqrt[3]{x}}}{5a^{\frac{7}{2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}-\frac{77b^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5a^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{77b^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{10a^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] -3*x**2/(a*sqrt(a*x + b*x**(1/3))) + 11*x*sqrt(a*x + b*x**(1/3))/
(3*a**2) - 77*b*x**(1/3)*sqrt(a*x + b*x**(1/3))/(15*a**3) + 77*b*
*2*sqrt(a*x + b*x**(1/3))/(5*a**(7/2)*(sqrt(a)*x**(1/3) + sqrt(b)
)) - 77*b**(9/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b
))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*ellipt
ic_e(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(5*a**(15/4)*x**(1/
6)*(a*x**(2/3) + b)) + 77*b**(9/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)
*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x +
b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(
10*a**(15/4)*x**(1/6)*(a*x**(2/3) + b))
```

Mathematica [C] time = 0.0782301, size = 94, normalized size = 0.27

$$\frac{x^{2/3}\left(10a^2x^{4/3}+231b^2\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)-22abx^{2/3}-77b^2\right)}{15a^3\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (x^(2/3)*(-77*b^2 - 22*a*b*x^(2/3) + 10*a^2*x^(4/3) + 231*b^2*Sqr
t[1 + b/(a*x^(2/3))]*Hypergeometric2F1[-1/4, 1/2, 3/4, -(b/(a*x^(
2/3)))]))/(15*a^3*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.017, size = 312, normalized size = 0.9

$$-\frac{1}{30\,a^4}\left(-462\,b^3\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\,EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)+231\,b^3\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] -1/30/a^4*(-462*b^3*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)
*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b
)^(1/2)*a)^(1/2)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticE(((a*x^(1
/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+231*b^3*((a*x^
(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/
2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*(x^(1/3)*
(b+a*x^(2/3)))^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(
```

```
1/2))^(1/2),1/2*2^(1/2))+64*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(2/3)
*a*b^2+44*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(4/3)*a^2*b-20*(x^(1/3)
*(b+a*x^(2/3)))^(1/2)*x^2*a^3+90*(b*x^(1/3)+a*x)^(1/2)*x^(2/3)*a*
b^2)/x^(1/3)/(b+a*x^(2/3))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(a*x + b*x^(1/3))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/(a*x + b*x^(1/3))^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(a*x + b*x^(1/3))^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x^2/(a*x + b*x^(1/3))^(3/2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\left(ax + b\sqrt[3]{x}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Integral(x**2/(a*x + b*x**(1/3))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(a*x + b*x^(1/3))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/(a*x + b*x^(1/3))^(3/2), x)
```

3.161 $\int \frac{x}{\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=149

$$-\frac{5b^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{2a^{9/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{5\sqrt{ax+b\sqrt[3]{x}}}{a^2}-\frac{3x}{a\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] (-3*x)/(a*Sqrt[b*x^(1/3) + a*x]) + (5*Sqrt[b*x^(1/3) + a*x])/a^2
- (5*b^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sq
rt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x
^(1/6))/b^(1/4)], 1/2])/(2*a^(9/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.375868, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.353

$$-\frac{5b^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{2a^{9/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{5\sqrt{ax+b\sqrt[3]{x}}}{a^2}-\frac{3x}{a\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (-3*x)/(a*Sqrt[b*x^(1/3) + a*x]) + (5*Sqrt[b*x^(1/3) + a*x])/a^2
- (5*b^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sq
rt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x
^(1/6))/b^(1/4)], 1/2])/(2*a^(9/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 30.5913, size = 143, normalized size = 0.96

$$-\frac{3x}{a\sqrt{ax+b\sqrt[3]{x}}}+\frac{5\sqrt{ax+b\sqrt[3]{x}}}{a^2}-\frac{5b^{\frac{3}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\,\mathrm{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{2a^{\frac{9}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] -3*x/(a*sqrt(a*x + b*x**(1/3))) + 5*sqrt(a*x + b*x**(1/3))/a**2 -
 5*b**(3/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2
)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f(
2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(2*a**(9/4)*x**(1/6)*(a*
x**(2/3) + b))
```

Mathematica [C] time = 0.0716452, size = 76, normalized size = 0.51

$$\frac{\sqrt[3]{x}\left(5b\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+2ax^{2/3}+5b\right)}{a^2\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[x/(b*x^(1/3) + a*x)^(3/2),x]
```

```
[Out] (x^(1/3)*(5*b + 2*a*x^(2/3) + 5*b*Sqrt[1 + b/(a*x^(2/3))]*Hyperge
ometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))]))/(a^2*Sqrt[b*x^(1/3)
 + a*x])
```

Maple [A] time = 0.012, size = 184, normalized size = 1.2

$$\frac{1}{2\,a^3}\left(-5\,\sqrt{\sqrt[3]{x}\,(b+ax^{2/3})}\,\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticF\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\,\sqrt{2}\right)b+4\,\sqrt{\sqrt[3]{x}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] 1/2*(-5*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*(-a*b)^(1/2)*((a*x^(1/3)+(-
a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*
b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*EllipticF(((a*x^(
1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))*b+4*(x^(1/3)*
(b+a*x^(2/3)))^(1/2)*x^(1/3)*a*b+4*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*
x*a^2+6*x^(1/3)*(b*x^(1/3)+a*x)^(1/2)*a*b)/x^(1/3)/(b+a*x^(2/3))/
a^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/(a*x + b*x^(1/3))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x/(a*x + b*x^(1/3))^(3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x}{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/(a*x + b*x^(1/3))^(3/2),x, algorithm="fricas")
```

```
[Out] integral(x/(a*x + b*x^(1/3))^(3/2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Integral(x/(a*x + b*x**(1/3))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(a*x + b*x^(1/3))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x/(a*x + b*x^(1/3))^(3/2), x)
```

3.162 $\int \frac{1}{\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=296

$$-\frac{3\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{2a^{3/4}b^{3/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{3\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{a^{3/4}b^{3/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{3\sqrt[3]{x}\left(ax^{2/3}+b\right)}{\sqrt{ab}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{3x^{2/3}}{b\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] (-3*(b + a*x^(2/3))*x^(1/3))/(Sqrt[a]*b*(Sqrt[b] + Sqrt[a]*x^(1/3
))*Sqrt[b*x^(1/3) + a*x]) + (3*x^(2/3))/(b*Sqrt[b*x^(1/3) + a*x])
 + (3*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] +
 Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))
/b^(1/4)], 1/2])/(a^(3/4)*b^(3/4)*Sqrt[b*x^(1/3) + a*x]) - (3*(Sq
rt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*
x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)]
, 1/2])/(2*a^(3/4)*b^(3/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.53324, antiderivative size = 296, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.467

$$-\frac{3\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{2a^{3/4}b^{3/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{3\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{a^{3/4}b^{3/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{3\sqrt[3]{x}\left(ax^{2/3}+b\right)}{\sqrt{ab}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{3x^{2/3}}{b\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1/3) + a*x)^(-3/2),x]
```


```
[Out] (-3*(b + a*x^(2/3))*x^(1/3))/(Sqrt[a]*b*(Sqrt[b] + Sqrt[a]*x^(1/3
))*Sqrt[b*x^(1/3) + a*x]) + (3*x^(2/3))/(b*Sqrt[b*x^(1/3) + a*x])
 + (3*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] +
 Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))
/b^(1/4)], 1/2])/(a^(3/4)*b^(3/4)*Sqrt[b*x^(1/3) + a*x]) - (3*(Sq
rt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*
x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)]
, 1/2])/(2*a^(3/4)*b^(3/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 46.2122, size = 270, normalized size = 0.91

$$\frac{3x^{\frac{2}{3}}}{b\sqrt{ax+b\sqrt[3]{x}}}-\frac{3\sqrt{ax+b\sqrt[3]{x}}}{\sqrt{a}b\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}+\frac{3\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^{2}}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{a^{\frac{3}{4}}b^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}-\frac{3\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^{2}}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{2a^{\frac{3}{4}}b^{\frac{3}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(1/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] 3*x**(2/3)/(b*sqrt(a*x + b*x**(1/3))) - 3*sqrt(a*x + b*x**(1/3))/
(sqrt(a)*b*(sqrt(a)*x**(1/3) + sqrt(b))) + 3*sqrt((a*x**(2/3) + b
)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*s
qrt(a*x + b*x**(1/3))*elliptic_e(2*atan(a**(1/4)*x**(1/6)/b**(1/4
)), 1/2)/(a**(3/4)*b**(3/4)*x**(1/6)*(a*x**(2/3) + b)) - 3*sqrt((
a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3
) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x*
*(1/6)/b**(1/4)), 1/2)/(2*a**(3/4)*b**(3/4)*x**(1/6)*(a*x**(2/3)
+ b))
```

Mathematica [C] time = 0.055254, size = 65, normalized size = 0.22

$$-\frac{3x^{2/3}\left(\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)-1\right)}{b\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[(b*x^(1/3) + a*x)^(-3/2),x]
```

```
[Out] (-3*x^(2/3)*(-1 + Sqrt[1 + b/(a*x^(2/3))]*Hypergeometric2F1[-1/4,
 1/2, 3/4, -(b/(a*x^(2/3)))]))/(b*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.007, size = 243, normalized size = 0.8

$$-\frac{3}{2\,ab}\left(2\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)b-\sqrt{\sqrt[3]{x}\left(b+a\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] -3/2/a*(2*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))
/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(
1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*EllipticE(((a*x^(1/3)+(-a*b)
^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))*b-(x^(1/3)*(b+a*x^(2/3))
)^(1/2)*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1
/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(
1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*
2^(1/2))*b-2*x^(2/3)*(b*x^(1/3)+a*x)^(1/2)*a)/x^(1/3)/(b+a*x^(2/3
```

```
))/b
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(-3/2),x, algorithm="maxima")

[Out] integrate((a*x + b*x^(1/3))^(-3/2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(-3/2),x, algorithm="fricas")

[Out] integral((a*x + b*x^(1/3))^(-3/2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + b\sqrt[3]{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**(1/3)+a*x)**(3/2),x)

[Out] Integral((a*x + b*x**(1/3))**(-3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(1/3))^(-3/2),x, algorithm="giac")

[Out] integrate((a*x + b*x^(1/3))^(-3/2), x)
```

3.163 $\int \frac{1}{x\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=158

$$-\frac{5a^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{2b^{9/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{5\sqrt{ax+b\sqrt[3]{x}}}{b^2x^{2/3}}+\frac{3}{b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] 3/(b*x^(1/3)*Sqrt[b*x^(1/3) + a*x]) - (5*Sqrt[b*x^(1/3) + a*x])/(
b^2*x^(2/3)) - (5*a^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a
*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcT
an[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(2*b^(9/4)*Sqrt[b*x^(1/3) +
a*x])
```

Rubi [A] time = 0.393298, antiderivative size = 158, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.316

$$-\frac{5a^{3/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{2b^{9/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{5\sqrt{ax+b\sqrt[3]{x}}}{b^2x^{2/3}}+\frac{3}{b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(b*x^(1/3) + a*x)^(3/2)),x]
```

```
[Out] 3/(b*x^(1/3)*Sqrt[b*x^(1/3) + a*x]) - (5*Sqrt[b*x^(1/3) + a*x])/(
b^2*x^(2/3)) - (5*a^(3/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a
*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcT
an[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(2*b^(9/4)*Sqrt[b*x^(1/3) +
a*x])
```

Rubi in Sympy [A] time = 31.6078, size = 151, normalized size = 0.96

$$-\frac{5a^{\frac{3}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{2b^{\frac{9}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{3}{b\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}-\frac{5\sqrt{ax+b\sqrt[3]{x}}}{b^2x^{\frac{2}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] -5*a**(3/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**2
)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_f(
2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(2*b**(9/4)*x**(1/6)*(a*
x**(2/3) + b)) + 3/(b*x**(1/3)*sqrt(a*x + b*x**(1/3))) - 5*sqrt(a
*x + b*x**(1/3))/(b**2*x**(2/3))
```

Mathematica [C] time = 0.0784883, size = 81, normalized size = 0.51

$$\frac{5ax^{2/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)-5ax^{2/3}-2b}{b^2\sqrt[3]{x}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[1/(x*(b*x^(1/3) + a*x)^(3/2)),x]
```

```
[Out] (-2*b - 5*a*x^(2/3) + 5*a*Sqrt[1 + b/(a*x^(2/3))]*x^(2/3)*Hyperge
ometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))])/(b^2*x^(1/3)*Sqrt[b*
x^(1/3) + a*x])
```

Maple [A] time = 0.017, size = 180, normalized size = 1.1

$$-\frac{1}{2\,b^2x}\left(5\,\sqrt{\sqrt[3]{x}\,\left(b+ax^{2/3}\right)}\,x^{2/3}\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}\,EllipticF\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\,\sqrt{2}\right)+4\,\sqrt{\ldots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] -1/2*(5*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(2/3)*(-a*b)^(1/2)*((a*x^
(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b)^(1/
2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*EllipticF
(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))+4*(x^
(1/3)*(b+a*x^(2/3)))^(1/2)*x^(1/3)*b+4*(x^(1/3)*(b+a*x^(2/3)))^(1
/2)*x*a+6*x*(b*x^(1/3)+a*x)^(1/2)*a)/b^2/x/(b+a*x^(2/3))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((a*x + b*x^(1/3))^(3/2)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/((a*x + b*x^(1/3))^(3/2)*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\left(ax^2+bx^{\frac{4}{3}}\right)\sqrt{ax+bx^{\frac{1}{3}}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/((a*x + b*x^(1/3))^(3/2)*x),x, algorithm="fricas")
```

```
[Out] integral(1/((a*x^2 + b*x^(4/3))*sqrt(a*x + b*x^(1/3))), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(ax+b\sqrt[3]{x}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x*(a*x + b*x**(1/3))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}} x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*x^(1/3))^(3/2)*x), x)
```

3.164 $\int \frac{1}{x^2\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=383

$$\frac{77a^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{10b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{77a^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{77a^{5/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}-\frac{77a^2\sqrt{ax+b\sqrt[3]{x}}}{5b^4\sqrt[3]{x}}+\frac{77a\sqrt{ax+b\sqrt[3]{x}}}{15b^3x}-\frac{11\sqrt{ax+b\sqrt[3]{x}}}{3b^2x^{5/3}}+\frac{3}{bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] 3/(b*x^(4/3)*Sqrt[b*x^(1/3) + a*x]) + (77*a^(5/2)*(b + a*x^(2/3))
*x^(1/3))/(5*b^4*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x
]) - (11*Sqrt[b*x^(1/3) + a*x])/(3*b^2*x^(5/3)) + (77*a*Sqrt[b*x^
(1/3) + a*x])/(15*b^3*x) - (77*a^2*Sqrt[b*x^(1/3) + a*x])/(5*b^4*
x^(1/3)) - (77*a^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^
(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[
(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*b^(15/4)*Sqrt[b*x^(1/3) + a*
x]) + (77*a^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3)
)/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1
/4)*x^(1/6))/b^(1/4)], 1/2])/(10*b^(15/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.927327, antiderivative size = 383, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.421$

$$\frac{77a^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{10b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{77a^{9/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{5b^{15/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{77a^{5/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{5b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}-\frac{77a^2\sqrt{ax+b\sqrt[3]{x}}}{5b^4\sqrt[3]{x}}+\frac{77a\sqrt{ax+b\sqrt[3]{x}}}{15b^3x}-\frac{11\sqrt{ax+b\sqrt[3]{x}}}{3b^2x^{5/3}}+\frac{3}{bx^{4/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(b*x^(1/3) + a*x)^(3/2)),x]
```


```
[Out] 3/(b*x^(4/3)*Sqrt[b*x^(1/3) + a*x]) + (77*a^(5/2)*(b + a*x^(2/3))
*x^(1/3))/(5*b^4*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[b*x^(1/3) + a*x
]) - (11*Sqrt[b*x^(1/3) + a*x])/(3*b^2*x^(5/3)) + (77*a*Sqrt[b*x^
(1/3) + a*x])/(15*b^3*x) - (77*a^2*Sqrt[b*x^(1/3) + a*x])/(5*b^4*
x^(1/3)) - (77*a^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^
(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[
(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(5*b^(15/4)*Sqrt[b*x^(1/3) + a*
x]) + (77*a^(9/4)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3)
)/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1
/4)*x^(1/6))/b^(1/4)], 1/2])/(10*b^(15/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 83.5986, size = 354, normalized size = 0.92

$$-\frac{77a^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{5b^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{77a^{\frac{9}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{10b^{\frac{15}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{77a^{\frac{5}{2}}\sqrt{ax+b\sqrt[3]{x}}}{5b^4\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)}-\frac{77a^2\sqrt{ax+b\sqrt[3]{x}}}{5b^4\sqrt[3]{x}}+\frac{77a\sqrt{ax+b\sqrt[3]{x}}}{15b^3x}+\frac{3}{bx^{\frac{4}{3}}\sqrt{ax+b\sqrt[3]{x}}}-\frac{11\sqrt{ax+b\sqrt[3]{x}}}{3b^2x^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] -77*a**(9/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))**
2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_e
(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(5*b**(15/4)*x**(1/6)*(
a*x**(2/3) + b)) + 77*a**(9/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**
(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x*
*(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(10*b
**(15/4)*x**(1/6)*(a*x**(2/3) + b)) + 77*a**(5/2)*sqrt(a*x + b*x*
*(1/3))/(5*b**4*(sqrt(a)*x**(1/3) + sqrt(b))) - 77*a**2*sqrt(a*x
+ b*x**(1/3))/(5*b**4*x**(1/3)) + 77*a*sqrt(a*x + b*x**(1/3))/(15
*b**3*x) + 3/(b*x**(4/3)*sqrt(a*x + b*x**(1/3))) - 11*sqrt(a*x +
b*x**(1/3))/(3*b**2*x**(5/3))
```

Mathematica [C] time = 0.0891386, size = 108, normalized size = 0.28

$$\frac{231a^3x^2\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right)-231a^3x^2-154a^2bx^{4/3}+22ab^2x^{2/3}-10b^3}{15b^4x^{4/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(b*x^(1/3) + a*x)^(3/2)),x]
```

```
[Out] (-10*b^3 + 22*a*b^2*x^(2/3) - 154*a^2*b*x^(4/3) - 231*a^3*x^2 + 2
31*a^3*Sqrt[1 + b/(a*x^(2/3))]*x^2*Hypergeometric2F1[-1/4, 1/2, 3
/4, -(b/(a*x^(2/3)))])/(15*b^4*x^(4/3)*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.02, size = 339, normalized size = 0.9

$$\frac{1}{30\,x^3b^4}\left(462\,a^2b\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}x^{8/3}\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\,EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right)-23\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] 1/30*(462*a^2*b*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2
*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1
/2)*a)^(1/2)*x^(8/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticE(((a*
x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-231*a^2*b*
((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*
b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*x^(
8/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticF(((a*x^(1/3)+(-a*b)^(
```

```
1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-462*(b*x^(1/3)+a*x)^(1/2)*
x^(10/3)*a^3-372*(b*x^(1/3)+a*x)^(1/2)*x^(8/3)*a^2*b+44*(x^(1/3)*
(b+a*x^(2/3)))^(1/2)*x^2*a*b^2+64*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x
^(8/3)*a^2*b-20*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(4/3)*b^3)/x^3/(b
+a*x^(2/3))/b^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}} x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/((a*x + b*x^(1/3))^(3/2)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\left(ax^3 + bx^{\frac{7}{3}}\right)\sqrt{ax + bx^{\frac{1}{3}}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/((a*x^3 + b*x^(7/3))*sqrt(a*x + b*x^(1/3))), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \left(ax + b\sqrt[3]{x}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x**2*(a*x + b*x**(1/3))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}} x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*x^(1/3))^(3/2)*x^2), x)
```

3.165 $\int \frac{1}{x^3\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=246

$$\frac{663a^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{154b^{21/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{663a^3\sqrt{ax+b\sqrt[3]{x}}}{77b^5x^{2/3}}-\frac{1989a^2\sqrt{ax+b\sqrt[3]{x}}}{385b^4x^{4/3}}+\frac{221a\sqrt{ax+b\sqrt[3]{x}}}{55b^3x^2}-\frac{17\sqrt{ax+b\sqrt[3]{x}}}{5b^2x^{8/3}}+\frac{3}{bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] 3/(b*x^(7/3)*Sqrt[b*x^(1/3) + a*x]) - (17*Sqrt[b*x^(1/3) + a*x])/
(5*b^2*x^(8/3)) + (221*a*Sqrt[b*x^(1/3) + a*x])/(55*b^3*x^2) - (1
989*a^2*Sqrt[b*x^(1/3) + a*x])/(385*b^4*x^(4/3)) + (663*a^3*Sqrt[
b*x^(1/3) + a*x])/(77*b^5*x^(2/3)) + (663*a^(15/4)*(Sqrt[b] + Sqr
t[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]
*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(15
4*b^(21/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 0.671722, antiderivative size = 246, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.316

$$\frac{663a^{15/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{154b^{21/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{663a^3\sqrt{ax+b\sqrt[3]{x}}}{77b^5x^{2/3}}-\frac{1989a^2\sqrt{ax+b\sqrt[3]{x}}}{385b^4x^{4/3}}+\frac{221a\sqrt{ax+b\sqrt[3]{x}}}{55b^3x^2}-\frac{17\sqrt{ax+b\sqrt[3]{x}}}{5b^2x^{8/3}}+\frac{3}{bx^{7/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(b*x^(1/3) + a*x)^(3/2)),x]
```


```
[Out] 3/(b*x^(7/3)*Sqrt[b*x^(1/3) + a*x]) - (17*Sqrt[b*x^(1/3) + a*x])/
(5*b^2*x^(8/3)) + (221*a*Sqrt[b*x^(1/3) + a*x])/(55*b^3*x^2) - (1
989*a^2*Sqrt[b*x^(1/3) + a*x])/(385*b^4*x^(4/3)) + (663*a^3*Sqrt[
b*x^(1/3) + a*x])/(77*b^5*x^(2/3)) + (663*a^(15/4)*(Sqrt[b] + Sqr
t[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqrt[a]*x^(1/3))^2]
*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(1/4)], 1/2])/(15
4*b^(21/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 58.7093, size = 236, normalized size = 0.96

$$\frac{663a^{\frac{15}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{154b^{\frac{21}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)}+\frac{663a^3\sqrt{ax+b\sqrt[3]{x}}}{77b^5x^{\frac{2}{3}}}-\frac{1989a^2\sqrt{ax+b\sqrt[3]{x}}}{385b^4x^{\frac{4}{3}}}+\frac{221a\sqrt{ax+b\sqrt[3]{x}}}{55b^3x^2}+\frac{3}{bx^{\frac{7}{3}}\sqrt{ax+b\sqrt[3]{x}}}-\frac{17\sqrt{ax+b\sqrt[3]{x}}}{5b^2x^{\frac{8}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] 663*a**(15/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))*
*2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic_
f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(154*b**(21/4)*x**(1/6
)*(a*x**(2/3) + b)) + 663*a**3*sqrt(a*x + b*x**(1/3))/(77*b**5*x*
```

```
*(2/3)) - 1989*a**2*sqrt(a*x + b*x**(1/3))/(385*b**4*x**(4/3)) +
221*a*sqrt(a*x + b*x**(1/3))/(55*b**3*x**2) + 3/(b*x**(7/3)*sqrt(
a*x + b*x**(1/3))) - 17*sqrt(a*x + b*x**(1/3))/(5*b**2*x**(8/3))
```

Mathematica [C] time = 0.0999876, size = 123, normalized size = 0.5

$$\frac{-3315a^4x^{8/3}\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};-\frac{b}{ax^{2/3}}\right)+3315a^4x^{8/3}+1326a^3bx^2-442a^2b^2x^{4/3}+238ab^3x^{2/3}-154b^4}{385b^5x^{7/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(b*x^(1/3) + a*x)^(3/2)),x]
```

```
[Out] (-154*b^4 + 238*a*b^3*x^(2/3) - 442*a^2*b^2*x^(4/3) + 1326*a^3*b*
x^2 + 3315*a^4*x^(8/3) - 3315*a^4*Sqrt[1 + b/(a*x^(2/3))]*x^(8/3)
*Hypergeometric2F1[1/4, 1/2, 5/4, -(b/(a*x^(2/3)))])/(385*b^5*x^(
7/3)*Sqrt[b*x^(1/3) + a*x])
```

Maple [A] time = 0.019, size = 261, normalized size = 1.1

$$\frac{1}{770\,b^5x^5}\left(3315\,\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}\,x^{14/3}\sqrt{-ab}\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\,\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}EllipticF\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] 1/770*(3315*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(14/3)*(-a*b)^(1/2)*(
(a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^(1/3)-(-a*b
)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)^(1/2)*Elli
pticF(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))*
a^3-884*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(11/3)*a^2*b^2+2652*(x^(1
/3)*(b+a*x^(2/3)))^(1/2)*x^(13/3)*a^3*b+476*(x^(1/3)*(b+a*x^(2/3)
))^(1/2)*x^3*a*b^3+4320*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^5*a^4+231
0*x^5*(b*x^(1/3)+a*x)^(1/2)*a^4-308*(x^(1/3)*(b+a*x^(2/3)))^(1/2)
*x^(7/3)*b^4)/b^5/x^5/(b+a*x^(2/3))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^3),x, algorithm="maxima")
```

```
[Out] integrate(1/((a*x + b*x^(1/3))^(3/2)*x^3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\left(ax^4+bx^{\frac{10}{3}}\right)\sqrt{ax+bx^{\frac{1}{3}}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^3),x, algorithm="fricas")
```

```
[Out] integral(1/((a*x^4 + b*x^(10/3))*sqrt(a*x + b*x^(1/3))), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + bx^{\frac{1}{3}}\right)^{\frac{3}{2}} x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^3),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*x^(1/3))^(3/2)*x^3), x)
```

3.166 $\int \frac{1}{x^4\left(b\sqrt[3]{x}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=471

$$-\frac{4807a^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{442b^{27/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{4807a^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221b^{27/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{4807a^{11/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{221b^7\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{4807a^5\sqrt{ax+b\sqrt[3]{x}}}{221b^7\sqrt[3]{x}}-\frac{4807a^4\sqrt{ax+b\sqrt[3]{x}}}{663b^6x}+\frac{24035a^3\sqrt{ax+b\sqrt[3]{x}}}{4641b^5x^{5/3}}-\frac{6555a^2\sqrt{ax+b\sqrt[3]{x}}}{1547b^4x^{7/3}}+\frac{437a\sqrt{ax+b\sqrt[3]{x}}}{119b^3x^3}-\frac{23\sqrt{ax+b\sqrt[3]{x}}}{7b^2x^{11/3}}+\frac{3}{bx^{10/3}\sqrt{ax+b\sqrt[3]{x}}}$$

```
[Out] 3/(b*x^(10/3)*Sqrt[b*x^(1/3) + a*x]) - (4807*a^(11/2)*(b + a*x^(2
/3))*x^(1/3))/(221*b^7*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[b*x^(1/3)
 + a*x]) - (23*Sqrt[b*x^(1/3) + a*x])/(7*b^2*x^(11/3)) + (437*a*S
qrt[b*x^(1/3) + a*x])/(119*b^3*x^3) - (6555*a^2*Sqrt[b*x^(1/3) +
a*x])/(1547*b^4*x^(7/3)) + (24035*a^3*Sqrt[b*x^(1/3) + a*x])/(464
1*b^5*x^(5/3)) - (4807*a^4*Sqrt[b*x^(1/3) + a*x])/(663*b^6*x) + (
4807*a^5*Sqrt[b*x^(1/3) + a*x])/(221*b^7*x^(1/3)) + (4807*a^(21/4
)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqr
t[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(
1/4)], 1/2])/(221*b^(27/4)*Sqrt[b*x^(1/3) + a*x]) - (4807*a^(21/4
)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqr
t[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(
1/4)], 1/2])/(442*b^(27/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi [A] time = 1.29632, antiderivative size = 471, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421

$$-\frac{4807a^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}F\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{442b^{27/4}\sqrt{ax+b\sqrt[3]{x}}}+\frac{4807a^{21/4}\sqrt[6]{x}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{\frac{ax^{2/3}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}E\left(2\tan^{-1}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)|\frac{1}{2}\right)}{221b^{27/4}\sqrt{ax+b\sqrt[3]{x}}}-\frac{4807a^{11/2}\sqrt[3]{x}\left(ax^{2/3}+b\right)}{221b^7\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}}+\frac{4807a^5\sqrt{ax+b\sqrt[3]{x}}}{221b^7\sqrt[3]{x}}-\frac{4807a^4\sqrt{ax+b\sqrt[3]{x}}}{663b^6x}+\frac{24035a^3\sqrt{ax+b\sqrt[3]{x}}}{4641b^5x^{5/3}}-\frac{6555a^2\sqrt{ax+b\sqrt[3]{x}}}{1547b^4x^{7/3}}+\frac{437a\sqrt{ax+b\sqrt[3]{x}}}{119b^3x^3}-\frac{23\sqrt{ax+b\sqrt[3]{x}}}{7b^2x^{11/3}}+\frac{3}{bx^{10/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(b*x^(1/3) + a*x)^(3/2)),x]
```


```
[Out] 3/(b*x^(10/3)*Sqrt[b*x^(1/3) + a*x]) - (4807*a^(11/2)*(b + a*x^(2
/3))*x^(1/3))/(221*b^7*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[b*x^(1/3)
 + a*x]) - (23*Sqrt[b*x^(1/3) + a*x])/(7*b^2*x^(11/3)) + (437*a*S
qrt[b*x^(1/3) + a*x])/(119*b^3*x^3) - (6555*a^2*Sqrt[b*x^(1/3) +
a*x])/(1547*b^4*x^(7/3)) + (24035*a^3*Sqrt[b*x^(1/3) + a*x])/(464
1*b^5*x^(5/3)) - (4807*a^4*Sqrt[b*x^(1/3) + a*x])/(663*b^6*x) + (
4807*a^5*Sqrt[b*x^(1/3) + a*x])/(221*b^7*x^(1/3)) + (4807*a^(21/4
)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqr
t[a]*x^(1/3))^2]*x^(1/6)*EllipticE[2*ArcTan[(a^(1/4)*x^(1/6))/b^(
1/4)], 1/2])/(221*b^(27/4)*Sqrt[b*x^(1/3) + a*x]) - (4807*a^(21/4
```

```
)*(Sqrt[b] + Sqrt[a]*x^(1/3))*Sqrt[(b + a*x^(2/3))/(Sqrt[b] + Sqr
t[a]*x^(1/3))^2]*x^(1/6)*EllipticF[2*ArcTan[(a^(1/4)*x^(1/6))/b^(
1/4)], 1/2])/(442*b^(27/4)*Sqrt[b*x^(1/3) + a*x])
```

Rubi in Sympy [A] time = 126.07, size = 439, normalized size = 0.93

$$\frac{4807a^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}E\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{221b^{\frac{27}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)} - \frac{4807a^{\frac{21}{4}}\sqrt{\frac{ax^{\frac{2}{3}}+b}{\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)^2}}\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)\sqrt{ax+b\sqrt[3]{x}}F\left(2\operatorname{atan}\left(\frac{\sqrt[4]{a}\sqrt[6]{x}}{\sqrt[4]{b}}\right)\middle|\frac{1}{2}\right)}{442b^{\frac{27}{4}}\sqrt[6]{x}\left(ax^{\frac{2}{3}}+b\right)} - \frac{4807a^{\frac{11}{2}}\sqrt{ax+b\sqrt[3]{x}}}{221b^7\left(\sqrt{a}\sqrt[3]{x}+\sqrt{b}\right)} + \frac{4807a^5\sqrt{ax+b\sqrt[3]{x}}}{221b^7\sqrt[3]{x}} - \frac{4807a^4\sqrt{ax+b\sqrt[3]{x}}}{663b^6x} + \frac{24035a^3\sqrt{ax+b\sqrt[3]{x}}}{4641b^5x^{\frac{5}{3}}} - \frac{6555a^2\sqrt{ax+b\sqrt[3]{x}}}{1547b^4x^{\frac{7}{3}}} + \frac{437a\sqrt{ax+b\sqrt[3]{x}}}{119b^3x^3} + \frac{3}{bx^{\frac{10}{3}}\sqrt{ax+b\sqrt[3]{x}}} - \frac{23\sqrt{ax+b\sqrt[3]{x}}}{7b^2x^{\frac{11}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] 4807*a**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt(a)*x**(1/3) + sqrt(b))
**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x + b*x**(1/3))*elliptic
_e(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2)/(221*b**(27/4)*x**(1/
6)*(a*x**(2/3) + b)) - 4807*a**(21/4)*sqrt((a*x**(2/3) + b)/(sqrt
(a)*x**(1/3) + sqrt(b))**2)*(sqrt(a)*x**(1/3) + sqrt(b))*sqrt(a*x
 + b*x**(1/3))*elliptic_f(2*atan(a**(1/4)*x**(1/6)/b**(1/4)), 1/2
)/(442*b**(27/4)*x**(1/6)*(a*x**(2/3) + b)) - 4807*a**(11/2)*sqrt
(a*x + b*x**(1/3))/(221*b**7*(sqrt(a)*x**(1/3) + sqrt(b))) + 4807
*a**5*sqrt(a*x + b*x**(1/3))/(221*b**7*x**(1/3)) - 4807*a**4*sqrt
(a*x + b*x**(1/3))/(663*b**6*x) + 24035*a**3*sqrt(a*x + b*x**(1/3
))/(4641*b**5*x**(5/3)) - 6555*a**2*sqrt(a*x + b*x**(1/3))/(1547*
b**4*x**(7/3)) + 437*a*sqrt(a*x + b*x**(1/3))/(119*b**3*x**3) + 3
/(b*x**(10/3)*sqrt(a*x + b*x**(1/3))) - 23*sqrt(a*x + b*x**(1/3))
/(7*b**2*x**(11/3))
```

Mathematica [C] time = 0.119265, size = 145, normalized size = 0.31

$$\frac{-100947a^6x^4\sqrt{\frac{b}{ax^{2/3}}+1}\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};-\frac{b}{ax^{2/3}}\right) + 100947a^6x^4 + 67298a^5bx^{10/3} - 9614a^4b^2x^{8/3} + 4370a^3b^3x^2 - 2622a^2b^4x^{4/}}{4641b^7x^{10/3}\sqrt{ax+b\sqrt[3]{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^4*(b*x^(1/3) + a*x)^(3/2)),x]
```

```
[Out] (-1326*b^6 + 1794*a*b^5*x^(2/3) - 2622*a^2*b^4*x^(4/3) + 4370*a^3
*b^3*x^2 - 9614*a^4*b^2*x^(8/3) + 67298*a^5*b*x^(10/3) + 100947*a
^6*x^4 - 100947*a^6*Sqrt[1 + b/(a*x^(2/3))]*x^4*Hypergeometric2F1
[-1/4, 1/2, 3/4, -(b/(a*x^(2/3)))])/(4641*b^7*x^(10/3)*Sqrt[b*x^(
1/3) + a*x])
```

Maple [A] time = 0.021, size = 411, normalized size = 0.9

$$-\frac{1}{9282x^7b^7}\left(201894a^5b\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-2\frac{a\sqrt[3]{x}-\sqrt{-ab}}{\sqrt{-ab}}}\sqrt{-\frac{a\sqrt[3]{x}}{\sqrt{-ab}}}x^{\frac{20}{3}}\sqrt{\sqrt[3]{x}\left(b+ax^{2/3}\right)}EllipticE\left(\sqrt{\frac{a\sqrt[3]{x}+\sqrt{-ab}}{\sqrt{-ab}}},1/2\sqrt{2}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^(1/3)+a*x)^(3/2),x)
```

```
[Out] -1/9282*(201894*a^5*b*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/
2)*(-2*(a*x^(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a
*b)^(1/2)*a)^(1/2)*x^(20/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*Ellipti
cE(((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-100
947*a^5*b*((a*x^(1/3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-2*(a*x^
(1/3)-(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2)*(-x^(1/3)/(-a*b)^(1/2)*a)
^(1/2)*x^(20/3)*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*EllipticF(((a*x^(1/
3)+(-a*b)^(1/2))/(-a*b)^(1/2))^(1/2),1/2*2^(1/2))-201894*(b*x^(1/
3)+a*x)^(1/2)*x^(22/3)*a^6-174048*(b*x^(1/3)+a*x)^(1/2)*x^(20/3)*
a^5*b+19228*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^6*a^4*b^2+39452*(x^(1
/3)*(b+a*x^(2/3)))^(1/2)*x^(20/3)*a^5*b+5244*(x^(1/3)*(b+a*x^(2/3
)))^(1/2)*x^(14/3)*a^2*b^4-8740*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(
16/3)*a^3*b^3-3588*(x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^4*a*b^5+2652*(
x^(1/3)*(b+a*x^(2/3)))^(1/2)*x^(10/3)*b^6)/x^7/(b+a*x^(2/3))/b^7
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^4),x, algorithm="maxima")
```

```
[Out] integrate(1/((a*x + b*x^(1/3))^(3/2)*x^4), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\left(ax^5+bx^{\frac{13}{3}}\right)\sqrt{ax+bx^{\frac{1}{3}}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^4),x, algorithm="fricas")
```

```
[Out] integral(1/((a*x^5 + b*x^(13/3))*sqrt(a*x + b*x^(1/3))), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**(1/3)+a*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax+bx^{\frac{1}{3}}\right)^{\frac{3}{2}}x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(1/3))^(3/2)*x^4),x, algorithm="giac")
```

```
[Out] integrate(1/((a*x + b*x^(1/3))^(3/2)*x^4), x)
```

3.167 $\int x^3\sqrt{bx^{2/3}+ax}\,dx$

Optimal. Leaf size=371

$$\frac{8388608b^{12}\left(ax+bx^{2/3}\right)^{3/2}}{152108775a^{13}x}-\frac{4194304b^{11}\left(ax+bx^{2/3}\right)^{3/2}}{50702925a^{12}x^{2/3}}+\frac{1048576b^{10}\left(ax+bx^{2/3}\right)^{3/2}}{10140585a^{11}\sqrt[3]{x}}-\frac{524288b^{9}\left(ax+bx^{2/3}\right)^{3/2}}{4345965a^{10}}+\frac{65536b^{8}\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{3/2}}{482885a^{9}}-\frac{360448b^{7}x^{2/3}\left(ax+bx^{2/3}\right)^{3/2}}{2414425a^{8}}+\frac{90112b^{6}x\left(ax+bx^{2/3}\right)^{3/2}}{557175a^{7}}-\frac{45056b^{5}x^{4/3}\left(ax+bx^{2/3}\right)^{3/2}}{260015a^{6}}+\frac{2816b^{4}x^{5/3}\left(ax+bx^{2/3}\right)^{3/2}}{15295a^{5}}-\frac{1408b^{3}x^{2}\left(ax+bx^{2/3}\right)^{3/2}}{7245a^{4}}+\frac{352b^{2}x^{7/3}\left(ax+bx^{2/3}\right)^{3/2}}{1725a^{3}}-\frac{16bx^{8/3}\left(ax+bx^{2/3}\right)^{3/2}}{75a^{2}}+\frac{2x^{3}\left(ax+bx^{2/3}\right)^{3/2}}{9a}$$

```
[Out] (-524288*b^9*(b*x^(2/3) + a*x)^(3/2))/(4345965*a^10) + (8388608*b
^12*(b*x^(2/3) + a*x)^(3/2))/(152108775*a^13*x) - (4194304*b^11*(
b*x^(2/3) + a*x)^(3/2))/(50702925*a^12*x^(2/3)) + (1048576*b^10*(
b*x^(2/3) + a*x)^(3/2))/(10140585*a^11*x^(1/3)) + (65536*b^8*x^(1
/3)*(b*x^(2/3) + a*x)^(3/2))/(482885*a^9) - (360448*b^7*x^(2/3)*(
b*x^(2/3) + a*x)^(3/2))/(2414425*a^8) + (90112*b^6*x*(b*x^(2/3) +
 a*x)^(3/2))/(557175*a^7) - (45056*b^5*x^(4/3)*(b*x^(2/3) + a*x)^
(3/2))/(260015*a^6) + (2816*b^4*x^(5/3)*(b*x^(2/3) + a*x)^(3/2))/
(15295*a^5) - (1408*b^3*x^2*(b*x^(2/3) + a*x)^(3/2))/(7245*a^4) +
 (352*b^2*x^(7/3)*(b*x^(2/3) + a*x)^(3/2))/(1725*a^3) - (16*b*x^(
8/3)*(b*x^(2/3) + a*x)^(3/2))/(75*a^2) + (2*x^3*(b*x^(2/3) + a*x)
^(3/2))/(9*a)
```

Rubi [A] time = 1.08863, antiderivative size = 371, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{8388608b^{12}\left(ax+bx^{2/3}\right)^{3/2}}{152108775a^{13}x}-\frac{4194304b^{11}\left(ax+bx^{2/3}\right)^{3/2}}{50702925a^{12}x^{2/3}}+\frac{1048576b^{10}\left(ax+bx^{2/3}\right)^{3/2}}{10140585a^{11}\sqrt[3]{x}}-\frac{524288b^{9}\left(ax+bx^{2/3}\right)^{3/2}}{4345965a^{10}}+\frac{65536b^{8}\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{3/2}}{482885a^{9}}-\frac{360448b^{7}x^{2/3}\left(ax+bx^{2/3}\right)^{3/2}}{2414425a^{8}}+\frac{90112b^{6}x\left(ax+bx^{2/3}\right)^{3/2}}{557175a^{7}}-\frac{45056b^{5}x^{4/3}\left(ax+bx^{2/3}\right)^{3/2}}{260015a^{6}}+\frac{2816b^{4}x^{5/3}\left(ax+bx^{2/3}\right)^{3/2}}{15295a^{5}}-\frac{1408b^{3}x^{2}\left(ax+bx^{2/3}\right)^{3/2}}{7245a^{4}}+\frac{352b^{2}x^{7/3}\left(ax+bx^{2/3}\right)^{3/2}}{1725a^{3}}-\frac{16bx^{8/3}\left(ax+bx^{2/3}\right)^{3/2}}{75a^{2}}+\frac{2x^{3}\left(ax+bx^{2/3}\right)^{3/2}}{9a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3*Sqrt[b*x^(2/3) + a*x],x]
```


```
[Out] (-524288*b^9*(b*x^(2/3) + a*x)^(3/2))/(4345965*a^10) + (8388608*b
^12*(b*x^(2/3) + a*x)^(3/2))/(152108775*a^13*x) - (4194304*b^11*(
b*x^(2/3) + a*x)^(3/2))/(50702925*a^12*x^(2/3)) + (1048576*b^10*(
b*x^(2/3) + a*x)^(3/2))/(10140585*a^11*x^(1/3)) + (65536*b^8*x^(1
/3)*(b*x^(2/3) + a*x)^(3/2))/(482885*a^9) - (360448*b^7*x^(2/3)*(
b*x^(2/3) + a*x)^(3/2))/(2414425*a^8) + (90112*b^6*x*(b*x^(2/3) +
 a*x)^(3/2))/(557175*a^7) - (45056*b^5*x^(4/3)*(b*x^(2/3) + a*x)^
(3/2))/(260015*a^6) + (2816*b^4*x^(5/3)*(b*x^(2/3) + a*x)^(3/2))/
(15295*a^5) - (1408*b^3*x^2*(b*x^(2/3) + a*x)^(3/2))/(7245*a^4) +
 (352*b^2*x^(7/3)*(b*x^(2/3) + a*x)^(3/2))/(1725*a^3) - (16*b*x^(
8/3)*(b*x^(2/3) + a*x)^(3/2))/(75*a^2) + (2*x^3*(b*x^(2/3) + a*x)
^(3/2))/(9*a)
```

Rubi in Sympy [A] time = 113.452, size = 352, normalized size = 0.95

$$\frac{2x^3\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{9a}-\frac{16bx^{\frac{8}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{75a^2}+\frac{352b^2x^{\frac{7}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{1725a^3}-\frac{1408b^3x^2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{7245a^4}+\frac{2816b^4x^{\frac{5}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{15295a^5}-\frac{45056b^5x^{\frac{4}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{260015a^6}+\frac{90112b^6x\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{557175a^7}-\frac{360448b^7x^{\frac{2}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{2414425a^8}+\frac{65536b^8\sqrt[3]{x}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{482885a^9}-\frac{524288b^9\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{4345965a^{10}}+\frac{1048576b^{10}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{10140585a^{11}\sqrt[3]{x}}-\frac{4194304b^{11}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{50702925a^{12}x^{\frac{2}{3}}}+\frac{8388608b^{12}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{152108775a^{13}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**3*(a*x + b*x**(2/3))**(3/2)/(9*a) - 16*b*x**(8/3)*(a*x + b*x
**(2/3))**(3/2)/(75*a**2) + 352*b**2*x**(7/3)*(a*x + b*x**(2/3))*
*(3/2)/(1725*a**3) - 1408*b**3*x**2*(a*x + b*x**(2/3))**(3/2)/(72
45*a**4) + 2816*b**4*x**(5/3)*(a*x + b*x**(2/3))**(3/2)/(15295*a*
*5) - 45056*b**5*x**(4/3)*(a*x + b*x**(2/3))**(3/2)/(260015*a**6)
 + 90112*b**6*x*(a*x + b*x**(2/3))**(3/2)/(557175*a**7) - 360448*
b**7*x**(2/3)*(a*x + b*x**(2/3))**(3/2)/(2414425*a**8) + 65536*b*
*8*x**(1/3)*(a*x + b*x**(2/3))**(3/2)/(482885*a**9) - 524288*b**9
*(a*x + b*x**(2/3))**(3/2)/(4345965*a**10) + 1048576*b**10*(a*x +
 b*x**(2/3))**(3/2)/(10140585*a**11*x**(1/3)) - 4194304*b**11*(a*
x + b*x**(2/3))**(3/2)/(50702925*a**12*x**(2/3)) + 8388608*b**12*
(a*x + b*x**(2/3))**(3/2)/(152108775*a**13*x)
```

Mathematica [A] time = 0.0892474, size = 185, normalized size = 0.5

$$2\sqrt{ax+bx^{2/3}}\left(16900975a^{13}x^{13/3}+676039a^{12}bx^4-705432a^{11}b^2x^{11/3}+739024a^{10}b^3x^{10/3}-777920a^9b^4x^3+823680a^8b^5x^{8/}\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3*Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(4194304*b^13 - 2097152*a*b^12*x^(1/3) +
 1572864*a^2*b^11*x^(2/3) - 1310720*a^3*b^10*x + 1146880*a^4*b^9*
x^(4/3) - 1032192*a^5*b^8*x^(5/3) + 946176*a^6*b^7*x^2 - 878592*a
^7*b^6*x^(7/3) + 823680*a^8*b^5*x^(8/3) - 777920*a^9*b^4*x^3 + 73
9024*a^10*b^3*x^(10/3) - 705432*a^11*b^2*x^(11/3) + 676039*a^12*b
*x^4 + 16900975*a^13*x^(13/3)))/(152108775*a^13*x^(1/3))
```

Maple [A] time = 0.016, size = 156, normalized size = 0.4

$$-\frac{2}{152108775\,a^{13}}\sqrt{bx^{\frac{2}{3}}+ax}\left(b+a\sqrt[3]{x}\right)\left(16224936\,x^{11/3}a^{11}b-15519504\,x^{10/3}a^{10}b^2-14002560\,x^{8/3}a^8b^4+13178880\,x^{7/3}a^7b\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] -2/152108775*(b*x^(2/3)+a*x)^(1/2)*(b+a*x^(1/3))*(16224936*x^(11/
3)*a^11*b-15519504*x^(10/3)*a^10*b^2-14002560*x^(8/3)*a^8*b^4+131
78880*x^(7/3)*a^7*b^5+11354112*x^(5/3)*a^5*b^7-10321920*x^(4/3)*a
^4*b^8-16900975*x^4*a^12+14780480*x^3*a^9*b^3-7864320*x^(2/3)*a^2
```

```
*b^10-12300288*x^2*a^6*b^6+6291456*x^(1/3)*a*b^11+9175040*x*a^3*b
^9-4194304*b^12)/x^(1/3)/a^13
```

Maxima [A] time = 1.44924, size = 293, normalized size = 0.79

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{27}{2}}}{9\,a^{13}}-\frac{72\left(ax^{\frac{1}{3}}+b\right)^{\frac{25}{2}}b}{25\,a^{13}}+\frac{396\left(ax^{\frac{1}{3}}+b\right)^{\frac{23}{2}}b^{2}}{23\,a^{13}}-\frac{440\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}b^{3}}{7\,a^{13}}+\frac{2970\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}b^{4}}{19\,a^{13}}-\frac{4752\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}b^{5}}{17\,a^{13}}+\frac{1848\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}b^{6}}{5\,a^{13}}-\frac{4752\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b^{7}}{13\,a^{13}}+\frac{270\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^{8}}{a^{13}}-\frac{440\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^{9}}{3\,a^{13}}+\frac{396\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^{10}}{7\,a^{13}}-\frac{72\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^{11}}{5\,a^{13}}+\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^{12}}{a^{13}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))*x^3,x, algorithm="maxima")
```

```
[Out] 2/9*(a*x^(1/3) + b)^(27/2)/a^13 - 72/25*(a*x^(1/3) + b)^(25/2)*b/
a^13 + 396/23*(a*x^(1/3) + b)^(23/2)*b^2/a^13 - 440/7*(a*x^(1/3)
+ b)^(21/2)*b^3/a^13 + 2970/19*(a*x^(1/3) + b)^(19/2)*b^4/a^13 -
4752/17*(a*x^(1/3) + b)^(17/2)*b^5/a^13 + 1848/5*(a*x^(1/3) + b)^
(15/2)*b^6/a^13 - 4752/13*(a*x^(1/3) + b)^(13/2)*b^7/a^13 + 270*(
a*x^(1/3) + b)^(11/2)*b^8/a^13 - 440/3*(a*x^(1/3) + b)^(9/2)*b^9/
a^13 + 396/7*(a*x^(1/3) + b)^(7/2)*b^10/a^13 - 72/5*(a*x^(1/3) +
b)^(5/2)*b^11/a^13 + 2*(a*x^(1/3) + b)^(3/2)*b^12/a^13
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))*x^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^{3}\sqrt{ax+bx^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x**3*sqrt(a*x + b*x**(2/3)), x)
```

GIAC/XCAS [A] time = 0.23287, size = 323, normalized size = 0.87

$$-\frac{8388608\,b^{\frac{27}{2}}\,\mathrm{sign}\left(x^{\frac{1}{3}}\right)}{152108775\,a^{13}}+\frac{2\left(16900975\left(ax^{\frac{1}{3}}+b\right)^{\frac{27}{2}}a^{312}-219036636\left(ax^{\frac{1}{3}}+b\right)^{\frac{25}{2}}a^{312}b+1309458150\left(ax^{\frac{1}{3}}+b\right)^{\frac{23}{2}}a^{312}b^{2}-4780561500\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))*x^3,x, algorithm="giac")
```

```
[Out] -8388608/152108775*b^(27/2)*sign(x^(1/3))/a^13 + 2/152108775*(169
00975*(a*x^(1/3) + b)^(27/2)*a^312 - 219036636*(a*x^(1/3) + b)^(2
5/2)*a^312*b + 1309458150*(a*x^(1/3) + b)^(23/2)*a^312*b^2 - 4780
561500*(a*x^(1/3) + b)^(21/2)*a^312*b^3 + 11888501625*(a*x^(1/3)
+ b)^(19/2)*a^312*b^4 - 21259438200*(a*x^(1/3) + b)^(17/2)*a^312*
b^5 + 28109701620*(a*x^(1/3) + b)^(15/2)*a^312*b^6 - 27800803800*
(a*x^(1/3) + b)^(13/2)*a^312*b^7 + 20534684625*(a*x^(1/3) + b)^(1
1/2)*a^312*b^8 - 11154643500*(a*x^(1/3) + b)^(9/2)*a^312*b^9 + 43
02505350*(a*x^(1/3) + b)^(7/2)*a^312*b^10 - 1095183180*(a*x^(1/3)
 + b)^(5/2)*a^312*b^11 + 152108775*(a*x^(1/3) + b)^(3/2)*a^312*b^
12)*sign(x^(1/3))/a^325
```

3.168 $\int x^2\sqrt{bx^{2/3}+ax}\,dx$

Optimal. Leaf size=283

$$-\frac{131072b^9\left(ax+bx^{2/3}\right)^{3/2}}{1616615a^{10}x}+\frac{196608b^8\left(ax+bx^{2/3}\right)^{3/2}}{1616615a^9x^{2/3}}-\frac{49152b^7\left(ax+bx^{2/3}\right)^{3/2}}{323323a^8\sqrt[3]{x}}+\frac{8192b^6\left(ax+bx^{2/3}\right)^{3/2}}{46189a^7}-\frac{9216b^5\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{3/2}}{46189a^6}+\frac{4608b^4x^{2/3}\left(ax+bx^{2/3}\right)^{3/2}}{20995a^5}-\frac{384b^3x\left(ax+bx^{2/3}\right)^{3/2}}{1615a^4}+\frac{576b^2x^{4/3}\left(ax+bx^{2/3}\right)^{3/2}}{2261a^3}-\frac{36bx^{5/3}\left(ax+bx^{2/3}\right)^{3/2}}{133a^2}+\frac{2x^2\left(ax+bx^{2/3}\right)^{3/2}}{7a}$$

```
[Out] (8192*b^6*(b*x^(2/3) + a*x)^(3/2))/(46189*a^7) - (131072*b^9*(b*x
^(2/3) + a*x)^(3/2))/(1616615*a^10*x) + (196608*b^8*(b*x^(2/3) +
a*x)^(3/2))/(1616615*a^9*x^(2/3)) - (49152*b^7*(b*x^(2/3) + a*x)^
(3/2))/(323323*a^8*x^(1/3)) - (9216*b^5*x^(1/3)*(b*x^(2/3) + a*x)
^(3/2))/(46189*a^6) + (4608*b^4*x^(2/3)*(b*x^(2/3) + a*x)^(3/2))/
(20995*a^5) - (384*b^3*x*(b*x^(2/3) + a*x)^(3/2))/(1615*a^4) + (5
76*b^2*x^(4/3)*(b*x^(2/3) + a*x)^(3/2))/(2261*a^3) - (36*b*x^(5/3
)*(b*x^(2/3) + a*x)^(3/2))/(133*a^2) + (2*x^2*(b*x^(2/3) + a*x)^(
3/2))/(7*a)
```

Rubi [A] time = 0.756917, antiderivative size = 283, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{131072b^9\left(ax+bx^{2/3}\right)^{3/2}}{1616615a^{10}x}+\frac{196608b^8\left(ax+bx^{2/3}\right)^{3/2}}{1616615a^9x^{2/3}}-\frac{49152b^7\left(ax+bx^{2/3}\right)^{3/2}}{323323a^8\sqrt[3]{x}}+\frac{8192b^6\left(ax+bx^{2/3}\right)^{3/2}}{46189a^7}-\frac{9216b^5\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{3/2}}{46189a^6}+\frac{4608b^4x^{2/3}\left(ax+bx^{2/3}\right)^{3/2}}{20995a^5}-\frac{384b^3x\left(ax+bx^{2/3}\right)^{3/2}}{1615a^4}+\frac{576b^2x^{4/3}\left(ax+bx^{2/3}\right)^{3/2}}{2261a^3}-\frac{36bx^{5/3}\left(ax+bx^{2/3}\right)^{3/2}}{133a^2}+\frac{2x^2\left(ax+bx^{2/3}\right)^{3/2}}{7a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*Sqrt[b*x^(2/3) + a*x],x]
```


```
[Out] (8192*b^6*(b*x^(2/3) + a*x)^(3/2))/(46189*a^7) - (131072*b^9*(b*x
^(2/3) + a*x)^(3/2))/(1616615*a^10*x) + (196608*b^8*(b*x^(2/3) +
a*x)^(3/2))/(1616615*a^9*x^(2/3)) - (49152*b^7*(b*x^(2/3) + a*x)^
(3/2))/(323323*a^8*x^(1/3)) - (9216*b^5*x^(1/3)*(b*x^(2/3) + a*x)
^(3/2))/(46189*a^6) + (4608*b^4*x^(2/3)*(b*x^(2/3) + a*x)^(3/2))/
(20995*a^5) - (384*b^3*x*(b*x^(2/3) + a*x)^(3/2))/(1615*a^4) + (5
76*b^2*x^(4/3)*(b*x^(2/3) + a*x)^(3/2))/(2261*a^3) - (36*b*x^(5/3
)*(b*x^(2/3) + a*x)^(3/2))/(133*a^2) + (2*x^2*(b*x^(2/3) + a*x)^(
3/2))/(7*a)
```

Rubi in Sympy [A] time = 75.0392, size = 267, normalized size = 0.94

$$\frac{2x^2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{7a}-\frac{36bx^{\frac{5}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{133a^2}+\frac{576b^2x^{\frac{4}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{2261a^3}-\frac{384b^3x\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{1615a^4}+\frac{4608b^4x^{\frac{2}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{20995a^5}-\frac{9216b^5\sqrt[3]{x}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{46189a^6}+\frac{8192b^6\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{46189a^7}-\frac{49152b^7\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{323323a^8\sqrt[3]{x}}+\frac{196608b^8\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{1616615a^9x^{\frac{2}{3}}}-\frac{131072b^9\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{1616615a^{10}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**2*(a*x + b*x**(2/3))**(3/2)/(7*a) - 36*b*x**(5/3)*(a*x + b*x
**(2/3))**(3/2)/(133*a**2) + 576*b**2*x**(4/3)*(a*x + b*x**(2/3))
**(3/2)/(2261*a**3) - 384*b**3*x*(a*x + b*x**(2/3))**(3/2)/(1615*
a**4) + 4608*b**4*x**(2/3)*(a*x + b*x**(2/3))**(3/2)/(20995*a**5)
 - 9216*b**5*x**(1/3)*(a*x + b*x**(2/3))**(3/2)/(46189*a**6) + 81
92*b**6*(a*x + b*x**(2/3))**(3/2)/(46189*a**7) - 49152*b**7*(a*x
+ b*x**(2/3))**(3/2)/(323323*a**8*x**(1/3)) + 196608*b**8*(a*x +
b*x**(2/3))**(3/2)/(1616615*a**9*x**(2/3)) - 131072*b**9*(a*x + b
*x**(2/3))**(3/2)/(1616615*a**10*x)
```

Mathematica [A] time = 0.0625154, size = 148, normalized size = 0.52

$$\frac{2\sqrt{ax+bx^{2/3}}\left(230945a^{10}x^{10/3}+12155a^9bx^3-12870a^8b^2x^{8/3}+13728a^7b^3x^{7/3}-14784a^6b^4x^2+16128a^5b^5x^{5/3}-17920a^4\right.}{1616615a^{10}\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(-65536*b^10 + 32768*a*b^9*x^(1/3) - 245
76*a^2*b^8*x^(2/3) + 20480*a^3*b^7*x - 17920*a^4*b^6*x^(4/3) + 16
128*a^5*b^5*x^(5/3) - 14784*a^6*b^4*x^2 + 13728*a^7*b^3*x^(7/3) -
 12870*a^8*b^2*x^(8/3) + 12155*a^9*b*x^3 + 230945*a^10*x^(10/3)))
/(1616615*a^10*x^(1/3))
```

Maple [A] time = 0.006, size = 123, normalized size = 0.4

$$-\frac{2}{1616615\,a^{10}}\sqrt{bx^{\frac{2}{3}}+ax}\left(b+a\sqrt[3]{x}\right)\left(218790\,x^{8/3}a^8b-205920\,x^{7/3}a^7b^2-177408\,x^{5/3}a^5b^4+161280\,x^{4/3}a^4b^5-230945\,x^3a\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] -2/1616615*(b*x^(2/3)+a*x)^(1/2)*(b+a*x^(1/3))*(218790*x^(8/3)*a^
8*b-205920*x^(7/3)*a^7*b^2-177408*x^(5/3)*a^5*b^4+161280*x^(4/3)*
a^4*b^5-230945*x^3*a^9+122880*x^(2/3)*a^2*b^7+192192*x^2*a^6*b^3-
98304*x^(1/3)*a*b^8-143360*x*a^3*b^6+65536*b^9)/x^(1/3)/a^10
```

Maxima [A] time = 1.45417, size = 224, normalized size = 0.79

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}}{7\,a^{10}}-\frac{54\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}b}{19\,a^{10}}+\frac{216\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}b^2}{17\,a^{10}}-\frac{168\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}b^3}{5\,a^{10}}+\frac{756\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b^4}{13\,a^{10}}-\frac{756\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^5}{11\,a^{10}}+\frac{56\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^6}{a^{10}}-\frac{216\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^7}{7\,a^{10}}+\frac{54\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^8}{5\,a^{10}}-\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^9}{a^{10}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))*x^2,x, algorithm="maxima")
```

```
[Out] 2/7*(a*x^(1/3) + b)^(21/2)/a^10 - 54/19*(a*x^(1/3) + b)^(19/2)*b/
a^10 + 216/17*(a*x^(1/3) + b)^(17/2)*b^2/a^10 - 168/5*(a*x^(1/3)
```

```
+ b)^(15/2)*b^3/a^10 + 756/13*(a*x^(1/3) + b)^(13/2)*b^4/a^10 - 7
56/11*(a*x^(1/3) + b)^(11/2)*b^5/a^10 + 56*(a*x^(1/3) + b)^(9/2)*
b^6/a^10 - 216/7*(a*x^(1/3) + b)^(7/2)*b^7/a^10 + 54/5*(a*x^(1/3)
 + b)^(5/2)*b^8/a^10 - 2*(a*x^(1/3) + b)^(3/2)*b^9/a^10
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))*x^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2 \sqrt{ax + bx^{\frac{2}{3}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x**2*sqrt(a*x + b*x**(2/3)), x)
```

GIAC/XCAS [A] time = 0.227671, size = 254, normalized size = 0.9

$$\frac{131072\, b^{\frac{21}{2}} \operatorname{sign}\left(x^{\frac{1}{3}}\right)}{1616615\, a^{10}} + \frac{2\left(230945 \left(ax^{\frac{1}{3}} + b\right)^{\frac{21}{2}} a^{180} - 2297295 \left(ax^{\frac{1}{3}} + b\right)^{\frac{19}{2}} a^{180} b + 10270260 \left(ax^{\frac{1}{3}} + b\right)^{\frac{17}{2}} a^{180} b^2 - 27159132 \left(ax^{\frac{1}{3}} + b\right)^{\frac{15}{2}} a^{180} b^3 + 4\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))*x^2,x, algorithm="giac")
```

```
[Out] 131072/1616615*b^(21/2)*sign(x^(1/3))/a^10 + 2/1616615*(230945*(a
*x^(1/3) + b)^(21/2)*a^180 - 2297295*(a*x^(1/3) + b)^(19/2)*a^180
*b + 10270260*(a*x^(1/3) + b)^(17/2)*a^180*b^2 - 27159132*(a*x^(1
/3) + b)^(15/2)*a^180*b^3 + 47006190*(a*x^(1/3) + b)^(13/2)*a^180
*b^4 - 55552770*(a*x^(1/3) + b)^(11/2)*a^180*b^5 + 45265220*(a*x^
(1/3) + b)^(9/2)*a^180*b^6 - 24942060*(a*x^(1/3) + b)^(7/2)*a^180
*b^7 + 8729721*(a*x^(1/3) + b)^(5/2)*a^180*b^8 - 1616615*(a*x^(1/
3) + b)^(3/2)*a^180*b^9)*sign(x^(1/3))/a^190
```

3.169 $\int x\sqrt{bx^{2/3}+ax}\,dx$

Optimal. Leaf size=195

$$\frac{2048b^6\left(ax+bx^{2/3}\right)^{3/2}}{15015a^7x}-\frac{1024b^5\left(ax+bx^{2/3}\right)^{3/2}}{5005a^6x^{2/3}}+\frac{256b^4\left(ax+bx^{2/3}\right)^{3/2}}{1001a^5\sqrt[3]{x}}-\frac{128b^3\left(ax+bx^{2/3}\right)^{3/2}}{429a^4}+\frac{48b^2\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{3/2}}{143a^3}-\frac{24bx^{2/3}\left(ax+bx^{2/3}\right)^{3/2}}{65a^2}+\frac{2x\left(ax+bx^{2/3}\right)^{3/2}}{5a}$$

```
[Out] (-128*b^3*(b*x^(2/3) + a*x)^(3/2))/(429*a^4) + (2048*b^6*(b*x^(2/
3) + a*x)^(3/2))/(15015*a^7*x) - (1024*b^5*(b*x^(2/3) + a*x)^(3/2
))/(5005*a^6*x^(2/3)) + (256*b^4*(b*x^(2/3) + a*x)^(3/2))/(1001*a
^5*x^(1/3)) + (48*b^2*x^(1/3)*(b*x^(2/3) + a*x)^(3/2))/(143*a^3)
- (24*b*x^(2/3)*(b*x^(2/3) + a*x)^(3/2))/(65*a^2) + (2*x*(b*x^(2/
3) + a*x)^(3/2))/(5*a)
```

Rubi [A] time = 0.470358, antiderivative size = 195, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$\frac{2048b^6\left(ax+bx^{2/3}\right)^{3/2}}{15015a^7x}-\frac{1024b^5\left(ax+bx^{2/3}\right)^{3/2}}{5005a^6x^{2/3}}+\frac{256b^4\left(ax+bx^{2/3}\right)^{3/2}}{1001a^5\sqrt[3]{x}}-\frac{128b^3\left(ax+bx^{2/3}\right)^{3/2}}{429a^4}+\frac{48b^2\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{3/2}}{143a^3}-\frac{24bx^{2/3}\left(ax+bx^{2/3}\right)^{3/2}}{65a^2}+\frac{2x\left(ax+bx^{2/3}\right)^{3/2}}{5a}$$

Antiderivative was successfully verified.

```
[In]  Int[x*Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (-128*b^3*(b*x^(2/3) + a*x)^(3/2))/(429*a^4) + (2048*b^6*(b*x^(2/
3) + a*x)^(3/2))/(15015*a^7*x) - (1024*b^5*(b*x^(2/3) + a*x)^(3/2
))/(5005*a^6*x^(2/3)) + (256*b^4*(b*x^(2/3) + a*x)^(3/2))/(1001*a
^5*x^(1/3)) + (48*b^2*x^(1/3)*(b*x^(2/3) + a*x)^(3/2))/(143*a^3)
- (24*b*x^(2/3)*(b*x^(2/3) + a*x)^(3/2))/(65*a^2) + (2*x*(b*x^(2/
3) + a*x)^(3/2))/(5*a)
```

Rubi in Sympy [A] time = 43.7983, size = 182, normalized size = 0.93

$$\frac{2x\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{5a}-\frac{24bx^{\frac{2}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{65a^2}+\frac{48b^2\sqrt[3]{x}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{143a^3}-\frac{128b^3\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{429a^4}+\frac{256b^4\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{1001a^5\sqrt[3]{x}}-\frac{1024b^5\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{5005a^6x^{\frac{2}{3}}}+\frac{2048b^6\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{15015a^7x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*x*(a*x + b*x**(2/3))**(3/2)/(5*a) - 24*b*x**(2/3)*(a*x + b*x**(
2/3))**(3/2)/(65*a**2) + 48*b**2*x**(1/3)*(a*x + b*x**(2/3))**(3/
2)/(143*a**3) - 128*b**3*(a*x + b*x**(2/3))**(3/2)/(429*a**4) + 2
56*b**4*(a*x + b*x**(2/3))**(3/2)/(1001*a**5*x**(1/3)) - 1024*b**
5*(a*x + b*x**(2/3))**(3/2)/(5005*a**6*x**(2/3)) + 2048*b**6*(a*x
 + b*x**(2/3))**(3/2)/(15015*a**7*x)
```

Mathematica [A] time = 0.0588068, size = 111, normalized size = 0.57

$$\frac{2\sqrt{ax+bx^{2/3}}\left(3003a^7x^{7/3}+231a^6bx^2-252a^5b^2x^{5/3}+280a^4b^3x^{4/3}-320a^3b^4x+384a^2b^5x^{2/3}-512ab^6\sqrt[3]{x}+1024b^7\right)}{15015a^7\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[x*Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(1024*b^7 - 512*a*b^6*x^(1/3) + 384*a^2*
b^5*x^(2/3) - 320*a^3*b^4*x + 280*a^4*b^3*x^(4/3) - 252*a^5*b^2*x
^(5/3) + 231*a^6*b*x^2 + 3003*a^7*x^(7/3)))/(15015*a^7*x^(1/3))
```

Maple [A] time = 0.007, size = 90, normalized size = 0.5

$$-\frac{2}{15015\,a^{7}}\sqrt{bx^{\frac{2}{3}}+ax}\,\left(b+a\sqrt[3]{x}\right)\left(2772\,x^{5/3}a^{5}b-2520\,x^{4/3}a^{4}b^{2}-1920\,x^{2/3}a^{2}b^{4}-3003\,x^{2}a^{6}+1536\,\sqrt[3]{x}ab^{5}+2240\,xa^{3}b^{3}-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x*(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] -2/15015*(b*x^(2/3)+a*x)^(1/2)*(b+a*x^(1/3))*(2772*x^(5/3)*a^5*b-
2520*x^(4/3)*a^4*b^2-1920*x^(2/3)*a^2*b^4-3003*x^2*a^6+1536*x^(1/
3)*a*b^5+2240*x*a^3*b^3-1024*b^6)/x^(1/3)/a^7
```

Maxima [A] time = 1.47093, size = 155, normalized size = 0.79

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}}{5\,a^{7}}-\frac{36\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b}{13\,a^{7}}+\frac{90\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^{2}}{11\,a^{7}}-\frac{40\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^{3}}{3\,a^{7}}+\frac{90\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^{4}}{7\,a^{7}}-\frac{36\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^{5}}{5\,a^{7}}+\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^{6}}{a^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(a*x + b*x^(2/3))*x,x, algorithm="maxima")
```

```
[Out] 2/5*(a*x^(1/3) + b)^(15/2)/a^7 - 36/13*(a*x^(1/3) + b)^(13/2)*b/a
^7 + 90/11*(a*x^(1/3) + b)^(11/2)*b^2/a^7 - 40/3*(a*x^(1/3) + b)^
(9/2)*b^3/a^7 + 90/7*(a*x^(1/3) + b)^(7/2)*b^4/a^7 - 36/5*(a*x^(1
/3) + b)^(5/2)*b^5/a^7 + 2*(a*x^(1/3) + b)^(3/2)*b^6/a^7
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(a*x + b*x^(2/3))*x,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\sqrt{ax+bx^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x*sqrt(a*x + b*x**(2/3)), x)
```

GIAC/XCAS [A] time = 0.227908, size = 185, normalized size = 0.95

$$-\frac{2048\, b^{\frac{15}{2}} \operatorname{sign}\left(x^{\frac{1}{3}}\right)}{15015\, a^{7}} + \frac{2\left(3003\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}} a^{84} - 20790\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}} a^{84} b + 61425\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}} a^{84} b^{2} - 100100\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}} a^{84} b^{3} + 96525\left(ax^{\frac{1}{3}}+b\right)}{15015\, a^{91}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))*x,x, algorithm="giac")
```

```
[Out] -2048/15015*b^(15/2)*sign(x^(1/3))/a^7 + 2/15015*(3003*(a*x^(1/3)
 + b)^(15/2)*a^84 - 20790*(a*x^(1/3) + b)^(13/2)*a^84*b + 61425*(
a*x^(1/3) + b)^(11/2)*a^84*b^2 - 100100*(a*x^(1/3) + b)^(9/2)*a^8
4*b^3 + 96525*(a*x^(1/3) + b)^(7/2)*a^84*b^4 - 54054*(a*x^(1/3) +
 b)^(5/2)*a^84*b^5 + 15015*(a*x^(1/3) + b)^(3/2)*a^84*b^6)*sign(x
^(1/3))/a^91
```

3.170 $\int \sqrt{bx^{2/3}+ax}\,dx$

Optimal. Leaf size=109

$$-\frac{32b^3\left(ax+bx^{2/3}\right)^{3/2}}{105a^4x}+\frac{16b^2\left(ax+bx^{2/3}\right)^{3/2}}{35a^3x^{2/3}}-\frac{4b\left(ax+bx^{2/3}\right)^{3/2}}{7a^2\sqrt[3]{x}}+\frac{2\left(ax+bx^{2/3}\right)^{3/2}}{3a}$$

```
[Out] (2*(b*x^(2/3) + a*x)^(3/2))/(3*a) - (32*b^3*(b*x^(2/3) + a*x)^(3/
2))/(105*a^4*x) + (16*b^2*(b*x^(2/3) + a*x)^(3/2))/(35*a^3*x^(2/3
)) - (4*b*(b*x^(2/3) + a*x)^(3/2))/(7*a^2*x^(1/3))
```

Rubi [A] time = 0.236793, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$-\frac{32b^3\left(ax+bx^{2/3}\right)^{3/2}}{105a^4x}+\frac{16b^2\left(ax+bx^{2/3}\right)^{3/2}}{35a^3x^{2/3}}-\frac{4b\left(ax+bx^{2/3}\right)^{3/2}}{7a^2\sqrt[3]{x}}+\frac{2\left(ax+bx^{2/3}\right)^{3/2}}{3a}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*(b*x^(2/3) + a*x)^(3/2))/(3*a) - (32*b^3*(b*x^(2/3) + a*x)^(3/
2))/(105*a^4*x) + (16*b^2*(b*x^(2/3) + a*x)^(3/2))/(35*a^3*x^(2/3
)) - (4*b*(b*x^(2/3) + a*x)^(3/2))/(7*a^2*x^(1/3))
```

Rubi in Sympy [A] time = 20.7487, size = 99, normalized size = 0.91

$$\frac{2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{3a}-\frac{4b\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{7a^2\sqrt[3]{x}}+\frac{16b^2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{35a^3x^{\frac{2}{3}}}-\frac{32b^3\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{105a^4x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*(a*x + b*x**(2/3))**(3/2)/(3*a) - 4*b*(a*x + b*x**(2/3))**(3/2)
/(7*a**2*x**(1/3)) + 16*b**2*(a*x + b*x**(2/3))**(3/2)/(35*a**3*x
**(2/3)) - 32*b**3*(a*x + b*x**(2/3))**(3/2)/(105*a**4*x)
```

Mathematica [A] time = 0.0366656, size = 74, normalized size = 0.68

$$\frac{2\sqrt{ax+bx^{2/3}}\left(35a^4x^{4/3}+5a^3bx-6a^2b^2x^{2/3}+8ab^3\sqrt[3]{x}-16b^4\right)}{105a^4\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(-16*b^4 + 8*a*b^3*x^(1/3) - 6*a^2*b^2*x
^(2/3) + 5*a^3*b*x + 35*a^4*x^(4/3)))/(105*a^4*x^(1/3))
```

Maple [A] time = 0.004, size = 57, normalized size = 0.5

$$-\frac{2}{105\,a^4}\sqrt{bx^{\frac{2}{3}}+ax}\left(b+a\sqrt[3]{x}\right)\left(30\,a^2bx^{2/3}-24\,a\sqrt[3]{x}b^2-35\,xa^3+16\,b^3\right)\frac{1}{\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] -2/105*(b*x^(2/3)+a*x)^(1/2)*(b+a*x^(1/3))*(30*a^2*b*x^(2/3)-24*a
*x^(1/3)*b^2-35*x*a^3+16*b^3)/x^(1/3)/a^4
```

Maxima [A] time = 1.44052, size = 86, normalized size = 0.79

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}}{3\,a^4}-\frac{18\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b}{7\,a^4}+\frac{18\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^2}{5\,a^4}-\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^3}{a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(a*x + b*x^(2/3)),x, algorithm="maxima")
```

```
[Out] 2/3*(a*x^(1/3) + b)^(9/2)/a^4 - 18/7*(a*x^(1/3) + b)^(7/2)*b/a^4
+ 18/5*(a*x^(1/3) + b)^(5/2)*b^2/a^4 - 2*(a*x^(1/3) + b)^(3/2)*b^
3/a^4
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(a*x + b*x^(2/3)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{ax+bx^{\frac{2}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(sqrt(a*x + b*x**(2/3)), x)
```

GIAC/XCAS [A] time = 0.225809, size = 116, normalized size = 1.06

$$\frac{32\,b^{\frac{9}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{105\,a^4}+\frac{2\left(35\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^{24}-135\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{24}b+189\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^{24}b^2-105\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^{24}b^3\right)\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{105\,a^{28}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(a*x + b*x^(2/3)),x, algorithm="giac")
```

```
[Out] 32/105*b^(9/2)*sign(x^(1/3))/a^4 + 2/105*(35*(a*x^(1/3) + b)^(9/2
)*a^24 - 135*(a*x^(1/3) + b)^(7/2)*a^24*b + 189*(a*x^(1/3) + b)^(
5/2)*a^24*b^2 - 105*(a*x^(1/3) + b)^(3/2)*a^24*b^3)*sign(x^(1/3))
/a^28
```

3.171 $\int \frac{\sqrt{bx^{2/3}+ax}}{x}\,dx$

Optimal. Leaf size=23

$$\frac{2\left(ax+bx^{2/3}\right)^{3/2}}{ax}$$

```
[Out] (2*(b*x^(2/3) + a*x)^(3/2))/(a*x)
```

Rubi [A] time = 0.0697851, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053

$$\frac{2\left(ax+bx^{2/3}\right)^{3/2}}{ax}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(2/3) + a*x]/x,x]

[Out] (2*(b*x^(2/3) + a*x)^(3/2))/(a*x)
```

Rubi in Sympy [A] time = 6.71298, size = 17, normalized size = 0.74

$$\frac{2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(1/2)/x,x)

[Out] 2*(a*x + b*x**(2/3))**(3/2)/(a*x)
```

Mathematica [A] time = 0.0276808, size = 29, normalized size = 1.26

$$\left(\frac{2b}{a\sqrt[3]{x}}+2\right)\sqrt{ax+bx^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(2/3) + a*x]/x,x]

[Out] (2 + (2*b)/(a*x^(1/3)))*Sqrt[b*x^(2/3) + a*x]
```

Maple [A] time = 0.005, size = 27, normalized size = 1.2

$$2\,\frac{\sqrt{bx^{2/3}+ax}\left(b+a\sqrt[3]{x}\right)}{a\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(1/2)/x,x)
```

```
[Out] 2*(b*x^(2/3)+a*x)^(1/2)/x^(1/3)*(b+a*x^(1/3))/a
```

Maxima [A] time = 1.40874, size = 19, normalized size = 0.83

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x,x, algorithm="maxima")
```

```
[Out] 2*(a*x^(1/3) + b)^(3/2)/a
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax+bx^{\frac{2}{3}}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(1/2)/x,x)
```

```
[Out] Integral(sqrt(a*x + b*x**(2/3))/x, x)
```

GIAC/XCAS [A] time = 0.222296, size = 42, normalized size = 1.83

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{a}-\frac{2\,b^{\frac{3}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x,x, algorithm="giac")
```

```
[Out] 2*(a*x^(1/3) + b)^(3/2)*sign(x^(1/3))/a - 2*b^(3/2)*sign(x^(1/3))
/a
```

3.172 $\int \frac{\sqrt{bx^{2/3}+ax}}{x^2}\,dx$

Optimal. Leaf size=90

$$\frac{3a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{4b^{3/2}}-\frac{3a\sqrt{ax+bx^{2/3}}}{4bx^{2/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{2x}$$

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(2*x) - (3*a*Sqrt[b*x^(2/3) + a*x])/(4
*b*x^(2/3)) + (3*a^2*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a
*x]])/(4*b^(3/2))
```

Rubi [A] time = 0.241292, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{3a^2\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{4b^{3/2}}-\frac{3a\sqrt{ax+bx^{2/3}}}{4bx^{2/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{2x}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(2/3) + a*x]/x^2,x]
```

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(2*x) - (3*a*Sqrt[b*x^(2/3) + a*x])/(4
*b*x^(2/3)) + (3*a^2*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a
*x]])/(4*b^(3/2))
```

Rubi in Sympy [A] time = 20.0525, size = 80, normalized size = 0.89

$$\frac{3a^2\,\mathrm{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{4b^{\frac{3}{2}}}-\frac{3a\sqrt{ax+bx^{\frac{2}{3}}}}{4bx^{\frac{2}{3}}}-\frac{3\sqrt{ax+bx^{\frac{2}{3}}}}{2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(1/2)/x**2,x)
```

```
[Out] 3*a**2*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(4*b**(3/2)
) - 3*a*sqrt(a*x + b*x**(2/3))/(4*b*x**(2/3)) - 3*sqrt(a*x + b*x*
*(2/3))/(2*x)
```

Mathematica [A] time = 0.127274, size = 76, normalized size = 0.84

$$\frac{3a^2\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{4b^{3/2}}-\frac{3\left(a\sqrt[3]{x}+2b\right)\sqrt{ax+bx^{2/3}}}{4bx}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(2/3) + a*x]/x^2,x]
```

```
[Out] (-3*(2*b + a*x^(1/3))*Sqrt[b*x^(2/3) + a*x])/(4*b*x) + (3*a^2*Arc
Tanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/(4*b^(3/2))
```

Maple [A] time = 0.005, size = 79, normalized size = 0.9

$$-\frac{3}{4x}\sqrt{bx^{\frac{2}{3}}+ax}\left(b^{\frac{3}{2}}\left(b+a\sqrt[3]{x}\right)^{\frac{3}{2}}-Artanh\left(1\sqrt{b+a\sqrt[3]{x}}\frac{1}{\sqrt{b}}\right)ba^{2}x^{\frac{2}{3}}+b^{\frac{5}{2}}\sqrt{b+a\sqrt[3]{x}}\right)b^{-\frac{5}{2}}\frac{1}{\sqrt{b+a\sqrt[3]{x}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(1/2)/x^2,x)
```

```
[Out] -3/4*(b*x^(2/3)+a*x)^(1/2)*(b^(3/2)*(b+a*x^(1/3))^(3/2)-arctanh((
b+a*x^(1/3))^(1/2)/b^(1/2))*b*a^2*x^(2/3)+b^(5/2)*(b+a*x^(1/3))^(
1/2))/x/(b+a*x^(1/3))^(1/2)/b^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{ax+bx^{\frac{2}{3}}}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(1/2)/x**2,x)
```

```
[Out] Integral(sqrt(a*x + b*x**(2/3))/x**2, x)
```

GIAC/XCAS [A] time = 0.245093, size = 103, normalized size = 1.14

$$-\frac{3\left(\frac{a^{3}\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}b}+\frac{\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^{3}+\sqrt{ax^{\frac{1}{3}}+b}a^{3}b}{a^{2}bx^{\frac{2}{3}}}\right)\mathrm{sign}\left(x^{\frac{1}{3}}\right)}{4a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^2,x, algorithm="giac")
```

```
[Out] -3/4*(a^3*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-b)*b) + ((a
*x^(1/3) + b)^(3/2)*a^3 + sqrt(a*x^(1/3) + b)*a^3*b)/(a^2*b*x^(2/
3)))*sign(x^(1/3))/a
```

3.173 $\int \frac{\sqrt{bx^{2/3}+ax}}{x^3}\,dx$

Optimal. Leaf size=178

$$-\frac{21a^5\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{128b^{9/2}}+\frac{21a^4\sqrt{ax+bx^{2/3}}}{128b^4x^{2/3}}-\frac{7a^3\sqrt{ax+bx^{2/3}}}{64b^3x}+\frac{7a^2\sqrt{ax+bx^{2/3}}}{80b^2x^{4/3}}-\frac{3a\sqrt{ax+bx^{2/3}}}{40bx^{5/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{5x^2}$$

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(5*x^2) - (3*a*Sqrt[b*x^(2/3) + a*x])/
(40*b*x^(5/3)) + (7*a^2*Sqrt[b*x^(2/3) + a*x])/(80*b^2*x^(4/3)) -
 (7*a^3*Sqrt[b*x^(2/3) + a*x])/(64*b^3*x) + (21*a^4*Sqrt[b*x^(2/3
) + a*x])/(128*b^4*x^(2/3)) - (21*a^5*ArcTanh[(Sqrt[b]*x^(1/3))/S
qrt[b*x^(2/3) + a*x]])/(128*b^(9/2))
```

Rubi [A] time = 0.506702, antiderivative size = 178, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$-\frac{21a^5\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{128b^{9/2}}+\frac{21a^4\sqrt{ax+bx^{2/3}}}{128b^4x^{2/3}}-\frac{7a^3\sqrt{ax+bx^{2/3}}}{64b^3x}+\frac{7a^2\sqrt{ax+bx^{2/3}}}{80b^2x^{4/3}}-\frac{3a\sqrt{ax+bx^{2/3}}}{40bx^{5/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{5x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(2/3) + a*x]/x^3,x]
```

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(5*x^2) - (3*a*Sqrt[b*x^(2/3) + a*x])/
(40*b*x^(5/3)) + (7*a^2*Sqrt[b*x^(2/3) + a*x])/(80*b^2*x^(4/3)) -
 (7*a^3*Sqrt[b*x^(2/3) + a*x])/(64*b^3*x) + (21*a^4*Sqrt[b*x^(2/3
) + a*x])/(128*b^4*x^(2/3)) - (21*a^5*ArcTanh[(Sqrt[b]*x^(1/3))/S
qrt[b*x^(2/3) + a*x]])/(128*b^(9/2))
```

Rubi in Sympy [A] time = 43.3736, size = 165, normalized size = 0.93

$$-\frac{21a^5\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{128b^{\frac{9}{2}}}+\frac{21a^4\sqrt{ax+bx^{\frac{2}{3}}}}{128b^4x^{\frac{2}{3}}}-\frac{7a^3\sqrt{ax+bx^{\frac{2}{3}}}}{64b^3x}+\frac{7a^2\sqrt{ax+bx^{\frac{2}{3}}}}{80b^2x^{\frac{4}{3}}}-\frac{3a\sqrt{ax+bx^{\frac{2}{3}}}}{40bx^{\frac{5}{3}}}-\frac{3\sqrt{ax+bx^{\frac{2}{3}}}}{5x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(1/2)/x**3,x)
```

```
[Out] -21*a**5*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(128*b**(
9/2)) + 21*a**4*sqrt(a*x + b*x**(2/3))/(128*b**4*x**(2/3)) - 7*a*
*3*sqrt(a*x + b*x**(2/3))/(64*b**3*x) + 7*a**2*sqrt(a*x + b*x**(2
/3))/(80*b**2*x**(4/3)) - 3*a*sqrt(a*x + b*x**(2/3))/(40*b*x**(5/
3)) - 3*sqrt(a*x + b*x**(2/3))/(5*x**2)
```

Mathematica [A] time = 0.177362, size = 112, normalized size = 0.63

$$\frac{\sqrt{ax+bx^{2/3}}\left(105a^4x^{4/3}-70a^3bx+56a^2b^2x^{2/3}-48ab^3\sqrt[3]{x}-384b^4\right)}{640b^4x^2}-\frac{21a^5\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{128b^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(2/3) + a*x]/x^3,x]
```

```
[Out] (Sqrt[b*x^(2/3) + a*x]*(-384*b^4 - 48*a*b^3*x^(1/3) + 56*a^2*b^2*
x^(2/3) - 70*a^3*b*x + 105*a^4*x^(4/3)))/(640*b^4*x^2) - (21*a^5*
ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/(128*b^(9/2))
```

Maple [A] time = 0.018, size = 125, normalized size = 0.7

$$\frac{1}{640\,x^2}\sqrt{bx^{\frac{2}{3}}+ax}\left(105\,\left(b+a\sqrt[3]{x}\right)^{9/2}b^{9/2}-490\,\left(b+a\sqrt[3]{x}\right)^{7/2}b^{11/2}+896\,\left(b+a\sqrt[3]{x}\right)^{5/2}b^{13/2}-790\,\left(b+a\sqrt[3]{x}\right)^{3/2}b^{15/2}-1\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(1/2)/x^3,x)
```

```
[Out] 1/640*(b*x^(2/3)+a*x)^(1/2)*(105*(b+a*x^(1/3))^(9/2)*b^(9/2)-490*
(b+a*x^(1/3))^(7/2)*b^(11/2)+896*(b+a*x^(1/3))^(5/2)*b^(13/2)-790
*(b+a*x^(1/3))^(3/2)*b^(15/2)-105*arctanh((b+a*x^(1/3))^(1/2)/b^(
1/2))*b^4*a^5*x^(5/3)-105*(b+a*x^(1/3))^(1/2)*b^(17/2))/x^2/(b+a*
x^(1/3))^(1/2)/b^(17/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax+bx^{\frac{2}{3}}}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(1/2)/x**3,x)
```

```
[Out] Integral(sqrt(a*x + b*x**(2/3))/x**3, x)
```

GIAC/XCAS [A] time = 0.284706, size = 176, normalized size = 0.99

$$\frac{\left(\frac{105\,a^6\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}b^4}+\frac{105\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^6-490\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^6b+896\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^6b^2-790\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^6b^3-105\sqrt{ax^{\frac{1}{3}}+b}a^6b^4}{a^5b^4x^{\frac{5}{3}}}\right)\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{640\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^3,x, algorithm="giac")
```

```
[Out] 1/640*(105*a^6*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-b)*b^4
) + (105*(a*x^(1/3) + b)^(9/2)*a^6 - 490*(a*x^(1/3) + b)^(7/2)*a^
6*b + 896*(a*x^(1/3) + b)^(5/2)*a^6*b^2 - 790*(a*x^(1/3) + b)^(3/
2)*a^6*b^3 - 105*sqrt(a*x^(1/3) + b)*a^6*b^4)/(a^5*b^4*x^(5/3)))*
sign(x^(1/3))/a
```

3.174 $\int \frac{\sqrt{bx^{2/3}+ax}}{x^4}\,dx$

Optimal. Leaf size=266

$$\frac{1287a^8\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{16384b^{15/2}}-\frac{1287a^7\sqrt{ax+bx^{2/3}}}{16384b^7x^{2/3}}+\frac{429a^6\sqrt{ax+bx^{2/3}}}{8192b^6x}-\frac{429a^5\sqrt{ax+bx^{2/3}}}{10240b^5x^{4/3}}+\frac{1287a^4\sqrt{ax+bx^{2/3}}}{35840b^4x^{5/3}}-\frac{143a^3\sqrt{ax+bx^{2/3}}}{4480b^3x^2}+\frac{13a^2\sqrt{ax+bx^{2/3}}}{448b^2x^{7/3}}-\frac{3a\sqrt{ax+bx^{2/3}}}{112bx^{8/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{8x^3}$$

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(8*x^3) - (3*a*Sqrt[b*x^(2/3) + a*x])/
(112*b*x^(8/3)) + (13*a^2*Sqrt[b*x^(2/3) + a*x])/(448*b^2*x^(7/3)
) - (143*a^3*Sqrt[b*x^(2/3) + a*x])/(4480*b^3*x^2) + (1287*a^4*Sq
rt[b*x^(2/3) + a*x])/(35840*b^4*x^(5/3)) - (429*a^5*Sqrt[b*x^(2/3
) + a*x])/(10240*b^5*x^(4/3)) + (429*a^6*Sqrt[b*x^(2/3) + a*x])/(
8192*b^6*x) - (1287*a^7*Sqrt[b*x^(2/3) + a*x])/(16384*b^7*x^(2/3)
) + (1287*a^8*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(
16384*b^(15/2))
```

Rubi [A] time = 0.804235, antiderivative size = 266, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{1287a^8\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{16384b^{15/2}}-\frac{1287a^7\sqrt{ax+bx^{2/3}}}{16384b^7x^{2/3}}+\frac{429a^6\sqrt{ax+bx^{2/3}}}{8192b^6x}-\frac{429a^5\sqrt{ax+bx^{2/3}}}{10240b^5x^{4/3}}+\frac{1287a^4\sqrt{ax+bx^{2/3}}}{35840b^4x^{5/3}}-\frac{143a^3\sqrt{ax+bx^{2/3}}}{4480b^3x^2}+\frac{13a^2\sqrt{ax+bx^{2/3}}}{448b^2x^{7/3}}-\frac{3a\sqrt{ax+bx^{2/3}}}{112bx^{8/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{8x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(2/3) + a*x]/x^4,x]
```

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(8*x^3) - (3*a*Sqrt[b*x^(2/3) + a*x])/
(112*b*x^(8/3)) + (13*a^2*Sqrt[b*x^(2/3) + a*x])/(448*b^2*x^(7/3)
) - (143*a^3*Sqrt[b*x^(2/3) + a*x])/(4480*b^3*x^2) + (1287*a^4*Sq
rt[b*x^(2/3) + a*x])/(35840*b^4*x^(5/3)) - (429*a^5*Sqrt[b*x^(2/3
) + a*x])/(10240*b^5*x^(4/3)) + (429*a^6*Sqrt[b*x^(2/3) + a*x])/(
8192*b^6*x) - (1287*a^7*Sqrt[b*x^(2/3) + a*x])/(16384*b^7*x^(2/3)
) + (1287*a^8*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(
16384*b^(15/2))
```

Rubi in Sympy [A] time = 73.6625, size = 250, normalized size = 0.94

$$\frac{1287a^8\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{16384b^{\frac{15}{2}}}-\frac{1287a^7\sqrt{ax+bx^{\frac{2}{3}}}}{16384b^7x^{\frac{2}{3}}}+\frac{429a^6\sqrt{ax+bx^{\frac{2}{3}}}}{8192b^6x}-\frac{429a^5\sqrt{ax+bx^{\frac{2}{3}}}}{10240b^5x^{\frac{4}{3}}}+\frac{1287a^4\sqrt{ax+bx^{\frac{2}{3}}}}{35840b^4x^{\frac{5}{3}}}-\frac{143a^3\sqrt{ax+bx^{\frac{2}{3}}}}{4480b^3x^2}+\frac{13a^2\sqrt{ax+bx^{\frac{2}{3}}}}{448b^2x^{\frac{7}{3}}}-\frac{3a\sqrt{ax+bx^{\frac{2}{3}}}}{112bx^{\frac{8}{3}}}-\frac{3\sqrt{ax+bx^{\frac{2}{3}}}}{8x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(1/2)/x**4,x)
```

```
[Out] 1287*a**8*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(16384*b
**(15/2)) - 1287*a**7*sqrt(a*x + b*x**(2/3))/(16384*b**7*x**(2/3)
) + 429*a**6*sqrt(a*x + b*x**(2/3))/(8192*b**6*x) - 429*a**5*sqrt
(a*x + b*x**(2/3))/(10240*b**5*x**(4/3)) + 1287*a**4*sqrt(a*x + b
*x**(2/3))/(35840*b**4*x**(5/3)) - 143*a**3*sqrt(a*x + b*x**(2/3)
)/(4480*b**3*x**2) + 13*a**2*sqrt(a*x + b*x**(2/3))/(448*b**2*x**
```

```
(7/3)) - 3*a*sqrt(a*x + b*x**(2/3))/(112*b*x**(8/3)) - 3*sqrt(a*x
 + b*x**(2/3))/(8*x**3)
```

Mathematica [A] time = 0.251241, size = 149, normalized size = 0.56

$$\frac{1287a^8\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{16384b^{15/2}}-\frac{\sqrt{ax+bx^{2/3}}\left(45045a^7x^{7/3}-30030a^6bx^2+24024a^5b^2x^{5/3}-20592a^4b^3x^{4/3}+18304a^3b^4x-16640a^2b^5x^{2/3}+15360ab^6\sqrt[3]{x}\right.}{573440b^7x^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(2/3) + a*x]/x^4,x]
```

```
[Out] -(Sqrt[b*x^(2/3) + a*x]*(215040*b^7 + 15360*a*b^6*x^(1/3) - 16640
*a^2*b^5*x^(2/3) + 18304*a^3*b^4*x - 20592*a^4*b^3*x^(4/3) + 2402
4*a^5*b^2*x^(5/3) - 30030*a^6*b*x^2 + 45045*a^7*x^(7/3)))/(573440
*b^7*x^3) + (1287*a^8*ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1
/3))])/(16384*b^(15/2))
```

Maple [A] time = 0.023, size = 167, normalized size = 0.6

$$-\frac{1}{573440\,x^3}\sqrt{bx^{\frac{2}{3}}+ax}\left(45045\,\left(b+a\sqrt[3]{x}\right)^{15/2}b^{15/2}-345345\,\left(b+a\sqrt[3]{x}\right)^{13/2}b^{17/2}+1150149\,\left(b+a\sqrt[3]{x}\right)^{11/2}b^{19/2}-2167737\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(1/2)/x^4,x)
```

```
[Out] -1/573440*(b*x^(2/3)+a*x)^(1/2)*(45045*(b+a*x^(1/3))^(15/2)*b^(15
/2)-345345*(b+a*x^(1/3))^(13/2)*b^(17/2)+1150149*(b+a*x^(1/3))^(1
1/2)*b^(19/2)-2167737*(b+a*x^(1/3))^(9/2)*b^(21/2)+2518087*(b+a*x
^(1/3))^(7/2)*b^(23/2)-1831739*(b+a*x^(1/3))^(5/2)*b^(25/2)+80153
5*(b+a*x^(1/3))^(3/2)*b^(27/2)-45045*arctanh((b+a*x^(1/3))^(1/2)/
b^(1/2))*b^7*a^8*x^(8/3)+45045*(b+a*x^(1/3))^(1/2)*b^(29/2))/x^3/
(b+a*x^(1/3))^(1/2)/b^(29/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^4,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(1/2)/x**4,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.347857, size = 244, normalized size = 0.92

$$-\frac{\frac{45045\,a^9\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}b^7}+\frac{45045\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}a^9-345345\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}a^9b+1150149\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}a^9b^2-2167737\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^9b^3+2518087\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^9b^4\cdots}{a^8b^7x^{\frac{8}{3}}}}{573440\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^4,x, algorithm="giac")
```

```
[Out] -1/573440*(45045*a^9*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-
b)*b^7) + (45045*(a*x^(1/3) + b)^(15/2)*a^9 - 345345*(a*x^(1/3) +
 b)^(13/2)*a^9*b + 1150149*(a*x^(1/3) + b)^(11/2)*a^9*b^2 - 21677
37*(a*x^(1/3) + b)^(9/2)*a^9*b^3 + 2518087*(a*x^(1/3) + b)^(7/2)*
a^9*b^4 - 1831739*(a*x^(1/3) + b)^(5/2)*a^9*b^5 + 801535*(a*x^(1/
3) + b)^(3/2)*a^9*b^6 + 45045*sqrt(a*x^(1/3) + b)*a^9*b^7)/(a^8*b
^7*x^(8/3)))*sign(x^(1/3))/a
```

3.175 $\int \frac{\sqrt{bx^{2/3}+ax}}{x^5}\,dx$

Optimal. Leaf size=354

$$-\frac{12597a^{11}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{262144b^{21/2}}+\frac{12597a^{10}\sqrt{ax+bx^{2/3}}}{262144b^{10}x^{2/3}}-\frac{4199a^9\sqrt{ax+bx^{2/3}}}{131072b^9x}+\frac{4199a^8\sqrt{ax+bx^{2/3}}}{163840b^8x^{4/3}}-\frac{12597a^7\sqrt{ax+bx^{2/3}}}{573440b^7x^{5/3}}+\frac{4199a^6\sqrt{ax+bx^{2/3}}}{215040b^6x^2}-\frac{4199a^5\sqrt{ax+bx^{2/3}}}{236544b^5x^{7/3}}+\frac{323a^4\sqrt{ax+bx^{2/3}}}{19712b^4x^{8/3}}-\frac{323a^3\sqrt{ax+bx^{2/3}}}{21120b^3x^3}+\frac{19a^2\sqrt{ax+bx^{2/3}}}{1320b^2x^{10/3}}-\frac{3a\sqrt{ax+bx^{2/3}}}{220bx^{11/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{11x^4}$$

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(11*x^4) - (3*a*Sqrt[b*x^(2/3) + a*x])
/(220*b*x^(11/3)) + (19*a^2*Sqrt[b*x^(2/3) + a*x])/(1320*b^2*x^(1
0/3)) - (323*a^3*Sqrt[b*x^(2/3) + a*x])/(21120*b^3*x^3) + (323*a^
4*Sqrt[b*x^(2/3) + a*x])/(19712*b^4*x^(8/3)) - (4199*a^5*Sqrt[b*x
^(2/3) + a*x])/(236544*b^5*x^(7/3)) + (4199*a^6*Sqrt[b*x^(2/3) +
a*x])/(215040*b^6*x^2) - (12597*a^7*Sqrt[b*x^(2/3) + a*x])/(57344
0*b^7*x^(5/3)) + (4199*a^8*Sqrt[b*x^(2/3) + a*x])/(163840*b^8*x^(
4/3)) - (4199*a^9*Sqrt[b*x^(2/3) + a*x])/(131072*b^9*x) + (12597*
a^10*Sqrt[b*x^(2/3) + a*x])/(262144*b^10*x^(2/3)) - (12597*a^11*A
rcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(262144*b^(21/2)
)
```

Rubi [A] time = 1.13445, antiderivative size = 354, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$-\frac{12597a^{11}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{262144b^{21/2}}+\frac{12597a^{10}\sqrt{ax+bx^{2/3}}}{262144b^{10}x^{2/3}}-\frac{4199a^9\sqrt{ax+bx^{2/3}}}{131072b^9x}+\frac{4199a^8\sqrt{ax+bx^{2/3}}}{163840b^8x^{4/3}}-\frac{12597a^7\sqrt{ax+bx^{2/3}}}{573440b^7x^{5/3}}+\frac{4199a^6\sqrt{ax+bx^{2/3}}}{215040b^6x^2}-\frac{4199a^5\sqrt{ax+bx^{2/3}}}{236544b^5x^{7/3}}+\frac{323a^4\sqrt{ax+bx^{2/3}}}{19712b^4x^{8/3}}-\frac{323a^3\sqrt{ax+bx^{2/3}}}{21120b^3x^3}+\frac{19a^2\sqrt{ax+bx^{2/3}}}{1320b^2x^{10/3}}-\frac{3a\sqrt{ax+bx^{2/3}}}{220bx^{11/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{11x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[b*x^(2/3) + a*x]/x^5,x]
```


```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(11*x^4) - (3*a*Sqrt[b*x^(2/3) + a*x])
/(220*b*x^(11/3)) + (19*a^2*Sqrt[b*x^(2/3) + a*x])/(1320*b^2*x^(1
0/3)) - (323*a^3*Sqrt[b*x^(2/3) + a*x])/(21120*b^3*x^3) + (323*a^
4*Sqrt[b*x^(2/3) + a*x])/(19712*b^4*x^(8/3)) - (4199*a^5*Sqrt[b*x
^(2/3) + a*x])/(236544*b^5*x^(7/3)) + (4199*a^6*Sqrt[b*x^(2/3) +
a*x])/(215040*b^6*x^2) - (12597*a^7*Sqrt[b*x^(2/3) + a*x])/(57344
0*b^7*x^(5/3)) + (4199*a^8*Sqrt[b*x^(2/3) + a*x])/(163840*b^8*x^(
4/3)) - (4199*a^9*Sqrt[b*x^(2/3) + a*x])/(131072*b^9*x) + (12597*
a^10*Sqrt[b*x^(2/3) + a*x])/(262144*b^10*x^(2/3)) - (12597*a^11*A
rcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(262144*b^(21/2)
)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{4199a^{11}\int \frac{1}{x^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}\,dx}{524288b^{10}}+\frac{12597a^{10}\sqrt{ax+bx^{\frac{2}{3}}}}{262144b^{10}x^{\frac{2}{3}}}-\frac{4199a^9\sqrt{ax+bx^{\frac{2}{3}}}}{131072b^9x}+\frac{4199a^8\sqrt{ax+bx^{\frac{2}{3}}}}{163840b^8x^{\frac{4}{3}}}-\frac{12597a^7\sqrt{ax+bx^{\frac{2}{3}}}}{573440b^7x^{\frac{5}{3}}}+\frac{4199a^6\sqrt{ax+bx^{\frac{2}{3}}}}{215040b^6x^2}-\frac{4199a^5\sqrt{ax+bx^{\frac{2}{3}}}}{236544b^5x^{\frac{7}{3}}}+\frac{323a^4\sqrt{ax+bx^{\frac{2}{3}}}}{19712b^4x^{\frac{8}{3}}}-\frac{323a^3\sqrt{ax+bx^{\frac{2}{3}}}}{21120b^3x^3}+\frac{19a^2\sqrt{ax+bx^{\frac{2}{3}}}}{1320b^2x^{\frac{10}{3}}}-\frac{3a\sqrt{ax+bx^{\frac{2}{3}}}}{220bx^{\frac{11}{3}}}-\frac{3\sqrt{ax+bx^{\frac{2}{3}}}}{11x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(1/2)/x**5,x)
```

```
[Out] 4199*a**11*Integral(1/(x**(2/3)*sqrt(a*x + b*x**(2/3))), x)/(5242
88*b**10) + 12597*a**10*sqrt(a*x + b*x**(2/3))/(262144*b**10*x**(
2/3)) - 4199*a**9*sqrt(a*x + b*x**(2/3))/(131072*b**9*x) + 4199*a
**8*sqrt(a*x + b*x**(2/3))/(163840*b**8*x**(4/3)) - 12597*a**7*sq
rt(a*x + b*x**(2/3))/(573440*b**7*x**(5/3)) + 4199*a**6*sqrt(a*x
+ b*x**(2/3))/(215040*b**6*x**2) - 4199*a**5*sqrt(a*x + b*x**(2/3
))/(236544*b**5*x**(7/3)) + 323*a**4*sqrt(a*x + b*x**(2/3))/(1971
2*b**4*x**(8/3)) - 323*a**3*sqrt(a*x + b*x**(2/3))/(21120*b**3*x*
*3) + 19*a**2*sqrt(a*x + b*x**(2/3))/(1320*b**2*x**(10/3)) - 3*a*
sqrt(a*x + b*x**(2/3))/(220*b*x**(11/3)) - 3*sqrt(a*x + b*x**(2/3
))/(11*x**4)
```

Mathematica [A] time = 0.355985, size = 190, normalized size = 0.54

$$\frac{\sqrt{b}\sqrt{ax+bx^{2/3}}\left(14549535a^{10}x^{10/3}-9699690a^9bx^3+7759752a^8b^2x^{8/3}-6651216a^7b^3x^{7/3}+5912192a^6b^4x^2-5374720a^5b\right.}{302}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[b*x^(2/3) + a*x]/x^5,x]
```

```
[Out] (Sqrt[b]*Sqrt[b*x^(2/3) + a*x]*(-82575360*b^10 - 4128768*a*b^9*x^
(1/3) + 4358144*a^2*b^8*x^(2/3) - 4630528*a^3*b^7*x + 4961280*a^4
*b^6*x^(4/3) - 5374720*a^5*b^5*x^(5/3) + 5912192*a^6*b^4*x^2 - 66
51216*a^7*b^3*x^(7/3) + 7759752*a^8*b^2*x^(8/3) - 9699690*a^9*b*x
^3 + 14549535*a^10*x^(10/3)) - 14549535*a^11*x^4*ArcTanh[Sqrt[b*x
^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/(302776320*b^(21/2)*x^4)
```

Maple [A] time = 0.024, size = 209, normalized size = 0.6

$$\frac{1}{302776320\,x^4}\sqrt{bx^{\frac{2}{3}}+ax}\left(14549535\left(b+a\sqrt[3]{x}\right)^{21/2}b^{21/2}-155195040\left(b+a\sqrt[3]{x}\right)^{19/2}b^{23/2}+749786037\left(b+a\sqrt[3]{x}\right)^{17/2}b^{\frac{25}{2}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(1/2)/x^5,x)
```

```
[Out] 1/302776320*(b*x^(2/3)+a*x)^(1/2)*(14549535*(b+a*x^(1/3))^(21/2)*
b^(21/2)-155195040*(b+a*x^(1/3))^(19/2)*b^(23/2)+749786037*(b+a*x
^(1/3))^(17/2)*b^(25/2)-2163862272*(b+a*x^(1/3))^(15/2)*b^(27/2)+
4139920070*(b+a*x^(1/3))^(13/2)*b^(29/2)-5503713280*(b+a*x^(1/3))
^(11/2)*b^(31/2)+5174056250*(b+a*x^(1/3))^(9/2)*b^(33/2)-34245235
20*(b+a*x^(1/3))^(7/2)*b^(35/2)+1551313995*(b+a*x^(1/3))^(5/2)*b^
(37/2)-450357600*(b+a*x^(1/3))^(3/2)*b^(39/2)-14549535*arctanh((b
+a*x^(1/3))^(1/2)/b^(1/2))*b^10*a^11*x^(11/3)-14549535*(b+a*x^(1/
3))^(1/2)*b^(41/2))/x^4/(b+a*x^(1/3))^(1/2)/b^(41/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^5,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(1/2)/x**5,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.509795, size = 313, normalized size = 0.88

$$\left(\frac{14549535\,a^{12}\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}b^{10}}+\frac{14549535\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}a^{12}-155195040\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}a^{12}b+749786037\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}a^{12}b^{2}-2163862272\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}a^{12}b^{3}+41399\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^(2/3))/x^5,x, algorithm="giac")
```

```
[Out] 1/302776320*(14549535*a^12*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(
sqrt(-b)*b^10) + (14549535*(a*x^(1/3) + b)^(21/2)*a^12 - 15519504
0*(a*x^(1/3) + b)^(19/2)*a^12*b + 749786037*(a*x^(1/3) + b)^(17/2
)*a^12*b^2 - 2163862272*(a*x^(1/3) + b)^(15/2)*a^12*b^3 + 4139920
070*(a*x^(1/3) + b)^(13/2)*a^12*b^4 - 5503713280*(a*x^(1/3) + b)^
(11/2)*a^12*b^5 + 5174056250*(a*x^(1/3) + b)^(9/2)*a^12*b^6 - 342
4523520*(a*x^(1/3) + b)^(7/2)*a^12*b^7 + 1551313995*(a*x^(1/3) +
b)^(5/2)*a^12*b^8 - 450357600*(a*x^(1/3) + b)^(3/2)*a^12*b^9 - 14
549535*sqrt(a*x^(1/3) + b)*a^12*b^10)/(a^11*b^10*x^(11/3)))*sign(
x^(1/3))/a
```

3.176 $\int x^2 \left(bx^{2/3}+ax\right)^{3/2}\,dx$

Optimal. Leaf size=343

$$-\frac{1048576b^{11}\left(ax+bx^{2/3}\right)^{5/2}}{152108775a^{12}x^{5/3}}+\frac{524288b^{10}\left(ax+bx^{2/3}\right)^{5/2}}{30421755a^{11}x^{4/3}}-\frac{131072b^9\left(ax+bx^{2/3}\right)^{5/2}}{4345965a^{10}x}+\frac{65536b^8\left(ax+bx^{2/3}\right)^{5/2}}{1448655a^9x^{2/3}}-\frac{90112b^7\left(ax+bx^{2/3}\right)^{5/2}}{1448655a^8\sqrt[3]{x}}+\frac{45056b^6\left(ax+bx^{2/3}\right)^{5/2}}{557175a^7}-\frac{11264b^5\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{5/2}}{111435a^6}+\frac{5632b^4x^{2/3}\left(ax+bx^{2/3}\right)^{5/2}}{45885a^5}-\frac{352b^3x\left(ax+bx^{2/3}\right)^{5/2}}{2415a^4}+\frac{176b^2x^{4/3}\left(ax+bx^{2/3}\right)^{5/2}}{1035a^3}-\frac{44bx^{5/3}\left(ax+bx^{2/3}\right)^{5/2}}{225a^2}+\frac{2x^2\left(ax+bx^{2/3}\right)^{5/2}}{9a}$$

```
[Out] (45056*b^6*(b*x^(2/3) + a*x)^(5/2))/(557175*a^7) - (1048576*b^11*
(b*x^(2/3) + a*x)^(5/2))/(152108775*a^12*x^(5/3)) + (524288*b^10*
(b*x^(2/3) + a*x)^(5/2))/(30421755*a^11*x^(4/3)) - (131072*b^9*(b
*x^(2/3) + a*x)^(5/2))/(4345965*a^10*x) + (65536*b^8*(b*x^(2/3) +
 a*x)^(5/2))/(1448655*a^9*x^(2/3)) - (90112*b^7*(b*x^(2/3) + a*x)
^(5/2))/(1448655*a^8*x^(1/3)) - (11264*b^5*x^(1/3)*(b*x^(2/3) + a
*x)^(5/2))/(111435*a^6) + (5632*b^4*x^(2/3)*(b*x^(2/3) + a*x)^(5/
2))/(45885*a^5) - (352*b^3*x*(b*x^(2/3) + a*x)^(5/2))/(2415*a^4)
+ (176*b^2*x^(4/3)*(b*x^(2/3) + a*x)^(5/2))/(1035*a^3) - (44*b*x^
(5/3)*(b*x^(2/3) + a*x)^(5/2))/(225*a^2) + (2*x^2*(b*x^(2/3) + a*
x)^(5/2))/(9*a)
```

Rubi [A] time = 0.952827, antiderivative size = 343, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{1048576b^{11}\left(ax+bx^{2/3}\right)^{5/2}}{152108775a^{12}x^{5/3}}+\frac{524288b^{10}\left(ax+bx^{2/3}\right)^{5/2}}{30421755a^{11}x^{4/3}}-\frac{131072b^9\left(ax+bx^{2/3}\right)^{5/2}}{4345965a^{10}x}+\frac{65536b^8\left(ax+bx^{2/3}\right)^{5/2}}{1448655a^9x^{2/3}}-\frac{90112b^7\left(ax+bx^{2/3}\right)^{5/2}}{1448655a^8\sqrt[3]{x}}+\frac{45056b^6\left(ax+bx^{2/3}\right)^{5/2}}{557175a^7}-\frac{11264b^5\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{5/2}}{111435a^6}+\frac{5632b^4x^{2/3}\left(ax+bx^{2/3}\right)^{5/2}}{45885a^5}-\frac{352b^3x\left(ax+bx^{2/3}\right)^{5/2}}{2415a^4}+\frac{176b^2x^{4/3}\left(ax+bx^{2/3}\right)^{5/2}}{1035a^3}-\frac{44bx^{5/3}\left(ax+bx^{2/3}\right)^{5/2}}{225a^2}+\frac{2x^2\left(ax+bx^{2/3}\right)^{5/2}}{9a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(b*x^(2/3) + a*x)^(3/2),x]
```


```
[Out] (45056*b^6*(b*x^(2/3) + a*x)^(5/2))/(557175*a^7) - (1048576*b^11*
(b*x^(2/3) + a*x)^(5/2))/(152108775*a^12*x^(5/3)) + (524288*b^10*
(b*x^(2/3) + a*x)^(5/2))/(30421755*a^11*x^(4/3)) - (131072*b^9*(b
*x^(2/3) + a*x)^(5/2))/(4345965*a^10*x) + (65536*b^8*(b*x^(2/3) +
 a*x)^(5/2))/(1448655*a^9*x^(2/3)) - (90112*b^7*(b*x^(2/3) + a*x)
^(5/2))/(1448655*a^8*x^(1/3)) - (11264*b^5*x^(1/3)*(b*x^(2/3) + a
*x)^(5/2))/(111435*a^6) + (5632*b^4*x^(2/3)*(b*x^(2/3) + a*x)^(5/
2))/(45885*a^5) - (352*b^3*x*(b*x^(2/3) + a*x)^(5/2))/(2415*a^4)
+ (176*b^2*x^(4/3)*(b*x^(2/3) + a*x)^(5/2))/(1035*a^3) - (44*b*x^
(5/3)*(b*x^(2/3) + a*x)^(5/2))/(225*a^2) + (2*x^2*(b*x^(2/3) + a*
x)^(5/2))/(9*a)
```

Rubi in Sympy [A] time = 100.082, size = 325, normalized size = 0.95

$$\frac{2x^2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{9a}-\frac{44bx^{\frac{5}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{225a^2}+\frac{176b^2x^{\frac{4}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{1035a^3}-\frac{352b^3x\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{2415a^4}+\frac{5632b^4x^{\frac{2}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{45885a^5}-\frac{11264b^5\sqrt[3]{x}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{111435a^6}+\frac{45056b^6\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{557175a^7}-\frac{90112b^7\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{1448655a^8\sqrt[3]{x}}+\frac{65536b^8\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{1448655a^9x^{\frac{2}{3}}}-\frac{131072b^9\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{4345965a^{10}x}+\frac{524288b^{10}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{30421755a^{11}x^{\frac{4}{3}}}-\frac{1048576b^{11}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{152108775a^{12}x^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] 2*x**2*(a*x + b*x**(2/3))**(5/2)/(9*a) - 44*b*x**(5/3)*(a*x + b*x
**(2/3))**(5/2)/(225*a**2) + 176*b**2*x**(4/3)*(a*x + b*x**(2/3))
**(5/2)/(1035*a**3) - 352*b**3*x*(a*x + b*x**(2/3))**(5/2)/(2415*
a**4) + 5632*b**4*x**(2/3)*(a*x + b*x**(2/3))**(5/2)/(45885*a**5)
 - 11264*b**5*x**(1/3)*(a*x + b*x**(2/3))**(5/2)/(111435*a**6) +
45056*b**6*(a*x + b*x**(2/3))**(5/2)/(557175*a**7) - 90112*b**7*(
a*x + b*x**(2/3))**(5/2)/(1448655*a**8*x**(1/3)) + 65536*b**8*(a*
x + b*x**(2/3))**(5/2)/(1448655*a**9*x**(2/3)) - 131072*b**9*(a*x
 + b*x**(2/3))**(5/2)/(4345965*a**10*x) + 524288*b**10*(a*x + b*x
**(2/3))**(5/2)/(30421755*a**11*x**(4/3)) - 1048576*b**11*(a*x +
b*x**(2/3))**(5/2)/(152108775*a**12*x**(5/3))
```

Mathematica [A] time = 0.114692, size = 172, normalized size = 0.5

$$\frac{2\left(a\sqrt[3]{x}+b\right)^2\sqrt{ax+bx^{2/3}}\left(16900975a^{11}x^{11/3}-14872858a^{10}bx^{10/3}+12932920a^9b^2x^3-11085360a^8b^3x^{8/3}+9335040a^7b^4x\right.}{1521\ldots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (2*(b + a*x^(1/3))^2*Sqrt[b*x^(2/3) + a*x]*(-524288*b^11 + 131072
0*a*b^10*x^(1/3) - 2293760*a^2*b^9*x^(2/3) + 3440640*a^3*b^8*x -
4730880*a^4*b^7*x^(4/3) + 6150144*a^5*b^6*x^(5/3) - 7687680*a^6*b
^5*x^2 + 9335040*a^7*b^4*x^(7/3) - 11085360*a^8*b^3*x^(8/3) + 129
32920*a^9*b^2*x^3 - 14872858*a^10*b*x^(10/3) + 16900975*a^11*x^(1
1/3)))/(152108775*a^12*x^(1/3))
```

Maple [A] time = 0.007, size = 145, normalized size = 0.4

$$\frac{2}{152108775\,xa^{12}}\left(bx^{\frac{2}{3}}+ax\right)^{\frac{3}{2}}\left(b+a\sqrt[3]{x}\right)\left(16900975\,x^{11/3}a^{11}-14872858\,x^{10/3}a^{10}b+12932920\,x^3a^9b^2-11085360\,x^{8/3}a^8b^3\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 2/152108775*(b*x^(2/3)+a*x)^(3/2)*(b+a*x^(1/3))*(16900975*x^(11/3
)*a^11-14872858*x^(10/3)*a^10*b+12932920*x^3*a^9*b^2-11085360*x^(
8/3)*a^8*b^3+9335040*x^(7/3)*a^7*b^4-7687680*x^2*a^6*b^5+6150144*
x^(5/3)*a^5*b^6-4730880*x^(4/3)*a^4*b^7+3440640*x*a^3*b^8-2293760
```

```
*x^(2/3)*a^2*b^9+1310720*x^(1/3)*a*b^10-524288*b^11)/x/a^12
```

Maxima [A] time = 1.53639, size = 228, normalized size = 0.66

$$\frac{2\left(16900975\left(ax^{\frac{1}{3}}+b\right)^{\frac{27}{2}}-200783583\left(ax^{\frac{1}{3}}+b\right)^{\frac{25}{2}}b+1091215125\left(ax^{\frac{1}{3}}+b\right)^{\frac{23}{2}}b^2-3585421125\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}b^3+7925667\ldots\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)*x^2,x, algorithm="maxima")
```

```
[Out] 2/152108775*(16900975*(a*x^(1/3) + b)^(27/2) - 200783583*(a*x^(1/
3) + b)^(25/2)*b + 1091215125*(a*x^(1/3) + b)^(23/2)*b^2 - 358542
1125*(a*x^(1/3) + b)^(21/2)*b^3 + 7925667750*(a*x^(1/3) + b)^(19/
2)*b^4 - 12401338950*(a*x^(1/3) + b)^(17/2)*b^5 + 14054850810*(a*
x^(1/3) + b)^(15/2)*b^6 - 11583668250*(a*x^(1/3) + b)^(13/2)*b^7
+ 6844894875*(a*x^(1/3) + b)^(11/2)*b^8 - 2788660875*(a*x^(1/3) +
 b)^(9/2)*b^9 + 717084225*(a*x^(1/3) + b)^(7/2)*b^10 - 91265265*(
a*x^(1/3) + b)^(5/2)*b^11)/a^12
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)*x^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.249311, size = 630, normalized size = 1.84

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)*x^2,x, algorithm="giac")
```

```
[Out] -2/152108775*(4194304*b^(27/2)*sign(x^(1/3))/a^13 - (16900975*(a*
x^(1/3) + b)^(27/2)*a^312 - 219036636*(a*x^(1/3) + b)^(25/2)*a^31
2*b + 1309458150*(a*x^(1/3) + b)^(23/2)*a^312*b^2 - 4780561500*(a
*x^(1/3) + b)^(21/2)*a^312*b^3 + 11888501625*(a*x^(1/3) + b)^(19/
2)*a^312*b^4 - 21259438200*(a*x^(1/3) + b)^(17/2)*a^312*b^5 + 281
09701620*(a*x^(1/3) + b)^(15/2)*a^312*b^6 - 27800803800*(a*x^(1/3
```

```
) + b)^(13/2)*a^312*b^7 + 20534684625*(a*x^(1/3) + b)^(11/2)*a^31
2*b^8 - 11154643500*(a*x^(1/3) + b)^(9/2)*a^312*b^9 + 4302505350*
(a*x^(1/3) + b)^(7/2)*a^312*b^10 - 1095183180*(a*x^(1/3) + b)^(5/
2)*a^312*b^11 + 152108775*(a*x^(1/3) + b)^(3/2)*a^312*b^12)*sign(
x^(1/3))/a^325)*a + 2/16900975*(524288*b^(25/2)*sign(x^(1/3))/a^1
2 + (2028117*(a*x^(1/3) + b)^(25/2)*a^264 - 24249225*(a*x^(1/3) +
 b)^(23/2)*a^264*b + 132793375*(a*x^(1/3) + b)^(21/2)*a^264*b^2 -
 440314875*(a*x^(1/3) + b)^(19/2)*a^264*b^3 + 984233250*(a*x^(1/3
) + b)^(17/2)*a^264*b^4 - 1561650090*(a*x^(1/3) + b)^(15/2)*a^264
*b^5 + 1801903950*(a*x^(1/3) + b)^(13/2)*a^264*b^6 - 1521087750*(
a*x^(1/3) + b)^(11/2)*a^264*b^7 + 929553625*(a*x^(1/3) + b)^(9/2)
*a^264*b^8 - 398380125*(a*x^(1/3) + b)^(7/2)*a^264*b^9 + 11154643
5*(a*x^(1/3) + b)^(5/2)*a^264*b^10 - 16900975*(a*x^(1/3) + b)^(3/
2)*a^264*b^11)*sign(x^(1/3))/a^276)*b
```

3.177 $\int x \left(bx^{2/3}+ax\right)^{3/2} dx$

Optimal. Leaf size=255

$$\frac{65536b^8\left(ax+bx^{2/3}\right)^{5/2}}{4849845a^9x^{5/3}}-\frac{32768b^7\left(ax+bx^{2/3}\right)^{5/2}}{969969a^8x^{4/3}}+\frac{8192b^6\left(ax+bx^{2/3}\right)^{5/2}}{138567a^7x}-\frac{4096b^5\left(ax+bx^{2/3}\right)^{5/2}}{46189a^6x^{2/3}}+\frac{512b^4\left(ax+bx^{2/3}\right)^{5/2}}{4199a^5\sqrt[3]{x}}-\frac{256b^3\left(ax+bx^{2/3}\right)^{5/2}}{1615a^4}+\frac{64b^2\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{5/2}}{323a^3}-\frac{32bx^{2/3}\left(ax+bx^{2/3}\right)^{5/2}}{133a^2}+\frac{2x\left(ax+bx^{2/3}\right)^{5/2}}{7a}$$

```
[Out] (-256*b^3*(b*x^(2/3) + a*x)^(5/2))/(1615*a^4) + (65536*b^8*(b*x^(
2/3) + a*x)^(5/2))/(4849845*a^9*x^(5/3)) - (32768*b^7*(b*x^(2/3)
+ a*x)^(5/2))/(969969*a^8*x^(4/3)) + (8192*b^6*(b*x^(2/3) + a*x)^
(5/2))/(138567*a^7*x) - (4096*b^5*(b*x^(2/3) + a*x)^(5/2))/(46189
*a^6*x^(2/3)) + (512*b^4*(b*x^(2/3) + a*x)^(5/2))/(4199*a^5*x^(1/
3)) + (64*b^2*x^(1/3)*(b*x^(2/3) + a*x)^(5/2))/(323*a^3) - (32*b*
x^(2/3)*(b*x^(2/3) + a*x)^(5/2))/(133*a^2) + (2*x*(b*x^(2/3) + a*
x)^(5/2))/(7*a)
```

Rubi [A] time = 0.651473, antiderivative size = 255, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$\frac{65536b^8\left(ax+bx^{2/3}\right)^{5/2}}{4849845a^9x^{5/3}}-\frac{32768b^7\left(ax+bx^{2/3}\right)^{5/2}}{969969a^8x^{4/3}}+\frac{8192b^6\left(ax+bx^{2/3}\right)^{5/2}}{138567a^7x}-\frac{4096b^5\left(ax+bx^{2/3}\right)^{5/2}}{46189a^6x^{2/3}}+\frac{512b^4\left(ax+bx^{2/3}\right)^{5/2}}{4199a^5\sqrt[3]{x}}-\frac{256b^3\left(ax+bx^{2/3}\right)^{5/2}}{1615a^4}+\frac{64b^2\sqrt[3]{x}\left(ax+bx^{2/3}\right)^{5/2}}{323a^3}-\frac{32bx^{2/3}\left(ax+bx^{2/3}\right)^{5/2}}{133a^2}+\frac{2x\left(ax+bx^{2/3}\right)^{5/2}}{7a}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (-256*b^3*(b*x^(2/3) + a*x)^(5/2))/(1615*a^4) + (65536*b^8*(b*x^(
2/3) + a*x)^(5/2))/(4849845*a^9*x^(5/3)) - (32768*b^7*(b*x^(2/3)
+ a*x)^(5/2))/(969969*a^8*x^(4/3)) + (8192*b^6*(b*x^(2/3) + a*x)^
(5/2))/(138567*a^7*x) - (4096*b^5*(b*x^(2/3) + a*x)^(5/2))/(46189
*a^6*x^(2/3)) + (512*b^4*(b*x^(2/3) + a*x)^(5/2))/(4199*a^5*x^(1/
3)) + (64*b^2*x^(1/3)*(b*x^(2/3) + a*x)^(5/2))/(323*a^3) - (32*b*
x^(2/3)*(b*x^(2/3) + a*x)^(5/2))/(133*a^2) + (2*x*(b*x^(2/3) + a*
x)^(5/2))/(7*a)
```

Rubi in Sympy [A] time = 64.3438, size = 240, normalized size = 0.94

$$\frac{2x\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{7a}-\frac{32bx^{\frac{2}{3}}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{133a^2}+\frac{64b^2\sqrt[3]{x}\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{323a^3}-\frac{256b^3\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{1615a^4}+\frac{512b^4\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{4199a^5\sqrt[3]{x}}-\frac{4096b^5\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{46189a^6x^{\frac{2}{3}}}+\frac{8192b^6\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{138567a^7x}-\frac{32768b^7\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{969969a^8x^{\frac{4}{3}}}+\frac{65536b^8\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{4849845a^9x^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] 2*x*(a*x + b*x**(2/3))**(5/2)/(7*a) - 32*b*x**(2/3)*(a*x + b*x**(
2/3))**(5/2)/(133*a**2) + 64*b**2*x**(1/3)*(a*x + b*x**(2/3))**(5
/2)/(323*a**3) - 256*b**3*(a*x + b*x**(2/3))**(5/2)/(1615*a**4) +
 512*b**4*(a*x + b*x**(2/3))**(5/2)/(4199*a**5*x**(1/3)) - 4096*b
**5*(a*x + b*x**(2/3))**(5/2)/(46189*a**6*x**(2/3)) + 8192*b**6*(
a*x + b*x**(2/3))**(5/2)/(138567*a**7*x) - 32768*b**7*(a*x + b*x*
*(2/3))**(5/2)/(969969*a**8*x**(4/3)) + 65536*b**8*(a*x + b*x**(2
/3))**(5/2)/(4849845*a**9*x**(5/3))
```

Mathematica [A] time = 0.0890247, size = 135, normalized size = 0.53

$$\frac{2\left(a\sqrt[3]{x}+b\right)^2\sqrt{ax+bx^{2/3}}\left(692835a^8x^{8/3}-583440a^7bx^{7/3}+480480a^6b^2x^2-384384a^5b^3x^{5/3}+295680a^4b^4x^{4/3}-215040a\right.}{4849845a^9\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (2*(b + a*x^(1/3))^2*Sqrt[b*x^(2/3) + a*x]*(32768*b^8 - 81920*a*b
^7*x^(1/3) + 143360*a^2*b^6*x^(2/3) - 215040*a^3*b^5*x + 295680*a
^4*b^4*x^(4/3) - 384384*a^5*b^3*x^(5/3) + 480480*a^6*b^2*x^2 - 58
3440*a^7*b*x^(7/3) + 692835*a^8*x^(8/3)))/(4849845*a^9*x^(1/3))
```

Maple [A] time = 0.007, size = 112, normalized size = 0.4

$$\frac{2}{4849845\,a^9x}\left(bx^{\frac{2}{3}}+ax\right)^{\frac{3}{2}}\left(b+a\sqrt[3]{x}\right)\left(692835\,x^{8/3}a^8-583440\,x^{7/3}a^7b+480480\,a^6b^2x^2-384384\,x^{5/3}a^5b^3+295680\,x^{4/3}a^4\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 2/4849845*(b*x^(2/3)+a*x)^(3/2)*(b+a*x^(1/3))*(692835*x^(8/3)*a^8
-583440*x^(7/3)*a^7*b+480480*a^6*b^2*x^2-384384*x^(5/3)*a^5*b^3+2
95680*x^(4/3)*a^4*b^4-215040*a^3*b^5*x+143360*x^(2/3)*a^2*b^6-819
20*x^(1/3)*a*b^7+32768*b^8)/a^9/x
```

Maxima [A] time = 1.51444, size = 171, normalized size = 0.67

$$\frac{2\left(692835\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}-6126120\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}b+23963940\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}b^2-54318264\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}b^3+78343650\left(ax^{\frac{1}{3}}+b\right.\right.}{4849845\,a^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)*x,x, algorithm="maxima")
```

```
[Out] 2/4849845*(692835*(a*x^(1/3) + b)^(21/2) - 6126120*(a*x^(1/3) + b
)^(19/2)*b + 23963940*(a*x^(1/3) + b)^(17/2)*b^2 - 54318264*(a*x^
(1/3) + b)^(15/2)*b^3 + 78343650*(a*x^(1/3) + b)^(13/2)*b^4 - 740
70360*(a*x^(1/3) + b)^(11/2)*b^5 + 45265220*(a*x^(1/3) + b)^(9/2)
*b^6 - 16628040*(a*x^(1/3) + b)^(7/2)*b^7 + 2909907*(a*x^(1/3) +
b)^(5/2)*b^8)/a^9
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)*x,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Integral(x*(a*x + b*x**(2/3))**(3/2), x)
```

GIAC/XCAS [A] time = 0.234992, size = 493, normalized size = 1.93

$$\frac{2}{1616615}\left(\frac{65536\,b^{\frac{21}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{a^{10}}+\frac{\left(230945\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}a^{180}-2297295\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}a^{180}b+10270260\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}a^{180}b^{2}-27\cdots\right.}{\cdots}\right.$$

$$-\frac{2}{692835}\left(\frac{32768\,b^{\frac{19}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{a^{9}}-\frac{\left(109395\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}a^{144}-978120\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}a^{144}b+3879876\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}a^{144}b^{2}-895\cdots\right.}{\cdots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)*x,x, algorithm="giac")
```

```
[Out] 2/1616615*(65536*b^(21/2)*sign(x^(1/3))/a^10 + (230945*(a*x^(1/3)
 + b)^(21/2)*a^180 - 2297295*(a*x^(1/3) + b)^(19/2)*a^180*b + 102
70260*(a*x^(1/3) + b)^(17/2)*a^180*b^2 - 27159132*(a*x^(1/3) + b)
^(15/2)*a^180*b^3 + 47006190*(a*x^(1/3) + b)^(13/2)*a^180*b^4 - 5
5552770*(a*x^(1/3) + b)^(11/2)*a^180*b^5 + 45265220*(a*x^(1/3) +
b)^(9/2)*a^180*b^6 - 24942060*(a*x^(1/3) + b)^(7/2)*a^180*b^7 + 8
729721*(a*x^(1/3) + b)^(5/2)*a^180*b^8 - 1616615*(a*x^(1/3) + b)^
(3/2)*a^180*b^9)*sign(x^(1/3))/a^190)*a - 2/692835*(32768*b^(19/2
)*sign(x^(1/3))/a^9 - (109395*(a*x^(1/3) + b)^(19/2)*a^144 - 9781
20*(a*x^(1/3) + b)^(17/2)*a^144*b + 3879876*(a*x^(1/3) + b)^(15/2
)*a^144*b^2 - 8953560*(a*x^(1/3) + b)^(13/2)*a^144*b^3 + 13226850
*(a*x^(1/3) + b)^(11/2)*a^144*b^4 - 12932920*(a*x^(1/3) + b)^(9/2
)*a^144*b^5 + 8314020*(a*x^(1/3) + b)^(7/2)*a^144*b^6 - 3325608*(
a*x^(1/3) + b)^(5/2)*a^144*b^7 + 692835*(a*x^(1/3) + b)^(3/2)*a^1
44*b^8)*sign(x^(1/3))/a^153)*b
```

3.178 $\int \left(bx^{2/3}+ax\right)^{3/2}\,dx$

Optimal. Leaf size=169

$$-\frac{512b^5\left(ax+bx^{2/3}\right)^{5/2}}{15015a^6x^{5/3}}+\frac{256b^4\left(ax+bx^{2/3}\right)^{5/2}}{3003a^5x^{4/3}}-\frac{64b^3\left(ax+bx^{2/3}\right)^{5/2}}{429a^4x}+\frac{32b^2\left(ax+bx^{2/3}\right)^{5/2}}{143a^3x^{2/3}}-\frac{4b\left(ax+bx^{2/3}\right)^{5/2}}{13a^2\sqrt[3]{x}}+\frac{2\left(ax+bx^{2/3}\right)^{5/2}}{5a}$$

```
[Out] (2*(b*x^(2/3) + a*x)^(5/2))/(5*a) - (512*b^5*(b*x^(2/3) + a*x)^(5
/2))/(15015*a^6*x^(5/3)) + (256*b^4*(b*x^(2/3) + a*x)^(5/2))/(300
3*a^5*x^(4/3)) - (64*b^3*(b*x^(2/3) + a*x)^(5/2))/(429*a^4*x) + (
32*b^2*(b*x^(2/3) + a*x)^(5/2))/(143*a^3*x^(2/3)) - (4*b*(b*x^(2/
3) + a*x)^(5/2))/(13*a^2*x^(1/3))
```

Rubi [A] time = 0.399992, antiderivative size = 169, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$-\frac{512b^5\left(ax+bx^{2/3}\right)^{5/2}}{15015a^6x^{5/3}}+\frac{256b^4\left(ax+bx^{2/3}\right)^{5/2}}{3003a^5x^{4/3}}-\frac{64b^3\left(ax+bx^{2/3}\right)^{5/2}}{429a^4x}+\frac{32b^2\left(ax+bx^{2/3}\right)^{5/2}}{143a^3x^{2/3}}-\frac{4b\left(ax+bx^{2/3}\right)^{5/2}}{13a^2\sqrt[3]{x}}+\frac{2\left(ax+bx^{2/3}\right)^{5/2}}{5a}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (2*(b*x^(2/3) + a*x)^(5/2))/(5*a) - (512*b^5*(b*x^(2/3) + a*x)^(5
/2))/(15015*a^6*x^(5/3)) + (256*b^4*(b*x^(2/3) + a*x)^(5/2))/(300
3*a^5*x^(4/3)) - (64*b^3*(b*x^(2/3) + a*x)^(5/2))/(429*a^4*x) + (
32*b^2*(b*x^(2/3) + a*x)^(5/2))/(143*a^3*x^(2/3)) - (4*b*(b*x^(2/
3) + a*x)^(5/2))/(13*a^2*x^(1/3))
```

Rubi in Sympy [A] time = 36.1997, size = 156, normalized size = 0.92

$$\frac{2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{5a}-\frac{4b\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{13a^2\sqrt[3]{x}}+\frac{32b^2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{143a^3x^{\frac{2}{3}}}-\frac{64b^3\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{429a^4x}+\frac{256b^4\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{3003a^5x^{\frac{4}{3}}}-\frac{512b^5\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{15015a^6x^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] 2*(a*x + b*x**(2/3))**(5/2)/(5*a) - 4*b*(a*x + b*x**(2/3))**(5/2)
/(13*a**2*x**(1/3)) + 32*b**2*(a*x + b*x**(2/3))**(5/2)/(143*a**3
*x**(2/3)) - 64*b**3*(a*x + b*x**(2/3))**(5/2)/(429*a**4*x) + 256
*b**4*(a*x + b*x**(2/3))**(5/2)/(3003*a**5*x**(4/3)) - 512*b**5*(
a*x + b*x**(2/3))**(5/2)/(15015*a**6*x**(5/3))
```

Mathematica [A] time = 0.0704977, size = 98, normalized size = 0.58

$$\frac{2\left(a\sqrt[3]{x}+b\right)^2\sqrt{ax+bx^{2/3}}\left(3003a^5x^{5/3}-2310a^4bx^{4/3}+1680a^3b^2x-1120a^2b^3x^{2/3}+640ab^4\sqrt[3]{x}-256b^5\right)}{15015a^6\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (2*(b + a*x^(1/3))^2*Sqrt[b*x^(2/3) + a*x]*(-256*b^5 + 640*a*b^4*
x^(1/3) - 1120*a^2*b^3*x^(2/3) + 1680*a^3*b^2*x - 2310*a^4*b*x^(4
/3) + 3003*a^5*x^(5/3)))/(15015*a^6*x^(1/3))
```

Maple [A] time = 0.006, size = 79, normalized size = 0.5

$$\frac{2}{15015\,xa^{6}}\left(bx^{\frac{2}{3}}+ax\right)^{\frac{3}{2}}\left(b+a\sqrt[3]{x}\right)\left(3003\,x^{5/3}a^{5}-2310\,a^{4}bx^{4/3}+1680\,a^{3}b^{2}x-1120\,x^{2/3}a^{2}b^{3}+640\,ab^{4}\sqrt[3]{x}-256\,b^{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 2/15015*(b*x^(2/3)+a*x)^(3/2)*(b+a*x^(1/3))*(3003*x^(5/3)*a^5-231
0*a^4*b*x^(4/3)+1680*a^3*b^2*x-1120*x^(2/3)*a^2*b^3+640*a*b^4*x^(
1/3)-256*b^5)/x/a^6
```

Maxima [A] time = 1.51203, size = 115, normalized size = 0.68

$$\frac{2\left(3003\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}-17325\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b+40950\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^{2}-50050\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^{3}+32175\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^{4}-9009\left(a\right.\right.}{15015\,a^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2),x, algorithm="maxima")
```

```
[Out] 2/15015*(3003*(a*x^(1/3) + b)^(15/2) - 17325*(a*x^(1/3) + b)^(13/
2)*b + 40950*(a*x^(1/3) + b)^(11/2)*b^2 - 50050*(a*x^(1/3) + b)^(
9/2)*b^3 + 32175*(a*x^(1/3) + b)^(7/2)*b^4 - 9009*(a*x^(1/3) + b)
^(5/2)*b^5)/a^6
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Integral((a*x + b*x**(2/3))**(3/2), x)
```

GIAC/XCAS [A] time = 0.233094, size = 355, normalized size = 2.1

$$-\frac{2}{15015}\left(\frac{1024\,b^{\frac{15}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{a^{7}}-\frac{\left(3003\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}a^{84}-20790\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}a^{84}b+61425\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}a^{84}b^{2}-100100\left(ax^{\frac{1}{3}}+\cdots\right.}{\cdots}\right.$$

$$+\frac{2}{3003}\left(\frac{256\,b^{\frac{13}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{a^{6}}+\frac{\left(693\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}a^{60}-4095\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}a^{60}b+10010\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^{60}b^{2}-12870\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{60}\cdots\right.}{a^{66}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2),x, algorithm="giac")
```

```
[Out] -2/15015*(1024*b^(15/2)*sign(x^(1/3))/a^7 - (3003*(a*x^(1/3) + b)
^(15/2)*a^84 - 20790*(a*x^(1/3) + b)^(13/2)*a^84*b + 61425*(a*x^(
1/3) + b)^(11/2)*a^84*b^2 - 100100*(a*x^(1/3) + b)^(9/2)*a^84*b^3
 + 96525*(a*x^(1/3) + b)^(7/2)*a^84*b^4 - 54054*(a*x^(1/3) + b)^(
5/2)*a^84*b^5 + 15015*(a*x^(1/3) + b)^(3/2)*a^84*b^6)*sign(x^(1/3
))/a^91)*a + 2/3003*(256*b^(13/2)*sign(x^(1/3))/a^6 + (693*(a*x^(
1/3) + b)^(13/2)*a^60 - 4095*(a*x^(1/3) + b)^(11/2)*a^60*b + 1001
0*(a*x^(1/3) + b)^(9/2)*a^60*b^2 - 12870*(a*x^(1/3) + b)^(7/2)*a^
60*b^3 + 9009*(a*x^(1/3) + b)^(5/2)*a^60*b^4 - 3003*(a*x^(1/3) +
b)^(3/2)*a^60*b^5)*sign(x^(1/3))/a^66)*b
```

3.179 $\int \frac{(bx^{2/3}+ax)^{3/2}}{x}\,dx$

Optimal. Leaf size=84

$$\frac{16b^2\left(ax+bx^{2/3}\right)^{5/2}}{105a^3x^{5/3}}-\frac{8b\left(ax+bx^{2/3}\right)^{5/2}}{21a^2x^{4/3}}+\frac{2\left(ax+bx^{2/3}\right)^{5/2}}{3ax}$$

```
[Out] (16*b^2*(b*x^(2/3) + a*x)^(5/2))/(105*a^3*x^(5/3)) - (8*b*(b*x^(2
/3) + a*x)^(5/2))/(21*a^2*x^(4/3)) + (2*(b*x^(2/3) + a*x)^(5/2))/
(3*a*x)
```

Rubi [A] time = 0.216907, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{16b^2\left(ax+bx^{2/3}\right)^{5/2}}{105a^3x^{5/3}}-\frac{8b\left(ax+bx^{2/3}\right)^{5/2}}{21a^2x^{4/3}}+\frac{2\left(ax+bx^{2/3}\right)^{5/2}}{3ax}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(2/3) + a*x)^(3/2)/x,x]
```

```
[Out] (16*b^2*(b*x^(2/3) + a*x)^(5/2))/(105*a^3*x^(5/3)) - (8*b*(b*x^(2
/3) + a*x)^(5/2))/(21*a^2*x^(4/3)) + (2*(b*x^(2/3) + a*x)^(5/2))/
(3*a*x)
```

Rubi in Sympy [A] time = 17.7865, size = 75, normalized size = 0.89

$$\frac{2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{3ax}-\frac{8b\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{21a^2x^{\frac{4}{3}}}+\frac{16b^2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{5}{2}}}{105a^3x^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(3/2)/x,x)
```

```
[Out] 2*(a*x + b*x**(2/3))**(5/2)/(3*a*x) - 8*b*(a*x + b*x**(2/3))**(5/
2)/(21*a**2*x**(4/3)) + 16*b**2*(a*x + b*x**(2/3))**(5/2)/(105*a*
*3*x**(5/3))
```

Mathematica [A] time = 0.0487628, size = 63, normalized size = 0.75

$$\frac{2\left(a\sqrt[3]{x}+b\right)^2\left(35a^2x^{2/3}-20ab\sqrt[3]{x}+8b^2\right)\sqrt{ax+bx^{2/3}}}{105a^3\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(2/3) + a*x)^(3/2)/x,x]
```

```
[Out] (2*(b + a*x^(1/3))^2*(8*b^2 - 20*a*b*x^(1/3) + 35*a^2*x^(2/3))*Sq
rt[b*x^(2/3) + a*x])/(105*a^3*x^(1/3))
```

Maple [A] time = 0.007, size = 48, normalized size = 0.6

$$\frac{2}{105\,xa^3}\left(bx^{\frac{2}{3}}+ax\right)^{\frac{3}{2}}\left(b+a\sqrt[3]{x}\right)\left(35\,a^2x^{2/3}-20\,ab\sqrt[3]{x}+8\,b^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(3/2)/x,x)
```

```
[Out] 2/105*(b*x^(2/3)+a*x)^(3/2)*(b+a*x^(1/3))*(35*a^2*x^(2/3)-20*a*b*
x^(1/3)+8*b^2)/x/a^3
```

Maxima [A] time = 1.43881, size = 63, normalized size = 0.75

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}}{3\,a^{3}}-\frac{12\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b}{7\,a^{3}}+\frac{6\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^{2}}{5\,a^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x,x, algorithm="maxima")
```

```
[Out] 2/3*(a*x^(1/3) + b)^(9/2)/a^3 - 12/7*(a*x^(1/3) + b)^(7/2)*b/a^3
+ 6/5*(a*x^(1/3) + b)^(5/2)*b^2/a^3
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(3/2)/x,x)
```

```
[Out] Integral((a*x + b*x**(2/3))**(3/2)/x, x)
```

GIAC/XCAS [A] time = 0.234856, size = 200, normalized size = 2.38

$$-\frac{16\,b^{\frac{9}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{105\,a^{3}}+\frac{2\left(\frac{3\left(15\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{12}-42\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^{12}b+35\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^{12}b^{2}\right)b\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{a^{14}}+\frac{\left(35\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^{24}-135\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{24}b+189\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^{24}b^{2}-105\left(ax^{\frac{1}{3}}+\right.}{a^{26}}}{105\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x,x, algorithm="giac")
```

```
[Out] -16/105*b^(9/2)*sign(x^(1/3))/a^3 + 2/105*(3*(15*(a*x^(1/3) + b)^
(7/2)*a^12 - 42*(a*x^(1/3) + b)^(5/2)*a^12*b + 35*(a*x^(1/3) + b)
^(3/2)*a^12*b^2)*b*sign(x^(1/3))/a^14 + (35*(a*x^(1/3) + b)^(9/2)
*a^24 - 135*(a*x^(1/3) + b)^(7/2)*a^24*b + 189*(a*x^(1/3) + b)^(5
/2)*a^24*b^2 - 105*(a*x^(1/3) + b)^(3/2)*a^24*b^3)*sign(x^(1/3))/
a^26)/a
```

3.180 $\int \frac{(bx^{2/3}+ax)^{3/2}}{x^2}\,dx$

Optimal. Leaf size=78

$$-6b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)+\frac{6b\sqrt{ax+bx^{2/3}}}{\sqrt[3]{x}}+\frac{2\left(ax+bx^{2/3}\right)^{3/2}}{x}$$

```
[Out] (6*b*Sqrt[b*x^(2/3) + a*x])/x^(1/3) + (2*(b*x^(2/3) + a*x)^(3/2))
/x - 6*b^(3/2)*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]]
```

Rubi [A] time = 0.228961, antiderivative size = 78, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-6b^{3/2}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)+\frac{6b\sqrt{ax+bx^{2/3}}}{\sqrt[3]{x}}+\frac{2\left(ax+bx^{2/3}\right)^{3/2}}{x}$$

Antiderivative was successfully verified.

```
[In] Int[(b*x^(2/3) + a*x)^(3/2)/x^2,x]
```

```
[Out] (6*b*Sqrt[b*x^(2/3) + a*x])/x^(1/3) + (2*(b*x^(2/3) + a*x)^(3/2))
/x - 6*b^(3/2)*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]]
```

Rubi in Sympy [A] time = 19.4475, size = 70, normalized size = 0.9

$$-6b^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)+\frac{6b\sqrt{ax+bx^{\frac{2}{3}}}}{\sqrt[3]{x}}+\frac{2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**(2/3)+a*x)**(3/2)/x**2,x)
```

```
[Out] -6*b**(3/2)*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3))) + 6*b*
sqrt(a*x + b*x**(2/3))/x**(1/3) + 2*(a*x + b*x**(2/3))**(3/2)/x
```

Mathematica [A] time = 0.118225, size = 63, normalized size = 0.81

$$\left(2a+\frac{8b}{\sqrt[3]{x}}\right)\sqrt{ax+bx^{2/3}}-6b^{3/2}\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(b*x^(2/3) + a*x)^(3/2)/x^2,x]
```

```
[Out] (2*a + (8*b)/x^(1/3))*Sqrt[b*x^(2/3) + a*x] - 6*b^(3/2)*ArcTanh[S
qrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))]
```

Maple [A] time = 0.006, size = 69, normalized size = 0.9

$$-2\,\frac{\left(bx^{2/3}+ax\right)^{3/2}}{x\left(b+a\sqrt[3]{x}\right)^{3/2}}\left(3\,b^{3/2}Artanh\left(\frac{\sqrt{b+a\sqrt[3]{x}}}{\sqrt{b}}\right)-\left(b+a\sqrt[3]{x}\right)^{3/2}-3\sqrt{b+a\sqrt[3]{x}}b\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(3/2)/x^2,x)
```

```
[Out] -2*(b*x^(2/3)+a*x)^(3/2)*(3*b^(3/2)*arctanh((b+a*x^(1/3))^(1/2)/b
^(1/2))-(b+a*x^(1/3))^(3/2)-3*(b+a*x^(1/3))^(1/2)*b)/x/(b+a*x^(1/
3))^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax + bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(3/2)/x**2,x)
```

```
[Out] Integral((a*x + b*x**(2/3))**(3/2)/x**2, x)
```

GIAC/XCAS [A] time = 0.227871, size = 134, normalized size = 1.72

$$\frac{6\,b^2 \arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right) \operatorname{sign}\left(x^{\frac{1}{3}}\right)}{\sqrt{-b}} + 2\left(ax^{\frac{1}{3}} + b\right)^{\frac{3}{2}} \operatorname{sign}\left(x^{\frac{1}{3}}\right) + 6\sqrt{ax^{\frac{1}{3}} + b}\,b\operatorname{sign}\left(x^{\frac{1}{3}}\right) - \frac{2\left(3\,b^2 \arctan\left(\frac{\sqrt{b}}{\sqrt{-b}}\right) + 4\sqrt{-b}b^{\frac{3}{2}}\right)\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{\sqrt{-b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^2,x, algorithm="giac")
```

```
[Out] 6*b^2*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))*sign(x^(1/3))/sqrt(-b)
 + 2*(a*x^(1/3) + b)^(3/2)*sign(x^(1/3)) + 6*sqrt(a*x^(1/3) + b)*
b*sign(x^(1/3)) - 2*(3*b^2*arctan(sqrt(b)/sqrt(-b)) + 4*sqrt(-b)*
b^(3/2))*sign(x^(1/3))/sqrt(-b)
```

3.181 $\int \frac{(bx^{2/3}+ax)^{3/2}}{x^3}\,dx$

Optimal. Leaf size=113

$$\frac{3a^3\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{8b^{3/2}}-\frac{3a^2\sqrt{ax+bx^{2/3}}}{8bx^{2/3}}-\frac{3a\sqrt{ax+bx^{2/3}}}{4x}-\frac{(ax+bx^{2/3})^{3/2}}{x^2}$$

```
[Out] (-3*a*Sqrt[b*x^(2/3) + a*x])/(4*x) - (3*a^2*Sqrt[b*x^(2/3) + a*x]
)/(8*b*x^(2/3)) - (b*x^(2/3) + a*x)^(3/2)/x^2 + (3*a^3*ArcTanh[(S
qrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(8*b^(3/2))
```

Rubi [A] time = 0.31782, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{3a^3\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{8b^{3/2}}-\frac{3a^2\sqrt{ax+bx^{2/3}}}{8bx^{2/3}}-\frac{3a\sqrt{ax+bx^{2/3}}}{4x}-\frac{(ax+bx^{2/3})^{3/2}}{x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(2/3) + a*x)^(3/2)/x^3,x]
```

```
[Out] (-3*a*Sqrt[b*x^(2/3) + a*x])/(4*x) - (3*a^2*Sqrt[b*x^(2/3) + a*x]
)/(8*b*x^(2/3)) - (b*x^(2/3) + a*x)^(3/2)/x^2 + (3*a^3*ArcTanh[(S
qrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(8*b^(3/2))
```

Rubi in Sympy [A] time = 26.3269, size = 100, normalized size = 0.88

$$\frac{3a^3\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{8b^{\frac{3}{2}}}-\frac{3a^2\sqrt{ax+bx^{\frac{2}{3}}}}{8bx^{\frac{2}{3}}}-\frac{3a\sqrt{ax+bx^{\frac{2}{3}}}}{4x}-\frac{\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(3/2)/x**3,x)
```

```
[Out] 3*a**3*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(8*b**(3/2)
) - 3*a**2*sqrt(a*x + b*x**(2/3))/(8*b*x**(2/3)) - 3*a*sqrt(a*x +
 b*x**(2/3))/(4*x) - (a*x + b*x**(2/3))**(3/2)/x**2
```

Mathematica [A] time = 0.134653, size = 92, normalized size = 0.81

$$\frac{3a^3\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{8b^{3/2}}-\frac{\left(3a^2x^{2/3}+14ab\sqrt[3]{x}+8b^2\right)\sqrt{ax+bx^{2/3}}}{8bx^{4/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(2/3) + a*x)^(3/2)/x^3,x]
```

```
[Out] -((8*b^2 + 14*a*b*x^(1/3) + 3*a^2*x^(2/3))*Sqrt[b*x^(2/3) + a*x])
/(8*b*x^(4/3)) + (3*a^3*ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^
(1/3))])/(8*b^(3/2))
```

Maple [A] time = 0.005, size = 93, normalized size = 0.8

$$\frac{1}{8\,x^{2}}\left(bx^{\frac{2}{3}}+ax\right)^{\frac{3}{2}}\left(3\,b^{7/2}\sqrt{b+a\sqrt[3]{x}}-8\,b^{5/2}\left(b+a\sqrt[3]{x}\right)^{3/2}-3\,b^{3/2}\left(b+a\sqrt[3]{x}\right)^{5/2}+3\,Artanh\left(\frac{\sqrt{b+a\sqrt[3]{x}}}{\sqrt{b}}\right)xa^{3}b\right)b^{-\frac{5}{2}}\left(b+a\sqrt[3]{x}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(3/2)/x^3,x)
```

```
[Out] 1/8*(b*x^(2/3)+a*x)^(3/2)*(3*b^(7/2)*(b+a*x^(1/3))^(1/2)-8*b^(5/2
)*(b+a*x^(1/3))^(3/2)-3*b^(3/2)*(b+a*x^(1/3))^(5/2)+3*arctanh((b+
a*x^(1/3))^(1/2)/b^(1/2))*x*a^3*b)/x^2/(b+a*x^(1/3))^(3/2)/b^(5/2
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(3/2)/x**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.255469, size = 146, normalized size = 1.29

$$-\frac{\frac{3\,a^{4}\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)\mathrm{sign}\left(x^{\frac{1}{3}}\right)}{\sqrt{-b}b}+\frac{3\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^{4}\mathrm{sign}\left(x^{\frac{1}{3}}\right)+8\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^{4}b\,\mathrm{sign}\left(x^{\frac{1}{3}}\right)-3\sqrt{ax^{\frac{1}{3}}+b}\,a^{4}b^{2}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}{a^{3}bx}}{8\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^3,x, algorithm="giac")
```

```
[Out] -1/8*(3*a^4*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))*sign(x^(1/3))/(s
qrt(-b)*b) + (3*(a*x^(1/3) + b)^(5/2)*a^4*sign(x^(1/3)) + 8*(a*x^
(1/3) + b)^(3/2)*a^4*b*sign(x^(1/3)) - 3*sqrt(a*x^(1/3) + b)*a^4*
b^2*sign(x^(1/3)))/(a^3*b*x))/a
```

3.182 $\int \frac{(bx^{2/3}+ax)^{3/2}}{x^4}\,dx$

Optimal. Leaf size=203

$$-\frac{21a^6\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{512b^{9/2}}+\frac{21a^5\sqrt{ax+bx^{2/3}}}{512b^4x^{2/3}}-\frac{7a^4\sqrt{ax+bx^{2/3}}}{256b^3x}+\frac{7a^3\sqrt{ax+bx^{2/3}}}{320b^2x^{4/3}}-\frac{3a^2\sqrt{ax+bx^{2/3}}}{160bx^{5/3}}-\frac{\left(ax+bx^{2/3}\right)^{3/2}}{2x^3}-\frac{3a\sqrt{ax+bx^{2/3}}}{20x^2}$$

```
[Out] (-3*a*Sqrt[b*x^(2/3) + a*x])/(20*x^2) - (3*a^2*Sqrt[b*x^(2/3) + a
*x])/(160*b*x^(5/3)) + (7*a^3*Sqrt[b*x^(2/3) + a*x])/(320*b^2*x^(
4/3)) - (7*a^4*Sqrt[b*x^(2/3) + a*x])/(256*b^3*x) + (21*a^5*Sqrt[
b*x^(2/3) + a*x])/(512*b^4*x^(2/3)) - (b*x^(2/3) + a*x)^(3/2)/(2*
x^3) - (21*a^6*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/
(512*b^(9/2))
```

Rubi [A] time = 0.582914, antiderivative size = 203, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$-\frac{21a^6\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{512b^{9/2}}+\frac{21a^5\sqrt{ax+bx^{2/3}}}{512b^4x^{2/3}}-\frac{7a^4\sqrt{ax+bx^{2/3}}}{256b^3x}+\frac{7a^3\sqrt{ax+bx^{2/3}}}{320b^2x^{4/3}}-\frac{3a^2\sqrt{ax+bx^{2/3}}}{160bx^{5/3}}-\frac{\left(ax+bx^{2/3}\right)^{3/2}}{2x^3}-\frac{3a\sqrt{ax+bx^{2/3}}}{20x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(2/3) + a*x)^(3/2)/x^4,x]
```

```
[Out] (-3*a*Sqrt[b*x^(2/3) + a*x])/(20*x^2) - (3*a^2*Sqrt[b*x^(2/3) + a
*x])/(160*b*x^(5/3)) + (7*a^3*Sqrt[b*x^(2/3) + a*x])/(320*b^2*x^(
4/3)) - (7*a^4*Sqrt[b*x^(2/3) + a*x])/(256*b^3*x) + (21*a^5*Sqrt[
b*x^(2/3) + a*x])/(512*b^4*x^(2/3)) - (b*x^(2/3) + a*x)^(3/2)/(2*
x^3) - (21*a^6*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/
(512*b^(9/2))
```

Rubi in Sympy [A] time = 50.8292, size = 187, normalized size = 0.92

$$-\frac{21a^6\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{512b^{\frac{9}{2}}}+\frac{21a^5\sqrt{ax+bx^{\frac{2}{3}}}}{512b^4x^{\frac{2}{3}}}-\frac{7a^4\sqrt{ax+bx^{\frac{2}{3}}}}{256b^3x}+\frac{7a^3\sqrt{ax+bx^{\frac{2}{3}}}}{320b^2x^{\frac{4}{3}}}-\frac{3a^2\sqrt{ax+bx^{\frac{2}{3}}}}{160bx^{\frac{5}{3}}}-\frac{3a\sqrt{ax+bx^{\frac{2}{3}}}}{20x^2}-\frac{\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{2x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(3/2)/x**4,x)
```

```
[Out] -21*a**6*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(512*b**(
9/2)) + 21*a**5*sqrt(a*x + b*x**(2/3))/(512*b**4*x**(2/3)) - 7*a*
*4*sqrt(a*x + b*x**(2/3))/(256*b**3*x) + 7*a**3*sqrt(a*x + b*x**(
2/3))/(320*b**2*x**(4/3)) - 3*a**2*sqrt(a*x + b*x**(2/3))/(160*b*
x**(5/3)) - 3*a*sqrt(a*x + b*x**(2/3))/(20*x**2) - (a*x + b*x**(2
/3))**(3/2)/(2*x**3)
```

Mathematica [A] time = 0.237915, size = 127, normalized size = 0.63

$$\frac{\sqrt{ax+bx^{2/3}}\left(105a^5x^{5/3}-70a^4bx^{4/3}+56a^3b^2x-48a^2b^3x^{2/3}-1664ab^4\sqrt[3]{x}-1280b^5\right)}{2560b^4x^{7/3}} - \frac{21a^6\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{512b^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(2/3) + a*x)^(3/2)/x^4,x]
```

```
[Out] (Sqrt[b*x^(2/3) + a*x]*(-1280*b^5 - 1664*a*b^4*x^(1/3) - 48*a^2*b
^3*x^(2/3) + 56*a^3*b^2*x - 70*a^4*b*x^(4/3) + 105*a^5*x^(5/3)))/
(2560*b^4*x^(7/3)) - (21*a^6*ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[
b]*x^(1/3))])/(512*b^(9/2))
```

Maple [A] time = 0.019, size = 139, normalized size = 0.7

$$\frac{1}{2560\,x^3}\left(bx^{\frac{2}{3}}+ax\right)^{\frac{3}{2}}\left(105\,\left(b+a\sqrt[3]{x}\right)^{11/2}b^{9/2}-595\,\left(b+a\sqrt[3]{x}\right)^{9/2}b^{11/2}+1386\,\left(b+a\sqrt[3]{x}\right)^{7/2}b^{13/2}-1686\,\left(b+a\sqrt[3]{x}\right)^{5/2}b^{15}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(3/2)/x^4,x)
```

```
[Out] 1/2560*(b*x^(2/3)+a*x)^(3/2)*(105*(b+a*x^(1/3))^(11/2)*b^(9/2)-59
5*(b+a*x^(1/3))^(9/2)*b^(11/2)+1386*(b+a*x^(1/3))^(7/2)*b^(13/2)-
1686*(b+a*x^(1/3))^(5/2)*b^(15/2)-595*(b+a*x^(1/3))^(3/2)*b^(17/2
)+105*(b+a*x^(1/3))^(1/2)*b^(19/2)-105*arctanh((b+a*x^(1/3))^(1/2
)/b^(1/2))*a^6*b^4*x^2)/x^3/(b+a*x^(1/3))^(3/2)/b^(17/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^4,x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(3/2)/x**4,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A]   time = 0.314681, size = 231, normalized size = 1.14

$$\frac{\frac{105\,a^{7}\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)\mathrm{sign}\left(x^{\frac{1}{3}}\right)}{\sqrt{-b}\,b^{4}}+\frac{105\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}a^{7}\mathrm{sign}\left(x^{\frac{1}{3}}\right)-595\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^{7}b\,\mathrm{sign}\left(x^{\frac{1}{3}}\right)+1386\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{7}b^{2}\mathrm{sign}\left(x^{\frac{1}{3}}\right)-1686\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^{7}b^{3}\mathrm{sign}\left(x \cdots\right.}{a^{6}b^{4}x^{2}}}{2560\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^4,x, algorithm="giac")
```

```
[Out] 1/2560*(105*a^7*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))*sign(x^(1/3)
)/(sqrt(-b)*b^4) + (105*(a*x^(1/3) + b)^(11/2)*a^7*sign(x^(1/3))
- 595*(a*x^(1/3) + b)^(9/2)*a^7*b*sign(x^(1/3)) + 1386*(a*x^(1/3)
 + b)^(7/2)*a^7*b^2*sign(x^(1/3)) - 1686*(a*x^(1/3) + b)^(5/2)*a^
7*b^3*sign(x^(1/3)) - 595*(a*x^(1/3) + b)^(3/2)*a^7*b^4*sign(x^(1
/3)) + 105*sqrt(a*x^(1/3) + b)*a^7*b^5*sign(x^(1/3)))/(a^6*b^4*x^
2))/a
```

3.183 $\int \frac{\left(bx^{2/3}+ax\right)^{3/2}}{x^5}\,dx$

Optimal. Leaf size=291

$$\frac{429a^9\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{32768b^{15/2}}-\frac{429a^8\sqrt{ax+bx^{2/3}}}{32768b^7x^{2/3}}+\frac{143a^7\sqrt{ax+bx^{2/3}}}{16384b^6x}-\frac{143a^6\sqrt{ax+bx^{2/3}}}{20480b^5x^{4/3}}+\frac{429a^5\sqrt{ax+bx^{2/3}}}{71680b^4x^{5/3}}-\frac{143a^4\sqrt{ax+bx^{2/3}}}{26880b^3x^2}+\frac{13a^3\sqrt{ax+bx^{2/3}}}{2688b^2x^{7/3}}-\frac{a^2\sqrt{ax+bx^{2/3}}}{224bx^{8/3}}-\frac{\left(ax+bx^{2/3}\right)^{3/2}}{3x^4}-\frac{a\sqrt{ax+bx^{2/3}}}{16x^3}$$

```
[Out] -(a*Sqrt[b*x^(2/3) + a*x])/(16*x^3) - (a^2*Sqrt[b*x^(2/3) + a*x])
/(224*b*x^(8/3)) + (13*a^3*Sqrt[b*x^(2/3) + a*x])/(2688*b^2*x^(7/
3)) - (143*a^4*Sqrt[b*x^(2/3) + a*x])/(26880*b^3*x^2) + (429*a^5*
Sqrt[b*x^(2/3) + a*x])/(71680*b^4*x^(5/3)) - (143*a^6*Sqrt[b*x^(2
/3) + a*x])/(20480*b^5*x^(4/3)) + (143*a^7*Sqrt[b*x^(2/3) + a*x])
/(16384*b^6*x) - (429*a^8*Sqrt[b*x^(2/3) + a*x])/(32768*b^7*x^(2/
3)) - (b*x^(2/3) + a*x)^(3/2)/(3*x^4) + (429*a^9*ArcTanh[(Sqrt[b]
*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(32768*b^(15/2))
```

Rubi [A] time = 0.882181, antiderivative size = 291, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{429a^9\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{32768b^{15/2}}-\frac{429a^8\sqrt{ax+bx^{2/3}}}{32768b^7x^{2/3}}+\frac{143a^7\sqrt{ax+bx^{2/3}}}{16384b^6x}-\frac{143a^6\sqrt{ax+bx^{2/3}}}{20480b^5x^{4/3}}+\frac{429a^5\sqrt{ax+bx^{2/3}}}{71680b^4x^{5/3}}-\frac{143a^4\sqrt{ax+bx^{2/3}}}{26880b^3x^2}+\frac{13a^3\sqrt{ax+bx^{2/3}}}{2688b^2x^{7/3}}-\frac{a^2\sqrt{ax+bx^{2/3}}}{224bx^{8/3}}-\frac{\left(ax+bx^{2/3}\right)^{3/2}}{3x^4}-\frac{a\sqrt{ax+bx^{2/3}}}{16x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(2/3) + a*x)^(3/2)/x^5,x]
```

```
[Out] -(a*Sqrt[b*x^(2/3) + a*x])/(16*x^3) - (a^2*Sqrt[b*x^(2/3) + a*x])
/(224*b*x^(8/3)) + (13*a^3*Sqrt[b*x^(2/3) + a*x])/(2688*b^2*x^(7/
3)) - (143*a^4*Sqrt[b*x^(2/3) + a*x])/(26880*b^3*x^2) + (429*a^5*
Sqrt[b*x^(2/3) + a*x])/(71680*b^4*x^(5/3)) - (143*a^6*Sqrt[b*x^(2
/3) + a*x])/(20480*b^5*x^(4/3)) + (143*a^7*Sqrt[b*x^(2/3) + a*x])
/(16384*b^6*x) - (429*a^8*Sqrt[b*x^(2/3) + a*x])/(32768*b^7*x^(2/
3)) - (b*x^(2/3) + a*x)^(3/2)/(3*x^4) + (429*a^9*ArcTanh[(Sqrt[b]
*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(32768*b^(15/2))
```

Rubi in Sympy [A] time = 83.0062, size = 269, normalized size = 0.92

$$\frac{429a^9\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{32768b^{\frac{15}{2}}}-\frac{429a^8\sqrt{ax+bx^{\frac{2}{3}}}}{32768b^7x^{\frac{2}{3}}}+\frac{143a^7\sqrt{ax+bx^{\frac{2}{3}}}}{16384b^6x}-\frac{143a^6\sqrt{ax+bx^{\frac{2}{3}}}}{20480b^5x^{\frac{4}{3}}}+\frac{429a^5\sqrt{ax+bx^{\frac{2}{3}}}}{71680b^4x^{\frac{5}{3}}}-\frac{143a^4\sqrt{ax+bx^{\frac{2}{3}}}}{26880b^3x^2}+\frac{13a^3\sqrt{ax+bx^{\frac{2}{3}}}}{2688b^2x^{\frac{7}{3}}}-\frac{a^2\sqrt{ax+bx^{\frac{2}{3}}}}{224bx^{\frac{8}{3}}}-\frac{a\sqrt{ax+bx^{\frac{2}{3}}}}{16x^3}-\frac{\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{3x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(3/2)/x**5,x)
```

```
[Out] 429*a**9*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(32768*b*
*(15/2)) - 429*a**8*sqrt(a*x + b*x**(2/3))/(32768*b**7*x**(2/3))
+ 143*a**7*sqrt(a*x + b*x**(2/3))/(16384*b**6*x) - 143*a**6*sqrt(
a*x + b*x**(2/3))/(20480*b**5*x**(4/3)) + 429*a**5*sqrt(a*x + b*x
**(2/3))/(71680*b**4*x**(5/3)) - 143*a**4*sqrt(a*x + b*x**(2/3))/
(26880*b**3*x**2) + 13*a**3*sqrt(a*x + b*x**(2/3))/(2688*b**2*x**
(7/3)) - a**2*sqrt(a*x + b*x**(2/3))/(224*b*x**(8/3)) - a*sqrt(a*
x + b*x**(2/3))/(16*x**3) - (a*x + b*x**(2/3))**(3/2)/(3*x**4)
```

Mathematica [A] time = 0.298075, size = 164, normalized size = 0.56

$$\frac{429a^9\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{32768b^{15/2}}-\frac{\sqrt{ax+bx^{2/3}}\left(45045a^8x^{8/3}-30030a^7bx^{7/3}+24024a^6b^2x^2-20592a^5b^3x^{5/3}+18304a^4b^4x^{4/3}-16640a^3b^5x+15360a^2b^6x\right.}{3440640b^7x^{10/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(2/3) + a*x)^(3/2)/x^5,x]
```

```
[Out] -(Sqrt[b*x^(2/3) + a*x]*(1146880*b^8 + 1361920*a*b^7*x^(1/3) + 15
360*a^2*b^6*x^(2/3) - 16640*a^3*b^5*x + 18304*a^4*b^4*x^(4/3) - 2
0592*a^5*b^3*x^(5/3) + 24024*a^6*b^2*x^2 - 30030*a^7*b*x^(7/3) +
45045*a^8*x^(8/3)))/(3440640*b^7*x^(10/3)) + (429*a^9*ArcTanh[Sqr
t[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/(32768*b^(15/2))
```

Maple [A] time = 0.022, size = 181, normalized size = 0.6

$$-\frac{1}{3440640\,x^4}\left(bx^{\frac{2}{3}}+ax\right)^{\frac{3}{2}}\left(45045\,\left(b+a\sqrt[3]{x}\right)^{17/2}b^{15/2}-390390\,\left(b+a\sqrt[3]{x}\right)^{15/2}b^{17/2}+1495494\,\left(b+a\sqrt[3]{x}\right)^{13/2}b^{19/2}-3317\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(3/2)/x^5,x)
```

```
[Out] -1/3440640*(b*x^(2/3)+a*x)^(3/2)*(45045*(b+a*x^(1/3))^(17/2)*b^(1
5/2)-390390*(b+a*x^(1/3))^(15/2)*b^(17/2)+1495494*(b+a*x^(1/3))^(
13/2)*b^(19/2)-3317886*(b+a*x^(1/3))^(11/2)*b^(21/2)+4685824*(b+a
*x^(1/3))^(9/2)*b^(23/2)-4349826*(b+a*x^(1/3))^(7/2)*b^(25/2)+263
3274*(b+a*x^(1/3))^(5/2)*b^(27/2)+390390*(b+a*x^(1/3))^(3/2)*b^(2
9/2)-45045*(b+a*x^(1/3))^(1/2)*b^(31/2)-45045*arctanh((b+a*x^(1/3
))^(1/2)/b^(1/2))*b^7*a^9*x^3)/x^4/(b+a*x^(1/3))^(3/2)/b^(29/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^5,x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(3/2)/x**5,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.4215, size = 316, normalized size = 1.09

$$-\frac{\frac{45045\,a^{10}\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)\mathrm{sign}\left(x^{\frac{1}{3}}\right)}{\sqrt{-b}b^{7}}+\frac{45045\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}a^{10}\mathrm{sign}\left(x^{\frac{1}{3}}\right)-390390\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}a^{10}b\,\mathrm{sign}\left(x^{\frac{1}{3}}\right)+1495494\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}a^{10}b^{2}\mathrm{sign}\left(x^{\frac{1}{3}}\right)-3317886\left(\cdots\right.}{\cdots}}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^5,x, algorithm="giac")

[Out] -1/3440640*(45045*a^10*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))*sign(
x^(1/3))/(sqrt(-b)*b^7) + (45045*(a*x^(1/3) + b)^(17/2)*a^10*sign
(x^(1/3)) - 390390*(a*x^(1/3) + b)^(15/2)*a^10*b*sign(x^(1/3)) +
1495494*(a*x^(1/3) + b)^(13/2)*a^10*b^2*sign(x^(1/3)) - 3317886*(
a*x^(1/3) + b)^(11/2)*a^10*b^3*sign(x^(1/3)) + 4685824*(a*x^(1/3)
 + b)^(9/2)*a^10*b^4*sign(x^(1/3)) - 4349826*(a*x^(1/3) + b)^(7/2
)*a^10*b^5*sign(x^(1/3)) + 2633274*(a*x^(1/3) + b)^(5/2)*a^10*b^6
*sign(x^(1/3)) + 390390*(a*x^(1/3) + b)^(3/2)*a^10*b^7*sign(x^(1/
3)) - 45045*sqrt(a*x^(1/3) + b)*a^10*b^8*sign(x^(1/3)))/(a^9*b^7*
x^3))/a
```

3.184 $\int \frac{(bx^{2/3}+ax)^{3/2}}{x^6}\,dx$

Optimal. Leaf size=379

$$-\frac{12597a^{12}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{2097152b^{21/2}}+\frac{12597a^{11}\sqrt{ax+bx^{2/3}}}{2097152b^{10}x^{2/3}}-\frac{4199a^{10}\sqrt{ax+bx^{2/3}}}{1048576b^9x}+\frac{4199a^9\sqrt{ax+bx^{2/3}}}{1310720b^8x^{4/3}}-\frac{12597a^8\sqrt{ax+bx^{2/3}}}{4587520b^7x^{5/3}}+\frac{4199a^7\sqrt{ax+bx^{2/3}}}{1720320b^6x^2}-\frac{4199a^6\sqrt{ax+bx^{2/3}}}{1892352b^5x^{7/3}}+\frac{323a^5\sqrt{ax+bx^{2/3}}}{157696b^4x^{8/3}}-\frac{323a^4\sqrt{ax+bx^{2/3}}}{168960b^3x^3}+\frac{19a^3\sqrt{ax+bx^{2/3}}}{10560b^2x^{10/3}}-\frac{3a^2\sqrt{ax+bx^{2/3}}}{1760bx^{11/3}}-\frac{\left(ax+bx^{2/3}\right)^{3/2}}{4x^5}-\frac{3a\sqrt{ax+bx^{2/3}}}{88x^4}$$

```
[Out] (-3*a*Sqrt[b*x^(2/3) + a*x])/(88*x^4) - (3*a^2*Sqrt[b*x^(2/3) + a
*x])/(1760*b*x^(11/3)) + (19*a^3*Sqrt[b*x^(2/3) + a*x])/(10560*b^
2*x^(10/3)) - (323*a^4*Sqrt[b*x^(2/3) + a*x])/(168960*b^3*x^3) +
(323*a^5*Sqrt[b*x^(2/3) + a*x])/(157696*b^4*x^(8/3)) - (4199*a^6*
Sqrt[b*x^(2/3) + a*x])/(1892352*b^5*x^(7/3)) + (4199*a^7*Sqrt[b*x
^(2/3) + a*x])/(1720320*b^6*x^2) - (12597*a^8*Sqrt[b*x^(2/3) + a*
x])/(4587520*b^7*x^(5/3)) + (4199*a^9*Sqrt[b*x^(2/3) + a*x])/(131
0720*b^8*x^(4/3)) - (4199*a^10*Sqrt[b*x^(2/3) + a*x])/(1048576*b^
9*x) + (12597*a^11*Sqrt[b*x^(2/3) + a*x])/(2097152*b^10*x^(2/3))
- (b*x^(2/3) + a*x)^(3/2)/(4*x^5) - (12597*a^12*ArcTanh[(Sqrt[b]*
x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(2097152*b^(21/2))
```

Rubi [A] time = 1.22452, antiderivative size = 379, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$-\frac{12597a^{12}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{2097152b^{21/2}}+\frac{12597a^{11}\sqrt{ax+bx^{2/3}}}{2097152b^{10}x^{2/3}}-\frac{4199a^{10}\sqrt{ax+bx^{2/3}}}{1048576b^9x}+\frac{4199a^9\sqrt{ax+bx^{2/3}}}{1310720b^8x^{4/3}}-\frac{12597a^8\sqrt{ax+bx^{2/3}}}{4587520b^7x^{5/3}}+\frac{4199a^7\sqrt{ax+bx^{2/3}}}{1720320b^6x^2}-\frac{4199a^6\sqrt{ax+bx^{2/3}}}{1892352b^5x^{7/3}}+\frac{323a^5\sqrt{ax+bx^{2/3}}}{157696b^4x^{8/3}}-\frac{323a^4\sqrt{ax+bx^{2/3}}}{168960b^3x^3}+\frac{19a^3\sqrt{ax+bx^{2/3}}}{10560b^2x^{10/3}}-\frac{3a^2\sqrt{ax+bx^{2/3}}}{1760bx^{11/3}}-\frac{\left(ax+bx^{2/3}\right)^{3/2}}{4x^5}-\frac{3a\sqrt{ax+bx^{2/3}}}{88x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(2/3) + a*x)^(3/2)/x^6,x]
```


```
[Out] (-3*a*Sqrt[b*x^(2/3) + a*x])/(88*x^4) - (3*a^2*Sqrt[b*x^(2/3) + a
*x])/(1760*b*x^(11/3)) + (19*a^3*Sqrt[b*x^(2/3) + a*x])/(10560*b^
2*x^(10/3)) - (323*a^4*Sqrt[b*x^(2/3) + a*x])/(168960*b^3*x^3) +
(323*a^5*Sqrt[b*x^(2/3) + a*x])/(157696*b^4*x^(8/3)) - (4199*a^6*
Sqrt[b*x^(2/3) + a*x])/(1892352*b^5*x^(7/3)) + (4199*a^7*Sqrt[b*x
^(2/3) + a*x])/(1720320*b^6*x^2) - (12597*a^8*Sqrt[b*x^(2/3) + a*
x])/(4587520*b^7*x^(5/3)) + (4199*a^9*Sqrt[b*x^(2/3) + a*x])/(131
0720*b^8*x^(4/3)) - (4199*a^10*Sqrt[b*x^(2/3) + a*x])/(1048576*b^
9*x) + (12597*a^11*Sqrt[b*x^(2/3) + a*x])/(2097152*b^10*x^(2/3))
- (b*x^(2/3) + a*x)^(3/2)/(4*x^5) - (12597*a^12*ArcTanh[(Sqrt[b]*
x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(2097152*b^(21/2))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{4199a^{11}\int \frac{1}{x\sqrt{ax+bx^{\frac{2}{3}}}}\,dx}{2097152b^9}-\frac{4199a^{10}\sqrt{ax+bx^{\frac{2}{3}}}}{1048576b^9x}+\frac{4199a^9\sqrt{ax+bx^{\frac{2}{3}}}}{1310720b^8x^{\frac{4}{3}}}-\frac{12597a^8\sqrt{ax+bx^{\frac{2}{3}}}}{4587520b^7x^{\frac{5}{3}}}+\frac{4199a^7\sqrt{ax+bx^{\frac{2}{3}}}}{1720320b^6x^2}-\frac{4199a^6\sqrt{ax+bx^{\frac{2}{3}}}}{1892352b^5x^{\frac{7}{3}}}+\frac{323a^5\sqrt{ax+bx^{\frac{2}{3}}}}{157696b^4x^{\frac{8}{3}}}-\frac{323a^4\sqrt{ax+bx^{\frac{2}{3}}}}{168960b^3x^3}+\frac{19a^3\sqrt{ax+bx^{\frac{2}{3}}}}{10560b^2x^{\frac{10}{3}}}-\frac{3a^2\sqrt{ax+bx^{\frac{2}{3}}}}{1760bx^{\frac{11}{3}}}-\frac{3a\sqrt{ax+bx^{\frac{2}{3}}}}{88x^4}-\frac{\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}{4x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**(2/3)+a*x)**(3/2)/x**6,x)
```

```
[Out] -4199*a**11*Integral(1/(x*sqrt(a*x + b*x**(2/3))), x)/(2097152*b*
*9) - 4199*a**10*sqrt(a*x + b*x**(2/3))/(1048576*b**9*x) + 4199*a
**9*sqrt(a*x + b*x**(2/3))/(1310720*b**8*x**(4/3)) - 12597*a**8*s
qrt(a*x + b*x**(2/3))/(4587520*b**7*x**(5/3)) + 4199*a**7*sqrt(a*
x + b*x**(2/3))/(1720320*b**6*x**2) - 4199*a**6*sqrt(a*x + b*x**(
2/3))/(1892352*b**5*x**(7/3)) + 323*a**5*sqrt(a*x + b*x**(2/3))/(
157696*b**4*x**(8/3)) - 323*a**4*sqrt(a*x + b*x**(2/3))/(168960*b
**3*x**3) + 19*a**3*sqrt(a*x + b*x**(2/3))/(10560*b**2*x**(10/3))
 - 3*a**2*sqrt(a*x + b*x**(2/3))/(1760*b*x**(11/3)) - 3*a*sqrt(a*
x + b*x**(2/3))/(88*x**4) - (a*x + b*x**(2/3))**(3/2)/(4*x**5)
```

Mathematica [A] time = 0.475617, size = 201, normalized size = 0.53

$$\frac{\sqrt{ax+bx^{2/3}}\left(14549535a^{11}x^{11/3}-9699690a^{10}bx^{10/3}+7759752a^9b^2x^3-6651216a^8b^3x^{8/3}+5912192a^7b^4x^{7/3}-5374720a^6b\right.}{2422210560b}$$
$$-\frac{12597a^{12}\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{2097152b^{21/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(2/3) + a*x)^(3/2)/x^6,x]
```

```
[Out] (Sqrt[b*x^(2/3) + a*x]*(-605552640*b^11 - 688128000*a*b^10*x^(1/3
) - 4128768*a^2*b^9*x^(2/3) + 4358144*a^3*b^8*x - 4630528*a^4*b^7
*x^(4/3) + 4961280*a^5*b^6*x^(5/3) - 5374720*a^6*b^5*x^2 + 591219
2*a^7*b^4*x^(7/3) - 6651216*a^8*b^3*x^(8/3) + 7759752*a^9*b^2*x^3
 - 9699690*a^10*b*x^(10/3) + 14549535*a^11*x^(11/3)))/(2422210560
*b^10*x^(13/3)) - (12597*a^12*ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt
[b]*x^(1/3))])/(2097152*b^(21/2))
```

Maple [A] time = 0.028, size = 223, normalized size = 0.6

$$\frac{1}{2422210560\,x^5}\left(bx^{\frac{2}{3}}+ax\right)^{\frac{3}{2}}\left(14549535\,\left(b+a\sqrt[3]{x}\right)^{23/2}b^{21/2}-169744575\,\left(b+a\sqrt[3]{x}\right)^{21/2}b^{23/2}+904981077\,\left(b+a\sqrt[3]{x}\right)^{19/2}b\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^(2/3)+a*x)^(3/2)/x^6,x)
```

```
[Out] 1/2422210560*(b*x^(2/3)+a*x)^(3/2)*(14549535*(b+a*x^(1/3))^(23/2)
*b^(21/2)-169744575*(b+a*x^(1/3))^(21/2)*b^(23/2)+904981077*(b+a*
x^(1/3))^(19/2)*b^(25/2)-2913648309*(b+a*x^(1/3))^(17/2)*b^(27/2)
+6303782342*(b+a*x^(1/3))^(15/2)*b^(29/2)-9643633350*(b+a*x^(1/3)
)^(13/2)*b^(31/2)+10677769530*(b+a*x^(1/3))^(11/2)*b^(33/2)-85985
```

```
79770*(b+a*x^(1/3))^(9/2)*b^(35/2)+4975837515*(b+a*x^(1/3))^(7/2)
*b^(37/2)-2001671595*(b+a*x^(1/3))^(5/2)*b^(39/2)-169744575*(b+a*
x^(1/3))^(3/2)*b^(41/2)+14549535*(b+a*x^(1/3))^(1/2)*b^(43/2)-145
49535*arctanh((b+a*x^(1/3))^(1/2)/b^(1/2))*b^10*a^12*x^4)/x^5/(b+
a*x^(1/3))^(3/2)/b^(41/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^6,x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^6,x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**(2/3)+a*x)**(3/2)/x**6,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.542489, size = 401, normalized size = 1.06

$$\frac{\frac{14549535\, a^{13} \arctan\left(\frac{\sqrt{a x^{\frac{1}{3}}+b}}{\sqrt{-b}}\right) \mathrm{sign}\left(x^{\frac{1}{3}}\right)}{\sqrt{-b}\, b^{10}} + \frac{14549535 \left(a x^{\frac{1}{3}}+b\right)^{\frac{23}{2}} a^{13} \mathrm{sign}\left(x^{\frac{1}{3}}\right) - 169744575 \left(a x^{\frac{1}{3}}+b\right)^{\frac{21}{2}} a^{13} b\, \mathrm{sign}\left(x^{\frac{1}{3}}\right) + 904981077 \left(a x^{\frac{1}{3}}+b\right)^{\frac{19}{2}} a^{13} b^{2} \mathrm{sign}\left(x^{\frac{1}{3}}\right) \cdots}{\cdots}}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(3/2)/x^6,x, algorithm="giac")

[Out] 1/2422210560*(14549535*a^13*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))*
sign(x^(1/3))/(sqrt(-b)*b^10) + (14549535*(a*x^(1/3) + b)^(23/2)*
a^13*sign(x^(1/3)) - 169744575*(a*x^(1/3) + b)^(21/2)*a^13*b*sign
(x^(1/3)) + 904981077*(a*x^(1/3) + b)^(19/2)*a^13*b^2*sign(x^(1/3
)) - 2913648309*(a*x^(1/3) + b)^(17/2)*a^13*b^3*sign(x^(1/3)) + 6
303782342*(a*x^(1/3) + b)^(15/2)*a^13*b^4*sign(x^(1/3)) - 9643633
350*(a*x^(1/3) + b)^(13/2)*a^13*b^5*sign(x^(1/3)) + 10677769530*(
a*x^(1/3) + b)^(11/2)*a^13*b^6*sign(x^(1/3)) - 8598579770*(a*x^(1
/3) + b)^(9/2)*a^13*b^7*sign(x^(1/3)) + 4975837515*(a*x^(1/3) + b
```

```
)^(7/2)*a^13*b^8*sign(x^(1/3)) - 2001671595*(a*x^(1/3) + b)^(5/2)
*a^13*b^9*sign(x^(1/3)) - 169744575*(a*x^(1/3) + b)^(3/2)*a^13*b^
10*sign(x^(1/3)) + 14549535*sqrt(a*x^(1/3) + b)*a^13*b^11*sign(x^
(1/3)))/(a^12*b^10*x^4))/a
```

3.185 $\int \frac{x^4}{\sqrt{bx^{2/3}+ax}}\,dx$

Optimal. Leaf size=401

$$-\frac{16777216b^{13}\sqrt{ax+bx^{2/3}}}{11700675a^{14}\sqrt[3]{x}}+\frac{8388608b^{12}\sqrt{ax+bx^{2/3}}}{11700675a^{13}}-\frac{2097152b^{11}\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{3900225a^{12}}+\frac{1048576b^{10}x^{2/3}\sqrt{ax+bx^{2/3}}}{2340135a^{11}}-\frac{131072b^{9}x\sqrt{ax+bx^{2/3}}}{334305a^{10}}+\frac{65536b^{8}x^{4/3}\sqrt{ax+bx^{2/3}}}{185725a^{9}}-\frac{180224b^{7}x^{5/3}\sqrt{ax+bx^{2/3}}}{557175a^{8}}+\frac{1171456b^{6}x^{2}\sqrt{ax+bx^{2/3}}}{3900225a^{7}}-\frac{73216b^{5}x^{7/3}\sqrt{ax+bx^{2/3}}}{260015a^{6}}+\frac{36608b^{4}x^{8/3}\sqrt{ax+bx^{2/3}}}{137655a^{5}}-\frac{9152b^{3}x^{3}\sqrt{ax+bx^{2/3}}}{36225a^{4}}+\frac{416b^{2}x^{10/3}\sqrt{ax+bx^{2/3}}}{1725a^{3}}-\frac{52bx^{11/3}\sqrt{ax+bx^{2/3}}}{225a^{2}}+\frac{2x^{4}\sqrt{ax+bx^{2/3}}}{9a}$$

```
[Out] (8388608*b^12*Sqrt[b*x^(2/3) + a*x])/(11700675*a^13) - (16777216*
b^13*Sqrt[b*x^(2/3) + a*x])/(11700675*a^14*x^(1/3)) - (2097152*b^
11*x^(1/3)*Sqrt[b*x^(2/3) + a*x])/(3900225*a^12) + (1048576*b^10*
x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(2340135*a^11) - (131072*b^9*x*Sqr
t[b*x^(2/3) + a*x])/(334305*a^10) + (65536*b^8*x^(4/3)*Sqrt[b*x^(
2/3) + a*x])/(185725*a^9) - (180224*b^7*x^(5/3)*Sqrt[b*x^(2/3) +
a*x])/(557175*a^8) + (1171456*b^6*x^2*Sqrt[b*x^(2/3) + a*x])/(390
0225*a^7) - (73216*b^5*x^(7/3)*Sqrt[b*x^(2/3) + a*x])/(260015*a^6
) + (36608*b^4*x^(8/3)*Sqrt[b*x^(2/3) + a*x])/(137655*a^5) - (915
2*b^3*x^3*Sqrt[b*x^(2/3) + a*x])/(36225*a^4) + (416*b^2*x^(10/3)*
Sqrt[b*x^(2/3) + a*x])/(1725*a^3) - (52*b*x^(11/3)*Sqrt[b*x^(2/3)
 + a*x])/(225*a^2) + (2*x^4*Sqrt[b*x^(2/3) + a*x])/(9*a)
```

Rubi [A] time = 1.25022, antiderivative size = 401, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{16777216b^{13}\sqrt{ax+bx^{2/3}}}{11700675a^{14}\sqrt[3]{x}}+\frac{8388608b^{12}\sqrt{ax+bx^{2/3}}}{11700675a^{13}}-\frac{2097152b^{11}\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{3900225a^{12}}+\frac{1048576b^{10}x^{2/3}\sqrt{ax+bx^{2/3}}}{2340135a^{11}}-\frac{131072b^{9}x\sqrt{ax+bx^{2/3}}}{334305a^{10}}+\frac{65536b^{8}x^{4/3}\sqrt{ax+bx^{2/3}}}{185725a^{9}}-\frac{180224b^{7}x^{5/3}\sqrt{ax+bx^{2/3}}}{557175a^{8}}+\frac{1171456b^{6}x^{2}\sqrt{ax+bx^{2/3}}}{3900225a^{7}}-\frac{73216b^{5}x^{7/3}\sqrt{ax+bx^{2/3}}}{260015a^{6}}+\frac{36608b^{4}x^{8/3}\sqrt{ax+bx^{2/3}}}{137655a^{5}}-\frac{9152b^{3}x^{3}\sqrt{ax+bx^{2/3}}}{36225a^{4}}+\frac{416b^{2}x^{10/3}\sqrt{ax+bx^{2/3}}}{1725a^{3}}-\frac{52bx^{11/3}\sqrt{ax+bx^{2/3}}}{225a^{2}}+\frac{2x^{4}\sqrt{ax+bx^{2/3}}}{9a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/Sqrt[b*x^(2/3) + a*x],x]
```


```
[Out] (8388608*b^12*Sqrt[b*x^(2/3) + a*x])/(11700675*a^13) - (16777216*
b^13*Sqrt[b*x^(2/3) + a*x])/(11700675*a^14*x^(1/3)) - (2097152*b^
11*x^(1/3)*Sqrt[b*x^(2/3) + a*x])/(3900225*a^12) + (1048576*b^10*
x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(2340135*a^11) - (131072*b^9*x*Sqr
t[b*x^(2/3) + a*x])/(334305*a^10) + (65536*b^8*x^(4/3)*Sqrt[b*x^(
2/3) + a*x])/(185725*a^9) - (180224*b^7*x^(5/3)*Sqrt[b*x^(2/3) +
a*x])/(557175*a^8) + (1171456*b^6*x^2*Sqrt[b*x^(2/3) + a*x])/(390
0225*a^7) - (73216*b^5*x^(7/3)*Sqrt[b*x^(2/3) + a*x])/(260015*a^6
) + (36608*b^4*x^(8/3)*Sqrt[b*x^(2/3) + a*x])/(137655*a^5) - (915
2*b^3*x^3*Sqrt[b*x^(2/3) + a*x])/(36225*a^4) + (416*b^2*x^(10/3)*
Sqrt[b*x^(2/3) + a*x])/(1725*a^3) - (52*b*x^(11/3)*Sqrt[b*x^(2/3)
 + a*x])/(225*a^2) + (2*x^4*Sqrt[b*x^(2/3) + a*x])/(9*a)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{2x^4\sqrt{ax+bx^{\frac{2}{3}}}}{9a}-\frac{52bx^{\frac{11}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{225a^2}+\frac{416b^2x^{\frac{10}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{1725a^3}-\frac{9152b^3x^3\sqrt{ax+bx^{\frac{2}{3}}}}{36225a^4}+\frac{36608b^4x^{\frac{8}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{137655a^5}-\frac{73216b^5x^{\frac{7}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{260015a^6}+\frac{1171456b^6x^2\sqrt{ax+bx^{\frac{2}{3}}}}{3900225a^7}-\frac{180224b^7x^{\frac{5}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{557175a^8}+\frac{65536b^8x^{\frac{4}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{185725a^9}-\frac{131072b^9x\sqrt{ax+bx^{\frac{2}{3}}}}{334305a^{10}}-\frac{1048576b^{11}\int\frac{\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\,dx}{2340135a^{11}}+\frac{1048576b^{10}x^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{2340135a^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**4*sqrt(a*x + b*x**(2/3))/(9*a) - 52*b*x**(11/3)*sqrt(a*x + b
*x**(2/3))/(225*a**2) + 416*b**2*x**(10/3)*sqrt(a*x + b*x**(2/3))
/(1725*a**3) - 9152*b**3*x**3*sqrt(a*x + b*x**(2/3))/(36225*a**4)
 + 36608*b**4*x**(8/3)*sqrt(a*x + b*x**(2/3))/(137655*a**5) - 732
16*b**5*x**(7/3)*sqrt(a*x + b*x**(2/3))/(260015*a**6) + 1171456*b
**6*x**2*sqrt(a*x + b*x**(2/3))/(3900225*a**7) - 180224*b**7*x**(
5/3)*sqrt(a*x + b*x**(2/3))/(557175*a**8) + 65536*b**8*x**(4/3)*s
qrt(a*x + b*x**(2/3))/(185725*a**9) - 131072*b**9*x*sqrt(a*x + b*
x**(2/3))/(334305*a**10) - 1048576*b**11*Integral(x**(1/3)/sqrt(a
*x + b*x**(2/3)), x)/(2340135*a**11) + 1048576*b**10*x**(2/3)*sqr
t(a*x + b*x**(2/3))/(2340135*a**11)
```

Mathematica [A] time = 0.0979775, size = 185, normalized size = 0.46

$$2\sqrt{ax+bx^{2/3}}\left(1300075a^{13}x^{13/3}-1352078a^{12}bx^4+1410864a^{11}b^2x^{11/3}-1478048a^{10}b^3x^{10/3}+1555840a^9b^4x^3-1647360a^8\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(-8388608*b^13 + 4194304*a*b^12*x^(1/3)
- 3145728*a^2*b^11*x^(2/3) + 2621440*a^3*b^10*x - 2293760*a^4*b^9
*x^(4/3) + 2064384*a^5*b^8*x^(5/3) - 1892352*a^6*b^7*x^2 + 175718
4*a^7*b^6*x^(7/3) - 1647360*a^8*b^5*x^(8/3) + 1555840*a^9*b^4*x^3
 - 1478048*a^10*b^3*x^(10/3) + 1410864*a^11*b^2*x^(11/3) - 135207
8*a^12*b*x^4 + 1300075*a^13*x^(13/3)))/(11700675*a^14*x^(1/3))
```

Maple [A] time = 0.007, size = 167, normalized size = 0.4

$$\frac{2}{11700675\,a^{14}}\sqrt[3]{x}\left(b+a\sqrt[3]{x}\right)\left(1300075\,x^{13/3}a^{13}-1352078\,x^4a^{12}b+1410864\,x^{11/3}a^{11}b^2-1478048\,x^{10/3}a^{10}b^3+1555840\,x^3a^9\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] 2/11700675*x^(1/3)*(b+a*x^(1/3))*(1300075*x^(13/3)*a^13-1352078*x
^4*a^12*b+1410864*x^(11/3)*a^11*b^2-1478048*x^(10/3)*a^10*b^3+155
5840*x^3*a^9*b^4-1647360*x^(8/3)*a^8*b^5+1757184*x^(7/3)*a^7*b^6-
1892352*x^2*a^6*b^7+2064384*x^(5/3)*a^5*b^8-2293760*x^(4/3)*a^4*b
^9+2621440*x*a^3*b^10-3145728*x^(2/3)*a^2*b^11+4194304*x^(1/3)*a*
b^12-8388608*b^13)/(b*x^(2/3)+a*x)^(1/2)/a^14
```

Maxima [A] time = 1.48709, size = 316, normalized size = 0.79

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{27}{2}}}{9\,a^{14}}-\frac{78\left(ax^{\frac{1}{3}}+b\right)^{\frac{25}{2}}b}{25\,a^{14}}+\frac{468\left(ax^{\frac{1}{3}}+b\right)^{\frac{23}{2}}b^{2}}{23\,a^{14}}-\frac{572\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}b^{3}}{7\,a^{14}}+\frac{4290\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}b^{4}}{19\,a^{14}}-\frac{7722\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}b^{5}}{17\,a^{14}}+\frac{3432\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}b^{6}}{5\,a^{14}}-\frac{792\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b^{7}}{a^{14}}+\frac{702\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^{8}}{a^{14}}-\frac{1430\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^{9}}{3\,a^{14}}+\frac{1716\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^{10}}{7\,a^{14}}-\frac{468\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^{11}}{5\,a^{14}}+\frac{26\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^{12}}{a^{14}}-\frac{6\sqrt{ax^{\frac{1}{3}}+b}b^{13}}{a^{14}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(a*x + b*x^(2/3)),x, algorithm="maxima")
```

```
[Out] 2/9*(a*x^(1/3) + b)^(27/2)/a^14 - 78/25*(a*x^(1/3) + b)^(25/2)*b/
a^14 + 468/23*(a*x^(1/3) + b)^(23/2)*b^2/a^14 - 572/7*(a*x^(1/3)
+ b)^(21/2)*b^3/a^14 + 4290/19*(a*x^(1/3) + b)^(19/2)*b^4/a^14 -
7722/17*(a*x^(1/3) + b)^(17/2)*b^5/a^14 + 3432/5*(a*x^(1/3) + b)^
(15/2)*b^6/a^14 - 792*(a*x^(1/3) + b)^(13/2)*b^7/a^14 + 702*(a*x^
(1/3) + b)^(11/2)*b^8/a^14 - 1430/3*(a*x^(1/3) + b)^(9/2)*b^9/a^1
4 + 1716/7*(a*x^(1/3) + b)^(7/2)*b^10/a^14 - 468/5*(a*x^(1/3) + b
)^(5/2)*b^11/a^14 + 26*(a*x^(1/3) + b)^(3/2)*b^12/a^14 - 6*sqrt(a
*x^(1/3) + b)*b^13/a^14
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(a*x + b*x^(2/3)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.239741, size = 348, normalized size = 0.87

$$\frac{16777216\,b^{\frac{27}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{11700675\,a^{14}}+\frac{2\left(1300075\left(ax^{\frac{1}{3}}+b\right)^{\frac{27}{2}}a^{338}-18253053\left(ax^{\frac{1}{3}}+b\right)^{\frac{25}{2}}a^{338}b+119041650\left(ax^{\frac{1}{3}}+b\right)^{\frac{23}{2}}a^{338}b^{2}-478056150\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}a^{338}b\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(a*x + b*x^(2/3)),x, algorithm="giac")
```

```
[Out] 16777216/11700675*b^(27/2)*sign(x^(1/3))/a^14 + 2/11700675*(13000
75*(a*x^(1/3) + b)^(27/2)*a^338 - 18253053*(a*x^(1/3) + b)^(25/2)
*a^338*b + 119041650*(a*x^(1/3) + b)^(23/2)*a^338*b^2 - 478056150
*(a*x^(1/3) + b)^(21/2)*a^338*b^3 + 1320944625*(a*x^(1/3) + b)^(1
9/2)*a^338*b^4 - 2657429775*(a*x^(1/3) + b)^(17/2)*a^338*b^5 + 40
15671660*(a*x^(1/3) + b)^(15/2)*a^338*b^6 - 4633467300*(a*x^(1/3)
 + b)^(13/2)*a^338*b^7 + 4106936925*(a*x^(1/3) + b)^(11/2)*a^338*
b^8 - 2788660875*(a*x^(1/3) + b)^(9/2)*a^338*b^9 + 1434168450*(a*
x^(1/3) + b)^(7/2)*a^338*b^10 - 547591590*(a*x^(1/3) + b)^(5/2)*a
^338*b^11 + 152108775*(a*x^(1/3) + b)^(3/2)*a^338*b^12 - 35102025
*sqrt(a*x^(1/3) + b)*a^338*b^13)/(a^352*sign(x^(1/3)))
```

3.186 $\int \frac{x^3}{\sqrt{bx^{2/3}+ax}}\,dx$

Optimal. Leaf size=313

$$\frac{524288b^{10}\sqrt{ax+bx^{2/3}}}{323323a^{11}\sqrt[3]{x}}-\frac{262144b^9\sqrt{ax+bx^{2/3}}}{323323a^{10}}+\frac{196608b^8\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{323323a^9}-\frac{163840b^7x^{2/3}\sqrt{ax+bx^{2/3}}}{323323a^8}+\frac{20480b^6x\sqrt{ax+bx^{2/3}}}{46189a^7}-\frac{18432b^5x^{4/3}\sqrt{ax+bx^{2/3}}}{46189a^6}+\frac{1536b^4x^{5/3}\sqrt{ax+bx^{2/3}}}{4199a^5}-\frac{768b^3x^2\sqrt{ax+bx^{2/3}}}{2261a^4}+\frac{720b^2x^{7/3}\sqrt{ax+bx^{2/3}}}{2261a^3}-\frac{40bx^{8/3}\sqrt{ax+bx^{2/3}}}{133a^2}+\frac{2x^3\sqrt{ax+bx^{2/3}}}{7a}$$

```
[Out] (-262144*b^9*Sqrt[b*x^(2/3) + a*x])/(323323*a^10) + (524288*b^10*
Sqrt[b*x^(2/3) + a*x])/(323323*a^11*x^(1/3)) + (196608*b^8*x^(1/3
)*Sqrt[b*x^(2/3) + a*x])/(323323*a^9) - (163840*b^7*x^(2/3)*Sqrt[
b*x^(2/3) + a*x])/(323323*a^8) + (20480*b^6*x*Sqrt[b*x^(2/3) + a*
x])/(46189*a^7) - (18432*b^5*x^(4/3)*Sqrt[b*x^(2/3) + a*x])/(4618
9*a^6) + (1536*b^4*x^(5/3)*Sqrt[b*x^(2/3) + a*x])/(4199*a^5) - (7
68*b^3*x^2*Sqrt[b*x^(2/3) + a*x])/(2261*a^4) + (720*b^2*x^(7/3)*S
qrt[b*x^(2/3) + a*x])/(2261*a^3) - (40*b*x^(8/3)*Sqrt[b*x^(2/3) +
 a*x])/(133*a^2) + (2*x^3*Sqrt[b*x^(2/3) + a*x])/(7*a)
```

Rubi [A] time = 0.900092, antiderivative size = 313, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$\frac{524288b^{10}\sqrt{ax+bx^{2/3}}}{323323a^{11}\sqrt[3]{x}}-\frac{262144b^9\sqrt{ax+bx^{2/3}}}{323323a^{10}}+\frac{196608b^8\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{323323a^9}-\frac{163840b^7x^{2/3}\sqrt{ax+bx^{2/3}}}{323323a^8}+\frac{20480b^6x\sqrt{ax+bx^{2/3}}}{46189a^7}-\frac{18432b^5x^{4/3}\sqrt{ax+bx^{2/3}}}{46189a^6}+\frac{1536b^4x^{5/3}\sqrt{ax+bx^{2/3}}}{4199a^5}-\frac{768b^3x^2\sqrt{ax+bx^{2/3}}}{2261a^4}+\frac{720b^2x^{7/3}\sqrt{ax+bx^{2/3}}}{2261a^3}-\frac{40bx^{8/3}\sqrt{ax+bx^{2/3}}}{133a^2}+\frac{2x^3\sqrt{ax+bx^{2/3}}}{7a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/Sqrt[b*x^(2/3) + a*x],x]
```


```
[Out] (-262144*b^9*Sqrt[b*x^(2/3) + a*x])/(323323*a^10) + (524288*b^10*
Sqrt[b*x^(2/3) + a*x])/(323323*a^11*x^(1/3)) + (196608*b^8*x^(1/3
)*Sqrt[b*x^(2/3) + a*x])/(323323*a^9) - (163840*b^7*x^(2/3)*Sqrt[
b*x^(2/3) + a*x])/(323323*a^8) + (20480*b^6*x*Sqrt[b*x^(2/3) + a*
x])/(46189*a^7) - (18432*b^5*x^(4/3)*Sqrt[b*x^(2/3) + a*x])/(4618
9*a^6) + (1536*b^4*x^(5/3)*Sqrt[b*x^(2/3) + a*x])/(4199*a^5) - (7
68*b^3*x^2*Sqrt[b*x^(2/3) + a*x])/(2261*a^4) + (720*b^2*x^(7/3)*S
qrt[b*x^(2/3) + a*x])/(2261*a^3) - (40*b*x^(8/3)*Sqrt[b*x^(2/3) +
 a*x])/(133*a^2) + (2*x^3*Sqrt[b*x^(2/3) + a*x])/(7*a)
```

Rubi in Sympy [A] time = 87.221, size = 298, normalized size = 0.95

$$\frac{2x^3\sqrt{ax+bx^{\frac{2}{3}}}}{7a}-\frac{40bx^{\frac{8}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{133a^2}+\frac{720b^2x^{\frac{7}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{2261a^3}-\frac{768b^3x^2\sqrt{ax+bx^{\frac{2}{3}}}}{2261a^4}+\frac{1536b^4x^{\frac{5}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{4199a^5}-\frac{18432b^5x^{\frac{4}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{46189a^6}+\frac{20480b^6x\sqrt{ax+bx^{\frac{2}{3}}}}{46189a^7}-\frac{163840b^7x^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{323323a^8}+\frac{196608b^8\sqrt[3]{x}\sqrt{ax+bx^{\frac{2}{3}}}}{323323a^9}-\frac{262144b^9\sqrt{ax+bx^{\frac{2}{3}}}}{323323a^{10}}+\frac{524288b^{10}\sqrt{ax+bx^{\frac{2}{3}}}}{323323a^{11}\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**3*sqrt(a*x + b*x**(2/3))/(7*a) - 40*b*x**(8/3)*sqrt(a*x + b*
x**(2/3))/(133*a**2) + 720*b**2*x**(7/3)*sqrt(a*x + b*x**(2/3))/(
2261*a**3) - 768*b**3*x**2*sqrt(a*x + b*x**(2/3))/(2261*a**4) + 1
536*b**4*x**(5/3)*sqrt(a*x + b*x**(2/3))/(4199*a**5) - 18432*b**5
*x**(4/3)*sqrt(a*x + b*x**(2/3))/(46189*a**6) + 20480*b**6*x*sqrt
(a*x + b*x**(2/3))/(46189*a**7) - 163840*b**7*x**(2/3)*sqrt(a*x +
 b*x**(2/3))/(323323*a**8) + 196608*b**8*x**(1/3)*sqrt(a*x + b*x*
*(2/3))/(323323*a**9) - 262144*b**9*sqrt(a*x + b*x**(2/3))/(32332
3*a**10) + 524288*b**10*sqrt(a*x + b*x**(2/3))/(323323*a**11*x**(
1/3))
```

Mathematica [A] time = 0.072648, size = 148, normalized size = 0.47

$$\frac{2\sqrt{ax+bx^{2/3}}\left(46189a^{10}x^{10/3}-48620a^9bx^3+51480a^8b^2x^{8/3}-54912a^7b^3x^{7/3}+59136a^6b^4x^2-64512a^5b^5x^{5/3}+71680a^4b^{6}\right.}{323323a^{11}\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(262144*b^10 - 131072*a*b^9*x^(1/3) + 98
304*a^2*b^8*x^(2/3) - 81920*a^3*b^7*x + 71680*a^4*b^6*x^(4/3) - 6
4512*a^5*b^5*x^(5/3) + 59136*a^6*b^4*x^2 - 54912*a^7*b^3*x^(7/3)
+ 51480*a^8*b^2*x^(8/3) - 48620*a^9*b*x^3 + 46189*a^10*x^(10/3)))
/(323323*a^11*x^(1/3))
```

Maple [A] time = 0.007, size = 134, normalized size = 0.4

$$\frac{2}{323323\,a^{11}}\sqrt[3]{x}\left(b+a\sqrt[3]{x}\right)\left(46189\,x^{10/3}a^{10}-48620\,x^3a^9b+51480\,a^8b^2x^{8/3}-54912\,x^{7/3}a^7b^3+59136\,a^6b^4x^2-64512\,a^5b^5x^5\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] 2/323323*x^(1/3)*(b+a*x^(1/3))*(46189*x^(10/3)*a^10-48620*x^3*a^9
*b+51480*a^8*b^2*x^(8/3)-54912*x^(7/3)*a^7*b^3+59136*a^6*b^4*x^2-
64512*a^5*b^5*x^(5/3)+71680*x^(4/3)*a^4*b^6-81920*a^3*b^7*x+98304
*a^2*b^8*x^(2/3)-131072*x^(1/3)*a*b^9+262144*b^10)/(b*x^(2/3)+a*x
)^(1/2)/a^11
```

Maxima [A] time = 1.45045, size = 247, normalized size = 0.79

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}}{7\,a^{11}}-\frac{60\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}b}{19\,a^{11}}+\frac{270\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}b^2}{17\,a^{11}}-\frac{48\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}b^3}{a^{11}}+\frac{1260\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b^4}{13\,a^{11}}-\frac{1512\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^5}{11\,a^{11}}+\frac{140\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^6}{a^{11}}-\frac{720\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^7}{7\,a^{11}}+\frac{54\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^8}{a^{11}}-\frac{20\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^9}{a^{11}}+\frac{6\sqrt{ax^{\frac{1}{3}}+b}b^{10}}{a^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(a*x + b*x^(2/3)),x, algorithm="maxima")
```

```
[Out] 2/7*(a*x^(1/3) + b)^(21/2)/a^11 - 60/19*(a*x^(1/3) + b)^(19/2)*b/
a^11 + 270/17*(a*x^(1/3) + b)^(17/2)*b^2/a^11 - 48*(a*x^(1/3) + b
)^(15/2)*b^3/a^11 + 1260/13*(a*x^(1/3) + b)^(13/2)*b^4/a^11 - 151
2/11*(a*x^(1/3) + b)^(11/2)*b^5/a^11 + 140*(a*x^(1/3) + b)^(9/2)*
b^6/a^11 - 720/7*(a*x^(1/3) + b)^(7/2)*b^7/a^11 + 54*(a*x^(1/3) +
 b)^(5/2)*b^8/a^11 - 20*(a*x^(1/3) + b)^(3/2)*b^9/a^11 + 6*sqrt(a
*x^(1/3) + b)*b^10/a^11
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(a*x + b*x^(2/3)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{ax + bx^{\frac{2}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x**3/sqrt(a*x + b*x**(2/3)), x)
```

GIAC/XCAS [A] time = 0.226699, size = 279, normalized size = 0.89

$$-\frac{524288\, b^{\frac{21}{2}} \operatorname{sign}\left(x^{\frac{1}{3}}\right)}{323323\, a^{11}} + \frac{2\left(46189\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}} a^{200} - 510510\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}} a^{200} b + 2567565\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}} a^{200} b^2 - 7759752\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}} a^{200} b^3 + 15668\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(a*x + b*x^(2/3)),x, algorithm="giac")
```

```
[Out] -524288/323323*b^(21/2)*sign(x^(1/3))/a^11 + 2/323323*(46189*(a*x
^(1/3) + b)^(21/2)*a^200 - 510510*(a*x^(1/3) + b)^(19/2)*a^200*b
+ 2567565*(a*x^(1/3) + b)^(17/2)*a^200*b^2 - 7759752*(a*x^(1/3) +
 b)^(15/2)*a^200*b^3 + 15668730*(a*x^(1/3) + b)^(13/2)*a^200*b^4
- 22221108*(a*x^(1/3) + b)^(11/2)*a^200*b^5 + 22632610*(a*x^(1/3)
 + b)^(9/2)*a^200*b^6 - 16628040*(a*x^(1/3) + b)^(7/2)*a^200*b^7
+ 8729721*(a*x^(1/3) + b)^(5/2)*a^200*b^8 - 3233230*(a*x^(1/3) +
b)^(3/2)*a^200*b^9 + 969969*sqrt(a*x^(1/3) + b)*a^200*b^10)/(a^21
1*sign(x^(1/3)))
```

3.187 $\int \frac{x^2}{\sqrt{bx^{2/3}+ax}}\,dx$

Optimal. Leaf size=225

$$-\frac{4096b^7\sqrt{ax+bx^{2/3}}}{2145a^8\sqrt[3]{x}}+\frac{2048b^6\sqrt{ax+bx^{2/3}}}{2145a^7}-\frac{512b^5\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{715a^6}+\frac{256b^4x^{2/3}\sqrt{ax+bx^{2/3}}}{429a^5}-\frac{224b^3x\sqrt{ax+bx^{2/3}}}{429a^4}+\frac{336b^2x^{4/3}\sqrt{ax+bx^{2/3}}}{715a^3}-\frac{28bx^{5/3}\sqrt{ax+bx^{2/3}}}{65a^2}+\frac{2x^2\sqrt{ax+bx^{2/3}}}{5a}$$

```
[Out] (2048*b^6*Sqrt[b*x^(2/3) + a*x])/(2145*a^7) - (4096*b^7*Sqrt[b*x^
(2/3) + a*x])/(2145*a^8*x^(1/3)) - (512*b^5*x^(1/3)*Sqrt[b*x^(2/3
) + a*x])/(715*a^6) + (256*b^4*x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(42
9*a^5) - (224*b^3*x*Sqrt[b*x^(2/3) + a*x])/(429*a^4) + (336*b^2*x
^(4/3)*Sqrt[b*x^(2/3) + a*x])/(715*a^3) - (28*b*x^(5/3)*Sqrt[b*x^
(2/3) + a*x])/(65*a^2) + (2*x^2*Sqrt[b*x^(2/3) + a*x])/(5*a)
```

Rubi [A] time = 0.58334, antiderivative size = 225, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{4096b^7\sqrt{ax+bx^{2/3}}}{2145a^8\sqrt[3]{x}}+\frac{2048b^6\sqrt{ax+bx^{2/3}}}{2145a^7}-\frac{512b^5\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{715a^6}+\frac{256b^4x^{2/3}\sqrt{ax+bx^{2/3}}}{429a^5}-\frac{224b^3x\sqrt{ax+bx^{2/3}}}{429a^4}+\frac{336b^2x^{4/3}\sqrt{ax+bx^{2/3}}}{715a^3}-\frac{28bx^{5/3}\sqrt{ax+bx^{2/3}}}{65a^2}+\frac{2x^2\sqrt{ax+bx^{2/3}}}{5a}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2048*b^6*Sqrt[b*x^(2/3) + a*x])/(2145*a^7) - (4096*b^7*Sqrt[b*x^
(2/3) + a*x])/(2145*a^8*x^(1/3)) - (512*b^5*x^(1/3)*Sqrt[b*x^(2/3
) + a*x])/(715*a^6) + (256*b^4*x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(42
9*a^5) - (224*b^3*x*Sqrt[b*x^(2/3) + a*x])/(429*a^4) + (336*b^2*x
^(4/3)*Sqrt[b*x^(2/3) + a*x])/(715*a^3) - (28*b*x^(5/3)*Sqrt[b*x^
(2/3) + a*x])/(65*a^2) + (2*x^2*Sqrt[b*x^(2/3) + a*x])/(5*a)
```

Rubi in Sympy [A] time = 52.9502, size = 212, normalized size = 0.94

$$\frac{2x^2\sqrt{ax+bx^{\frac{2}{3}}}}{5a}-\frac{28bx^{\frac{5}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{65a^2}+\frac{336b^2x^{\frac{4}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{715a^3}-\frac{224b^3x\sqrt{ax+bx^{\frac{2}{3}}}}{429a^4}+\frac{256b^4x^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{429a^5}-\frac{512b^5\sqrt[3]{x}\sqrt{ax+bx^{\frac{2}{3}}}}{715a^6}+\frac{2048b^6\sqrt{ax+bx^{\frac{2}{3}}}}{2145a^7}-\frac{4096b^7\sqrt{ax+bx^{\frac{2}{3}}}}{2145a^8\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*x**2*sqrt(a*x + b*x**(2/3))/(5*a) - 28*b*x**(5/3)*sqrt(a*x + b*
x**(2/3))/(65*a**2) + 336*b**2*x**(4/3)*sqrt(a*x + b*x**(2/3))/(7
15*a**3) - 224*b**3*x*sqrt(a*x + b*x**(2/3))/(429*a**4) + 256*b**
4*x**(2/3)*sqrt(a*x + b*x**(2/3))/(429*a**5) - 512*b**5*x**(1/3)*
sqrt(a*x + b*x**(2/3))/(715*a**6) + 2048*b**6*sqrt(a*x + b*x**(2/
3))/(2145*a**7) - 4096*b**7*sqrt(a*x + b*x**(2/3))/(2145*a**8*x**
(1/3))
```

Mathematica [A] time = 0.0576494, size = 111, normalized size = 0.49

$$\frac{2\sqrt{ax+bx^{2/3}}\left(429a^7x^{7/3}-462a^6bx^2+504a^5b^2x^{5/3}-560a^4b^3x^{4/3}+640a^3b^4x-768a^2b^5x^{2/3}+1024ab^6\sqrt[3]{x}-2048b^7\right)}{2145a^8\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[x^2/Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(-2048*b^7 + 1024*a*b^6*x^(1/3) - 768*a^
2*b^5*x^(2/3) + 640*a^3*b^4*x - 560*a^4*b^3*x^(4/3) + 504*a^5*b^2
*x^(5/3) - 462*a^6*b*x^2 + 429*a^7*x^(7/3)))/(2145*a^8*x^(1/3))
```

Maple [A] time = 0.007, size = 101, normalized size = 0.5

$$\frac{2}{2145\,a^8}\sqrt[3]{x}\left(b+a\sqrt[3]{x}\right)\left(429\,x^{7/3}a^7-462\,bx^2a^6+504\,x^{5/3}a^5b^2-560\,x^{4/3}a^4b^3+640\,xa^3b^4-768\,x^{2/3}a^2b^5+1024\,\sqrt[3]{x}ab^6-2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2/(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] 2/2145*x^(1/3)*(b+a*x^(1/3))*(429*x^(7/3)*a^7-462*b*x^2*a^6+504*x
^(5/3)*a^5*b^2-560*x^(4/3)*a^4*b^3+640*x*a^3*b^4-768*x^(2/3)*a^2*
b^5+1024*x^(1/3)*a*b^6-2048*b^7)/(b*x^(2/3)+a*x)^(1/2)/a^8
```

Maxima [A] time = 1.44924, size = 178, normalized size = 0.79

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}}{5\,a^8}-\frac{42\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b}{13\,a^8}+\frac{126\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^2}{11\,a^8}-\frac{70\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^3}{3\,a^8}+\frac{30\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^4}{a^8}-\frac{126\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^5}{5\,a^8}+\frac{14\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^6}{a^8}-\frac{6\sqrt{ax^{\frac{1}{3}}+b}b^7}{a^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^2/sqrt(a*x + b*x^(2/3)),x, algorithm="maxima")
```

```
[Out] 2/5*(a*x^(1/3) + b)^(15/2)/a^8 - 42/13*(a*x^(1/3) + b)^(13/2)*b/a
^8 + 126/11*(a*x^(1/3) + b)^(11/2)*b^2/a^8 - 70/3*(a*x^(1/3) + b)
^(9/2)*b^3/a^8 + 30*(a*x^(1/3) + b)^(7/2)*b^4/a^8 - 126/5*(a*x^(1
/3) + b)^(5/2)*b^5/a^8 + 14*(a*x^(1/3) + b)^(3/2)*b^6/a^8 - 6*sqr
t(a*x^(1/3) + b)*b^7/a^8
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^2/sqrt(a*x + b*x^(2/3)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{ax+bx^{\frac{2}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(a*x + b*x**(2/3)), x)
```

GIAC/XCAS [A] time = 0.229045, size = 211, normalized size = 0.94

$$\frac{4096\,b^{\frac{15}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{2145\,a^{8}} + \frac{2\left(429\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}a^{98} - 3465\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}a^{98}b + 12285\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}a^{98}b^{2} - 25025\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^{98}b^{3} + 32175\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{9}\right.}{2145\,a^{106}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(a*x + b*x^(2/3)),x, algorithm="giac")
```

```
[Out] 4096/2145*b^(15/2)*sign(x^(1/3))/a^8 + 2/2145*(429*(a*x^(1/3) + b
)^(15/2)*a^98 - 3465*(a*x^(1/3) + b)^(13/2)*a^98*b + 12285*(a*x^(
1/3) + b)^(11/2)*a^98*b^2 - 25025*(a*x^(1/3) + b)^(9/2)*a^98*b^3
+ 32175*(a*x^(1/3) + b)^(7/2)*a^98*b^4 - 27027*(a*x^(1/3) + b)^(5
/2)*a^98*b^5 + 15015*(a*x^(1/3) + b)^(3/2)*a^98*b^6 - 6435*sqrt(a
*x^(1/3) + b)*a^98*b^7)/(a^106*sign(x^(1/3)))
```

3.188 $\int \frac{x}{\sqrt{bx^{2/3}+ax}}\,dx$

Optimal. Leaf size=137

$$\frac{256b^4\sqrt{ax+bx^{2/3}}}{105a^5\sqrt[3]{x}}-\frac{128b^3\sqrt{ax+bx^{2/3}}}{105a^4}+\frac{32b^2\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{35a^3}-\frac{16bx^{2/3}\sqrt{ax+bx^{2/3}}}{21a^2}+\frac{2x\sqrt{ax+bx^{2/3}}}{3a}$$

```
[Out] (-128*b^3*Sqrt[b*x^(2/3) + a*x])/(105*a^4) + (256*b^4*Sqrt[b*x^(2
/3) + a*x])/(105*a^5*x^(1/3)) + (32*b^2*x^(1/3)*Sqrt[b*x^(2/3) +
a*x])/(35*a^3) - (16*b*x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(21*a^2) +
(2*x*Sqrt[b*x^(2/3) + a*x])/(3*a)
```

Rubi [A] time = 0.307186, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$\frac{256b^4\sqrt{ax+bx^{2/3}}}{105a^5\sqrt[3]{x}}-\frac{128b^3\sqrt{ax+bx^{2/3}}}{105a^4}+\frac{32b^2\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{35a^3}-\frac{16bx^{2/3}\sqrt{ax+bx^{2/3}}}{21a^2}+\frac{2x\sqrt{ax+bx^{2/3}}}{3a}$$

Antiderivative was successfully verified.

```
[In]  Int[x/Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (-128*b^3*Sqrt[b*x^(2/3) + a*x])/(105*a^4) + (256*b^4*Sqrt[b*x^(2
/3) + a*x])/(105*a^5*x^(1/3)) + (32*b^2*x^(1/3)*Sqrt[b*x^(2/3) +
a*x])/(35*a^3) - (16*b*x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(21*a^2) +
(2*x*Sqrt[b*x^(2/3) + a*x])/(3*a)
```

Rubi in Sympy [A] time = 26.4664, size = 128, normalized size = 0.93

$$\frac{2x\sqrt{ax+bx^{\frac{2}{3}}}}{3a}-\frac{16bx^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{21a^2}+\frac{32b^2\sqrt[3]{x}\sqrt{ax+bx^{\frac{2}{3}}}}{35a^3}-\frac{128b^3\sqrt{ax+bx^{\frac{2}{3}}}}{105a^4}+\frac{256b^4\sqrt{ax+bx^{\frac{2}{3}}}}{105a^5\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*x*sqrt(a*x + b*x**(2/3))/(3*a) - 16*b*x**(2/3)*sqrt(a*x + b*x**
(2/3))/(21*a**2) + 32*b**2*x**(1/3)*sqrt(a*x + b*x**(2/3))/(35*a*
*3) - 128*b**3*sqrt(a*x + b*x**(2/3))/(105*a**4) + 256*b**4*sqrt(
a*x + b*x**(2/3))/(105*a**5*x**(1/3))
```

Mathematica [A] time = 0.0424941, size = 74, normalized size = 0.54

$$\frac{2\sqrt{ax+bx^{2/3}}\left(35a^4x^{4/3}-40a^3bx+48a^2b^2x^{2/3}-64ab^3\sqrt[3]{x}+128b^4\right)}{105a^5\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(128*b^4 - 64*a*b^3*x^(1/3) + 48*a^2*b^2
*x^(2/3) - 40*a^3*b*x + 35*a^4*x^(4/3)))/(105*a^5*x^(1/3))
```

Maple [A] time = 0.007, size = 68, normalized size = 0.5

$$\frac{2}{105\,a^{5}}\sqrt[3]{x}\left(b+a\sqrt[3]{x}\right)\left(35\,x^{4/3}a^{4}-40\,xa^{3}b+48\,x^{2/3}a^{2}b^{2}-64\,\sqrt[3]{x}ab^{3}+128\,b^{4}\right)\frac{1}{\sqrt{bx^{\frac{2}{3}}+ax}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x/(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] 2/105*x^(1/3)*(b+a*x^(1/3))*(35*x^(4/3)*a^4-40*x*a^3*b+48*x^(2/3)
*a^2*b^2-64*x^(1/3)*a*b^3+128*b^4)/(b*x^(2/3)+a*x)^(1/2)/a^5
```

Maxima [A] time = 1.46307, size = 109, normalized size = 0.8

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}}{3\,a^{5}}-\frac{24\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b}{7\,a^{5}}+\frac{36\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^{2}}{5\,a^{5}}-\frac{8\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^{3}}{a^{5}}+\frac{6\sqrt{ax^{\frac{1}{3}}+b}b^{4}}{a^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/sqrt(a*x + b*x^(2/3)),x, algorithm="maxima")
```

```
[Out] 2/3*(a*x^(1/3) + b)^(9/2)/a^5 - 24/7*(a*x^(1/3) + b)^(7/2)*b/a^5
+ 36/5*(a*x^(1/3) + b)^(5/2)*b^2/a^5 - 8*(a*x^(1/3) + b)^(3/2)*b^
3/a^5 + 6*sqrt(a*x^(1/3) + b)*b^4/a^5
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/sqrt(a*x + b*x^(2/3)),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{ax+bx^{\frac{2}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(x/sqrt(a*x + b*x**(2/3)), x)
```

GIAC/XCAS [A] time = 0.224448, size = 142, normalized size = 1.04

$$-\frac{256\,b^{\frac{9}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{105\,a^{5}}+\frac{2\left(35\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^{32}-180\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{32}b+378\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^{32}b^{2}-420\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^{32}b^{3}+315\sqrt{ax^{\frac{1}{3}}+b}a^{32}b^{4}\right)}{105\,a^{37}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(a*x + b*x^(2/3)),x, algorithm="giac")
```

```
[Out] -256/105*b^(9/2)*sign(x^(1/3))/a^5 + 2/105*(35*(a*x^(1/3) + b)^(9
/2)*a^32 - 180*(a*x^(1/3) + b)^(7/2)*a^32*b + 378*(a*x^(1/3) + b)
^(5/2)*a^32*b^2 - 420*(a*x^(1/3) + b)^(3/2)*a^32*b^3 + 315*sqrt(a
*x^(1/3) + b)*a^32*b^4)/(a^37*sign(x^(1/3)))
```

3.189 $\int \frac{1}{\sqrt{bx^{2/3}+ax}} dx$

Optimal. Leaf size=47

$$\frac{2\sqrt{ax + bx^{2/3}}}{a} - \frac{4b\sqrt{ax + bx^{2/3}}}{a^2\sqrt[3]{x}}$$

```
[Out] (2*Sqrt[b*x^(2/3) + a*x])/a - (4*b*Sqrt[b*x^(2/3) + a*x])/(a^2*x^
(1/3))
```

Rubi [A] time = 0.0896311, antiderivative size = 47, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{2\sqrt{ax + bx^{2/3}}}{a} - \frac{4b\sqrt{ax + bx^{2/3}}}{a^2\sqrt[3]{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x])/a - (4*b*Sqrt[b*x^(2/3) + a*x])/(a^2*x^
(1/3))
```

Rubi in Sympy [A] time = 7.71065, size = 41, normalized size = 0.87

$$\frac{2\sqrt{ax + bx^{\frac{2}{3}}}}{a} - \frac{4b\sqrt{ax + bx^{\frac{2}{3}}}}{a^2\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 2*sqrt(a*x + b*x**(2/3))/a - 4*b*sqrt(a*x + b*x**(2/3))/(a**2*x**
(1/3))
```

Mathematica [A] time = 0.0224702, size = 37, normalized size = 0.79

$$\left(\frac{2}{a} - \frac{4b}{a^2\sqrt[3]{x}}\right)\sqrt{x^{2/3}\left(a\sqrt[3]{x} + b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[b*x^(2/3) + a*x],x]
```

```
[Out] (2/a - (4*b)/(a^2*x^(1/3)))*Sqrt[(b + a*x^(1/3))*x^(2/3)]
```

Maple [A] time = 0.005, size = 36, normalized size = 0.8

$$2\,\frac{\sqrt[3]{x}\left(b + a\sqrt[3]{x}\right)\left(a\sqrt[3]{x} - 2\,b\right)}{\sqrt{bx^{2/3} + ax}a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^(2/3)+a*x)^(1/2),x)

[Out] 2*x^(1/3)*(b+a*x^(1/3))*(a*x^(1/3)-2*b)/(b*x^(2/3)+a*x)^(1/2)/a^2
```

Maxima [A] time = 1.48691, size = 41, normalized size = 0.87

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}}{a^2}-\frac{6\sqrt{ax^{\frac{1}{3}}+b}b}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*x^(2/3)),x, algorithm="maxima")

[Out] 2*(a*x^(1/3) + b)^(3/2)/a^2 - 6*sqrt(a*x^(1/3) + b)*b/a^2
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*x^(2/3)),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax+bx^{\frac{2}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**(2/3)+a*x)**(1/2),x)

[Out] Integral(1/sqrt(a*x + b*x**(2/3)), x)
```

GIAC/XCAS [A] time = 0.221637, size = 62, normalized size = 1.32

$$\frac{4\,b^{\frac{3}{2}}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}{a^2}+\frac{2\left(\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}-3\sqrt{ax^{\frac{1}{3}}+b}b\right)}{a^2\mathrm{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x + b*x^(2/3)),x, algorithm="giac")

[Out] 4*b^(3/2)*sign(x^(1/3))/a^2 + 2*((a*x^(1/3) + b)^(3/2) - 3*sqrt(a
*x^(1/3) + b)*b)/(a^2*sign(x^(1/3)))
```

3.190 $\int \frac{1}{x\sqrt{bx^{2/3}+ax}}\,dx$

Optimal. Leaf size=61

$$\frac{3a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{b^{3/2}}-\frac{3\sqrt{ax+bx^{2/3}}}{bx^{2/3}}$$

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(b*x^(2/3)) + (3*a*ArcTanh[(Sqrt[b]*x^
(1/3))/Sqrt[b*x^(2/3) + a*x]])/b^(3/2)
```

Rubi [A] time = 0.164002, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{3a\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{b^{3/2}}-\frac{3\sqrt{ax+bx^{2/3}}}{bx^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[b*x^(2/3) + a*x]),x]
```

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(b*x^(2/3)) + (3*a*ArcTanh[(Sqrt[b]*x^
(1/3))/Sqrt[b*x^(2/3) + a*x]])/b^(3/2)
```

Rubi in Sympy [A] time = 13.0189, size = 54, normalized size = 0.89

$$\frac{3a\,\mathrm{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{b^{\frac{3}{2}}}-\frac{3\sqrt{ax+bx^{\frac{2}{3}}}}{bx^{\frac{2}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 3*a*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/b**(3/2) - 3*s
qrt(a*x + b*x**(2/3))/(b*x**(2/3))
```

Mathematica [A] time = 0.080102, size = 61, normalized size = 1.

$$\frac{3a\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{b^{3/2}}-\frac{3\sqrt{ax+bx^{2/3}}}{bx^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*Sqrt[b*x^(2/3) + a*x]),x]
```

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(b*x^(2/3)) + (3*a*ArcTanh[Sqrt[b*x^(2
/3) + a*x]/(Sqrt[b]*x^(1/3))])/b^(3/2)
```

Maple [A] time = 0.006, size = 61, normalized size = 1.

$$-3\,\frac{\sqrt{b+a\sqrt[3]{x}}}{\sqrt{bx^{2/3}+ax}b^{5/2}}\left(\sqrt{b+a\sqrt[3]{x}}b^{3/2}-\mathrm{Artanh}\left(\frac{\sqrt{b+a\sqrt[3]{x}}}{\sqrt{b}}\right)ba\sqrt[3]{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] -3*(b+a*x^(1/3))^(1/2)*((b+a*x^(1/3))^(1/2)*b^(3/2)-arctanh((b+a*
x^(1/3))^(1/2)/b^(1/2))*b*a*x^(1/3))/(b*x^(2/3)+a*x)^(1/2)/b^(5/2
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{ax + bx^{\frac{2}{3}}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(a*x + b*x**(2/3))), x)
```

GIAC/XCAS [A] time = 0.24051, size = 77, normalized size = 1.26

$$-\frac{3\left(\frac{a^2\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}b}+\frac{\sqrt{ax^{\frac{1}{3}}+b}a}{bx^{\frac{1}{3}}}\right)}{a\mathrm{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x),x, algorithm="giac")
```

```
[Out] -3*(a^2*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-b)*b) + sqrt(
a*x^(1/3) + b)*a/(b*x^(1/3)))/(a*sign(x^(1/3)))
```

3.191 $\int \frac{1}{x^2\sqrt{bx^{2/3}+ax}}\,dx$

Optimal. Leaf size=153

$$-\frac{105a^4\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{64b^{9/2}}+\frac{105a^3\sqrt{ax+bx^{2/3}}}{64b^4x^{2/3}}-\frac{35a^2\sqrt{ax+bx^{2/3}}}{32b^3x}+\frac{7a\sqrt{ax+bx^{2/3}}}{8b^2x^{4/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{4bx^{5/3}}$$

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(4*b*x^(5/3)) + (7*a*Sqrt[b*x^(2/3) +
a*x])/(8*b^2*x^(4/3)) - (35*a^2*Sqrt[b*x^(2/3) + a*x])/(32*b^3*x)
 + (105*a^3*Sqrt[b*x^(2/3) + a*x])/(64*b^4*x^(2/3)) - (105*a^4*Ar
cTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(64*b^(9/2))
```

Rubi [A] time = 0.410878, antiderivative size = 153, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$-\frac{105a^4\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{64b^{9/2}}+\frac{105a^3\sqrt{ax+bx^{2/3}}}{64b^4x^{2/3}}-\frac{35a^2\sqrt{ax+bx^{2/3}}}{32b^3x}+\frac{7a\sqrt{ax+bx^{2/3}}}{8b^2x^{4/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{4bx^{5/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*Sqrt[b*x^(2/3) + a*x]),x]
```

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(4*b*x^(5/3)) + (7*a*Sqrt[b*x^(2/3) +
a*x])/(8*b^2*x^(4/3)) - (35*a^2*Sqrt[b*x^(2/3) + a*x])/(32*b^3*x)
 + (105*a^3*Sqrt[b*x^(2/3) + a*x])/(64*b^4*x^(2/3)) - (105*a^4*Ar
cTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(64*b^(9/2))
```

Rubi in Sympy [A] time = 34.0088, size = 141, normalized size = 0.92

$$-\frac{105a^4\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{64b^{\frac{9}{2}}}+\frac{105a^3\sqrt{ax+bx^{\frac{2}{3}}}}{64b^4x^{\frac{2}{3}}}-\frac{35a^2\sqrt{ax+bx^{\frac{2}{3}}}}{32b^3x}+\frac{7a\sqrt{ax+bx^{\frac{2}{3}}}}{8b^2x^{\frac{4}{3}}}-\frac{3\sqrt{ax+bx^{\frac{2}{3}}}}{4bx^{\frac{5}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] -105*a**4*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(64*b**(
9/2)) + 105*a**3*sqrt(a*x + b*x**(2/3))/(64*b**4*x**(2/3)) - 35*a
**2*sqrt(a*x + b*x**(2/3))/(32*b**3*x) + 7*a*sqrt(a*x + b*x**(2/3
))/(8*b**2*x**(4/3)) - 3*sqrt(a*x + b*x**(2/3))/(4*b*x**(5/3))
```

Mathematica [A] time = 0.164054, size = 101, normalized size = 0.66

$$\frac{\sqrt{ax+bx^{2/3}}\left(105a^3x-70a^2bx^{2/3}+56ab^2\sqrt[3]{x}-48b^3\right)}{64b^4x^{5/3}}-\frac{105a^4\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{64b^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*Sqrt[b*x^(2/3) + a*x]),x]
```

```
[Out] (Sqrt[b*x^(2/3) + a*x]*(-48*b^3 + 56*a*b^2*x^(1/3) - 70*a^2*b*x^(
2/3) + 105*a^3*x))/(64*b^4*x^(5/3)) - (105*a^4*ArcTanh[Sqrt[b*x^(
```

```
2/3) + a*x]/(Sqrt[b]*x^(1/3))])/(64*b^(9/2))
```

Maple [A] time = 0.011, size = 126, normalized size = 0.8

$$-\frac{1}{64\,x^{2}}\sqrt{b+a\sqrt[3]{x}}\left(-56\,b^{7/2}\sqrt{b+a\sqrt[3]{x}}x^{4/3}a+70\,b^{5/2}\sqrt{b+a\sqrt[3]{x}}x^{5/3}a^{2}+105\,Artanh\left(\frac{\sqrt{b+a\sqrt[3]{x}}}{\sqrt{b}}\right)x^{7/3}a^{4}b+48\,\sqrt{b+a\sqrt[3]{x}}b^{9/}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] -1/64*(b+a*x^(1/3))^(1/2)*(-56*b^(7/2)*(b+a*x^(1/3))^(1/2)*x^(4/3
)*a+70*b^(5/2)*(b+a*x^(1/3))^(1/2)*x^(5/3)*a^2+105*arctanh((b+a*x
^(1/3))^(1/2)/b^(1/2))*x^(7/3)*a^4*b+48*(b+a*x^(1/3))^(1/2)*b^(9/
2)*x-105*b^(3/2)*(b+a*x^(1/3))^(1/2)*x^2*a^3)/x^2/(b*x^(2/3)+a*x)
^(1/2)/b^(11/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{2}\sqrt{ax+bx^{\frac{2}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(a*x + b*x**(2/3))), x)
```

GIAC/XCAS [A] time = 0.279294, size = 155, normalized size = 1.01

$$\frac{\frac{105\,a^{5}\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}b^{4}}+\frac{105\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{5}-385\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^{5}b+511\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^{5}b^{2}-279\sqrt{ax^{\frac{1}{3}}+b}a^{5}b^{3}}{a^{4}b^{4}x^{\frac{4}{3}}}}{64\,a\mathrm{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^2),x, algorithm="giac")
```

```
[Out] 1/64*(105*a^5*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-b)*b^4)
 + (105*(a*x^(1/3) + b)^(7/2)*a^5 - 385*(a*x^(1/3) + b)^(5/2)*a^5
*b + 511*(a*x^(1/3) + b)^(3/2)*a^5*b^2 - 279*sqrt(a*x^(1/3) + b)*
a^5*b^3)/(a^4*b^4*x^(4/3)))/(a*sign(x^(1/3)))
```

3.192 $\int \frac{1}{x^3\sqrt{bx^{2/3}+ax}}\,dx$

Optimal. Leaf size=241

$$\frac{1287a^7\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{1024b^{15/2}}-\frac{1287a^6\sqrt{ax+bx^{2/3}}}{1024b^7x^{2/3}}+\frac{429a^5\sqrt{ax+bx^{2/3}}}{512b^6x}-\frac{429a^4\sqrt{ax+bx^{2/3}}}{640b^5x^{4/3}}+\frac{1287a^3\sqrt{ax+bx^{2/3}}}{2240b^4x^{5/3}}-\frac{143a^2\sqrt{ax+bx^{2/3}}}{280b^3x^2}+\frac{13a\sqrt{ax+bx^{2/3}}}{28b^2x^{7/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{7bx^{8/3}}$$

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(7*b*x^(8/3)) + (13*a*Sqrt[b*x^(2/3) +
 a*x])/(28*b^2*x^(7/3)) - (143*a^2*Sqrt[b*x^(2/3) + a*x])/(280*b^
3*x^2) + (1287*a^3*Sqrt[b*x^(2/3) + a*x])/(2240*b^4*x^(5/3)) - (4
29*a^4*Sqrt[b*x^(2/3) + a*x])/(640*b^5*x^(4/3)) + (429*a^5*Sqrt[b
*x^(2/3) + a*x])/(512*b^6*x) - (1287*a^6*Sqrt[b*x^(2/3) + a*x])/(
1024*b^7*x^(2/3)) + (1287*a^7*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^
(2/3) + a*x]])/(1024*b^(15/2))
```

Rubi [A] time = 0.681176, antiderivative size = 241, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{1287a^7\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{1024b^{15/2}}-\frac{1287a^6\sqrt{ax+bx^{2/3}}}{1024b^7x^{2/3}}+\frac{429a^5\sqrt{ax+bx^{2/3}}}{512b^6x}-\frac{429a^4\sqrt{ax+bx^{2/3}}}{640b^5x^{4/3}}+\frac{1287a^3\sqrt{ax+bx^{2/3}}}{2240b^4x^{5/3}}-\frac{143a^2\sqrt{ax+bx^{2/3}}}{280b^3x^2}+\frac{13a\sqrt{ax+bx^{2/3}}}{28b^2x^{7/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{7bx^{8/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[b*x^(2/3) + a*x]),x]
```

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(7*b*x^(8/3)) + (13*a*Sqrt[b*x^(2/3) +
 a*x])/(28*b^2*x^(7/3)) - (143*a^2*Sqrt[b*x^(2/3) + a*x])/(280*b^
3*x^2) + (1287*a^3*Sqrt[b*x^(2/3) + a*x])/(2240*b^4*x^(5/3)) - (4
29*a^4*Sqrt[b*x^(2/3) + a*x])/(640*b^5*x^(4/3)) + (429*a^5*Sqrt[b
*x^(2/3) + a*x])/(512*b^6*x) - (1287*a^6*Sqrt[b*x^(2/3) + a*x])/(
1024*b^7*x^(2/3)) + (1287*a^7*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^
(2/3) + a*x]])/(1024*b^(15/2))
```

Rubi in Sympy [A] time = 61.8535, size = 226, normalized size = 0.94

$$\frac{1287a^7\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{1024b^{\frac{15}{2}}}-\frac{1287a^6\sqrt{ax+bx^{\frac{2}{3}}}}{1024b^7x^{\frac{2}{3}}}+\frac{429a^5\sqrt{ax+bx^{\frac{2}{3}}}}{512b^6x}-\frac{429a^4\sqrt{ax+bx^{\frac{2}{3}}}}{640b^5x^{\frac{4}{3}}}+\frac{1287a^3\sqrt{ax+bx^{\frac{2}{3}}}}{2240b^4x^{\frac{5}{3}}}-\frac{143a^2\sqrt{ax+bx^{\frac{2}{3}}}}{280b^3x^2}+\frac{13a\sqrt{ax+bx^{\frac{2}{3}}}}{28b^2x^{\frac{7}{3}}}-\frac{3\sqrt{ax+bx^{\frac{2}{3}}}}{7bx^{\frac{8}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] 1287*a**7*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(1024*b*
*(15/2)) - 1287*a**6*sqrt(a*x + b*x**(2/3))/(1024*b**7*x**(2/3))
+ 429*a**5*sqrt(a*x + b*x**(2/3))/(512*b**6*x) - 429*a**4*sqrt(a*
x + b*x**(2/3))/(640*b**5*x**(4/3)) + 1287*a**3*sqrt(a*x + b*x**(
2/3))/(2240*b**4*x**(5/3)) - 143*a**2*sqrt(a*x + b*x**(2/3))/(280
*b**3*x**2) + 13*a*sqrt(a*x + b*x**(2/3))/(28*b**2*x**(7/3)) - 3*
sqrt(a*x + b*x**(2/3))/(7*b*x**(8/3))
```

Mathematica [A] time = 0.263781, size = 138, normalized size = 0.57

$$\frac{1287a^7\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{1024b^{15/2}}+\frac{\sqrt{ax+bx^{2/3}}\left(-45045a^6x^2+30030a^5bx^{5/3}-24024a^4b^2x^{4/3}+20592a^3b^3x-18304a^2b^4x^{2/3}+16640ab^5\sqrt[3]{x}-15360b^6\right)}{35840b^7x^{8/3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*Sqrt[b*x^(2/3) + a*x]),x]
```

```
[Out] (Sqrt[b*x^(2/3) + a*x]*(-15360*b^6 + 16640*a*b^5*x^(1/3) - 18304*
a^2*b^4*x^(2/3) + 20592*a^3*b^3*x - 24024*a^4*b^2*x^(4/3) + 30030
*a^5*b*x^(5/3) - 45045*a^6*x^2))/(35840*b^7*x^(8/3)) + (1287*a^7*
ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/(1024*b^(15/2))
```

Maple [A] time = 0.01, size = 188, normalized size = 0.8

$$-\frac{1}{35840\,x^4}\sqrt{b+a\sqrt[3]{x}}\left(24024\,b^{7/2}\sqrt{b+a\sqrt[3]{x}}x^{10/3}a^4+45045\,b^{3/2}\sqrt{b+a\sqrt[3]{x}}x^4a^6-45045\,Artanh\left(\frac{\sqrt{b+a\sqrt[3]{x}}}{\sqrt{b}}\right)x^{13/3}a^7b-16\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] -1/35840/x^4*(b+a*x^(1/3))^(1/2)*(24024*b^(7/2)*(b+a*x^(1/3))^(1/
2)*x^(10/3)*a^4+45045*b^(3/2)*(b+a*x^(1/3))^(1/2)*x^4*a^6-45045*a
rctanh((b+a*x^(1/3))^(1/2)/b^(1/2))*x^(13/3)*a^7*b-16640*b^(13/2)
*(b+a*x^(1/3))^(1/2)*x^(7/3)*a-30030*b^(5/2)*(b+a*x^(1/3))^(1/2)*
x^(11/3)*a^5-20592*b^(9/2)*(b+a*x^(1/3))^(1/2)*x^3*a^3+18304*b^(1
1/2)*(b+a*x^(1/3))^(1/2)*x^(8/3)*a^2+15360*(b+a*x^(1/3))^(1/2)*b^
(15/2)*x^2)/(b*x^(2/3)+a*x)^(1/2)/b^(17/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^3),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\sqrt{ax+bx^{\frac{2}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(a*x + b*x**(2/3))), x)
```

GIAC/XCAS [A] time = 0.340001, size = 224, normalized size = 0.93

$$-\frac{\frac{45045\,a^8\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}\,b^7}+\frac{45045\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}a^8-300300\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}a^8b+849849\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^8b^2-1317888\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^8b^3+1200199\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^8b^4-63}{a^7b^7x^{\frac{7}{3}}}}{35840\,a\operatorname{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^3),x, algorithm="giac")
```

```
[Out] -1/35840*(45045*a^8*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-b
)*b^7) + (45045*(a*x^(1/3) + b)^(13/2)*a^8 - 300300*(a*x^(1/3) +
b)^(11/2)*a^8*b + 849849*(a*x^(1/3) + b)^(9/2)*a^8*b^2 - 1317888*
(a*x^(1/3) + b)^(7/2)*a^8*b^3 + 1200199*(a*x^(1/3) + b)^(5/2)*a^8
*b^4 - 631540*(a*x^(1/3) + b)^(3/2)*a^8*b^5 + 169995*sqrt(a*x^(1/
3) + b)*a^8*b^6)/(a^7*b^7*x^(7/3)))/(a*sign(x^(1/3)))
```

3.193 $\int \frac{1}{x^4\sqrt{bx^{2/3}+ax}}\,dx$

Optimal. Leaf size=329

$$-\frac{138567a^{10}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{131072b^{21/2}}+\frac{138567a^9\sqrt{ax+bx^{2/3}}}{131072b^{10}x^{2/3}}-\frac{46189a^8\sqrt{ax+bx^{2/3}}}{65536b^9x}+\frac{46189a^7\sqrt{ax+bx^{2/3}}}{81920b^8x^{4/3}}-\frac{138567a^6\sqrt{ax+bx^{2/3}}}{286720b^7x^{5/3}}+\frac{46189a^5\sqrt{ax+bx^{2/3}}}{107520b^6x^2}-\frac{4199a^4\sqrt{ax+bx^{2/3}}}{10752b^5x^{7/3}}+\frac{323a^3\sqrt{ax+bx^{2/3}}}{896b^4x^{8/3}}-\frac{323a^2\sqrt{ax+bx^{2/3}}}{960b^3x^3}+\frac{19a\sqrt{ax+bx^{2/3}}}{60b^2x^{10/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{10bx^{11/3}}$$

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(10*b*x^(11/3)) + (19*a*Sqrt[b*x^(2/3)
 + a*x])/(60*b^2*x^(10/3)) - (323*a^2*Sqrt[b*x^(2/3) + a*x])/(960
*b^3*x^3) + (323*a^3*Sqrt[b*x^(2/3) + a*x])/(896*b^4*x^(8/3)) - (
4199*a^4*Sqrt[b*x^(2/3) + a*x])/(10752*b^5*x^(7/3)) + (46189*a^5*
Sqrt[b*x^(2/3) + a*x])/(107520*b^6*x^2) - (138567*a^6*Sqrt[b*x^(2
/3) + a*x])/(286720*b^7*x^(5/3)) + (46189*a^7*Sqrt[b*x^(2/3) + a*
x])/(81920*b^8*x^(4/3)) - (46189*a^8*Sqrt[b*x^(2/3) + a*x])/(6553
6*b^9*x) + (138567*a^9*Sqrt[b*x^(2/3) + a*x])/(131072*b^10*x^(2/3
)) - (138567*a^10*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]
])/(131072*b^(21/2))
```

Rubi [A] time = 1.01321, antiderivative size = 329, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{138567a^{10}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{131072b^{21/2}}+\frac{138567a^9\sqrt{ax+bx^{2/3}}}{131072b^{10}x^{2/3}}-\frac{46189a^8\sqrt{ax+bx^{2/3}}}{65536b^9x}+\frac{46189a^7\sqrt{ax+bx^{2/3}}}{81920b^8x^{4/3}}-\frac{138567a^6\sqrt{ax+bx^{2/3}}}{286720b^7x^{5/3}}+\frac{46189a^5\sqrt{ax+bx^{2/3}}}{107520b^6x^2}-\frac{4199a^4\sqrt{ax+bx^{2/3}}}{10752b^5x^{7/3}}+\frac{323a^3\sqrt{ax+bx^{2/3}}}{896b^4x^{8/3}}-\frac{323a^2\sqrt{ax+bx^{2/3}}}{960b^3x^3}+\frac{19a\sqrt{ax+bx^{2/3}}}{60b^2x^{10/3}}-\frac{3\sqrt{ax+bx^{2/3}}}{10bx^{11/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*Sqrt[b*x^(2/3) + a*x]),x]
```

```
[Out] (-3*Sqrt[b*x^(2/3) + a*x])/(10*b*x^(11/3)) + (19*a*Sqrt[b*x^(2/3)
 + a*x])/(60*b^2*x^(10/3)) - (323*a^2*Sqrt[b*x^(2/3) + a*x])/(960
*b^3*x^3) + (323*a^3*Sqrt[b*x^(2/3) + a*x])/(896*b^4*x^(8/3)) - (
4199*a^4*Sqrt[b*x^(2/3) + a*x])/(10752*b^5*x^(7/3)) + (46189*a^5*
Sqrt[b*x^(2/3) + a*x])/(107520*b^6*x^2) - (138567*a^6*Sqrt[b*x^(2
/3) + a*x])/(286720*b^7*x^(5/3)) + (46189*a^7*Sqrt[b*x^(2/3) + a*
x])/(81920*b^8*x^(4/3)) - (46189*a^8*Sqrt[b*x^(2/3) + a*x])/(6553
6*b^9*x) + (138567*a^9*Sqrt[b*x^(2/3) + a*x])/(131072*b^10*x^(2/3
)) - (138567*a^10*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]
])/(131072*b^(21/2))
```

Rubi in Sympy [A] time = 96.8438, size = 311, normalized size = 0.95

$$-\frac{138567a^{10}\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{131072b^{\frac{21}{2}}}+\frac{138567a^9\sqrt{ax+bx^{\frac{2}{3}}}}{131072b^{10}x^{\frac{2}{3}}}-\frac{46189a^8\sqrt{ax+bx^{\frac{2}{3}}}}{65536b^9x}+\frac{46189a^7\sqrt{ax+bx^{\frac{2}{3}}}}{81920b^8x^{\frac{4}{3}}}-\frac{138567a^6\sqrt{ax+bx^{\frac{2}{3}}}}{286720b^7x^{\frac{5}{3}}}+\frac{46189a^5\sqrt{ax+bx^{\frac{2}{3}}}}{107520b^6x^2}-\frac{4199a^4\sqrt{ax+bx^{\frac{2}{3}}}}{10752b^5x^{\frac{7}{3}}}+\frac{323a^3\sqrt{ax+bx^{\frac{2}{3}}}}{896b^4x^{\frac{8}{3}}}-\frac{323a^2\sqrt{ax+bx^{\frac{2}{3}}}}{960b^3x^3}+\frac{19a\sqrt{ax+bx^{\frac{2}{3}}}}{60b^2x^{\frac{10}{3}}}-\frac{3\sqrt{ax+bx^{\frac{2}{3}}}}{10bx^{\frac{11}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(1/x**4/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] -138567*a**10*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(131
072*b**(21/2)) + 138567*a**9*sqrt(a*x + b*x**(2/3))/(131072*b**10
*x**(2/3)) - 46189*a**8*sqrt(a*x + b*x**(2/3))/(65536*b**9*x) + 4
6189*a**7*sqrt(a*x + b*x**(2/3))/(81920*b**8*x**(4/3)) - 138567*a
**6*sqrt(a*x + b*x**(2/3))/(286720*b**7*x**(5/3)) + 46189*a**5*sq
rt(a*x + b*x**(2/3))/(107520*b**6*x**2) - 4199*a**4*sqrt(a*x + b*
x**(2/3))/(10752*b**5*x**(7/3)) + 323*a**3*sqrt(a*x + b*x**(2/3))
/(896*b**4*x**(8/3)) - 323*a**2*sqrt(a*x + b*x**(2/3))/(960*b**3*
x**3) + 19*a*sqrt(a*x + b*x**(2/3))/(60*b**2*x**(10/3)) - 3*sqrt(
a*x + b*x**(2/3))/(10*b*x**(11/3))
```

Mathematica [A] time = 0.334833, size = 175, normalized size = 0.53

$$\frac{\sqrt{ax+bx^{2/3}}\left(14549535a^9x^3-9699690a^8bx^{8/3}+7759752a^7b^2x^{7/3}-6651216a^6b^3x^2+5912192a^5b^4x^{5/3}-5374720a^4b^5x^{4/3}\right.}{13762560b^{10}x^{11/3}}$$
$$-\frac{138567a^{10}\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{131072b^{21/2}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[1/(x^4*Sqrt[b*x^(2/3) + a*x]),x]
```

```
[Out] (Sqrt[b*x^(2/3) + a*x]*(-4128768*b^9 + 4358144*a*b^8*x^(1/3) - 46
30528*a^2*b^7*x^(2/3) + 4961280*a^3*b^6*x - 5374720*a^4*b^5*x^(4/
3) + 5912192*a^5*b^4*x^(5/3) - 6651216*a^6*b^3*x^2 + 7759752*a^7*
b^2*x^(7/3) - 9699690*a^8*b*x^(8/3) + 14549535*a^9*x^3))/(1376256
0*b^10*x^(11/3)) - (138567*a^10*ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sq
rt[b]*x^(1/3))])/(131072*b^(21/2))
```

Maple [A] time = 0.011, size = 248, normalized size = 0.8

$$-\frac{1}{13762560\,x^6}\sqrt{b+a\sqrt[3]{x}}\left(9699690\sqrt{b+a\sqrt[3]{x}}x^{\frac{17}{3}}b^{5/2}a^8-7759752\sqrt{b+a\sqrt[3]{x}}x^{16/3}b^{7/2}a^7-5912192\sqrt{b+a\sqrt[3]{x}}x^{14/3}b^{11/2}a^5\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^4/(b*x^(2/3)+a*x)^(1/2),x)
```

```
[Out] -1/13762560*(b+a*x^(1/3))^(1/2)*(9699690*(b+a*x^(1/3))^(1/2)*x^(1
7/3)*b^(5/2)*a^8-7759752*(b+a*x^(1/3))^(1/2)*x^(16/3)*b^(7/2)*a^7
-5912192*(b+a*x^(1/3))^(1/2)*x^(14/3)*b^(11/2)*a^5+5374720*(b+a*x
^(1/3))^(1/2)*x^(13/3)*b^(13/2)*a^4+4630528*(b+a*x^(1/3))^(1/2)*x
^(11/3)*b^(17/2)*a^2-4358144*(b+a*x^(1/3))^(1/2)*x^(10/3)*b^(19/2
)*a+14549535*x^(19/3)*arctanh((b+a*x^(1/3))^(1/2)/b^(1/2))*a^10*b
+4128768*(b+a*x^(1/3))^(1/2)*b^(21/2)*x^3-4961280*(b+a*x^(1/3))^(
1/2)*x^4*b^(15/2)*a^3+6651216*(b+a*x^(1/3))^(1/2)*x^5*b^(9/2)*a^6
-14549535*(b+a*x^(1/3))^(1/2)*x^6*b^(3/2)*a^9)/x^6/(b*x^(2/3)+a*x
)^(1/2)/b^(23/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^4),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^4),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**(2/3)+a*x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.473336, size = 293, normalized size = 0.89

$$\frac{\frac{14549535\,a^{11}\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}\,b^{10}}+\frac{14549535\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}a^{11}-140645505\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}a^{11}b+609140532\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}a^{11}b^{2}-1554721740\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}a^{11}b^{3}+2585198\cdots}{\cdots}}{137625\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^(2/3))*x^4),x, algorithm="giac")
```

```
[Out] 1/13762560*(14549535*a^11*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(s
qrt(-b)*b^10) + (14549535*(a*x^(1/3) + b)^(19/2)*a^11 - 140645505
*(a*x^(1/3) + b)^(17/2)*a^11*b + 609140532*(a*x^(1/3) + b)^(15/2)
*a^11*b^2 - 1554721740*(a*x^(1/3) + b)^(13/2)*a^11*b^3 + 25851983
30*(a*x^(1/3) + b)^(11/2)*a^11*b^4 - 2918514950*(a*x^(1/3) + b)^(
9/2)*a^11*b^5 + 2255541300*(a*x^(1/3) + b)^(7/2)*a^11*b^6 - 11689
82220*(a*x^(1/3) + b)^(5/2)*a^11*b^7 + 382331775*(a*x^(1/3) + b)^
(3/2)*a^11*b^8 - 68025825*sqrt(a*x^(1/3) + b)*a^11*b^9)/(a^10*b^1
0*x^(10/3)))/(a*sign(x^(1/3)))
```

3.194 $\int \frac{x^4}{\left(bx^{2/3}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=336

$$\frac{1048576b^{10}\sqrt{ax+bx^{2/3}}}{29393a^{12}\sqrt[3]{x}}-\frac{524288b^9\sqrt{ax+bx^{2/3}}}{29393a^{11}}+\frac{393216b^8\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{29393a^{10}}-\frac{327680b^7x^{2/3}\sqrt{ax+bx^{2/3}}}{29393a^9}+\frac{40960b^6x\sqrt{ax+bx^{2/3}}}{4199a^8}-\frac{36864b^5x^{4/3}\sqrt{ax+bx^{2/3}}}{4199a^7}+\frac{33792b^4x^{5/3}\sqrt{ax+bx^{2/3}}}{4199a^6}-\frac{16896b^3x^2\sqrt{ax+bx^{2/3}}}{2261a^5}+\frac{15840b^2x^{7/3}\sqrt{ax+bx^{2/3}}}{2261a^4}-\frac{880bx^{8/3}\sqrt{ax+bx^{2/3}}}{133a^3}+\frac{44x^3\sqrt{ax+bx^{2/3}}}{7a^2}-\frac{6x^4}{a\sqrt{ax+bx^{2/3}}}$$

```
[Out] (-6*x^4)/(a*Sqrt[b*x^(2/3) + a*x]) - (524288*b^9*Sqrt[b*x^(2/3) +
 a*x])/(29393*a^11) + (1048576*b^10*Sqrt[b*x^(2/3) + a*x])/(29393
*a^12*x^(1/3)) + (393216*b^8*x^(1/3)*Sqrt[b*x^(2/3) + a*x])/(2939
3*a^10) - (327680*b^7*x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(29393*a^9)
+ (40960*b^6*x*Sqrt[b*x^(2/3) + a*x])/(4199*a^8) - (36864*b^5*x^(
4/3)*Sqrt[b*x^(2/3) + a*x])/(4199*a^7) + (33792*b^4*x^(5/3)*Sqrt[
b*x^(2/3) + a*x])/(4199*a^6) - (16896*b^3*x^2*Sqrt[b*x^(2/3) + a*
x])/(2261*a^5) + (15840*b^2*x^(7/3)*Sqrt[b*x^(2/3) + a*x])/(2261*
a^4) - (880*b*x^(8/3)*Sqrt[b*x^(2/3) + a*x])/(133*a^3) + (44*x^3*
Sqrt[b*x^(2/3) + a*x])/(7*a^2)
```

Rubi [A] time = 1.00667, antiderivative size = 336, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$\frac{1048576b^{10}\sqrt{ax+bx^{2/3}}}{29393a^{12}\sqrt[3]{x}}-\frac{524288b^9\sqrt{ax+bx^{2/3}}}{29393a^{11}}+\frac{393216b^8\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{29393a^{10}}-\frac{327680b^7x^{2/3}\sqrt{ax+bx^{2/3}}}{29393a^9}+\frac{40960b^6x\sqrt{ax+bx^{2/3}}}{4199a^8}-\frac{36864b^5x^{4/3}\sqrt{ax+bx^{2/3}}}{4199a^7}+\frac{33792b^4x^{5/3}\sqrt{ax+bx^{2/3}}}{4199a^6}-\frac{16896b^3x^2\sqrt{ax+bx^{2/3}}}{2261a^5}+\frac{15840b^2x^{7/3}\sqrt{ax+bx^{2/3}}}{2261a^4}-\frac{880bx^{8/3}\sqrt{ax+bx^{2/3}}}{133a^3}+\frac{44x^3\sqrt{ax+bx^{2/3}}}{7a^2}-\frac{6x^4}{a\sqrt{ax+bx^{2/3}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (-6*x^4)/(a*Sqrt[b*x^(2/3) + a*x]) - (524288*b^9*Sqrt[b*x^(2/3) +
 a*x])/(29393*a^11) + (1048576*b^10*Sqrt[b*x^(2/3) + a*x])/(29393
*a^12*x^(1/3)) + (393216*b^8*x^(1/3)*Sqrt[b*x^(2/3) + a*x])/(2939
3*a^10) - (327680*b^7*x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(29393*a^9)
+ (40960*b^6*x*Sqrt[b*x^(2/3) + a*x])/(4199*a^8) - (36864*b^5*x^(
4/3)*Sqrt[b*x^(2/3) + a*x])/(4199*a^7) + (33792*b^4*x^(5/3)*Sqrt[
b*x^(2/3) + a*x])/(4199*a^6) - (16896*b^3*x^2*Sqrt[b*x^(2/3) + a*
x])/(2261*a^5) + (15840*b^2*x^(7/3)*Sqrt[b*x^(2/3) + a*x])/(2261*
a^4) - (880*b*x^(8/3)*Sqrt[b*x^(2/3) + a*x])/(133*a^3) + (44*x^3*
Sqrt[b*x^(2/3) + a*x])/(7*a^2)
```

Rubi in Sympy [A] time = 99.2973, size = 320, normalized size = 0.95

$$-\frac{6x^4}{a\sqrt{ax+bx^{\frac{2}{3}}}}+\frac{44x^3\sqrt{ax+bx^{\frac{2}{3}}}}{7a^2}-\frac{880bx^{\frac{8}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{133a^3}+\frac{15840b^2x^{\frac{7}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{2261a^4}-\frac{16896b^3x^2\sqrt{ax+bx^{\frac{2}{3}}}}{2261a^5}+\frac{33792b^4x^{\frac{5}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{4199a^6}-\frac{36864b^5x^{\frac{4}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{4199a^7}+\frac{40960b^6x\sqrt{ax+bx^{\frac{2}{3}}}}{4199a^8}-\frac{327680b^7x^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{29393a^9}+\frac{393216b^8\sqrt[3]{x}\sqrt{ax+bx^{\frac{2}{3}}}}{29393a^{10}}-\frac{524288b^9\sqrt{ax+bx^{\frac{2}{3}}}}{29393a^{11}}+\frac{1048576b^{10}\sqrt{ax+bx^{\frac{2}{3}}}}{29393a^{12}\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] -6*x**4/(a*sqrt(a*x + b*x**(2/3))) + 44*x**3*sqrt(a*x + b*x**(2/3
))/(7*a**2) - 880*b*x**(8/3)*sqrt(a*x + b*x**(2/3))/(133*a**3) +
15840*b**2*x**(7/3)*sqrt(a*x + b*x**(2/3))/(2261*a**4) - 16896*b*
*3*x**2*sqrt(a*x + b*x**(2/3))/(2261*a**5) + 33792*b**4*x**(5/3)*
sqrt(a*x + b*x**(2/3))/(4199*a**6) - 36864*b**5*x**(4/3)*sqrt(a*x
 + b*x**(2/3))/(4199*a**7) + 40960*b**6*x*sqrt(a*x + b*x**(2/3))/
(4199*a**8) - 327680*b**7*x**(2/3)*sqrt(a*x + b*x**(2/3))/(29393*
a**9) + 393216*b**8*x**(1/3)*sqrt(a*x + b*x**(2/3))/(29393*a**10)
 - 524288*b**9*sqrt(a*x + b*x**(2/3))/(29393*a**11) + 1048576*b**
10*sqrt(a*x + b*x**(2/3))/(29393*a**12*x**(1/3))
```

Mathematica [A] time = 0.0933845, size = 172, normalized size = 0.51

$$\frac{2\sqrt{ax+bx^{2/3}}\left(4199a^{11}x^{11/3}-4862a^{10}bx^{10/3}+5720a^9b^2x^3-6864a^8b^3x^{8/3}+8448a^7b^4x^{7/3}-10752a^6b^5x^2+14336a^5b^6x^{5/3}\right.}{29393a^{12}\sqrt[3]{x}\left(a\sqrt[3]{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(524288*b^11 + 262144*a*b^10*x^(1/3) - 6
5536*a^2*b^9*x^(2/3) + 32768*a^3*b^8*x - 20480*a^4*b^7*x^(4/3) +
14336*a^5*b^6*x^(5/3) - 10752*a^6*b^5*x^2 + 8448*a^7*b^4*x^(7/3)
- 6864*a^8*b^3*x^(8/3) + 5720*a^9*b^2*x^3 - 4862*a^10*b*x^(10/3)
+ 4199*a^11*x^(11/3)))/(29393*a^12*(b + a*x^(1/3))*x^(1/3))
```

Maple [A] time = 0.01, size = 143, normalized size = 0.4

$$\frac{2\,x}{29393\,a^{12}}\left(b+a\sqrt[3]{x}\right)\left(4199\,x^{11/3}a^{11}-4862\,x^{10/3}a^{10}b+5720\,x^{3}a^{9}b^{2}-6864\,x^{8/3}a^{8}b^{3}+8448\,x^{7/3}a^{7}b^{4}-10752\,x^{2}a^{6}b^{5}+1433\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 2/29393*x*(b+a*x^(1/3))*(4199*x^(11/3)*a^11-4862*x^(10/3)*a^10*b+
5720*x^3*a^9*b^2-6864*x^(8/3)*a^8*b^3+8448*x^(7/3)*a^7*b^4-10752*
x^2*a^6*b^5+14336*x^(5/3)*a^5*b^6-20480*x^(4/3)*a^4*b^7+32768*x*a
^3*b^8-65536*x^(2/3)*a^2*b^9+262144*x^(1/3)*a*b^10+524288*b^11)/(
b*x^(2/3)+a*x)^(3/2)/a^12
```

Maxima [A] time = 1.49012, size = 270, normalized size = 0.8

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}}{7\,a^{12}}-\frac{66\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}b}{19\,a^{12}}+\frac{330\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}b^{2}}{17\,a^{12}}-\frac{66\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}b^{3}}{a^{12}}+\frac{1980\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b^{4}}{13\,a^{12}}-\frac{252\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^{5}}{a^{12}}+\frac{308\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^{6}}{a^{12}}-\frac{1980\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^{7}}{7\,a^{12}}+\frac{198\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^{8}}{a^{12}}-\frac{110\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^{9}}{a^{12}}+\frac{66\sqrt{ax^{\frac{1}{3}}+b}b^{10}}{a^{12}}+\frac{6\,b^{11}}{\sqrt{ax^{\frac{1}{3}}+b}a^{12}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(a*x + b*x^(2/3))^(3/2),x, algorithm="maxima")
```

```
[Out] 2/7*(a*x^(1/3) + b)^(21/2)/a^12 - 66/19*(a*x^(1/3) + b)^(19/2)*b/
a^12 + 330/17*(a*x^(1/3) + b)^(17/2)*b^2/a^12 - 66*(a*x^(1/3) + b
)^(15/2)*b^3/a^12 + 1980/13*(a*x^(1/3) + b)^(13/2)*b^4/a^12 - 252
*(a*x^(1/3) + b)^(11/2)*b^5/a^12 + 308*(a*x^(1/3) + b)^(9/2)*b^6/
a^12 - 1980/7*(a*x^(1/3) + b)^(7/2)*b^7/a^12 + 198*(a*x^(1/3) + b
)^(5/2)*b^8/a^12 - 110*(a*x^(1/3) + b)^(3/2)*b^9/a^12 + 66*sqrt(a
*x^(1/3) + b)*b^10/a^12 + 6*b^11/(sqrt(a*x^(1/3) + b)*a^12)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(a*x + b*x^(2/3))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.239522, size = 311, normalized size = 0.93

$$-\frac{1048576\, b^{\frac{21}{2}} \operatorname{sign}\left(x^{\frac{1}{3}}\right)}{29393\, a^{12}} + \frac{6\, b^{11}}{\sqrt{a x^{\frac{1}{3}} + b} a^{12} \operatorname{sign}\left(x^{\frac{1}{3}}\right)} + \frac{2 \left(4199 \left(a x^{\frac{1}{3}} + b\right)^{\frac{21}{2}} a^{240} - 51051 \left(a x^{\frac{1}{3}} + b\right)^{\frac{19}{2}} a^{240} b + 285285 \left(a x^{\frac{1}{3}} + b\right)^{\frac{17}{2}} a^{240} b^{2} - 969969 \left(a x^{\frac{1}{3}} + b\right)^{\frac{15}{2}} a^{240} b^{3} + 2238390 \left(a\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(a*x + b*x^(2/3))^(3/2),x, algorithm="giac")
```

```
[Out] -1048576/29393*b^(21/2)*sign(x^(1/3))/a^12 + 6*b^11/(sqrt(a*x^(1/
3) + b)*a^12*sign(x^(1/3))) + 2/29393*(4199*(a*x^(1/3) + b)^(21/2
)*a^240 - 51051*(a*x^(1/3) + b)^(19/2)*a^240*b + 285285*(a*x^(1/3
) + b)^(17/2)*a^240*b^2 - 969969*(a*x^(1/3) + b)^(15/2)*a^240*b^3
 + 2238390*(a*x^(1/3) + b)^(13/2)*a^240*b^4 - 3703518*(a*x^(1/3)
+ b)^(11/2)*a^240*b^5 + 4526522*(a*x^(1/3) + b)^(9/2)*a^240*b^6 -
 4157010*(a*x^(1/3) + b)^(7/2)*a^240*b^7 + 2909907*(a*x^(1/3) + b
)^(5/2)*a^240*b^8 - 1616615*(a*x^(1/3) + b)^(3/2)*a^240*b^9 + 969
969*sqrt(a*x^(1/3) + b)*a^240*b^10)/(a^252*sign(x^(1/3)))
```

3.195 $\int \frac{x^3}{\left(bx^{2/3}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=248

$$-\frac{65536b^7\sqrt{ax+bx^{2/3}}}{2145a^9\sqrt[3]{x}}+\frac{32768b^6\sqrt{ax+bx^{2/3}}}{2145a^8}-\frac{8192b^5\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{715a^7}+\frac{4096b^4x^{2/3}\sqrt{ax+bx^{2/3}}}{429a^6}-\frac{3584b^3x\sqrt{ax+bx^{2/3}}}{429a^5}+\frac{5376b^2x^{4/3}\sqrt{ax+bx^{2/3}}}{715a^4}-\frac{448bx^{5/3}\sqrt{ax+bx^{2/3}}}{65a^3}+\frac{32x^2\sqrt{ax+bx^{2/3}}}{5a^2}-\frac{6x^3}{a\sqrt{ax+bx^{2/3}}}$$

```
[Out] (-6*x^3)/(a*Sqrt[b*x^(2/3) + a*x]) + (32768*b^6*Sqrt[b*x^(2/3) +
a*x])/(2145*a^8) - (65536*b^7*Sqrt[b*x^(2/3) + a*x])/(2145*a^9*x^
(1/3)) - (8192*b^5*x^(1/3)*Sqrt[b*x^(2/3) + a*x])/(715*a^7) + (40
96*b^4*x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(429*a^6) - (3584*b^3*x*Sqr
t[b*x^(2/3) + a*x])/(429*a^5) + (5376*b^2*x^(4/3)*Sqrt[b*x^(2/3)
+ a*x])/(715*a^4) - (448*b*x^(5/3)*Sqrt[b*x^(2/3) + a*x])/(65*a^3
) + (32*x^2*Sqrt[b*x^(2/3) + a*x])/(5*a^2)
```

Rubi [A] time = 0.683606, antiderivative size = 248, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$-\frac{65536b^7\sqrt{ax+bx^{2/3}}}{2145a^9\sqrt[3]{x}}+\frac{32768b^6\sqrt{ax+bx^{2/3}}}{2145a^8}-\frac{8192b^5\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{715a^7}+\frac{4096b^4x^{2/3}\sqrt{ax+bx^{2/3}}}{429a^6}-\frac{3584b^3x\sqrt{ax+bx^{2/3}}}{429a^5}+\frac{5376b^2x^{4/3}\sqrt{ax+bx^{2/3}}}{715a^4}-\frac{448bx^{5/3}\sqrt{ax+bx^{2/3}}}{65a^3}+\frac{32x^2\sqrt{ax+bx^{2/3}}}{5a^2}-\frac{6x^3}{a\sqrt{ax+bx^{2/3}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (-6*x^3)/(a*Sqrt[b*x^(2/3) + a*x]) + (32768*b^6*Sqrt[b*x^(2/3) +
a*x])/(2145*a^8) - (65536*b^7*Sqrt[b*x^(2/3) + a*x])/(2145*a^9*x^
(1/3)) - (8192*b^5*x^(1/3)*Sqrt[b*x^(2/3) + a*x])/(715*a^7) + (40
96*b^4*x^(2/3)*Sqrt[b*x^(2/3) + a*x])/(429*a^6) - (3584*b^3*x*Sqr
t[b*x^(2/3) + a*x])/(429*a^5) + (5376*b^2*x^(4/3)*Sqrt[b*x^(2/3)
+ a*x])/(715*a^4) - (448*b*x^(5/3)*Sqrt[b*x^(2/3) + a*x])/(65*a^3
) + (32*x^2*Sqrt[b*x^(2/3) + a*x])/(5*a^2)
```

Rubi in Sympy [A] time = 63.539, size = 235, normalized size = 0.95

$$-\frac{6x^3}{a\sqrt{ax+bx^{\frac{2}{3}}}}+\frac{32x^2\sqrt{ax+bx^{\frac{2}{3}}}}{5a^2}-\frac{448bx^{\frac{5}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{65a^3}+\frac{5376b^2x^{\frac{4}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{715a^4}-\frac{3584b^3x\sqrt{ax+bx^{\frac{2}{3}}}}{429a^5}+\frac{4096b^4x^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{429a^6}-\frac{8192b^5\sqrt[3]{x}\sqrt{ax+bx^{\frac{2}{3}}}}{715a^7}+\frac{32768b^6\sqrt{ax+bx^{\frac{2}{3}}}}{2145a^8}-\frac{65536b^7\sqrt{ax+bx^{\frac{2}{3}}}}{2145a^9\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] -6*x**3/(a*sqrt(a*x + b*x**(2/3))) + 32*x**2*sqrt(a*x + b*x**(2/3
))/(5*a**2) - 448*b*x**(5/3)*sqrt(a*x + b*x**(2/3))/(65*a**3) + 5
376*b**2*x**(4/3)*sqrt(a*x + b*x**(2/3))/(715*a**4) - 3584*b**3*x
*sqrt(a*x + b*x**(2/3))/(429*a**5) + 4096*b**4*x**(2/3)*sqrt(a*x
+ b*x**(2/3))/(429*a**6) - 8192*b**5*x**(1/3)*sqrt(a*x + b*x**(2/
```

```
3))/(715*a**7) + 32768*b**6*sqrt(a*x + b*x**(2/3))/(2145*a**8) -
65536*b**7*sqrt(a*x + b*x**(2/3))/(2145*a**9*x**(1/3))
```

Mathematica [A] time = 0.0688987, size = 135, normalized size = 0.54

$$\frac{2\sqrt{ax+bx^{2/3}}\left(429a^8x^{8/3}-528a^7bx^{7/3}+672a^6b^2x^2-896a^5b^3x^{5/3}+1280a^4b^4x^{4/3}-2048a^3b^5x+4096a^2b^6x^{2/3}-16384ab\right.}{2145a^9\sqrt[3]{x}\left(a\sqrt[3]{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(-32768*b^8 - 16384*a*b^7*x^(1/3) + 4096
*a^2*b^6*x^(2/3) - 2048*a^3*b^5*x + 1280*a^4*b^4*x^(4/3) - 896*a^
5*b^3*x^(5/3) + 672*a^6*b^2*x^2 - 528*a^7*b*x^(7/3) + 429*a^8*x^(
8/3)))/(2145*a^9*(b + a*x^(1/3))*x^(1/3))
```

Maple [A] time = 0.01, size = 110, normalized size = 0.4

$$\frac{2x}{2145a^9}\left(b+a\sqrt[3]{x}\right)\left(429x^{8/3}a^8-528x^{7/3}a^7b+672a^6b^2x^2-896x^{5/3}a^5b^3+1280x^{4/3}a^4b^4-2048a^3b^5x+4096x^{2/3}a^2b^6-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 2/2145*x*(b+a*x^(1/3))*(429*x^(8/3)*a^8-528*x^(7/3)*a^7*b+672*a^6
*b^2*x^2-896*x^(5/3)*a^5*b^3+1280*x^(4/3)*a^4*b^4-2048*a^3*b^5*x+
4096*x^(2/3)*a^2*b^6-16384*x^(1/3)*a*b^7-32768*b^8)/(b*x^(2/3)+a*
x)^(3/2)/a^9
```

Maxima [A] time = 1.45865, size = 201, normalized size = 0.81

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}}{5a^9}-\frac{48\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}b}{13a^9}+\frac{168\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}b^2}{11a^9}-\frac{112\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}b^3}{3a^9}+\frac{60\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b^4}{a^9}-\frac{336\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^5}{5a^9}+\frac{56\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^6}{a^9}-\frac{48\sqrt{ax^{\frac{1}{3}}+b}b^7}{a^9}-\frac{6b^8}{\sqrt{ax^{\frac{1}{3}}+b}a^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(a*x + b*x^(2/3))^(3/2),x, algorithm="maxima")
```

```
[Out] 2/5*(a*x^(1/3) + b)^(15/2)/a^9 - 48/13*(a*x^(1/3) + b)^(13/2)*b/a
^9 + 168/11*(a*x^(1/3) + b)^(11/2)*b^2/a^9 - 112/3*(a*x^(1/3) + b
)^(9/2)*b^3/a^9 + 60*(a*x^(1/3) + b)^(7/2)*b^4/a^9 - 336/5*(a*x^(
1/3) + b)^(5/2)*b^5/a^9 + 56*(a*x^(1/3) + b)^(3/2)*b^6/a^9 - 48*s
qrt(a*x^(1/3) + b)*b^7/a^9 - 6*b^8/(sqrt(a*x^(1/3) + b)*a^9)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(a*x + b*x^(2/3))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\left(ax + bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Integral(x**3/(a*x + b*x**(2/3))**(3/2), x)
```

GIAC/XCAS [A] time = 0.232035, size = 242, normalized size = 0.98

$$\frac{65536\,b^{\frac{15}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{2145\,a^9} - \frac{6\,b^8}{\sqrt{ax^{\frac{1}{3}} + b}\,a^9\operatorname{sign}\left(x^{\frac{1}{3}}\right)} + \frac{2\left(429\left(ax^{\frac{1}{3}} + b\right)^{\frac{15}{2}}a^{126} - 3960\left(ax^{\frac{1}{3}} + b\right)^{\frac{13}{2}}a^{126}b + 16380\left(ax^{\frac{1}{3}} + b\right)^{\frac{11}{2}}a^{126}b^2 - 40040\left(ax^{\frac{1}{3}} + b\right)^{\frac{9}{2}}a^{126}b^3 + 64350\left(ax^{\frac{1}{3}} + b\right)\cdots\right.}{2145\,a^{135}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(a*x + b*x^(2/3))^(3/2),x, algorithm="giac")
```

```
[Out] 65536/2145*b^(15/2)*sign(x^(1/3))/a^9 - 6*b^8/(sqrt(a*x^(1/3) + b
)*a^9*sign(x^(1/3))) + 2/2145*(429*(a*x^(1/3) + b)^(15/2)*a^126 -
 3960*(a*x^(1/3) + b)^(13/2)*a^126*b + 16380*(a*x^(1/3) + b)^(11/
2)*a^126*b^2 - 40040*(a*x^(1/3) + b)^(9/2)*a^126*b^3 + 64350*(a*x
^(1/3) + b)^(7/2)*a^126*b^4 - 72072*(a*x^(1/3) + b)^(5/2)*a^126*b
^5 + 60060*(a*x^(1/3) + b)^(3/2)*a^126*b^6 - 51480*sqrt(a*x^(1/3)
 + b)*a^126*b^7)/(a^135*sign(x^(1/3)))
```

3.196 $\int \frac{x^2}{\left(bx^{2/3}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=160

$$\frac{512b^4\sqrt{ax+bx^{2/3}}}{21a^6\sqrt[3]{x}}-\frac{256b^3\sqrt{ax+bx^{2/3}}}{21a^5}+\frac{64b^2\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{7a^4}-\frac{160bx^{2/3}\sqrt{ax+bx^{2/3}}}{21a^3}+\frac{20x\sqrt{ax+bx^{2/3}}}{3a^2}-\frac{6x^2}{a\sqrt{ax+bx^{2/3}}}$$

```
[Out] (-6*x^2)/(a*Sqrt[b*x^(2/3) + a*x]) - (256*b^3*Sqrt[b*x^(2/3) + a*
x])/(21*a^5) + (512*b^4*Sqrt[b*x^(2/3) + a*x])/(21*a^6*x^(1/3)) +
 (64*b^2*x^(1/3)*Sqrt[b*x^(2/3) + a*x])/(7*a^4) - (160*b*x^(2/3)*
Sqrt[b*x^(2/3) + a*x])/(21*a^3) + (20*x*Sqrt[b*x^(2/3) + a*x])/(3
*a^2)
```

Rubi [A] time = 0.397586, antiderivative size = 160, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{512b^4\sqrt{ax+bx^{2/3}}}{21a^6\sqrt[3]{x}}-\frac{256b^3\sqrt{ax+bx^{2/3}}}{21a^5}+\frac{64b^2\sqrt[3]{x}\sqrt{ax+bx^{2/3}}}{7a^4}-\frac{160bx^{2/3}\sqrt{ax+bx^{2/3}}}{21a^3}+\frac{20x\sqrt{ax+bx^{2/3}}}{3a^2}-\frac{6x^2}{a\sqrt{ax+bx^{2/3}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (-6*x^2)/(a*Sqrt[b*x^(2/3) + a*x]) - (256*b^3*Sqrt[b*x^(2/3) + a*
x])/(21*a^5) + (512*b^4*Sqrt[b*x^(2/3) + a*x])/(21*a^6*x^(1/3)) +
 (64*b^2*x^(1/3)*Sqrt[b*x^(2/3) + a*x])/(7*a^4) - (160*b*x^(2/3)*
Sqrt[b*x^(2/3) + a*x])/(21*a^3) + (20*x*Sqrt[b*x^(2/3) + a*x])/(3
*a^2)
```

Rubi in Sympy [A] time = 34.945, size = 150, normalized size = 0.94

$$-\frac{6x^2}{a\sqrt{ax+bx^{\frac{2}{3}}}}+\frac{20x\sqrt{ax+bx^{\frac{2}{3}}}}{3a^2}-\frac{160bx^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}{21a^3}+\frac{64b^2\sqrt[3]{x}\sqrt{ax+bx^{\frac{2}{3}}}}{7a^4}-\frac{256b^3\sqrt{ax+bx^{\frac{2}{3}}}}{21a^5}+\frac{512b^4\sqrt{ax+bx^{\frac{2}{3}}}}{21a^6\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] -6*x**2/(a*sqrt(a*x + b*x**(2/3))) + 20*x*sqrt(a*x + b*x**(2/3))/
(3*a**2) - 160*b*x**(2/3)*sqrt(a*x + b*x**(2/3))/(21*a**3) + 64*b
**2*x**(1/3)*sqrt(a*x + b*x**(2/3))/(7*a**4) - 256*b**3*sqrt(a*x
+ b*x**(2/3))/(21*a**5) + 512*b**4*sqrt(a*x + b*x**(2/3))/(21*a**
6*x**(1/3))
```

Mathematica [A] time = 0.0563666, size = 98, normalized size = 0.61

$$\frac{2\sqrt{ax+bx^{2/3}}\left(7a^5x^{5/3}-10a^4bx^{4/3}+16a^3b^2x-32a^2b^3x^{2/3}+128ab^4\sqrt[3]{x}+256b^5\right)}{21a^6\sqrt[3]{x}\left(a\sqrt[3]{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]   Integrate[x^2/(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (2*Sqrt[b*x^(2/3) + a*x]*(256*b^5 + 128*a*b^4*x^(1/3) - 32*a^2*b^
3*x^(2/3) + 16*a^3*b^2*x - 10*a^4*b*x^(4/3) + 7*a^5*x^(5/3)))/(21
*a^6*(b + a*x^(1/3))*x^(1/3))
```

Maple [A] time = 0.01, size = 77, normalized size = 0.5

$$\frac{2x}{21a^6}\left(b+a\sqrt[3]{x}\right)\left(7x^{5/3}a^5-10a^4bx^{4/3}+16a^3b^2x-32x^{2/3}a^2b^3+128ab^4\sqrt[3]{x}+256b^5\right)\left(bx^{\frac{2}{3}}+ax\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^2/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 2/21*x*(b+a*x^(1/3))*(7*x^(5/3)*a^5-10*a^4*b*x^(4/3)+16*a^3*b^2*x
-32*x^(2/3)*a^2*b^3+128*a*b^4*x^(1/3)+256*b^5)/(b*x^(2/3)+a*x)^(3
/2)/a^6
```

Maxima [A] time = 1.43693, size = 132, normalized size = 0.82

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}}{3a^6}-\frac{30\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}b}{7a^6}+\frac{12\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}b^2}{a^6}-\frac{20\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}b^3}{a^6}+\frac{30\sqrt{ax^{\frac{1}{3}}+b}\,b^4}{a^6}+\frac{6b^5}{\sqrt{ax^{\frac{1}{3}}+b}\,a^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^2/(a*x + b*x^(2/3))^(3/2),x, algorithm="maxima")
```

```
[Out] 2/3*(a*x^(1/3) + b)^(9/2)/a^6 - 30/7*(a*x^(1/3) + b)^(7/2)*b/a^6
+ 12*(a*x^(1/3) + b)^(5/2)*b^2/a^6 - 20*(a*x^(1/3) + b)^(3/2)*b^3
/a^6 + 30*sqrt(a*x^(1/3) + b)*b^4/a^6 + 6*b^5/(sqrt(a*x^(1/3) + b
)*a^6)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^2/(a*x + b*x^(2/3))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^2}{\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**2/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Integral(x**2/(a*x + b*x**(2/3))**(3/2), x)
```

GIAC/XCAS [A] time = 0.229823, size = 173, normalized size = 1.08

$$-\frac{512\,b^{\frac{9}{2}}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}{21\,a^{6}}+\frac{6\,b^{5}}{\sqrt{ax^{\frac{1}{3}}+b}a^{6}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}+\frac{2\left(7\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^{48}-45\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^{48}b+126\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^{48}b^{2}-210\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^{48}b^{3}+315\sqrt{ax^{\frac{1}{3}}+b}a^{48}b^{4}\right)}{21\,a^{54}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(a*x + b*x^(2/3))^(3/2),x, algorithm="giac")
```

```
[Out] -512/21*b^(9/2)*sign(x^(1/3))/a^6 + 6*b^5/(sqrt(a*x^(1/3) + b)*a^
6*sign(x^(1/3))) + 2/21*(7*(a*x^(1/3) + b)^(9/2)*a^48 - 45*(a*x^(
1/3) + b)^(7/2)*a^48*b + 126*(a*x^(1/3) + b)^(5/2)*a^48*b^2 - 210
*(a*x^(1/3) + b)^(3/2)*a^48*b^3 + 315*sqrt(a*x^(1/3) + b)*a^48*b^
4)/(a^54*sign(x^(1/3)))
```

3.197 $\int \frac{x}{\left(bx^{2/3}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=68

$$-\frac{16b\sqrt{ax+bx^{2/3}}}{a^3\sqrt[3]{x}}+\frac{8\sqrt{ax+bx^{2/3}}}{a^2}-\frac{6x}{a\sqrt{ax+bx^{2/3}}}$$

```
[Out] (-6*x)/(a*Sqrt[b*x^(2/3) + a*x]) + (8*Sqrt[b*x^(2/3) + a*x])/a^2
- (16*b*Sqrt[b*x^(2/3) + a*x])/(a^3*x^(1/3))
```

Rubi [A] time = 0.142879, antiderivative size = 68, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$-\frac{16b\sqrt{ax+bx^{2/3}}}{a^3\sqrt[3]{x}}+\frac{8\sqrt{ax+bx^{2/3}}}{a^2}-\frac{6x}{a\sqrt{ax+bx^{2/3}}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (-6*x)/(a*Sqrt[b*x^(2/3) + a*x]) + (8*Sqrt[b*x^(2/3) + a*x])/a^2
- (16*b*Sqrt[b*x^(2/3) + a*x])/(a^3*x^(1/3))
```

Rubi in Sympy [A] time = 12.8231, size = 61, normalized size = 0.9

$$-\frac{6x}{a\sqrt{ax+bx^{\frac{2}{3}}}}+\frac{8\sqrt{ax+bx^{\frac{2}{3}}}}{a^2}-\frac{16b\sqrt{ax+bx^{\frac{2}{3}}}}{a^3\sqrt[3]{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] -6*x/(a*sqrt(a*x + b*x**(2/3))) + 8*sqrt(a*x + b*x**(2/3))/a**2 -
 16*b*sqrt(a*x + b*x**(2/3))/(a**3*x**(1/3))
```

Mathematica [A] time = 0.0546141, size = 45, normalized size = 0.66

$$\frac{2\left(\frac{3ab}{a\sqrt[3]{x}+b}+a-\frac{8b}{\sqrt[3]{x}}\right)\sqrt{ax+bx^{2/3}}}{a^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(b*x^(2/3) + a*x)^(3/2),x]
```

```
[Out] (2*(a + (3*a*b)/(b + a*x^(1/3)) - (8*b)/x^(1/3))*Sqrt[b*x^(2/3) +
 a*x])/a^3
```

Maple [A] time = 0.01, size = 45, normalized size = 0.7

$$2\,\frac{x\left(b+a\sqrt[3]{x}\right)\left(a^2x^{2/3}-4\,ab\sqrt[3]{x}-8\,b^2\right)}{\left(bx^{2/3}+ax\right)^{3/2}a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 2*x*(b+a*x^(1/3))*(a^2*x^(2/3)-4*a*b*x^(1/3)-8*b^2)/(b*x^(2/3)+a*
x)^(3/2)/a^3
```

Maxima [A]   time = 1.43205, size = 63, normalized size = 0.93

$$\frac{2\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}}{a^3}-\frac{12\sqrt{ax^{\frac{1}{3}}+b}b}{a^3}-\frac{6b^2}{\sqrt{ax^{\frac{1}{3}}+b}a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/(a*x + b*x^(2/3))^(3/2),x, algorithm="maxima")
```

```
[Out] 2*(a*x^(1/3) + b)^(3/2)/a^3 - 12*sqrt(a*x^(1/3) + b)*b/a^3 - 6*b^
2/(sqrt(a*x^(1/3) + b)*a^3)
```

Fricas [F(-1)]   time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/(a*x + b*x^(2/3))^(3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F]   time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Integral(x/(a*x + b*x**(2/3))**(3/2), x)
```

GIAC/XCAS [A]   time = 0.224354, size = 103, normalized size = 1.51

$$\frac{16b^{\frac{3}{2}}\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{a^3}-\frac{6b^2}{\sqrt{ax^{\frac{1}{3}}+b}a^3\operatorname{sign}\left(x^{\frac{1}{3}}\right)}+\frac{2\left(\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^6-6\sqrt{ax^{\frac{1}{3}}+b}a^6b\right)}{a^9\operatorname{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x/(a*x + b*x^(2/3))^(3/2),x, algorithm="giac")
```

```
[Out] 16*b^(3/2)*sign(x^(1/3))/a^3 - 6*b^2/(sqrt(a*x^(1/3) + b)*a^3*sig
n(x^(1/3))) + 2*((a*x^(1/3) + b)^(3/2)*a^6 - 6*sqrt(a*x^(1/3) + b
)*a^6*b)/(a^9*sign(x^(1/3)))
```

3.198 $\int \frac{1}{\left(bx^{2/3}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=60

$$\frac{6\sqrt[3]{x}}{b\sqrt{ax+bx^{2/3}}}-\frac{6\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{b^{3/2}}$$

```
[Out] (6*x^(1/3))/(b*Sqrt[b*x^(2/3) + a*x]) - (6*ArcTanh[(Sqrt[b]*x^(1/
3))/Sqrt[b*x^(2/3) + a*x]])/b^(3/2)
```

Rubi [A] time = 0.103153, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{6\sqrt[3]{x}}{b\sqrt{ax+bx^{2/3}}}-\frac{6\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(2/3) + a*x)^(-3/2),x]
```

```
[Out] (6*x^(1/3))/(b*Sqrt[b*x^(2/3) + a*x]) - (6*ArcTanh[(Sqrt[b]*x^(1/
3))/Sqrt[b*x^(2/3) + a*x]])/b^(3/2)
```

Rubi in Sympy [A] time = 8.95854, size = 53, normalized size = 0.88

$$\frac{6\sqrt[3]{x}}{b\sqrt{ax+bx^{\frac{2}{3}}}}-\frac{6\,\mathrm{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] 6*x**(1/3)/(b*sqrt(a*x + b*x**(2/3))) - 6*atanh(sqrt(b)*x**(1/3)/
sqrt(a*x + b*x**(2/3)))/b**(3/2)
```

Mathematica [A] time = 0.107749, size = 71, normalized size = 1.18

$$\frac{6\sqrt{ax+bx^{2/3}}}{b\sqrt[3]{x}\left(a\sqrt[3]{x}+b\right)}-\frac{6\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(2/3) + a*x)^(-3/2),x]
```

```
[Out] (6*Sqrt[b*x^(2/3) + a*x])/(b*(b + a*x^(1/3))*x^(1/3)) - (6*ArcTan
h[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/b^(3/2)
```

Maple [A] time = 0.005, size = 55, normalized size = 0.9

$$6\,\frac{x\left(b+a\sqrt[3]{x}\right)}{\left(bx^{2/3}+ax\right)^{3/2}b^{5/2}}\left(b^{3/2}-Artanh\left(\frac{\sqrt{b+a\sqrt[3]{x}}}{\sqrt{b}}\right)b\sqrt{b+a\sqrt[3]{x}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 6*x*(b+a*x^(1/3))*(b^(3/2)-arctanh((b+a*x^(1/3))^(1/2)/b^(1/2))*b
*(b+a*x^(1/3))^(1/2))/(b*x^(2/3)+a*x)^(3/2)/b^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(-3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(-3/2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax + bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Integral((a*x + b*x**(2/3))**(-3/2), x)
```

GIAC/XCAS [A] time = 0.226018, size = 117, normalized size = 1.95

$$-\frac{6\left(\sqrt{b}\arctan\left(\frac{\sqrt{b}}{\sqrt{-b}}\right) + \sqrt{-b}\right)\operatorname{sign}\left(x^{\frac{1}{3}}\right)}{\sqrt{-b}b^{\frac{3}{2}}} + \frac{6\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{\sqrt{-b}b\operatorname{sign}\left(x^{\frac{1}{3}}\right)} + \frac{6}{\sqrt{ax^{\frac{1}{3}} + b}b\operatorname{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^(2/3))^(-3/2),x, algorithm="giac")
```

```
[Out] -6*(sqrt(b)*arctan(sqrt(b)/sqrt(-b)) + sqrt(-b))*sign(x^(1/3))/(s
qrt(-b)*b^(3/2)) + 6*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-
b)*b*sign(x^(1/3))) + 6/(sqrt(a*x^(1/3) + b)*b*sign(x^(1/3)))
```

3.199 $\int \frac{1}{x\left(bx^{2/3}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=146

$$\frac{105a^3\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{8b^{9/2}}-\frac{105a^2\sqrt{ax+bx^{2/3}}}{8b^4x^{2/3}}+\frac{35a\sqrt{ax+bx^{2/3}}}{4b^3x}-\frac{7\sqrt{ax+bx^{2/3}}}{b^2x^{4/3}}+\frac{6}{bx^{2/3}\sqrt{ax+bx^{2/3}}}$$

```
[Out] 6/(b*x^(2/3)*Sqrt[b*x^(2/3) + a*x]) - (7*Sqrt[b*x^(2/3) + a*x])/(
b^2*x^(4/3)) + (35*a*Sqrt[b*x^(2/3) + a*x])/(4*b^3*x) - (105*a^2*
Sqrt[b*x^(2/3) + a*x])/(8*b^4*x^(2/3)) + (105*a^3*ArcTanh[(Sqrt[b
]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(8*b^(9/2))
```

Rubi [A] time = 0.399266, antiderivative size = 146, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$\frac{105a^3\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{8b^{9/2}}-\frac{105a^2\sqrt{ax+bx^{2/3}}}{8b^4x^{2/3}}+\frac{35a\sqrt{ax+bx^{2/3}}}{4b^3x}-\frac{7\sqrt{ax+bx^{2/3}}}{b^2x^{4/3}}+\frac{6}{bx^{2/3}\sqrt{ax+bx^{2/3}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(b*x^(2/3) + a*x)^(3/2)),x]
```


```
[Out] 6/(b*x^(2/3)*Sqrt[b*x^(2/3) + a*x]) - (7*Sqrt[b*x^(2/3) + a*x])/(
b^2*x^(4/3)) + (35*a*Sqrt[b*x^(2/3) + a*x])/(4*b^3*x) - (105*a^2*
Sqrt[b*x^(2/3) + a*x])/(8*b^4*x^(2/3)) + (105*a^3*ArcTanh[(Sqrt[b
]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(8*b^(9/2))
```

Rubi in Sympy [A] time = 35.4833, size = 134, normalized size = 0.92

$$\frac{105a^3\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{8b^{\frac{9}{2}}}-\frac{105a^2\sqrt{ax+bx^{\frac{2}{3}}}}{8b^4x^{\frac{2}{3}}}+\frac{35a\sqrt{ax+bx^{\frac{2}{3}}}}{4b^3x}+\frac{6}{bx^{\frac{2}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}-\frac{7\sqrt{ax+bx^{\frac{2}{3}}}}{b^2x^{\frac{4}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] 105*a**3*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(8*b**(9/
2)) - 105*a**2*sqrt(a*x + b*x**(2/3))/(8*b**4*x**(2/3)) + 35*a*sq
rt(a*x + b*x**(2/3))/(4*b**3*x) + 6/(b*x**(2/3)*sqrt(a*x + b*x**(
2/3))) - 7*sqrt(a*x + b*x**(2/3))/(b**2*x**(4/3))
```

Mathematica [A] time = 0.221144, size = 112, normalized size = 0.77

$$\frac{105a^3\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{8b^{9/2}}-\frac{\sqrt{ax+bx^{2/3}}\left(105a^3x+35a^2bx^{2/3}-14ab^2\sqrt[3]{x}+8b^3\right)}{8b^4x^{4/3}\left(a\sqrt[3]{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(b*x^(2/3) + a*x)^(3/2)),x]
```

```
[Out] -(Sqrt[b*x^(2/3) + a*x]*(8*b^3 - 14*a*b^2*x^(1/3) + 35*a^2*b*x^(2
/3) + 105*a^3*x))/(8*b^4*(b + a*x^(1/3))*x^(4/3)) + (105*a^3*ArcT
```

```
anh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/(8*b^(9/2))
```

Maple [A] time = 0.005, size = 88, normalized size = 0.6

$$-\frac{1}{8}\left(b+a\sqrt[3]{x}\right)\left(-14\,b^{5/2}\sqrt[3]{x}a+35\,b^{3/2}x^{2/3}a^{2}+105\,\sqrt{b}xa^{3}+8\,b^{7/2}-105\,Artanh\left(\frac{\sqrt{b+a\sqrt[3]{x}}}{\sqrt{b}}\right)\sqrt{b+a\sqrt[3]{x}}xa^{3}\right)\left(bx^{\frac{2}{3}}+ax\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] -1/8*(b+a*x^(1/3))*(-14*b^(5/2)*x^(1/3)*a+35*b^(3/2)*x^(2/3)*a^2+
105*b^(1/2)*x*a^3+8*b^(7/2)-105*arctanh((b+a*x^(1/3))^(1/2)/b^(1/
2))*(b+a*x^(1/3))^(1/2)*x*a^3)/(b*x^(2/3)+a*x)^(3/2)/b^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x*(a*x + b*x**(2/3))**(3/2)), x)
```

GIAC/XCAS [A] time = 0.2933, size = 166, normalized size = 1.14

$$-\frac{105\,a^3\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{8\,\sqrt{-b}b^4\mathrm{sign}\left(x^{\frac{1}{3}}\right)}-\frac{6\,a^3}{\sqrt{ax^{\frac{1}{3}}+b}b^4\mathrm{sign}\left(x^{\frac{1}{3}}\right)}-\frac{57\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^3-136\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a^3b+87\,\sqrt{ax^{\frac{1}{3}}+b}a^3b^2}{8\,a^3b^4x\mathrm{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x),x, algorithm="giac")
```

```
[Out] -105/8*a^3*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-b)*b^4*sig
n(x^(1/3))) - 6*a^3/(sqrt(a*x^(1/3) + b)*b^4*sign(x^(1/3))) - 1/8
*(57*(a*x^(1/3) + b)^(5/2)*a^3 - 136*(a*x^(1/3) + b)^(3/2)*a^3*b
+ 87*sqrt(a*x^(1/3) + b)*a^3*b^2)/(a^3*b^4*x*sign(x^(1/3)))
```

3.200 $\int \frac{1}{x^2\left(bx^{2/3}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=236

$$-\frac{9009a^6\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{512b^{15/2}}+\frac{9009a^5\sqrt{ax+bx^{2/3}}}{512b^7x^{2/3}}-\frac{3003a^4\sqrt{ax+bx^{2/3}}}{256b^6x}+\frac{3003a^3\sqrt{ax+bx^{2/3}}}{320b^5x^{4/3}}-\frac{1287a^2\sqrt{ax+bx^{2/3}}}{160b^4x^{5/3}}+\frac{143a\sqrt{ax+bx^{2/3}}}{20b^3x^2}-\frac{13\sqrt{ax+bx^{2/3}}}{2b^2x^{7/3}}+\frac{6}{bx^{5/3}\sqrt{ax+bx^{2/3}}}$$

```
[Out] 6/(b*x^(5/3)*Sqrt[b*x^(2/3) + a*x]) - (13*Sqrt[b*x^(2/3) + a*x])/
(2*b^2*x^(7/3)) + (143*a*Sqrt[b*x^(2/3) + a*x])/(20*b^3*x^2) - (1
287*a^2*Sqrt[b*x^(2/3) + a*x])/(160*b^4*x^(5/3)) + (3003*a^3*Sqrt
[b*x^(2/3) + a*x])/(320*b^5*x^(4/3)) - (3003*a^4*Sqrt[b*x^(2/3) +
 a*x])/(256*b^6*x) + (9009*a^5*Sqrt[b*x^(2/3) + a*x])/(512*b^7*x^
(2/3)) - (9009*a^6*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x
]])/(512*b^(15/2))
```

Rubi [A] time = 0.687773, antiderivative size = 236, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$-\frac{9009a^6\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{512b^{15/2}}+\frac{9009a^5\sqrt{ax+bx^{2/3}}}{512b^7x^{2/3}}-\frac{3003a^4\sqrt{ax+bx^{2/3}}}{256b^6x}+\frac{3003a^3\sqrt{ax+bx^{2/3}}}{320b^5x^{4/3}}-\frac{1287a^2\sqrt{ax+bx^{2/3}}}{160b^4x^{5/3}}+\frac{143a\sqrt{ax+bx^{2/3}}}{20b^3x^2}-\frac{13\sqrt{ax+bx^{2/3}}}{2b^2x^{7/3}}+\frac{6}{bx^{5/3}\sqrt{ax+bx^{2/3}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(b*x^(2/3) + a*x)^(3/2)),x]
```

```
[Out] 6/(b*x^(5/3)*Sqrt[b*x^(2/3) + a*x]) - (13*Sqrt[b*x^(2/3) + a*x])/
(2*b^2*x^(7/3)) + (143*a*Sqrt[b*x^(2/3) + a*x])/(20*b^3*x^2) - (1
287*a^2*Sqrt[b*x^(2/3) + a*x])/(160*b^4*x^(5/3)) + (3003*a^3*Sqrt
[b*x^(2/3) + a*x])/(320*b^5*x^(4/3)) - (3003*a^4*Sqrt[b*x^(2/3) +
 a*x])/(256*b^6*x) + (9009*a^5*Sqrt[b*x^(2/3) + a*x])/(512*b^7*x^
(2/3)) - (9009*a^6*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x
]])/(512*b^(15/2))
```

Rubi in Sympy [A] time = 62.4927, size = 221, normalized size = 0.94

$$-\frac{9009a^6\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{512b^{\frac{15}{2}}}+\frac{9009a^5\sqrt{ax+bx^{\frac{2}{3}}}}{512b^7x^{\frac{2}{3}}}-\frac{3003a^4\sqrt{ax+bx^{\frac{2}{3}}}}{256b^6x}+\frac{3003a^3\sqrt{ax+bx^{\frac{2}{3}}}}{320b^5x^{\frac{4}{3}}}-\frac{1287a^2\sqrt{ax+bx^{\frac{2}{3}}}}{160b^4x^{\frac{5}{3}}}+\frac{143a\sqrt{ax+bx^{\frac{2}{3}}}}{20b^3x^2}+\frac{6}{bx^{\frac{5}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}-\frac{13\sqrt{ax+bx^{\frac{2}{3}}}}{2b^2x^{\frac{7}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] -9009*a**6*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(512*b*
*(15/2)) + 9009*a**5*sqrt(a*x + b*x**(2/3))/(512*b**7*x**(2/3)) -
 3003*a**4*sqrt(a*x + b*x**(2/3))/(256*b**6*x) + 3003*a**3*sqrt(a
*x + b*x**(2/3))/(320*b**5*x**(4/3)) - 1287*a**2*sqrt(a*x + b*x**
(2/3))/(160*b**4*x**(5/3)) + 143*a*sqrt(a*x + b*x**(2/3))/(20*b**
3*x**2) + 6/(b*x**(5/3)*sqrt(a*x + b*x**(2/3))) - 13*sqrt(a*x + b
*x**(2/3))/(2*b**2*x**(7/3))
```

Mathematica [A] time = 0.302245, size = 149, normalized size = 0.63

$$\frac{\sqrt{ax+bx^{2/3}}\left(45045a^6x^2+15015a^5bx^{5/3}-6006a^4b^2x^{4/3}+3432a^3b^3x-2288a^2b^4x^{2/3}+1664ab^5\sqrt[3]{x}-1280b^6\right)}{2560b^7x^{7/3}\left(a\sqrt[3]{x}+b\right)}-\frac{9009a^6\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{512b^{15/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(b*x^(2/3) + a*x)^(3/2)),x]
```

```
[Out] (Sqrt[b*x^(2/3) + a*x]*(-1280*b^6 + 1664*a*b^5*x^(1/3) - 2288*a^2
*b^4*x^(2/3) + 3432*a^3*b^3*x - 6006*a^4*b^2*x^(4/3) + 15015*a^5*
b*x^(5/3) + 45045*a^6*x^2))/(2560*b^7*(b + a*x^(1/3))*x^(7/3)) -
(9009*a^6*ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/(512*
b^(15/2))
```

Maple [A] time = 0.026, size = 126, normalized size = 0.5

$$-\frac{1}{2560\,x}\left(b+a\sqrt[3]{x}\right)\left(-15015\,x^{5/3}b^{3/2}a^5+6006\,x^{4/3}b^{5/2}a^4-3432\,xb^{7/2}a^3+2288\,x^{2/3}b^{9/2}a^2-1664\,\sqrt[3]{x}b^{11/2}a+1280\,b^{13/2}-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] -1/2560*(b+a*x^(1/3))*(-15015*x^(5/3)*b^(3/2)*a^5+6006*x^(4/3)*b^
(5/2)*a^4-3432*x*b^(7/2)*a^3+2288*x^(2/3)*b^(9/2)*a^2-1664*x^(1/3
)*b^(11/2)*a+1280*b^(13/2)-45045*x^2*a^6*b^(1/2)+45045*(b+a*x^(1/
3))^(1/2)*arctanh((b+a*x^(1/3))^(1/2)/b^(1/2))*x^2*a^6)/x/(b*x^(2
/3)+a*x)^(3/2)/b^(15/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\left(ax+bx^{\frac{2}{3}}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Integral(1/(x**2*(a*x + b*x**(2/3))**(3/2)), x)
```

GIAC/XCAS [A] time = 0.369492, size = 235, normalized size = 1.

$$\frac{9009\,a^6\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{512\,\sqrt{-b}b^7\operatorname{sign}\left(x^{\frac{1}{3}}\right)}+\frac{6\,a^6}{\sqrt{ax^{\frac{1}{3}}+b}\,b^7\operatorname{sign}\left(x^{\frac{1}{3}}\right)}+\frac{29685\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}a^6-163095\left(ax^{\frac{1}{3}}+b\right)^{\frac{9}{2}}a^6b+364194\left(ax^{\frac{1}{3}}+b\right)^{\frac{7}{2}}a^6b^2-416094\left(ax^{\frac{1}{3}}+b\right)^{\frac{5}{2}}a^6b^3+246505\left(ax^{\frac{1}{3}}+b\right)^{\frac{3}{2}}a}{2560\,a^6b^7x^2\operatorname{sign}\left(x^{\frac{1}{3}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] 9009/512*a^6*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-b)*b^7*s
ign(x^(1/3))) + 6*a^6/(sqrt(a*x^(1/3) + b)*b^7*sign(x^(1/3))) + 1
/2560*(29685*(a*x^(1/3) + b)^(11/2)*a^6 - 163095*(a*x^(1/3) + b)^
(9/2)*a^6*b + 364194*(a*x^(1/3) + b)^(7/2)*a^6*b^2 - 416094*(a*x^
(1/3) + b)^(5/2)*a^6*b^3 + 246505*(a*x^(1/3) + b)^(3/2)*a^6*b^4 -
 62475*sqrt(a*x^(1/3) + b)*a^6*b^5)/(a^6*b^7*x^2*sign(x^(1/3)))
```

3.201 $\int \frac{1}{x^3\left(bx^{2/3}+ax\right)^{3/2}}\,dx$

Optimal. Leaf size=324

$$\frac{692835a^9\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{32768b^{21/2}}-\frac{692835a^8\sqrt{ax+bx^{2/3}}}{32768b^{10}x^{2/3}}+\frac{230945a^7\sqrt{ax+bx^{2/3}}}{16384b^9x}-\frac{46189a^6\sqrt{ax+bx^{2/3}}}{4096b^8x^{4/3}}+\frac{138567a^5\sqrt{ax+bx^{2/3}}}{14336b^7x^{5/3}}-\frac{46189a^4\sqrt{ax+bx^{2/3}}}{5376b^6x^2}+\frac{20995a^3\sqrt{ax+bx^{2/3}}}{2688b^5x^{7/3}}-\frac{1615a^2\sqrt{ax+bx^{2/3}}}{224b^4x^{8/3}}+\frac{323a\sqrt{ax+bx^{2/3}}}{48b^3x^3}-\frac{19\sqrt{ax+bx^{2/3}}}{3b^2x^{10/3}}+\frac{6}{bx^{8/3}\sqrt{ax+bx^{2/3}}}$$

```
[Out] 6/(b*x^(8/3)*Sqrt[b*x^(2/3) + a*x]) - (19*Sqrt[b*x^(2/3) + a*x])/
(3*b^2*x^(10/3)) + (323*a*Sqrt[b*x^(2/3) + a*x])/(48*b^3*x^3) - (
1615*a^2*Sqrt[b*x^(2/3) + a*x])/(224*b^4*x^(8/3)) + (20995*a^3*Sq
rt[b*x^(2/3) + a*x])/(2688*b^5*x^(7/3)) - (46189*a^4*Sqrt[b*x^(2/
3) + a*x])/(5376*b^6*x^2) + (138567*a^5*Sqrt[b*x^(2/3) + a*x])/(1
4336*b^7*x^(5/3)) - (46189*a^6*Sqrt[b*x^(2/3) + a*x])/(4096*b^8*x
^(4/3)) + (230945*a^7*Sqrt[b*x^(2/3) + a*x])/(16384*b^9*x) - (692
835*a^8*Sqrt[b*x^(2/3) + a*x])/(32768*b^10*x^(2/3)) + (692835*a^9
*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(32768*b^(21/2
))
```

Rubi [A] time = 0.976924, antiderivative size = 324, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$\frac{692835a^9\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{32768b^{21/2}}-\frac{692835a^8\sqrt{ax+bx^{2/3}}}{32768b^{10}x^{2/3}}+\frac{230945a^7\sqrt{ax+bx^{2/3}}}{16384b^9x}-\frac{46189a^6\sqrt{ax+bx^{2/3}}}{4096b^8x^{4/3}}+\frac{138567a^5\sqrt{ax+bx^{2/3}}}{14336b^7x^{5/3}}-\frac{46189a^4\sqrt{ax+bx^{2/3}}}{5376b^6x^2}+\frac{20995a^3\sqrt{ax+bx^{2/3}}}{2688b^5x^{7/3}}-\frac{1615a^2\sqrt{ax+bx^{2/3}}}{224b^4x^{8/3}}+\frac{323a\sqrt{ax+bx^{2/3}}}{48b^3x^3}-\frac{19\sqrt{ax+bx^{2/3}}}{3b^2x^{10/3}}+\frac{6}{bx^{8/3}\sqrt{ax+bx^{2/3}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*(b*x^(2/3) + a*x)^(3/2)),x]
```

```
[Out] 6/(b*x^(8/3)*Sqrt[b*x^(2/3) + a*x]) - (19*Sqrt[b*x^(2/3) + a*x])/
(3*b^2*x^(10/3)) + (323*a*Sqrt[b*x^(2/3) + a*x])/(48*b^3*x^3) - (
1615*a^2*Sqrt[b*x^(2/3) + a*x])/(224*b^4*x^(8/3)) + (20995*a^3*Sq
rt[b*x^(2/3) + a*x])/(2688*b^5*x^(7/3)) - (46189*a^4*Sqrt[b*x^(2/
3) + a*x])/(5376*b^6*x^2) + (138567*a^5*Sqrt[b*x^(2/3) + a*x])/(1
4336*b^7*x^(5/3)) - (46189*a^6*Sqrt[b*x^(2/3) + a*x])/(4096*b^8*x
^(4/3)) + (230945*a^7*Sqrt[b*x^(2/3) + a*x])/(16384*b^9*x) - (692
835*a^8*Sqrt[b*x^(2/3) + a*x])/(32768*b^10*x^(2/3)) + (692835*a^9
*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(32768*b^(21/2
))
```

Rubi in Sympy [A] time = 97.4313, size = 306, normalized size = 0.94

$$\frac{692835a^9\operatorname{atanh}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{\frac{2}{3}}}}\right)}{32768b^{\frac{21}{2}}}-\frac{692835a^8\sqrt{ax+bx^{\frac{2}{3}}}}{32768b^{10}x^{\frac{2}{3}}}+\frac{230945a^7\sqrt{ax+bx^{\frac{2}{3}}}}{16384b^9x}-\frac{46189a^6\sqrt{ax+bx^{\frac{2}{3}}}}{4096b^8x^{\frac{4}{3}}}+\frac{138567a^5\sqrt{ax+bx^{\frac{2}{3}}}}{14336b^7x^{\frac{5}{3}}}-\frac{46189a^4\sqrt{ax+bx^{\frac{2}{3}}}}{5376b^6x^2}+\frac{20995a^3\sqrt{ax+bx^{\frac{2}{3}}}}{2688b^5x^{\frac{7}{3}}}-\frac{1615a^2\sqrt{ax+bx^{\frac{2}{3}}}}{224b^4x^{\frac{8}{3}}}+\frac{323a\sqrt{ax+bx^{\frac{2}{3}}}}{48b^3x^3}+\frac{6}{bx^{\frac{8}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}-\frac{19\sqrt{ax+bx^{\frac{2}{3}}}}{3b^2x^{\frac{10}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] 692835*a**9*atanh(sqrt(b)*x**(1/3)/sqrt(a*x + b*x**(2/3)))/(32768
*b**(21/2)) - 692835*a**8*sqrt(a*x + b*x**(2/3))/(32768*b**10*x**
(2/3)) + 230945*a**7*sqrt(a*x + b*x**(2/3))/(16384*b**9*x) - 4618
9*a**6*sqrt(a*x + b*x**(2/3))/(4096*b**8*x**(4/3)) + 138567*a**5*
sqrt(a*x + b*x**(2/3))/(14336*b**7*x**(5/3)) - 46189*a**4*sqrt(a*
x + b*x**(2/3))/(5376*b**6*x**2) + 20995*a**3*sqrt(a*x + b*x**(2/
3))/(2688*b**5*x**(7/3)) - 1615*a**2*sqrt(a*x + b*x**(2/3))/(224*
b**4*x**(8/3)) + 323*a*sqrt(a*x + b*x**(2/3))/(48*b**3*x**3) + 6/
(b*x**(8/3)*sqrt(a*x + b*x**(2/3))) - 19*sqrt(a*x + b*x**(2/3))/(
3*b**2*x**(10/3))
```

Mathematica [A] time = 0.38296, size = 186, normalized size = 0.57

$$\frac{692835a^9\tanh^{-1}\left(\frac{\sqrt{ax+bx^{2/3}}}{\sqrt{b}\sqrt[3]{x}}\right)}{32768b^{21/2}} - \frac{\sqrt{ax+bx^{2/3}}\left(14549535a^9x^3+4849845a^8bx^{8/3}-1939938a^7b^2x^{7/3}+1108536a^6b^3x^2-739024a^5b^4x^{5/3}+537472a^4b^5x^{4/3}\right.}{688128b^{10}x^{10/3}\left(a\sqrt[3]{x}+b\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*(b*x^(2/3) + a*x)^(3/2)),x]
```

```
[Out] -(Sqrt[b*x^(2/3) + a*x]*(229376*b^9 - 272384*a*b^8*x^(1/3) + 3307
52*a^2*b^7*x^(2/3) - 413440*a^3*b^6*x + 537472*a^4*b^5*x^(4/3) -
739024*a^5*b^4*x^(5/3) + 1108536*a^6*b^3*x^2 - 1939938*a^7*b^2*x^
(7/3) + 4849845*a^8*b*x^(8/3) + 14549535*a^9*x^3))/(688128*b^10*(
b + a*x^(1/3))*x^(10/3)) + (692835*a^9*ArcTanh[Sqrt[b*x^(2/3) + a
*x]/(Sqrt[b]*x^(1/3))])/(32768*b^(21/2))
```

Maple [A] time = 0.03, size = 159, normalized size = 0.5

$$\frac{1}{688128\,x^2}\left(b+a\sqrt[3]{x}\right)\left(-14549535\,x^3a^9\sqrt{b}-4849845\,x^{8/3}b^{3/2}a^8+1939938\,x^{7/3}b^{5/2}a^7-1108536\,x^2b^{7/2}a^6+739024\,x^{5/3}b^{9/}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] 1/688128*(b+a*x^(1/3))*(-14549535*x^3*a^9*b^(1/2)-4849845*x^(8/3)
*b^(3/2)*a^8+1939938*x^(7/3)*b^(5/2)*a^7-1108536*x^2*b^(7/2)*a^6+
739024*x^(5/3)*b^(9/2)*a^5-537472*x^(4/3)*b^(11/2)*a^4+413440*x*b
^(13/2)*a^3-330752*x^(2/3)*b^(15/2)*a^2+272384*x^(1/3)*b^(17/2)*a
-229376*b^(19/2)+14549535*(b+a*x^(1/3))^(1/2)*arctanh((b+a*x^(1/3
))^(1/2)/b^(1/2))*x^3*a^9)/x^2/(b*x^(2/3)+a*x)^(3/2)/b^(21/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^3),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.517992, size = 304, normalized size = 0.94

$$-\frac{692835\,a^9\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{32768\sqrt{-b}b^{10}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}-\frac{6\,a^9}{\sqrt{ax^{\frac{1}{3}}+b}b^{10}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}-\frac{10420767\left(ax^{\frac{1}{3}}+b\right)^{\frac{17}{2}}a^9-88937058\left(ax^{\frac{1}{3}}+b\right)^{\frac{15}{2}}a^9b+334408914\left(ax^{\frac{1}{3}}+b\right)^{\frac{13}{2}}a^9b^2-724860666\left(ax^{\frac{1}{3}}+b\right)^{\frac{11}{2}}a^9b^3+9932}{688}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^3),x, algorithm="giac")
```

```
[Out] -692835/32768*a^9*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(-b)*
b^10*sign(x^(1/3))) - 6*a^9/(sqrt(a*x^(1/3) + b)*b^10*sign(x^(1/3
))) - 1/688128*(10420767*(a*x^(1/3) + b)^(17/2)*a^9 - 88937058*(a
*x^(1/3) + b)^(15/2)*a^9*b + 334408914*(a*x^(1/3) + b)^(13/2)*a^9
*b^2 - 724860666*(a*x^(1/3) + b)^(11/2)*a^9*b^3 + 993296384*(a*x^
(1/3) + b)^(9/2)*a^9*b^4 - 884769030*(a*x^(1/3) + b)^(7/2)*a^9*b^
5 + 503730990*(a*x^(1/3) + b)^(5/2)*a^9*b^6 - 169799070*(a*x^(1/3
) + b)^(3/2)*a^9*b^7 + 26738145*sqrt(a*x^(1/3) + b)*a^9*b^8)/(a^9
*b^10*x^3*sign(x^(1/3)))
```

3.202 $\int \frac{1}{x^4 \left(bx^{2/3}+ax\right)^{3/2}} \, dx$

Optimal. Leaf size=412

$$-\frac{50702925a^{12}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{2097152b^{27/2}}+\frac{50702925a^{11}\sqrt{ax+bx^{2/3}}}{2097152b^{13}x^{2/3}}-\frac{16900975a^{10}\sqrt{ax+bx^{2/3}}}{1048576b^{12}x}+\frac{3380195a^9\sqrt{ax+bx^{2/3}}}{262144b^{11}x^{4/3}}-\frac{1448655a^8\sqrt{ax+bx^{2/3}}}{131072b^{10}x^{5/3}}+\frac{482885a^7\sqrt{ax+bx^{2/3}}}{49152b^9x^2}-\frac{2414425a^6\sqrt{ax+bx^{2/3}}}{270336b^8x^{7/3}}+\frac{185725a^5\sqrt{ax+bx^{2/3}}}{22528b^7x^{8/3}}-\frac{260015a^4\sqrt{ax+bx^{2/3}}}{33792b^6x^3}+\frac{15295a^3\sqrt{ax+bx^{2/3}}}{2112b^5x^{10/3}}-\frac{2415a^2\sqrt{ax+bx^{2/3}}}{352b^4x^{11/3}}+\frac{575a\sqrt{ax+bx^{2/3}}}{88b^3x^4}-\frac{25\sqrt{ax+bx^{2/3}}}{4b^2x^{13/3}}+\frac{6}{bx^{11/3}\sqrt{ax+bx^{2/3}}}$$

```
[Out] 6/(b*x^(11/3)*Sqrt[b*x^(2/3) + a*x]) - (25*Sqrt[b*x^(2/3) + a*x])
/(4*b^2*x^(13/3)) + (575*a*Sqrt[b*x^(2/3) + a*x])/(88*b^3*x^4) -
(2415*a^2*Sqrt[b*x^(2/3) + a*x])/(352*b^4*x^(11/3)) + (15295*a^3*
Sqrt[b*x^(2/3) + a*x])/(2112*b^5*x^(10/3)) - (260015*a^4*Sqrt[b*x
^(2/3) + a*x])/(33792*b^6*x^3) + (185725*a^5*Sqrt[b*x^(2/3) + a*x
])/(22528*b^7*x^(8/3)) - (2414425*a^6*Sqrt[b*x^(2/3) + a*x])/(270
336*b^8*x^(7/3)) + (482885*a^7*Sqrt[b*x^(2/3) + a*x])/(49152*b^9*
x^2) - (1448655*a^8*Sqrt[b*x^(2/3) + a*x])/(131072*b^10*x^(5/3))
+ (3380195*a^9*Sqrt[b*x^(2/3) + a*x])/(262144*b^11*x^(4/3)) - (16
900975*a^10*Sqrt[b*x^(2/3) + a*x])/(1048576*b^12*x) + (50702925*a
^11*Sqrt[b*x^(2/3) + a*x])/(2097152*b^13*x^(2/3)) - (50702925*a^1
2*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(2097152*b^(2
7/2))
```

Rubi [A] time = 1.34523, antiderivative size = 412, normalized size of antiderivative = 1., number of steps used = 15, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$-\frac{50702925a^{12}\tanh^{-1}\left(\frac{\sqrt{b}\sqrt[3]{x}}{\sqrt{ax+bx^{2/3}}}\right)}{2097152b^{27/2}}+\frac{50702925a^{11}\sqrt{ax+bx^{2/3}}}{2097152b^{13}x^{2/3}}-\frac{16900975a^{10}\sqrt{ax+bx^{2/3}}}{1048576b^{12}x}+\frac{3380195a^9\sqrt{ax+bx^{2/3}}}{262144b^{11}x^{4/3}}-\frac{1448655a^8\sqrt{ax+bx^{2/3}}}{131072b^{10}x^{5/3}}+\frac{482885a^7\sqrt{ax+bx^{2/3}}}{49152b^9x^2}-\frac{2414425a^6\sqrt{ax+bx^{2/3}}}{270336b^8x^{7/3}}+\frac{185725a^5\sqrt{ax+bx^{2/3}}}{22528b^7x^{8/3}}-\frac{260015a^4\sqrt{ax+bx^{2/3}}}{33792b^6x^3}+\frac{15295a^3\sqrt{ax+bx^{2/3}}}{2112b^5x^{10/3}}-\frac{2415a^2\sqrt{ax+bx^{2/3}}}{352b^4x^{11/3}}+\frac{575a\sqrt{ax+bx^{2/3}}}{88b^3x^4}-\frac{25\sqrt{ax+bx^{2/3}}}{4b^2x^{13/3}}+\frac{6}{bx^{11/3}\sqrt{ax+bx^{2/3}}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*(b*x^(2/3) + a*x)^(3/2)),x]
```

```
[Out] 6/(b*x^(11/3)*Sqrt[b*x^(2/3) + a*x]) - (25*Sqrt[b*x^(2/3) + a*x])
/(4*b^2*x^(13/3)) + (575*a*Sqrt[b*x^(2/3) + a*x])/(88*b^3*x^4) -
(2415*a^2*Sqrt[b*x^(2/3) + a*x])/(352*b^4*x^(11/3)) + (15295*a^3*
Sqrt[b*x^(2/3) + a*x])/(2112*b^5*x^(10/3)) - (260015*a^4*Sqrt[b*x
^(2/3) + a*x])/(33792*b^6*x^3) + (185725*a^5*Sqrt[b*x^(2/3) + a*x
])/(22528*b^7*x^(8/3)) - (2414425*a^6*Sqrt[b*x^(2/3) + a*x])/(270
336*b^8*x^(7/3)) + (482885*a^7*Sqrt[b*x^(2/3) + a*x])/(49152*b^9*
x^2) - (1448655*a^8*Sqrt[b*x^(2/3) + a*x])/(131072*b^10*x^(5/3))
+ (3380195*a^9*Sqrt[b*x^(2/3) + a*x])/(262144*b^11*x^(4/3)) - (16
900975*a^10*Sqrt[b*x^(2/3) + a*x])/(1048576*b^12*x) + (50702925*a
^11*Sqrt[b*x^(2/3) + a*x])/(2097152*b^13*x^(2/3)) - (50702925*a^1
2*ArcTanh[(Sqrt[b]*x^(1/3))/Sqrt[b*x^(2/3) + a*x]])/(2097152*b^(2
7/2))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{16900975a^{10}\int \frac{1}{x^{\frac{4}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}\,dx}{1572864b^{11}}+\frac{3380195a^9\sqrt{ax+bx^{\frac{2}{3}}}}{262144b^{11}x^{\frac{4}{3}}}-\frac{1448655a^8\sqrt{ax+bx^{\frac{2}{3}}}}{131072b^{10}x^{\frac{5}{3}}}+\frac{482885a^7\sqrt{ax+bx^{\frac{2}{3}}}}{49152b^9x^2}-\frac{2414425a^6\sqrt{ax+bx^{\frac{2}{3}}}}{270336b^8x^{\frac{7}{3}}}+\frac{185725a^5\sqrt{ax+bx^{\frac{2}{3}}}}{22528b^7x^{\frac{8}{3}}}-\frac{260015a^4\sqrt{ax+bx^{\frac{2}{3}}}}{33792b^6x^3}+\frac{15295a^3\sqrt{ax+bx^{\frac{2}{3}}}}{2112b^5x^{\frac{10}{3}}}-\frac{2415a^2\sqrt{ax+bx^{\frac{2}{3}}}}{352b^4x^{\frac{11}{3}}}+\frac{575a\sqrt{ax+bx^{\frac{2}{3}}}}{88b^3x^4}+\frac{6}{bx^{\frac{11}{3}}\sqrt{ax+bx^{\frac{2}{3}}}}-\frac{25\sqrt{ax+bx^{\frac{2}{3}}}}{4b^2x^{\frac{13}{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**(2/3)+a*x)**(3/2),x)
```

```
[Out] 16900975*a**10*Integral(1/(x**(4/3)*sqrt(a*x + b*x**(2/3))), x)/(
1572864*b**11) + 3380195*a**9*sqrt(a*x + b*x**(2/3))/(262144*b**1
1*x**(4/3)) - 1448655*a**8*sqrt(a*x + b*x**(2/3))/(131072*b**10*x
**(5/3)) + 482885*a**7*sqrt(a*x + b*x**(2/3))/(49152*b**9*x**2) -
 2414425*a**6*sqrt(a*x + b*x**(2/3))/(270336*b**8*x**(7/3)) + 185
725*a**5*sqrt(a*x + b*x**(2/3))/(22528*b**7*x**(8/3)) - 260015*a*
*4*sqrt(a*x + b*x**(2/3))/(33792*b**6*x**3) + 15295*a**3*sqrt(a*x
 + b*x**(2/3))/(2112*b**5*x**(10/3)) - 2415*a**2*sqrt(a*x + b*x**
(2/3))/(352*b**4*x**(11/3)) + 575*a*sqrt(a*x + b*x**(2/3))/(88*b*
*3*x**4) + 6/(b*x**(11/3)*sqrt(a*x + b*x**(2/3))) - 25*sqrt(a*x +
 b*x**(2/3))/(4*b**2*x**(13/3))
```

Mathematica [A] time = 0.718174, size = 224, normalized size = 0.54

$$\frac{\frac{\sqrt{b}\sqrt{ax+bx^{2/3}}\left(1673196525a^{12}x^4+557732175a^{11}bx^{11/3}-223092870a^{10}b^2x^{10/3}+127481640a^9b^3x^3-84987760a^8b^4x^{8/3}+61809280a^7b^5x^{7/3}-47545600a^6b^6x^2+3803\right.}{x^{13/3}\left(a\sqrt[3]{x}+b\right)}}{69206016}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^4*(b*x^(2/3) + a*x)^(3/2)),x]
```

```
[Out] ((Sqrt[b]*Sqrt[b*x^(2/3) + a*x]*(-17301504*b^12 + 19660800*a*b^11
*x^(1/3) - 22609920*a^2*b^10*x^(2/3) + 26378240*a^3*b^9*x - 31324
160*a^4*b^8*x^(4/3) + 38036480*a^5*b^7*x^(5/3) - 47545600*a^6*b^6
*x^2 + 61809280*a^7*b^5*x^(7/3) - 84987760*a^8*b^4*x^(8/3) + 1274
81640*a^9*b^3*x^3 - 223092870*a^10*b^2*x^(10/3) + 557732175*a^11*
b*x^(11/3) + 1673196525*a^12*x^4))/((b + a*x^(1/3))*x^(13/3)) - 1
673196525*a^12*ArcTanh[Sqrt[b*x^(2/3) + a*x]/(Sqrt[b]*x^(1/3))])/
(69206016*b^(27/2))
```

Maple [A] time = 0.037, size = 192, normalized size = 0.5

$$-\frac{1}{69206016\,x^3}\left(b+a\sqrt[3]{x}\right)\left(-1673196525\,x^4a^{12}\sqrt{b}-557732175\,x^{11/3}b^{3/2}a^{11}+223092870\,x^{10/3}b^{5/2}a^{10}-127481640\,x^3b^{7/2}a^9\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^(2/3)+a*x)^(3/2),x)
```

```
[Out] -1/69206016*(b+a*x^(1/3))*(-1673196525*x^4*a^12*b^(1/2)-557732175
*x^(11/3)*b^(3/2)*a^11+223092870*x^(10/3)*b^(5/2)*a^10-127481640*
x^3*b^(7/2)*a^9+84987760*x^(8/3)*b^(9/2)*a^8-61809280*x^(7/3)*b^(
11/2)*a^7+47545600*x^2*b^(13/2)*a^6-38036480*x^(5/3)*b^(15/2)*a^5
+31324160*x^(4/3)*b^(17/2)*a^4-26378240*x*b^(19/2)*a^3+22609920*x
```

```
^(2/3)*b^(21/2)*a^2-19660800*x^(1/3)*b^(23/2)*a+1673196525*(b+a*x
^(1/3))^(1/2)*arctanh((b+a*x^(1/3))^(1/2)/b^(1/2))*x^4*a^12+17301
504*b^(25/2))/x^3/(b*x^(2/3)+a*x)^(3/2)/b^(27/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^4),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^4),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**(2/3)+a*x)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.770853, size = 373, normalized size = 0.91

$$\frac{50702925\,a^{12}\arctan\left(\frac{\sqrt{ax^{\frac{1}{3}}+b}}{\sqrt{-b}}\right)}{2097152\,\sqrt{-b}b^{13}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}+\frac{6\,a^{12}}{\sqrt{ax^{\frac{1}{3}}+b}b^{13}\mathrm{sign}\left(x^{\frac{1}{3}}\right)}$$
$$+\frac{1257960429\left(ax^{\frac{1}{3}}+b\right)^{\frac{23}{2}}a^{12}-14537792973\left(ax^{\frac{1}{3}}+b\right)^{\frac{21}{2}}a^{12}b+76667241519\left(ax^{\frac{1}{3}}+b\right)^{\frac{19}{2}}a^{12}b^{2}-243717614415\left(ax^{\frac{1}{3}}+b\right)}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((a*x + b*x^(2/3))^(3/2)*x^4),x, algorithm="giac")

[Out] 50702925/2097152*a^12*arctan(sqrt(a*x^(1/3) + b)/sqrt(-b))/(sqrt(
-b)*b^13*sign(x^(1/3))) + 6*a^12/(sqrt(a*x^(1/3) + b)*b^13*sign(x
^(1/3))) + 1/69206016*(1257960429*(a*x^(1/3) + b)^(23/2)*a^12 - 1
4537792973*(a*x^(1/3) + b)^(21/2)*a^12*b + 76667241519*(a*x^(1/3)
 + b)^(19/2)*a^12*b^2 - 243717614415*(a*x^(1/3) + b)^(17/2)*a^12*
```

```
b^3 + 519393101810*(a*x^(1/3) + b)^(15/2)*a^12*b^4 - 780150847218
*(a*x^(1/3) + b)^(13/2)*a^12*b^5 + 844265343246*(a*x^(1/3) + b)^(
11/2)*a^12*b^6 - 659969685518*(a*x^(1/3) + b)^(9/2)*a^12*b^7 + 36
6679446705*(a*x^(1/3) + b)^(7/2)*a^12*b^8 - 138840292305*(a*x^(1/
3) + b)^(5/2)*a^12*b^9 + 32660709939*(a*x^(1/3) + b)^(3/2)*a^12*b
^10 - 3724872723*sqrt(a*x^(1/3) + b)*a^12*b^11)/(a^12*b^13*x^4*si
gn(x^(1/3)))
```

3.203 $\int x^2 \left(ax^2 + bx^3\right) \, dx$

Optimal. Leaf size=17

$$\frac{ax^5}{5} + \frac{bx^6}{6}$$

```
[Out] (a*x^5)/5 + (b*x^6)/6
```

Rubi [A] time = 0.0144111, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$

$$\frac{ax^5}{5} + \frac{bx^6}{6}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(a*x^2 + b*x^3),x]

[Out] (a*x^5)/5 + (b*x^6)/6
```

Rubi in Sympy [A] time = 3.66584, size = 12, normalized size = 0.71

$$\frac{ax^5}{5} + \frac{bx^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**2*(b*x**3+a*x**2),x)

[Out] a*x**5/5 + b*x**6/6
```

Mathematica [A] time = 0.00155928, size = 17, normalized size = 1.

$$\frac{ax^5}{5} + \frac{bx^6}{6}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(a*x^2 + b*x^3),x]

[Out] (a*x^5)/5 + (b*x^6)/6
```

Maple [A] time = 0.001, size = 14, normalized size = 0.8

$$\frac{ax^5}{5} + \frac{bx^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(b*x^3+a*x^2),x)

[Out] 1/5*a*x^5+1/6*b*x^6
```

Maxima [A] time = 1.38013, size = 18, normalized size = 1.06

$$\frac{1}{6}\,bx^6 + \frac{1}{5}\,ax^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)*x^2,x, algorithm="maxima")
```

```
[Out] 1/6*b*x^6 + 1/5*a*x^5
```

Fricas [A] time = 0.220656, size = 1, normalized size = 0.06

$$\frac{1}{6}x^6b + \frac{1}{5}x^5a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)*x^2,x, algorithm="fricas")
```

```
[Out] 1/6*x^6*b + 1/5*x^5*a
```

Sympy [A] time = 0.065888, size = 12, normalized size = 0.71

$$\frac{ax^5}{5} + \frac{bx^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a*x**2),x)
```

```
[Out] a*x**5/5 + b*x**6/6
```

GIAC/XCAS [A] time = 0.215441, size = 18, normalized size = 1.06

$$\frac{1}{6}\,bx^6 + \frac{1}{5}\,ax^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)*x^2,x, algorithm="giac")
```

```
[Out] 1/6*b*x^6 + 1/5*a*x^5
```

3.204 $\int x\left(ax^2+bx^3\right)\,dx$

Optimal. Leaf size=17

$$\frac{ax^4}{4}+\frac{bx^5}{5}$$

```
[Out] (a*x^4)/4 + (b*x^5)/5
```

Rubi [A] time = 0.0160158, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{ax^4}{4}+\frac{bx^5}{5}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a*x^2 + b*x^3),x]

[Out] (a*x^4)/4 + (b*x^5)/5
```

Rubi in Sympy [A] time = 3.56007, size = 12, normalized size = 0.71

$$\frac{ax^4}{4}+\frac{bx^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a*x**2),x)

[Out] a*x**4/4 + b*x**5/5
```

Mathematica [A] time = 0.00158456, size = 17, normalized size = 1.

$$\frac{ax^4}{4}+\frac{bx^5}{5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(a*x^2 + b*x^3),x]

[Out] (a*x^4)/4 + (b*x^5)/5
```

Maple [A] time = 0.001, size = 14, normalized size = 0.8

$$\frac{ax^4}{4}+\frac{bx^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a*x^2),x)

[Out] 1/4*a*x^4+1/5*b*x^5
```

Maxima [A] time = 1.37514, size = 18, normalized size = 1.06

$$\frac{1}{5}\,bx^5 + \frac{1}{4}\,ax^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)*x,x, algorithm="maxima")
```

```
[Out] 1/5*b*x^5 + 1/4*a*x^4
```

Fricas [A] time = 0.211404, size = 1, normalized size = 0.06

$$\frac{1}{5}x^5b + \frac{1}{4}x^4a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)*x,x, algorithm="fricas")
```

```
[Out] 1/5*x^5*b + 1/4*x^4*a
```

Sympy [A] time = 0.063603, size = 12, normalized size = 0.71

$$\frac{ax^4}{4} + \frac{bx^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a*x**2),x)
```

```
[Out] a*x**4/4 + b*x**5/5
```

GIAC/XCAS [A] time = 0.214607, size = 18, normalized size = 1.06

$$\frac{1}{5}\,bx^5 + \frac{1}{4}\,ax^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)*x,x, algorithm="giac")
```

```
[Out] 1/5*b*x^5 + 1/4*a*x^4
```

3.205 $\int (ax^2 + bx^3)\, dx$

Optimal. Leaf size=17

$$\frac{ax^3}{3} + \frac{bx^4}{4}$$

```
[Out] (a*x^3)/3 + (b*x^4)/4
```

Rubi [A] time = 0.012638, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 0, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.

$$\frac{ax^3}{3} + \frac{bx^4}{4}$$

Antiderivative was successfully verified.

```
[In]  Int[a*x^2 + b*x^3,x]

[Out] (a*x^3)/3 + (b*x^4)/4
```

Rubi in Sympy [A] time = 1.60994, size = 12, normalized size = 0.71

$$\frac{ax^3}{3} + \frac{bx^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(b*x**3+a*x**2,x)

[Out] a*x**3/3 + b*x**4/4
```

Mathematica [A] time = 0.0000719962, size = 17, normalized size = 1.

$$\frac{ax^3}{3} + \frac{bx^4}{4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[a*x^2 + b*x^3,x]

[Out] (a*x^3)/3 + (b*x^4)/4
```

Maple [A] time = 0.002, size = 14, normalized size = 0.8

$$\frac{ax^3}{3} + \frac{bx^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(b*x^3+a*x^2,x)

[Out] 1/3*a*x^3+1/4*b*x^4
```

Maxima [A] time = 1.38127, size = 18, normalized size = 1.06

$$\frac{1}{4}\,bx^{4} + \frac{1}{3}\,ax^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(b*x^3 + a*x^2,x, algorithm="maxima")
```

```
[Out] 1/4*b*x^4 + 1/3*a*x^3
```

Fricas [A] time = 0.188549, size = 1, normalized size = 0.06

$$\frac{1}{4}x^{4}b + \frac{1}{3}x^{3}a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(b*x^3 + a*x^2,x, algorithm="fricas")
```

```
[Out] 1/4*x^4*b + 1/3*x^3*a
```

Sympy [A] time = 0.059717, size = 12, normalized size = 0.71

$$\frac{ax^{3}}{3} + \frac{bx^{4}}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(b*x**3+a*x**2,x)
```

```
[Out] a*x**3/3 + b*x**4/4
```

GIAC/XCAS [A] time = 0.215297, size = 18, normalized size = 1.06

$$\frac{1}{4}\,bx^{4} + \frac{1}{3}\,ax^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(b*x^3 + a*x^2,x, algorithm="giac")
```

```
[Out] 1/4*b*x^4 + 1/3*a*x^3
```

3.206 $\int \frac{ax^2+bx^3}{x} \, dx$

Optimal. Leaf size=17

$$\frac{ax^2}{2} + \frac{bx^3}{3}$$

```
[Out] (a*x^2)/2 + (b*x^3)/3
```

Rubi [A] time = 0.0158174, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067

$$\frac{ax^2}{2} + \frac{bx^3}{3}$$

Antiderivative was successfully verified.

```
[In] Int[(a*x^2 + b*x^3)/x,x]

[Out] (a*x^2)/2 + (b*x^3)/3
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$a \int x \, dx + \frac{bx^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a*x**2)/x,x)

[Out] a*Integral(x, x) + b*x**3/3
```

Mathematica [A] time = 0.00149464, size = 17, normalized size = 1.

$$\frac{ax^2}{2} + \frac{bx^3}{3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*x^2 + b*x^3)/x,x]

[Out] (a*x^2)/2 + (b*x^3)/3
```

Maple [A] time = 0.002, size = 14, normalized size = 0.8

$$\frac{ax^2}{2} + \frac{bx^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^3+a*x^2)/x,x)

[Out] 1/2*a*x^2+1/3*b*x^3
```

Maxima [A] time = 1.37522, size = 18, normalized size = 1.06

$$\frac{1}{3}\,bx^3 + \frac{1}{2}\,ax^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)/x,x, algorithm="maxima")
```

```
[Out] 1/3*b*x^3 + 1/2*a*x^2
```

Fricas [A] time = 0.206781, size = 18, normalized size = 1.06

$$\frac{1}{3}\,bx^3 + \frac{1}{2}\,ax^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)/x,x, algorithm="fricas")
```

```
[Out] 1/3*b*x^3 + 1/2*a*x^2
```

Sympy [A] time = 0.060467, size = 12, normalized size = 0.71

$$\frac{ax^2}{2} + \frac{bx^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)/x,x)
```

```
[Out] a*x**2/2 + b*x**3/3
```

GIAC/XCAS [A] time = 0.215668, size = 18, normalized size = 1.06

$$\frac{1}{3}\,bx^3 + \frac{1}{2}\,ax^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)/x,x, algorithm="giac")
```

```
[Out] 1/3*b*x^3 + 1/2*a*x^2
```

3.207 $\int \frac{ax^2+bx^3}{x^2} \, dx$

Optimal. Leaf size=12

$$ax + \frac{bx^2}{2}$$

```
[Out] a*x + (b*x^2)/2
```

Rubi [A] time = 0.0123369, antiderivative size = 12, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$

$$ax + \frac{bx^2}{2}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)/x^2,x]

[Out] a*x + (b*x^2)/2
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$b \int x \, dx + \int a \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)/x**2,x)

[Out] b*Integral(x, x) + Integral(a, x)
```

Mathematica [A] time = 0.000847315, size = 12, normalized size = 1.

$$ax + \frac{bx^2}{2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)/x^2,x]

[Out] a*x + (b*x^2)/2
```

Maple [A] time = 0.002, size = 11, normalized size = 0.9

$$ax + \frac{bx^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)/x^2,x)

[Out] a*x+1/2*b*x^2
```

Maxima [A] time = 1.39166, size = 14, normalized size = 1.17

$$\frac{1}{2}bx^2 + ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*b*x^2 + a*x
```

Fricas [A] time = 0.211376, size = 14, normalized size = 1.17

$$\frac{1}{2}bx^2 + ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)/x^2,x, algorithm="fricas")
```

```
[Out] 1/2*b*x^2 + a*x
```

Sympy [A] time = 0.066234, size = 8, normalized size = 0.67

$$ax + \frac{bx^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)/x**2,x)
```

```
[Out] a*x + b*x**2/2
```

GIAC/XCAS [A] time = 0.217009, size = 14, normalized size = 1.17

$$\frac{1}{2}bx^2 + ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)/x^2,x, algorithm="giac")
```

```
[Out] 1/2*b*x^2 + a*x
```

3.208 $\int x^2 \left(ax^2+bx^3\right)^2 \, dx$

Optimal. Leaf size=30

$$\frac{a^2x^7}{7}+\frac{1}{4}abx^8+\frac{b^2x^9}{9}$$

```
[Out] (a^2*x^7)/7 + (a*b*x^8)/4 + (b^2*x^9)/9
```

Rubi [A] time = 0.0557625, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{a^2x^7}{7}+\frac{1}{4}abx^8+\frac{b^2x^9}{9}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(a*x^2 + b*x^3)^2,x]

[Out] (a^2*x^7)/7 + (a*b*x^8)/4 + (b^2*x^9)/9
```

Rubi in Sympy [A] time = 8.06149, size = 24, normalized size = 0.8

$$\frac{a^2x^7}{7}+\frac{abx^8}{4}+\frac{b^2x^9}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a*x**2)**2,x)

[Out] a**2*x**7/7 + a*b*x**8/4 + b**2*x**9/9
```

Mathematica [A] time = 0.0026613, size = 30, normalized size = 1.

$$\frac{a^2x^7}{7}+\frac{1}{4}abx^8+\frac{b^2x^9}{9}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(a*x^2 + b*x^3)^2,x]

[Out] (a^2*x^7)/7 + (a*b*x^8)/4 + (b^2*x^9)/9
```

Maple [A] time = 0.001, size = 25, normalized size = 0.8

$$\frac{a^2x^7}{7}+\frac{abx^8}{4}+\frac{b^2x^9}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a*x^2)^2,x)

[Out] 1/7*a^2*x^7+1/4*a*b*x^8+1/9*b^2*x^9
```

Maxima [A] time = 1.3788, size = 32, normalized size = 1.07

$$\frac{1}{9}b^2x^9 + \frac{1}{4}abx^8 + \frac{1}{7}a^2x^7$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2*x^2,x, algorithm="maxima")
```

```
[Out] 1/9*b^2*x^9 + 1/4*a*b*x^8 + 1/7*a^2*x^7
```

Fricas [A] time = 0.195328, size = 1, normalized size = 0.03

$$\frac{1}{9}x^9b^2 + \frac{1}{4}x^8ba + \frac{1}{7}x^7a^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2*x^2,x, algorithm="fricas")
```

```
[Out] 1/9*x^9*b^2 + 1/4*x^8*b*a + 1/7*x^7*a^2
```

Sympy [A] time = 0.094223, size = 24, normalized size = 0.8

$$\frac{a^2x^7}{7} + \frac{abx^8}{4} + \frac{b^2x^9}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a*x**2)**2,x)
```

```
[Out] a**2*x**7/7 + a*b*x**8/4 + b**2*x**9/9
```

GIAC/XCAS [A] time = 0.216634, size = 32, normalized size = 1.07

$$\frac{1}{9}b^2x^9 + \frac{1}{4}abx^8 + \frac{1}{7}a^2x^7$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2*x^2,x, algorithm="giac")
```

```
[Out] 1/9*b^2*x^9 + 1/4*a*b*x^8 + 1/7*a^2*x^7
```

3.209 $\int x \left(ax^2+bx^3\right)^2 \, dx$

Optimal. Leaf size=30

$$\frac{a^2x^6}{6}+\frac{2}{7}abx^7+\frac{b^2x^8}{8}$$

```
[Out] (a^2*x^6)/6 + (2*a*b*x^7)/7 + (b^2*x^8)/8
```

Rubi [A] time = 0.0470887, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{a^2x^6}{6}+\frac{2}{7}abx^7+\frac{b^2x^8}{8}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a*x^2 + b*x^3)^2,x]

[Out] (a^2*x^6)/6 + (2*a*b*x^7)/7 + (b^2*x^8)/8
```

Rubi in Sympy [A] time = 7.52156, size = 26, normalized size = 0.87

$$\frac{a^2x^6}{6}+\frac{2abx^7}{7}+\frac{b^2x^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a*x**2)**2,x)

[Out] a**2*x**6/6 + 2*a*b*x**7/7 + b**2*x**8/8
```

Mathematica [A] time = 0.00316111, size = 30, normalized size = 1.

$$\frac{a^2x^6}{6}+\frac{2}{7}abx^7+\frac{b^2x^8}{8}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(a*x^2 + b*x^3)^2,x]

[Out] (a^2*x^6)/6 + (2*a*b*x^7)/7 + (b^2*x^8)/8
```

Maple [A] time = 0., size = 25, normalized size = 0.8

$$\frac{a^2x^6}{6}+\frac{2\,abx^7}{7}+\frac{b^2x^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a*x^2)^2,x)

[Out] 1/6*a^2*x^6+2/7*a*b*x^7+1/8*b^2*x^8
```

Maxima [A] time = 1.42729, size = 32, normalized size = 1.07

$$\frac{1}{8}\,b^2x^8 + \frac{2}{7}\,abx^7 + \frac{1}{6}\,a^2x^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2*x,x, algorithm="maxima")
```

```
[Out] 1/8*b^2*x^8 + 2/7*a*b*x^7 + 1/6*a^2*x^6
```

Fricas [A] time = 0.193738, size = 1, normalized size = 0.03

$$\frac{1}{8}x^8b^2 + \frac{2}{7}x^7ba + \frac{1}{6}x^6a^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2*x,x, algorithm="fricas")
```

```
[Out] 1/8*x^8*b^2 + 2/7*x^7*b*a + 1/6*x^6*a^2
```

Sympy [A] time = 0.091962, size = 26, normalized size = 0.87

$$\frac{a^2x^6}{6} + \frac{2abx^7}{7} + \frac{b^2x^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a*x**2)**2,x)
```

```
[Out] a**2*x**6/6 + 2*a*b*x**7/7 + b**2*x**8/8
```

GIAC/XCAS [A] time = 0.217163, size = 32, normalized size = 1.07

$$\frac{1}{8}\,b^2x^8 + \frac{2}{7}\,abx^7 + \frac{1}{6}\,a^2x^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2*x,x, algorithm="giac")
```

```
[Out] 1/8*b^2*x^8 + 2/7*a*b*x^7 + 1/6*a^2*x^6
```

3.210 $\int \left(ax^2+bx^3\right)^2 \, dx$

Optimal. Leaf size=30

$$\frac{a^2x^5}{5}+\frac{1}{3}abx^6+\frac{b^2x^7}{7}$$

```
[Out] (a^2*x^5)/5 + (a*b*x^6)/3 + (b^2*x^7)/7
```

Rubi [A] time = 0.0405498, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{a^2x^5}{5}+\frac{1}{3}abx^6+\frac{b^2x^7}{7}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^2,x]

[Out] (a^2*x^5)/5 + (a*b*x^6)/3 + (b^2*x^7)/7
```

Rubi in Sympy [A] time = 3.28217, size = 24, normalized size = 0.8

$$\frac{a^2x^5}{5}+\frac{abx^6}{3}+\frac{b^2x^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**2,x)

[Out] a**2*x**5/5 + a*b*x**6/3 + b**2*x**7/7
```

Mathematica [A] time = 0.00244595, size = 30, normalized size = 1.

$$\frac{a^2x^5}{5}+\frac{1}{3}abx^6+\frac{b^2x^7}{7}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^2,x]

[Out] (a^2*x^5)/5 + (a*b*x^6)/3 + (b^2*x^7)/7
```

Maple [A] time = 0.001, size = 25, normalized size = 0.8

$$\frac{a^2x^5}{5}+\frac{abx^6}{3}+\frac{b^2x^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^2,x)

[Out] 1/5*a^2*x^5+1/3*a*b*x^6+1/7*b^2*x^7
```

Maxima [A] time = 1.46792, size = 32, normalized size = 1.07

$$\frac{1}{7}\,b^2x^7+\frac{1}{3}\,abx^6+\frac{1}{5}\,a^2x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2,x, algorithm="maxima")

[Out] 1/7*b^2*x^7 + 1/3*a*b*x^6 + 1/5*a^2*x^5
```

Fricas [A] time = 0.188083, size = 1, normalized size = 0.03

$$\frac{1}{7}x^7b^2+\frac{1}{3}x^6ba+\frac{1}{5}x^5a^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2,x, algorithm="fricas")

[Out] 1/7*x^7*b^2 + 1/3*x^6*b*a + 1/5*x^5*a^2
```

Sympy [A] time = 0.087906, size = 24, normalized size = 0.8

$$\frac{a^2x^5}{5}+\frac{abx^6}{3}+\frac{b^2x^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**2,x)

[Out] a**2*x**5/5 + a*b*x**6/3 + b**2*x**7/7
```

GIAC/XCAS [A] time = 0.217867, size = 32, normalized size = 1.07

$$\frac{1}{7}\,b^2x^7+\frac{1}{3}\,abx^6+\frac{1}{5}\,a^2x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2,x, algorithm="giac")

[Out] 1/7*b^2*x^7 + 1/3*a*b*x^6 + 1/5*a^2*x^5
```

3.211 $\int \frac{(ax^2+bx^3)^2}{x} dx$

Optimal. Leaf size=30

$$\frac{a^2x^4}{4} + \frac{2}{5}abx^5 + \frac{b^2x^6}{6}$$

[Out] (a^2*x^4)/4 + (2*a*b*x^5)/5 + (b^2*x^6)/6

Rubi [A] time = 0.0397211, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{a^2x^4}{4} + \frac{2}{5}abx^5 + \frac{b^2x^6}{6}$$

Antiderivative was successfully verified.

[In] Int[(a*x^2 + b*x^3)^2/x,x]

[Out] (a^2*x^4)/4 + (2*a*b*x^5)/5 + (b^2*x^6)/6

Rubi in Sympy [A] time = 6.93237, size = 26, normalized size = 0.87

$$\frac{a^2x^4}{4} + \frac{2abx^5}{5} + \frac{b^2x^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] rubi_integrate((b*x**3+a*x**2)**2/x,x)

[Out] a**2*x**4/4 + 2*a*b*x**5/5 + b**2*x**6/6

Mathematica [A] time = 0.00241619, size = 30, normalized size = 1.

$$\frac{a^2x^4}{4} + \frac{2}{5}abx^5 + \frac{b^2x^6}{6}$$

Antiderivative was successfully verified.

[In] Integrate[(a*x^2 + b*x^3)^2/x,x]

[Out] (a^2*x^4)/4 + (2*a*b*x^5)/5 + (b^2*x^6)/6

Maple [A] time = 0.002, size = 25, normalized size = 0.8

$$\frac{a^2x^4}{4} + \frac{2\,abx^5}{5} + \frac{b^2x^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((b*x^3+a*x^2)^2/x,x)

[Out] 1/4*a^2*x^4+2/5*a*b*x^5+1/6*b^2*x^6

Maxima [A] time = 1.40459, size = 32, normalized size = 1.07

$$\frac{1}{6}\,b^2x^6 + \frac{2}{5}\,abx^5 + \frac{1}{4}\,a^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2/x,x, algorithm="maxima")
```

```
[Out] 1/6*b^2*x^6 + 2/5*a*b*x^5 + 1/4*a^2*x^4
```

Fricas [A] time = 0.198338, size = 32, normalized size = 1.07

$$\frac{1}{6}\,b^2x^6 + \frac{2}{5}\,abx^5 + \frac{1}{4}\,a^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2/x,x, algorithm="fricas")
```

```
[Out] 1/6*b^2*x^6 + 2/5*a*b*x^5 + 1/4*a^2*x^4
```

Sympy [A] time = 0.086975, size = 26, normalized size = 0.87

$$\frac{a^2x^4}{4} + \frac{2abx^5}{5} + \frac{b^2x^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**2/x,x)
```

```
[Out] a**2*x**4/4 + 2*a*b*x**5/5 + b**2*x**6/6
```

GIAC/XCAS [A] time = 0.217166, size = 32, normalized size = 1.07

$$\frac{1}{6}\,b^2x^6 + \frac{2}{5}\,abx^5 + \frac{1}{4}\,a^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2/x,x, algorithm="giac")
```

```
[Out] 1/6*b^2*x^6 + 2/5*a*b*x^5 + 1/4*a^2*x^4
```

3.212 $\int \frac{(ax^2+bx^3)^2}{x^2}\,dx$

Optimal. Leaf size=30

$$\frac{a^2x^3}{3}+\frac{1}{2}abx^4+\frac{b^2x^5}{5}$$

```
[Out] (a^2*x^3)/3 + (a*b*x^4)/2 + (b^2*x^5)/5
```

Rubi [A] time = 0.0359229, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{a^2x^3}{3}+\frac{1}{2}abx^4+\frac{b^2x^5}{5}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^2/x^2,x]

[Out] (a^2*x^3)/3 + (a*b*x^4)/2 + (b^2*x^5)/5
```

Rubi in Sympy [A] time = 6.53583, size = 24, normalized size = 0.8

$$\frac{a^2x^3}{3}+\frac{abx^4}{2}+\frac{b^2x^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**2/x**2,x)

[Out] a**2*x**3/3 + a*b*x**4/2 + b**2*x**5/5
```

Mathematica [A] time = 0.00246771, size = 30, normalized size = 1.

$$\frac{a^2x^3}{3}+\frac{1}{2}abx^4+\frac{b^2x^5}{5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^2/x^2,x]

[Out] (a^2*x^3)/3 + (a*b*x^4)/2 + (b^2*x^5)/5
```

Maple [A] time = 0.002, size = 25, normalized size = 0.8

$$\frac{a^2x^3}{3}+\frac{abx^4}{2}+\frac{b^2x^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^2/x^2,x)

[Out] 1/3*a^2*x^3+1/2*a*b*x^4+1/5*b^2*x^5
```

Maxima [A] time = 1.41897, size = 32, normalized size = 1.07

$$\frac{1}{5}\,b^2x^5 + \frac{1}{2}\,abx^4 + \frac{1}{3}\,a^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2/x^2,x, algorithm="maxima")
```

```
[Out] 1/5*b^2*x^5 + 1/2*a*b*x^4 + 1/3*a^2*x^3
```

Fricas [A] time = 0.202412, size = 32, normalized size = 1.07

$$\frac{1}{5}\,b^2x^5 + \frac{1}{2}\,abx^4 + \frac{1}{3}\,a^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2/x^2,x, algorithm="fricas")
```

```
[Out] 1/5*b^2*x^5 + 1/2*a*b*x^4 + 1/3*a^2*x^3
```

Sympy [A] time = 0.08775, size = 24, normalized size = 0.8

$$\frac{a^2x^3}{3} + \frac{abx^4}{2} + \frac{b^2x^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**2/x**2,x)
```

```
[Out] a**2*x**3/3 + a*b*x**4/2 + b**2*x**5/5
```

GIAC/XCAS [A] time = 0.217032, size = 32, normalized size = 1.07

$$\frac{1}{5}\,b^2x^5 + \frac{1}{2}\,abx^4 + \frac{1}{3}\,a^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^2/x^2,x, algorithm="giac")
```

```
[Out] 1/5*b^2*x^5 + 1/2*a*b*x^4 + 1/3*a^2*x^3
```

3.213 $\int \frac{x^6}{ax^2+bx^3} \, dx$

Optimal. Leaf size=57

$$\frac{a^4 \log(a+bx)}{b^5} - \frac{a^3 x}{b^4} + \frac{a^2 x^2}{2b^3} - \frac{a x^3}{3b^2} + \frac{x^4}{4b}$$

```
[Out] -((a^3*x)/b^4) + (a^2*x^2)/(2*b^3) - (a*x^3)/(3*b^2) + x^4/(4*b)
+ (a^4*Log[a + b*x])/b^5
```

Rubi [A] time = 0.070891, antiderivative size = 57, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{a^4 \log(a+bx)}{b^5} - \frac{a^3 x}{b^4} + \frac{a^2 x^2}{2b^3} - \frac{a x^3}{3b^2} + \frac{x^4}{4b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/(a*x^2 + b*x^3),x]
```

```
[Out] -((a^3*x)/b^4) + (a^2*x^2)/(2*b^3) - (a*x^3)/(3*b^2) + x^4/(4*b)
+ (a^4*Log[a + b*x])/b^5
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{a^4 \log(a+bx)}{b^5} + \frac{a^2 \int x \, dx}{b^3} - \frac{a x^3}{3b^2} + \frac{x^4}{4b} - \frac{\int a^3 \, dx}{b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(b*x**3+a*x**2),x)
```

```
[Out] a**4*log(a + b*x)/b**5 + a**2*Integral(x, x)/b**3 - a*x**3/(3*b**
2) + x**4/(4*b) - Integral(a**3, x)/b**4
```

Mathematica [A] time = 0.00739385, size = 57, normalized size = 1.

$$\frac{a^4 \log(a+bx)}{b^5} - \frac{a^3 x}{b^4} + \frac{a^2 x^2}{2b^3} - \frac{a x^3}{3b^2} + \frac{x^4}{4b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^6/(a*x^2 + b*x^3),x]
```

```
[Out] -((a^3*x)/b^4) + (a^2*x^2)/(2*b^3) - (a*x^3)/(3*b^2) + x^4/(4*b)
+ (a^4*Log[a + b*x])/b^5
```

Maple [A] time = 0.005, size = 52, normalized size = 0.9

$$-\frac{x a^3}{b^4} + \frac{a^2 x^2}{2\,b^3} - \frac{a x^3}{3\,b^2} + \frac{x^4}{4\,b} + \frac{a^4 \ln(bx+a)}{b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(b*x^3+a*x^2),x)
```

```
[Out] -a^3*x/b^4+1/2*a^2*x^2/b^3-1/3*a*x^3/b^2+1/4*x^4/b+a^4*ln(b*x+a)/
b^5
```

Maxima [A] time = 1.37472, size = 70, normalized size = 1.23

$$\frac{a^4 \log(bx+a)}{b^5} + \frac{3\,b^3x^4 - 4\,ab^2x^3 + 6\,a^2bx^2 - 12\,a^3x}{12\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] a^4*log(b*x + a)/b^5 + 1/12*(3*b^3*x^4 - 4*a*b^2*x^3 + 6*a^2*b*x^
2 - 12*a^3*x)/b^4
```

Fricas [A] time = 0.204184, size = 70, normalized size = 1.23

$$\frac{3\,b^4x^4 - 4\,ab^3x^3 + 6\,a^2b^2x^2 - 12\,a^3bx + 12\,a^4\log(bx+a)}{12\,b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] 1/12*(3*b^4*x^4 - 4*a*b^3*x^3 + 6*a^2*b^2*x^2 - 12*a^3*b*x + 12*a
^4*log(b*x + a))/b^5
```

Sympy [A] time = 1.14161, size = 49, normalized size = 0.86

$$\frac{a^4 \log(a+bx)}{b^5} - \frac{a^3x}{b^4} + \frac{a^2x^2}{2b^3} - \frac{ax^3}{3b^2} + \frac{x^4}{4b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(b*x**3+a*x**2),x)
```

```
[Out] a**4*log(a + b*x)/b**5 - a**3*x/b**4 + a**2*x**2/(2*b**3) - a*x**
3/(3*b**2) + x**4/(4*b)
```

GIAC/XCAS [A] time = 0.219385, size = 72, normalized size = 1.26

$$\frac{a^4\ln(|bx+a|)}{b^5} + \frac{3\,b^3x^4 - 4\,ab^2x^3 + 6\,a^2bx^2 - 12\,a^3x}{12\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] a^4*ln(abs(b*x + a))/b^5 + 1/12*(3*b^3*x^4 - 4*a*b^2*x^3 + 6*a^2*
b*x^2 - 12*a^3*x)/b^4
```

3.214 $\int \frac{x^5}{ax^2+bx^3} \, dx$

Optimal. Leaf size=44

$$-\frac{a^3 \log(a+bx)}{b^4}+\frac{a^2 x}{b^3}-\frac{a x^2}{2 b^2}+\frac{x^3}{3 b}$$

```
[Out] (a^2*x)/b^3 - (a*x^2)/(2*b^2) + x^3/(3*b) - (a^3*Log[a + b*x])/b^
4
```

Rubi [A] time = 0.0535095, antiderivative size = 44, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$-\frac{a^3 \log(a+bx)}{b^4}+\frac{a^2 x}{b^3}-\frac{a x^2}{2 b^2}+\frac{x^3}{3 b}$$

Antiderivative was successfully verified.

```
[In] Int[x^5/(a*x^2 + b*x^3),x]
```

```
[Out] (a^2*x)/b^3 - (a*x^2)/(2*b^2) + x^3/(3*b) - (a^3*Log[a + b*x])/b^
4
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^3 \log(a+bx)}{b^4}-\frac{a \int x \, dx}{b^2}+\frac{x^3}{3b}+\frac{\int a^2 \, dx}{b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**5/(b*x**3+a*x**2),x)
```

```
[Out] -a**3*log(a + b*x)/b**4 - a*Integral(x, x)/b**2 + x**3/(3*b) + In
tegral(a**2, x)/b**3
```

Mathematica [A] time = 0.00554499, size = 44, normalized size = 1.

$$-\frac{a^3 \log(a+bx)}{b^4}+\frac{a^2 x}{b^3}-\frac{a x^2}{2 b^2}+\frac{x^3}{3 b}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5/(a*x^2 + b*x^3),x]
```

```
[Out] (a^2*x)/b^3 - (a*x^2)/(2*b^2) + x^3/(3*b) - (a^3*Log[a + b*x])/b^
4
```

Maple [A] time = 0.005, size = 41, normalized size = 0.9

$$\frac{a^2 x}{b^3}-\frac{a x^2}{2 b^2}+\frac{x^3}{3 b}-\frac{a^3 \ln(bx+a)}{b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5/(b*x^3+a*x^2),x)
```

```
[Out] a^2*x/b^3-1/2*a*x^2/b^2+1/3*x^3/b-a^3*ln(b*x+a)/b^4
```

Maxima [A] time = 1.3788, size = 57, normalized size = 1.3

$$-\frac{a^3 \log(bx+a)}{b^4} + \frac{2\,b^2x^3 - 3\,abx^2 + 6\,a^2x}{6\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] -a^3*log(b*x + a)/b^4 + 1/6*(2*b^2*x^3 - 3*a*b*x^2 + 6*a^2*x)/b^3
```

Fricas [A] time = 0.206827, size = 55, normalized size = 1.25

$$\frac{2\,b^3x^3 - 3\,ab^2x^2 + 6\,a^2bx - 6\,a^3 \log(bx+a)}{6\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] 1/6*(2*b^3*x^3 - 3*a*b^2*x^2 + 6*a^2*b*x - 6*a^3*log(b*x + a))/b^
4
```

Sympy [A] time = 1.13482, size = 37, normalized size = 0.84

$$-\frac{a^3 \log(a+bx)}{b^4} + \frac{a^2x}{b^3} - \frac{ax^2}{2b^2} + \frac{x^3}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a*x**2),x)
```

```
[Out] -a**3*log(a + b*x)/b**4 + a**2*x/b**3 - a*x**2/(2*b**2) + x**3/(3
*b)
```

GIAC/XCAS [A] time = 0.21741, size = 58, normalized size = 1.32

$$-\frac{a^3 \ln(|bx+a|)}{b^4} + \frac{2\,b^2x^3 - 3\,abx^2 + 6\,a^2x}{6\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] -a^3*ln(abs(b*x + a))/b^4 + 1/6*(2*b^2*x^3 - 3*a*b*x^2 + 6*a^2*x)
/b^3
```

3.215 $\int \frac{x^4}{ax^2+bx^3}\,dx$

Optimal. Leaf size=31

$$\frac{a^2\log(a+bx)}{b^3}-\frac{ax}{b^2}+\frac{x^2}{2b}$$

```
[Out] -((a*x)/b^2) + x^2/(2*b) + (a^2*Log[a + b*x])/b^3
```

Rubi [A] time = 0.0426045, antiderivative size = 31, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{a^2\log(a+bx)}{b^3}-\frac{ax}{b^2}+\frac{x^2}{2b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/(a*x^2 + b*x^3),x]
```

```
[Out] -((a*x)/b^2) + x^2/(2*b) + (a^2*Log[a + b*x])/b^3
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{a^2\log(a+bx)}{b^3}+\frac{\int x\,dx}{b}-\frac{\int a\,dx}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**3+a*x**2),x)
```

```
[Out] a**2*log(a + b*x)/b**3 + Integral(x, x)/b - Integral(a, x)/b**2
```

Mathematica [A] time = 0.00529348, size = 31, normalized size = 1.

$$\frac{a^2\log(a+bx)}{b^3}-\frac{ax}{b^2}+\frac{x^2}{2b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/(a*x^2 + b*x^3),x]
```

```
[Out] -((a*x)/b^2) + x^2/(2*b) + (a^2*Log[a + b*x])/b^3
```

Maple [A] time = 0.003, size = 30, normalized size = 1.

$$-\frac{ax}{b^2}+\frac{x^2}{2\,b}+\frac{a^2\ln(bx+a)}{b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a*x^2),x)
```

```
[Out] -a*x/b^2+1/2*x^2/b+a^2*ln(b*x+a)/b^3
```

Maxima [A] time = 1.37902, size = 39, normalized size = 1.26

$$\frac{a^2 \log(bx+a)}{b^3} + \frac{bx^2 - 2\,ax}{2\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] a^2*log(b*x + a)/b^3 + 1/2*(b*x^2 - 2*a*x)/b^2
```

Fricas [A] time = 0.206531, size = 39, normalized size = 1.26

$$\frac{b^2x^2 - 2\,abx + 2\,a^2 \log(bx+a)}{2\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] 1/2*(b^2*x^2 - 2*a*b*x + 2*a^2*log(b*x + a))/b^3
```

Sympy [A] time = 1.09562, size = 26, normalized size = 0.84

$$\frac{a^2 \log(a+bx)}{b^3} - \frac{ax}{b^2} + \frac{x^2}{2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a*x**2),x)
```

```
[Out] a**2*log(a + b*x)/b**3 - a*x/b**2 + x**2/(2*b)
```

GIAC/XCAS [A] time = 0.216817, size = 41, normalized size = 1.32

$$\frac{a^2 \ln(|bx+a|)}{b^3} + \frac{bx^2 - 2\,ax}{2\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] a^2*ln(abs(b*x + a))/b^3 + 1/2*(b*x^2 - 2*a*x)/b^2
```

3.216 $\int \frac{x^3}{ax^2+bx^3}\,dx$

Optimal. Leaf size=18

$$\frac{x}{b}-\frac{a\log(a+bx)}{b^2}$$

```
[Out] x/b - (a*Log[a + b*x])/b^2
```

Rubi [A] time = 0.0315174, antiderivative size = 18, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{x}{b}-\frac{a\log(a+bx)}{b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(a*x^2 + b*x^3),x]

[Out] x/b - (a*Log[a + b*x])/b^2
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a\log{(a+bx)}}{b^2}+\int\frac{1}{b}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a*x**2),x)

[Out] -a*log(a + b*x)/b**2 + Integral(1/b, x)
```

Mathematica [A] time = 0.00378476, size = 18, normalized size = 1.

$$\frac{x}{b}-\frac{a\log(a+bx)}{b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/(a*x^2 + b*x^3),x]

[Out] x/b - (a*Log[a + b*x])/b^2
```

Maple [A] time = 0.003, size = 19, normalized size = 1.1

$$\frac{x}{b}-\frac{a\ln(bx+a)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a*x^2),x)

[Out] x/b-a*ln(b*x+a)/b^2
```

Maxima [A] time = 1.37518, size = 24, normalized size = 1.33

$$\frac{x}{b} - \frac{a\log(bx+a)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] x/b - a*log(b*x + a)/b^2
```

Fricas [A] time = 0.211861, size = 23, normalized size = 1.28

$$\frac{bx - a\log(bx+a)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] (b*x - a*log(b*x + a))/b^2
```

Sympy [A] time = 1.0484, size = 14, normalized size = 0.78

$$-\frac{a\log(a+bx)}{b^2} + \frac{x}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a*x**2),x)
```

```
[Out] -a*log(a + b*x)/b**2 + x/b
```

GIAC/XCAS [A] time = 0.217641, size = 26, normalized size = 1.44

$$\frac{x}{b} - \frac{a\ln(|bx+a|)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] x/b - a*ln(abs(b*x + a))/b^2
```

3.217 $\int \frac{x^2}{ax^2+bx^3} \, dx$

Optimal. Leaf size=10

$$\frac{\log(a+bx)}{b}$$

```
[Out] Log[a + b*x]/b
```

Rubi [A] time = 0.0213208, antiderivative size = 10, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$\frac{\log(a+bx)}{b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(a*x^2 + b*x^3),x]

[Out] Log[a + b*x]/b
```

Rubi in Sympy [A] time = 2.80639, size = 7, normalized size = 0.7

$$\frac{\log(a+bx)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a*x**2),x)

[Out] log(a + b*x)/b
```

Mathematica [A] time = 0.00157528, size = 10, normalized size = 1.

$$\frac{\log(a+bx)}{b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(a*x^2 + b*x^3),x]

[Out] Log[a + b*x]/b
```

Maple [A] time = 0.001, size = 11, normalized size = 1.1

$$\frac{\ln(bx+a)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a*x^2),x)

[Out] ln(b*x+a)/b
```

Maxima [A] time = 1.39741, size = 14, normalized size = 1.4

$$\frac{\log(bx + a)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] log(b*x + a)/b
```

Fricas [A] time = 0.203565, size = 14, normalized size = 1.4

$$\frac{\log(bx + a)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] log(b*x + a)/b
```

Sympy [A] time = 0.091661, size = 7, normalized size = 0.7

$$\frac{\log(a + bx)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a*x**2),x)
```

```
[Out] log(a + b*x)/b
```

GIAC/XCAS [A] time = 0.219016, size = 15, normalized size = 1.5

$$\frac{\ln(|bx + a|)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] ln(abs(b*x + a))/b
```

3.218 $\int \frac{x}{ax^2+bx^3} \, dx$

Optimal. Leaf size=18

$$\frac{\log(x)}{a} - \frac{\log(a+bx)}{a}$$

```
[Out] Log[x]/a - Log[a + b*x]/a
```

Rubi [A] time = 0.0219345, antiderivative size = 18, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.267$

$$\frac{\log(x)}{a} - \frac{\log(a+bx)}{a}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(a*x^2 + b*x^3),x]

[Out] Log[x]/a - Log[a + b*x]/a
```

Rubi in Sympy [A] time = 4.5208, size = 12, normalized size = 0.67

$$\frac{\log(x)}{a} - \frac{\log(a+bx)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a*x**2),x)

[Out] log(x)/a - log(a + b*x)/a
```

Mathematica [A] time = 0.0056813, size = 18, normalized size = 1.

$$\frac{\log(x)}{a} - \frac{\log(a+bx)}{a}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(a*x^2 + b*x^3),x]

[Out] Log[x]/a - Log[a + b*x]/a
```

Maple [A] time = 0.008, size = 19, normalized size = 1.1

$$\frac{\ln(x)}{a} - \frac{\ln(bx+a)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a*x^2),x)

[Out] ln(x)/a-ln(b*x+a)/a
```

Maxima [A] time = 1.38077, size = 24, normalized size = 1.33

$$-\frac{\log(bx+a)}{a}+\frac{\log(x)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2),x, algorithm="maxima")

[Out] -log(b*x + a)/a + log(x)/a
```

Fricas [A] time = 0.213362, size = 22, normalized size = 1.22

$$-\frac{\log(bx+a)-\log(x)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2),x, algorithm="fricas")

[Out] -(log(b*x + a) - log(x))/a
```

Sympy [A] time = 0.335426, size = 10, normalized size = 0.56

$$\frac{\log(x)-\log\left(\frac{a}{b}+x\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a*x**2),x)

[Out] (log(x) - log(a/b + x))/a
```

GIAC/XCAS [A] time = 0.218869, size = 27, normalized size = 1.5

$$-\frac{\ln(|bx+a|)}{a}+\frac{\ln(|x|)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2),x, algorithm="giac")

[Out] -ln(abs(b*x + a))/a + ln(abs(x))/a
```

3.219 $\int \frac{1}{ax^2+bx^3}\,dx$

Optimal. Leaf size=28

$$-\frac{b\log(x)}{a^2}+\frac{b\log(a+bx)}{a^2}-\frac{1}{ax}$$

```
[Out] -(1/(a*x)) - (b*Log[x])/a^2 + (b*Log[a + b*x])/a^2
```

Rubi [A] time = 0.0347204, antiderivative size = 28, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$

$$-\frac{b\log(x)}{a^2}+\frac{b\log(a+bx)}{a^2}-\frac{1}{ax}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(-1),x]

[Out] -(1/(a*x)) - (b*Log[x])/a^2 + (b*Log[a + b*x])/a^2
```

Rubi in Sympy [A] time = 14.1272, size = 24, normalized size = 0.86

$$-\frac{1}{ax}-\frac{b\log(x)}{a^2}+\frac{b\log(a+bx)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a*x**2),x)

[Out] -1/(a*x) - b*log(x)/a**2 + b*log(a + b*x)/a**2
```

Mathematica [A] time = 0.00667933, size = 28, normalized size = 1.

$$-\frac{b\log(x)}{a^2}+\frac{b\log(a+bx)}{a^2}-\frac{1}{ax}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(-1),x]

[Out] -(1/(a*x)) - (b*Log[x])/a^2 + (b*Log[a + b*x])/a^2
```

Maple [A] time = 0.016, size = 29, normalized size = 1.

$$-\frac{1}{ax}-\frac{b\ln(x)}{a^2}+\frac{b\ln(bx+a)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a*x^2),x)

[Out] -1/a/x-b*ln(x)/a^2+b*ln(b*x+a)/a^2
```

Maxima [A] time = 1.37982, size = 38, normalized size = 1.36

$$\frac{b\log\left(bx+a\right)}{a^2}-\frac{b\log\left(x\right)}{a^2}-\frac{1}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + a*x^2),x, algorithm="maxima")

[Out] b*log(b*x + a)/a^2 - b*log(x)/a^2 - 1/(a*x)
```

Fricas [A] time = 0.221621, size = 35, normalized size = 1.25

$$\frac{bx\log\left(bx+a\right)-bx\log\left(x\right)-a}{a^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + a*x^2),x, algorithm="fricas")

[Out] (b*x*log(b*x + a) - b*x*log(x) - a)/(a^2*x)
```

Sympy [A] time = 1.27058, size = 19, normalized size = 0.68

$$-\frac{1}{ax}+\frac{b\left(-\log\left(x\right)+\log\left(\frac{a}{b}+x\right)\right)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a*x**2),x)

[Out] -1/(a*x) + b*(-log(x) + log(a/b + x))/a**2
```

GIAC/XCAS [A] time = 0.218589, size = 41, normalized size = 1.46

$$\frac{b\ln\left(|bx+a|\right)}{a^2}-\frac{b\ln\left(|x|\right)}{a^2}-\frac{1}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^3 + a*x^2),x, algorithm="giac")

[Out] b*ln(abs(b*x + a))/a^2 - b*ln(abs(x))/a^2 - 1/(a*x)
```

3.220 $\int \frac{1}{x(ax^2+bx^3)}\,dx$

Optimal. Leaf size=42

$$\frac{b^2\log(x)}{a^3}-\frac{b^2\log(a+bx)}{a^3}+\frac{b}{a^2x}-\frac{1}{2ax^2}$$

```
[Out] -1/(2*a*x^2) + b/(a^2*x) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*x])/
a^3
```

Rubi [A] time = 0.048631, antiderivative size = 42, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{b^2\log(x)}{a^3}-\frac{b^2\log(a+bx)}{a^3}+\frac{b}{a^2x}-\frac{1}{2ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a*x^2 + b*x^3)),x]
```

```
[Out] -1/(2*a*x^2) + b/(a^2*x) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*x])/
a^3
```

Rubi in Sympy [A] time = 9.15264, size = 37, normalized size = 0.88

$$-\frac{1}{2ax^2}+\frac{b}{a^2x}+\frac{b^2\log(x)}{a^3}-\frac{b^2\log(a+bx)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a*x**2),x)
```

```
[Out] -1/(2*a*x**2) + b/(a**2*x) + b**2*log(x)/a**3 - b**2*log(a + b*x)
/a**3
```

Mathematica [A] time = 0.00727897, size = 42, normalized size = 1.

$$\frac{b^2\log(x)}{a^3}-\frac{b^2\log(a+bx)}{a^3}+\frac{b}{a^2x}-\frac{1}{2ax^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a*x^2 + b*x^3)),x]
```

```
[Out] -1/(2*a*x^2) + b/(a^2*x) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*x])/
a^3
```

Maple [A] time = 0.011, size = 41, normalized size = 1.

$$-\frac{1}{2\,ax^2}+\frac{b}{a^2x}+\frac{b^2\ln(x)}{a^3}-\frac{b^2\ln(bx+a)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a*x^2),x)
```

```
[Out] -1/2/a/x^2+b/a^2/x+b^2*ln(x)/a^3-b^2*ln(b*x+a)/a^3
```

Maxima [A] time = 1.3771, size = 54, normalized size = 1.29

$$-\frac{b^2 \log(bx+a)}{a^3} + \frac{b^2 \log(x)}{a^3} + \frac{2\,bx - a}{2\,a^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)*x),x, algorithm="maxima")
```

```
[Out] -b^2*log(b*x + a)/a^3 + b^2*log(x)/a^3 + 1/2*(2*b*x - a)/(a^2*x^2
)
```

Fricas [A] time = 0.222014, size = 55, normalized size = 1.31

$$-\frac{2\,b^2x^2 \log(bx+a) - 2\,b^2x^2 \log(x) - 2\,abx + a^2}{2\,a^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)*x),x, algorithm="fricas")
```

```
[Out] -1/2*(2*b^2*x^2*log(b*x + a) - 2*b^2*x^2*log(x) - 2*a*b*x + a^2)/
(a^3*x^2)
```

Sympy [A] time = 1.39595, size = 31, normalized size = 0.74

$$\frac{-a+2bx}{2a^2x^2} + \frac{b^2\left(\log(x) - \log\left(\frac{a}{b}+x\right)\right)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a*x**2),x)
```

```
[Out] (-a + 2*b*x)/(2*a**2*x**2) + b**2*(log(x) - log(a/b + x))/a**3
```

GIAC/XCAS [A] time = 0.221782, size = 61, normalized size = 1.45

$$-\frac{b^2\ln(|bx+a|)}{a^3} + \frac{b^2\ln(|x|)}{a^3} + \frac{2\,abx - a^2}{2\,a^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)*x),x, algorithm="giac")
```

```
[Out] -b^2*ln(abs(b*x + a))/a^3 + b^2*ln(abs(x))/a^3 + 1/2*(2*a*b*x - a
^2)/(a^3*x^2)
```

3.221 $\int \frac{1}{x^2(ax^2+bx^3)}\,dx$

Optimal. Leaf size=56

$$-\frac{b^3\log(x)}{a^4}+\frac{b^3\log(a+bx)}{a^4}-\frac{b^2}{a^3x}+\frac{b}{2a^2x^2}-\frac{1}{3ax^3}$$

```
[Out] -1/(3*a*x^3) + b/(2*a^2*x^2) - b^2/(a^3*x) - (b^3*Log[x])/a^4 + (
b^3*Log[a + b*x])/a^4
```

Rubi [A] time = 0.0584743, antiderivative size = 56, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$-\frac{b^3\log(x)}{a^4}+\frac{b^3\log(a+bx)}{a^4}-\frac{b^2}{a^3x}+\frac{b}{2a^2x^2}-\frac{1}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a*x^2 + b*x^3)),x]
```

```
[Out] -1/(3*a*x^3) + b/(2*a^2*x^2) - b^2/(a^3*x) - (b^3*Log[x])/a^4 + (
b^3*Log[a + b*x])/a^4
```

Rubi in Sympy [A] time = 10.8652, size = 49, normalized size = 0.88

$$-\frac{1}{3ax^3}+\frac{b}{2a^2x^2}-\frac{b^2}{a^3x}-\frac{b^3\log(x)}{a^4}+\frac{b^3\log(a+bx)}{a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a*x**2),x)
```

```
[Out] -1/(3*a*x**3) + b/(2*a**2*x**2) - b**2/(a**3*x) - b**3*log(x)/a**
4 + b**3*log(a + b*x)/a**4
```

Mathematica [A] time = 0.00819892, size = 56, normalized size = 1.

$$-\frac{b^3\log(x)}{a^4}+\frac{b^3\log(a+bx)}{a^4}-\frac{b^2}{a^3x}+\frac{b}{2a^2x^2}-\frac{1}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(a*x^2 + b*x^3)),x]
```

```
[Out] -1/(3*a*x^3) + b/(2*a^2*x^2) - b^2/(a^3*x) - (b^3*Log[x])/a^4 + (
b^3*Log[a + b*x])/a^4
```

Maple [A] time = 0.011, size = 53, normalized size = 1.

$$-\frac{1}{3\,ax^3}+\frac{b}{2\,a^2x^2}-\frac{b^2}{xa^3}-\frac{b^3\ln(x)}{a^4}+\frac{b^3\ln(bx+a)}{a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a*x^2),x)
```

```
[Out] -1/3/a/x^3+1/2*b/a^2/x^2-b^2/a^3/x-b^3*ln(x)/a^4+b^3*ln(b*x+a)/a^
4
```

Maxima [A] time = 1.39426, size = 69, normalized size = 1.23

$$\frac{b^3 \log(bx + a)}{a^4} - \frac{b^3 \log(x)}{a^4} - \frac{6\, b^2x^2 - 3\, abx + 2\, a^2}{6\, a^3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)*x^2),x, algorithm="maxima")
```

```
[Out] b^3*log(b*x + a)/a^4 - b^3*log(x)/a^4 - 1/6*(6*b^2*x^2 - 3*a*b*x
+ 2*a^2)/(a^3*x^3)
```

Fricas [A] time = 0.231339, size = 73, normalized size = 1.3

$$\frac{6\, b^3x^3 \log(bx + a) - 6\, b^3x^3 \log(x) - 6\, ab^2x^2 + 3\, a^2bx - 2\, a^3}{6\, a^4x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)*x^2),x, algorithm="fricas")
```

```
[Out] 1/6*(6*b^3*x^3*log(b*x + a) - 6*b^3*x^3*log(x) - 6*a*b^2*x^2 + 3*
a^2*b*x - 2*a^3)/(a^4*x^3)
```

Sympy [A] time = 1.51566, size = 44, normalized size = 0.79

$$-\frac{2a^2 - 3abx + 6b^2x^2}{6a^3x^3} + \frac{b^3\left(-\log(x) + \log\left(\frac{a}{b} + x\right)\right)}{a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a*x**2),x)
```

```
[Out] -(2*a**2 - 3*a*b*x + 6*b**2*x**2)/(6*a**3*x**3) + b**3*(-log(x) +
 log(a/b + x))/a**4
```

GIAC/XCAS [A] time = 0.217432, size = 76, normalized size = 1.36

$$\frac{b^3\ln(|bx + a|)}{a^4} - \frac{b^3\ln(|x|)}{a^4} - \frac{6\, ab^2x^2 - 3\, a^2bx + 2\, a^3}{6\, a^4x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)*x^2),x, algorithm="giac")
```

```
[Out] b^3*ln(abs(b*x + a))/a^4 - b^3*ln(abs(x))/a^4 - 1/6*(6*a*b^2*x^2
- 3*a^2*b*x + 2*a^3)/(a^4*x^3)
```

3.222 $\int \frac{x^8}{(ax^2+bx^3)^2}\,dx$

Optimal. Leaf size=58

$$-\frac{a^4}{b^5(a+bx)}-\frac{4a^3\log(a+bx)}{b^5}+\frac{3a^2x}{b^4}-\frac{ax^2}{b^3}+\frac{x^3}{3b^2}$$

```
[Out] (3*a^2*x)/b^4 - (a*x^2)/b^3 + x^3/(3*b^2) - a^4/(b^5*(a + b*x)) -
 (4*a^3*Log[a + b*x])/b^5
```

Rubi [A] time = 0.0824263, antiderivative size = 58, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$-\frac{a^4}{b^5(a+bx)}-\frac{4a^3\log(a+bx)}{b^5}+\frac{3a^2x}{b^4}-\frac{ax^2}{b^3}+\frac{x^3}{3b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^8/(a*x^2 + b*x^3)^2,x]
```

```
[Out] (3*a^2*x)/b^4 - (a*x^2)/b^3 + x^3/(3*b^2) - a^4/(b^5*(a + b*x)) -
 (4*a^3*Log[a + b*x])/b^5
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^4}{b^5\left(a+bx\right)}-\frac{4a^3\log\left(a+bx\right)}{b^5}+\frac{3a^2x}{b^4}-\frac{2a\int x\,dx}{b^3}+\frac{x^3}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**8/(b*x**3+a*x**2)**2,x)
```

```
[Out] -a**4/(b**5*(a + b*x)) - 4*a**3*log(a + b*x)/b**5 + 3*a**2*x/b**4
 - 2*a*Integral(x, x)/b**3 + x**3/(3*b**2)
```

Mathematica [A] time = 0.0327915, size = 54, normalized size = 0.93

$$\frac{-\frac{3a^4}{a+bx}-12a^3\log(a+bx)+9a^2bx-3ab^2x^2+b^3x^3}{3b^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^8/(a*x^2 + b*x^3)^2,x]
```

```
[Out] (9*a^2*b*x - 3*a*b^2*x^2 + b^3*x^3 - (3*a^4)/(a + b*x) - 12*a^3*L
og[a + b*x])/(3*b^5)
```

Maple [A] time = 0.01, size = 57, normalized size = 1.

$$3\,\frac{a^2x}{b^4}-\frac{ax^2}{b^3}+\frac{x^3}{3\,b^2}-\frac{a^4}{b^5\left(bx+a\right)}-4\,\frac{a^3\ln\left(bx+a\right)}{b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^8/(b*x^3+a*x^2)^2,x)
```

```
[Out] 3*a^2*x/b^4-a*x^2/b^3+1/3*x^3/b^2-a^4/b^5/(b*x+a)-4*a^3*ln(b*x+a)
/b^5
```

Maxima [A] time = 1.37522, size = 80, normalized size = 1.38

$$-\frac{a^4}{b^6x+ab^5}-\frac{4\,a^3\log\left(bx+a\right)}{b^5}+\frac{b^2x^3-3\,abx^2+9\,a^2x}{3\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^8/(b*x^3 + a*x^2)^2,x, algorithm="maxima")
```

```
[Out] -a^4/(b^6*x + a*b^5) - 4*a^3*log(b*x + a)/b^5 + 1/3*(b^2*x^3 - 3*
a*b*x^2 + 9*a^2*x)/b^4
```

Fricas [A] time = 0.209152, size = 99, normalized size = 1.71

$$\frac{b^4x^4-2\,ab^3x^3+6\,a^2b^2x^2+9\,a^3bx-3\,a^4-12\,\left(a^3bx+a^4\right)\log\left(bx+a\right)}{3\,\left(b^6x+ab^5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^8/(b*x^3 + a*x^2)^2,x, algorithm="fricas")
```

```
[Out] 1/3*(b^4*x^4 - 2*a*b^3*x^3 + 6*a^2*b^2*x^2 + 9*a^3*b*x - 3*a^4 -
12*(a^3*b*x + a^4)*log(b*x + a))/(b^6*x + a*b^5)
```

Sympy [A] time = 1.41359, size = 54, normalized size = 0.93

$$-\frac{a^4}{ab^5+b^6x}-\frac{4a^3\log\left(a+bx\right)}{b^5}+\frac{3a^2x}{b^4}-\frac{ax^2}{b^3}+\frac{x^3}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**8/(b*x**3+a*x**2)**2,x)
```

```
[Out] -a**4/(a*b**5 + b**6*x) - 4*a**3*log(a + b*x)/b**5 + 3*a**2*x/b**
4 - a*x**2/b**3 + x**3/(3*b**2)
```

GIAC/XCAS [A] time = 0.218715, size = 84, normalized size = 1.45

$$-\frac{4\,a^3\ln\left(|bx+a|\right)}{b^5}-\frac{a^4}{(bx+a)b^5}+\frac{b^4x^3-3\,ab^3x^2+9\,a^2b^2x}{3\,b^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x^8/(b*x^3 + a*x^2)^2,x, algorithm="giac")
```

```
[Out] -4*a^3*ln(abs(b*x + a))/b^5 - a^4/((b*x + a)*b^5) + 1/3*(b^4*x^3
- 3*a*b^3*x^2 + 9*a^2*b^2*x)/b^6
```

3.223 $\int \frac{x^7}{(ax^2+bx^3)^2}\,dx$

Optimal. Leaf size=46

$$\frac{a^3}{b^4(a+bx)}+\frac{3a^2\log(a+bx)}{b^4}-\frac{2ax}{b^3}+\frac{x^2}{2b^2}$$

```
[Out] (-2*a*x)/b^3 + x^2/(2*b^2) + a^3/(b^4*(a + b*x)) + (3*a^2*Log[a +
 b*x])/b^4
```

Rubi [A] time = 0.0712484, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{a^3}{b^4(a+bx)}+\frac{3a^2\log(a+bx)}{b^4}-\frac{2ax}{b^3}+\frac{x^2}{2b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^7/(a*x^2 + b*x^3)^2,x]
```

```
[Out] (-2*a*x)/b^3 + x^2/(2*b^2) + a^3/(b^4*(a + b*x)) + (3*a^2*Log[a +
 b*x])/b^4
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{a^3}{b^4\left(a+bx\right)}+\frac{3a^2\log\left(a+bx\right)}{b^4}-\frac{2ax}{b^3}+\frac{\int x\,dx}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**7/(b*x**3+a*x**2)**2,x)
```

```
[Out] a**3/(b**4*(a + b*x)) + 3*a**2*log(a + b*x)/b**4 - 2*a*x/b**3 + I
ntegral(x, x)/b**2
```

Mathematica [A] time = 0.021882, size = 43, normalized size = 0.93

$$\frac{\frac{2a^3}{a+bx}+6a^2\log(a+bx)-4abx+b^2x^2}{2b^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^7/(a*x^2 + b*x^3)^2,x]
```

```
[Out] (-4*a*b*x + b^2*x^2 + (2*a^3)/(a + b*x) + 6*a^2*Log[a + b*x])/(2*
b^4)
```

Maple [A] time = 0.011, size = 45, normalized size = 1.

$$-2\,\frac{ax}{b^3}+\frac{x^2}{2\,b^2}+\frac{a^3}{b^4\left(bx+a\right)}+3\,\frac{a^2\ln\left(bx+a\right)}{b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^7/(b*x^3+a*x^2)^2,x)
```

```
[Out] -2*a*x/b^3+1/2*x^2/b^2+a^3/b^4/(b*x+a)+3*a^2*ln(b*x+a)/b^4
```

Maxima [A] time = 1.38243, size = 63, normalized size = 1.37

$$\frac{a^3}{b^5x + ab^4} + \frac{3\,a^2 \log\left(bx + a\right)}{b^4} + \frac{bx^2 - 4\,ax}{2\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/(b*x^3 + a*x^2)^2,x, algorithm="maxima")
```

```
[Out] a^3/(b^5*x + a*b^4) + 3*a^2*log(b*x + a)/b^4 + 1/2*(b*x^2 - 4*a*x
)/b^3
```

Fricas [A] time = 0.216719, size = 84, normalized size = 1.83

$$\frac{b^3x^3 - 3\,ab^2x^2 - 4\,a^2bx + 2\,a^3 + 6\,\left(a^2bx + a^3\right)\log\left(bx + a\right)}{2\,(b^5x + ab^4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/(b*x^3 + a*x^2)^2,x, algorithm="fricas")
```

```
[Out] 1/2*(b^3*x^3 - 3*a*b^2*x^2 - 4*a^2*b*x + 2*a^3 + 6*(a^2*b*x + a^3
)*log(b*x + a))/(b^5*x + a*b^4)
```

Sympy [A] time = 1.34642, size = 44, normalized size = 0.96

$$\frac{a^3}{ab^4 + b^5x} + \frac{3a^2 \log\left(a + bx\right)}{b^4} - \frac{2ax}{b^3} + \frac{x^2}{2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**7/(b*x**3+a*x**2)**2,x)
```

```
[Out] a**3/(a*b**4 + b**5*x) + 3*a**2*log(a + b*x)/b**4 - 2*a*x/b**3 +
x**2/(2*b**2)
```

GIAC/XCAS [A] time = 0.218746, size = 65, normalized size = 1.41

$$\frac{3\,a^2\ln\left(|bx + a|\right)}{b^4} + \frac{a^3}{(bx + a)b^4} + \frac{b^2x^2 - 4\,abx}{2\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^7/(b*x^3 + a*x^2)^2,x, algorithm="giac")
```

```
[Out] 3*a^2*ln(abs(b*x + a))/b^4 + a^3/((b*x + a)*b^4) + 1/2*(b^2*x^2 -
 4*a*b*x)/b^4
```

3.224 $\int \frac{x^6}{(ax^2+bx^3)^2}\,dx$

Optimal. Leaf size=33

$$-\frac{a^2}{b^3(a+bx)}-\frac{2a\log(a+bx)}{b^3}+\frac{x}{b^2}$$

```
[Out] x/b^2 - a^2/(b^3*(a + b*x)) - (2*a*Log[a + b*x])/b^3
```

Rubi [A] time = 0.0532433, antiderivative size = 33, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$-\frac{a^2}{b^3(a+bx)}-\frac{2a\log(a+bx)}{b^3}+\frac{x}{b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/(a*x^2 + b*x^3)^2,x]

[Out] x/b^2 - a^2/(b^3*(a + b*x)) - (2*a*Log[a + b*x])/b^3
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^2}{b^3\,(a+bx)}-\frac{2a\log{(a+bx)}}{b^3}+\int\frac{1}{b^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(b*x**3+a*x**2)**2,x)

[Out] -a**2/(b**3*(a + b*x)) - 2*a*log(a + b*x)/b**3 + Integral(b**(-2)
, x)
```

Mathematica [A] time = 0.0214129, size = 29, normalized size = 0.88

$$\frac{-\frac{a^2}{a+bx}-2a\log(a+bx)+bx}{b^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^6/(a*x^2 + b*x^3)^2,x]

[Out] (b*x - a^2/(a + b*x) - 2*a*Log[a + b*x])/b^3
```

Maple [A] time = 0.01, size = 34, normalized size = 1.

$$\frac{x}{b^2}-\frac{a^2}{b^3\,(bx+a)}-2\,\frac{a\ln{(bx+a)}}{b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(b*x^3+a*x^2)^2,x)
```

```
[Out] x/b^2-a^2/b^3/(b*x+a)-2*a*ln(b*x+a)/b^3
```

Maxima [A] time = 1.41625, size = 49, normalized size = 1.48

$$-\frac{a^2}{b^4x + ab^3} + \frac{x}{b^2} - \frac{2\,a\log(bx + a)}{b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/(b*x^3 + a*x^2)^2,x, algorithm="maxima")
```

```
[Out] -a^2/(b^4*x + a*b^3) + x/b^2 - 2*a*log(b*x + a)/b^3
```

Fricas [A] time = 0.214582, size = 63, normalized size = 1.91

$$\frac{b^2x^2 + abx - a^2 - 2\left(abx + a^2\right)\log(bx + a)}{b^4x + ab^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/(b*x^3 + a*x^2)^2,x, algorithm="fricas")
```

```
[Out] (b^2*x^2 + a*b*x - a^2 - 2*(a*b*x + a^2)*log(b*x + a))/(b^4*x + a
*b^3)
```

Sympy [A] time = 1.28761, size = 31, normalized size = 0.94

$$-\frac{a^2}{ab^3 + b^4x} - \frac{2a\log(a + bx)}{b^3} + \frac{x}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**6/(b*x**3+a*x**2)**2,x)
```

```
[Out] -a**2/(a*b**3 + b**4*x) - 2*a*log(a + b*x)/b**3 + x/b**2
```

GIAC/XCAS [A] time = 0.219137, size = 46, normalized size = 1.39

$$\frac{x}{b^2} - \frac{2\,a\ln(|bx + a|)}{b^3} - \frac{a^2}{(bx + a)b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/(b*x^3 + a*x^2)^2,x, algorithm="giac")
```

```
[Out] x/b^2 - 2*a*ln(abs(b*x + a))/b^3 - a^2/((b*x + a)*b^3)
```

3.225 $\int \frac{x^5}{(ax^2+bx^3)^2} dx$

Optimal. Leaf size=23

$$\frac{a}{b^2(a+bx)}+\frac{\log(a+bx)}{b^2}$$

```
[Out] a/(b^2*(a + b*x)) + Log[a + b*x]/b^2
```

Rubi [A] time = 0.0397896, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{a}{b^2(a+bx)}+\frac{\log(a+bx)}{b^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/(a*x^2 + b*x^3)^2,x]

[Out] a/(b^2*(a + b*x)) + Log[a + b*x]/b^2
```

Rubi in Sympy [A] time = 6.83493, size = 19, normalized size = 0.83

$$\frac{a}{b^2\left(a+bx\right)}+\frac{\log\left(a+bx\right)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a*x**2)**2,x)

[Out] a/(b**2*(a + b*x)) + log(a + b*x)/b**2
```

Mathematica [A] time = 0.0102577, size = 20, normalized size = 0.87

$$\frac{\frac{a}{a+bx}+\log(a+bx)}{b^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/(a*x^2 + b*x^3)^2,x]

[Out] (a/(a + b*x) + Log[a + b*x])/b^2
```

Maple [A] time = 0.01, size = 24, normalized size = 1.

$$\frac{a}{b^2\left(bx+a\right)}+\frac{\ln\left(bx+a\right)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^3+a*x^2)^2,x)

[Out] a/b^2/(b*x+a)+ln(b*x+a)/b^2
```

Maxima [A] time = 1.45213, size = 35, normalized size = 1.52

$$\frac{a}{b^3x + ab^2} + \frac{\log(bx + a)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2)^2,x, algorithm="maxima")
```

```
[Out] a/(b^3*x + a*b^2) + log(b*x + a)/b^2
```

Fricas [A] time = 0.205626, size = 38, normalized size = 1.65

$$\frac{(bx + a)\log(bx + a) + a}{b^3x + ab^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2)^2,x, algorithm="fricas")
```

```
[Out] ((b*x + a)*log(b*x + a) + a)/(b^3*x + a*b^2)
```

Sympy [A] time = 1.18563, size = 20, normalized size = 0.87

$$\frac{a}{ab^2 + b^3x} + \frac{\log(a + bx)}{b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a*x**2)**2,x)
```

```
[Out] a/(a*b**2 + b**3*x) + log(a + b*x)/b**2
```

GIAC/XCAS [A] time = 0.217479, size = 32, normalized size = 1.39

$$\frac{\ln(|bx + a|)}{b^2} + \frac{a}{(bx + a)b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2)^2,x, algorithm="giac")
```

```
[Out] ln(abs(b*x + a))/b^2 + a/((b*x + a)*b^2)
```

3.226 $\int \frac{x^4}{(ax^2+bx^3)^2} \, dx$

Optimal. Leaf size=21

$$-\frac{x^2}{b\left(ax^2+bx^3\right)}$$

```
[Out] -(x^2/(b*(a*x^2 + b*x^3)))
```

Rubi [A] time = 0.0124867, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059

$$-\frac{x^2}{b\left(ax^2+bx^3\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/(a*x^2 + b*x^3)^2,x]
```

```
[Out] -(x^2/(b*(a*x^2 + b*x^3)))
```

Rubi in Sympy [A] time = 2.78286, size = 8, normalized size = 0.38

$$-\frac{1}{b\left(a+bx\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**3+a*x**2)**2,x)
```

```
[Out] -1/(b*(a + b*x))
```

Mathematica [A] time = 0.00450408, size = 12, normalized size = 0.57

$$-\frac{1}{b(a+bx)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/(a*x^2 + b*x^3)^2,x]
```

```
[Out] -(1/(b*(a + b*x)))
```

Maple [A] time = 0.002, size = 13, normalized size = 0.6

$$-\frac{1}{\left(bx+a\right)b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a*x^2)^2,x)
```

```
[Out] -1/(b*x+a)/b
```

Maxima [A] time = 1.40712, size = 18, normalized size = 0.86

$$-\frac{1}{b^2x + ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2)^2,x, algorithm="maxima")
```

```
[Out] -1/(b^2*x + a*b)
```

Fricas [A] time = 0.200139, size = 18, normalized size = 0.86

$$-\frac{1}{b^2x + ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2)^2,x, algorithm="fricas")
```

```
[Out] -1/(b^2*x + a*b)
```

Sympy [A] time = 1.12443, size = 10, normalized size = 0.48

$$-\frac{1}{ab + b^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a*x**2)**2,x)
```

```
[Out] -1/(a*b + b**2*x)
```

GIAC/XCAS [A] time = 0.218432, size = 16, normalized size = 0.76

$$-\frac{1}{(bx + a)b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2)^2,x, algorithm="giac")
```

```
[Out] -1/((b*x + a)*b)
```

3.227 $\int \frac{x^3}{(ax^2+bx^3)^2}\,dx$

Optimal. Leaf size=29

$$-\frac{\log(a+bx)}{a^2}+\frac{\log(x)}{a^2}+\frac{1}{a(a+bx)}$$

```
[Out] 1/(a*(a + b*x)) + Log[x]/a^2 - Log[a + b*x]/a^2
```

Rubi [A] time = 0.0420813, antiderivative size = 29, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$-\frac{\log(a+bx)}{a^2}+\frac{\log(x)}{a^2}+\frac{1}{a(a+bx)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(a*x^2 + b*x^3)^2,x]

[Out] 1/(a*(a + b*x)) + Log[x]/a^2 - Log[a + b*x]/a^2
```

Rubi in Sympy [A] time = 7.6504, size = 24, normalized size = 0.83

$$\frac{1}{a\,(a+bx)}+\frac{\log\,(x)}{a^2}-\frac{\log\,(a+bx)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a*x**2)**2,x)

[Out] 1/(a*(a + b*x)) + log(x)/a**2 - log(a + b*x)/a**2
```

Mathematica [A] time = 0.0161748, size = 24, normalized size = 0.83

$$\frac{\frac{a}{a+bx}-\log(a+bx)+\log(x)}{a^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/(a*x^2 + b*x^3)^2,x]

[Out] (a/(a + b*x) + Log[x] - Log[a + b*x])/a^2
```

Maple [A] time = 0.011, size = 30, normalized size = 1.

$$\frac{1}{a\,(bx+a)}+\frac{\ln\,(x)}{a^2}-\frac{\ln\,(bx+a)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a*x^2)^2,x)

[Out] 1/a/(b*x+a)+ln(x)/a^2-ln(b*x+a)/a^2
```

Maxima [A] time = 1.40641, size = 38, normalized size = 1.31

$$\frac{1}{abx+a^2}-\frac{\log(bx+a)}{a^2}+\frac{\log(x)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2)^2,x, algorithm="maxima")
```

```
[Out] 1/(a*b*x + a^2) - log(b*x + a)/a^2 + log(x)/a^2
```

Fricas [A] time = 0.212578, size = 53, normalized size = 1.83

$$-\frac{(bx+a)\log(bx+a)-(bx+a)\log(x)-a}{a^2bx+a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2)^2,x, algorithm="fricas")
```

```
[Out] -((b*x + a)*log(b*x + a) - (b*x + a)*log(x) - a)/(a^2*b*x + a^3)
```

Sympy [A] time = 1.37572, size = 22, normalized size = 0.76

$$\frac{1}{a^2+abx}+\frac{\log(x)-\log\left(\frac{a}{b}+x\right)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a*x**2)**2,x)
```

```
[Out] 1/(a**2 + a*b*x) + (log(x) - log(a/b + x))/a**2
```

GIAC/XCAS [A] time = 0.219702, size = 42, normalized size = 1.45

$$-\frac{\ln(|bx+a|)}{a^2}+\frac{\ln(|x|)}{a^2}+\frac{1}{(bx+a)a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2)^2,x, algorithm="giac")
```

```
[Out] -ln(abs(b*x + a))/a^2 + ln(abs(x))/a^2 + 1/((b*x + a)*a)
```

3.228 $\int \frac{x^2}{(ax^2+bx^3)^2}\,dx$

Optimal. Leaf size=42

$$-\frac{2b\log(x)}{a^3}+\frac{2b\log(a+bx)}{a^3}-\frac{b}{a^2(a+bx)}-\frac{1}{a^2x}$$

```
[Out] -(1/(a^2*x)) - b/(a^2*(a + b*x)) - (2*b*Log[x])/a^3 + (2*b*Log[a
+ b*x])/a^3
```

Rubi [A] time = 0.0577944, antiderivative size = 42, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$-\frac{2b\log(x)}{a^3}+\frac{2b\log(a+bx)}{a^3}-\frac{b}{a^2(a+bx)}-\frac{1}{a^2x}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(a*x^2 + b*x^3)^2,x]
```

```
[Out] -(1/(a^2*x)) - b/(a^2*(a + b*x)) - (2*b*Log[x])/a^3 + (2*b*Log[a
+ b*x])/a^3
```

Rubi in Sympy [A] time = 10.1573, size = 39, normalized size = 0.93

$$-\frac{b}{a^2(a+bx)}-\frac{1}{a^2x}-\frac{2b\log(x)}{a^3}+\frac{2b\log(a+bx)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a*x**2)**2,x)
```

```
[Out] -b/(a**2*(a + b*x)) - 1/(a**2*x) - 2*b*log(x)/a**3 + 2*b*log(a +
b*x)/a**3
```

Mathematica [A] time = 0.0703691, size = 35, normalized size = 0.83

$$-\frac{a\left(\frac{b}{a+bx}+\frac{1}{x}\right)-2b\log(a+bx)+2b\log(x)}{a^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(a*x^2 + b*x^3)^2,x]
```

```
[Out] -((a*(x^(-1) + b/(a + b*x)) + 2*b*Log[x] - 2*b*Log[a + b*x])/a^3)
```

Maple [A] time = 0.017, size = 43, normalized size = 1.

$$-\frac{1}{a^2x}-\frac{b}{a^2(bx+a)}-2\,\frac{b\ln(x)}{a^3}+2\,\frac{b\ln(bx+a)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a*x^2)^2,x)
```

```
[Out] -1/a^2/x-b/a^2/(b*x+a)-2*b*ln(x)/a^3+2*b*ln(b*x+a)/a^3
```

Maxima [A] time = 7.04686, size = 61, normalized size = 1.45

$$-\frac{2\,bx+a}{a^2bx^2+a^3x}+\frac{2\,b\log\left(bx+a\right)}{a^3}-\frac{2\,b\log\left(x\right)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2)^2,x, algorithm="maxima")
```

```
[Out] -(2*b*x + a)/(a^2*b*x^2 + a^3*x) + 2*b*log(b*x + a)/a^3 - 2*b*log
(x)/a^3
```

Fricas [A] time = 0.216112, size = 85, normalized size = 2.02

$$-\frac{2\,abx+a^2-2\,\left(b^2x^2+abx\right)\,\log\left(bx+a\right)+2\,\left(b^2x^2+abx\right)\,\log\left(x\right)}{a^3bx^2+a^4x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2)^2,x, algorithm="fricas")
```

```
[Out] -(2*a*b*x + a^2 - 2*(b^2*x^2 + a*b*x)*log(b*x + a) + 2*(b^2*x^2 +
 a*b*x)*log(x))/(a^3*b*x^2 + a^4*x)
```

Sympy [A] time = 1.57812, size = 36, normalized size = 0.86

$$-\frac{a+2bx}{a^3x+a^2bx^2}+\frac{2b\left(-\log\left(x\right)+\log\left(\frac{a}{b}+x\right)\right)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a*x**2)**2,x)
```

```
[Out] -(a + 2*b*x)/(a**3*x + a**2*b*x**2) + 2*b*(-log(x) + log(a/b + x)
)/a**3
```

GIAC/XCAS [A] time = 0.219218, size = 61, normalized size = 1.45

$$\frac{2\,b\ln\left(|bx+a|\right)}{a^3}-\frac{2\,b\ln\left(|x|\right)}{a^3}-\frac{2\,bx+a}{\left(bx^2+ax\right)a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2)^2,x, algorithm="giac")
```

```
[Out] 2*b*ln(abs(b*x + a))/a^3 - 2*b*ln(abs(x))/a^3 - (2*b*x + a)/((b*x
^2 + a*x)*a^2)
```

3.229 $\int \frac{x}{(ax^2+bx^3)^2}\,dx$

Optimal. Leaf size=58

$$\frac{3b^2\log(x)}{a^4}-\frac{3b^2\log(a+bx)}{a^4}+\frac{b^2}{a^3(a+bx)}+\frac{2b}{a^3x}-\frac{1}{2a^2x^2}$$

```
[Out] -1/(2*a^2*x^2) + (2*b)/(a^3*x) + b^2/(a^3*(a + b*x)) + (3*b^2*Log
[x])/a^4 - (3*b^2*Log[a + b*x])/a^4
```

Rubi [A] time = 0.0724918, antiderivative size = 58, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{3b^2\log(x)}{a^4}-\frac{3b^2\log(a+bx)}{a^4}+\frac{b^2}{a^3(a+bx)}+\frac{2b}{a^3x}-\frac{1}{2a^2x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(a*x^2 + b*x^3)^2,x]
```

```
[Out] -1/(2*a^2*x^2) + (2*b)/(a^3*x) + b^2/(a^3*(a + b*x)) + (3*b^2*Log
[x])/a^4 - (3*b^2*Log[a + b*x])/a^4
```

Rubi in Sympy [A] time = 12.9001, size = 56, normalized size = 0.97

$$-\frac{1}{2a^2x^2}+\frac{b^2}{a^3\left(a+bx\right)}+\frac{2b}{a^3x}+\frac{3b^2\log\left(x\right)}{a^4}-\frac{3b^2\log\left(a+bx\right)}{a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a*x**2)**2,x)
```

```
[Out] -1/(2*a**2*x**2) + b**2/(a**3*(a + b*x)) + 2*b/(a**3*x) + 3*b**2*
log(x)/a**4 - 3*b**2*log(a + b*x)/a**4
```

Mathematica [A] time = 0.0942862, size = 53, normalized size = 0.91

$$\frac{a\left(\frac{2b^2}{a+bx}-\frac{a}{x^2}+\frac{4b}{x}\right)-6b^2\log(a+bx)+6b^2\log(x)}{2a^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(a*x^2 + b*x^3)^2,x]
```

```
[Out] (a*(-(a/x^2) + (4*b)/x + (2*b^2)/(a + b*x)) + 6*b^2*Log[x] - 6*b^
2*Log[a + b*x])/(2*a^4)
```

Maple [A] time = 0.016, size = 57, normalized size = 1.

$$-\frac{1}{2\,a^2x^2}+2\,\frac{b}{xa^3}+\frac{b^2}{a^3\left(bx+a\right)}+3\,\frac{b^2\ln\left(x\right)}{a^4}-3\,\frac{b^2\ln\left(bx+a\right)}{a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a*x^2)^2,x)
```

```
[Out] -1/2/a^2/x^2+2*b/a^3/x+b^2/a^3/(b*x+a)+3*b^2*ln(x)/a^4-3*b^2*ln(b
*x+a)/a^4
```

Maxima [A] time = 5.91187, size = 86, normalized size = 1.48

$$\frac{6\,b^2x^2 + 3\,abx - a^2}{2\,(a^3bx^3 + a^4x^2)} - \frac{3\,b^2\log\left(bx + a\right)}{a^4} + \frac{3\,b^2\log\left(x\right)}{a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2)^2,x, algorithm="maxima")
```

```
[Out] 1/2*(6*b^2*x^2 + 3*a*b*x - a^2)/(a^3*b*x^3 + a^4*x^2) - 3*b^2*log
(b*x + a)/a^4 + 3*b^2*log(x)/a^4
```

Fricas [A] time = 0.216441, size = 116, normalized size = 2.

$$\frac{6\,ab^2x^2 + 3\,a^2bx - a^3 - 6\,\left(b^3x^3 + ab^2x^2\right)\log\left(bx + a\right) + 6\,\left(b^3x^3 + ab^2x^2\right)\log\left(x\right)}{2\,(a^4bx^3 + a^5x^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2)^2,x, algorithm="fricas")
```

```
[Out] 1/2*(6*a*b^2*x^2 + 3*a^2*b*x - a^3 - 6*(b^3*x^3 + a*b^2*x^2)*log(
b*x + a) + 6*(b^3*x^3 + a*b^2*x^2)*log(x))/(a^4*b*x^3 + a^5*x^2)
```

Sympy [A] time = 1.70343, size = 54, normalized size = 0.93

$$\frac{-a^2 + 3abx + 6b^2x^2}{2a^4x^2 + 2a^3bx^3} + \frac{3b^2\left(\log\left(x\right) - \log\left(\frac{a}{b} + x\right)\right)}{a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a*x**2)**2,x)
```

```
[Out] (-a**2 + 3*a*b*x + 6*b**2*x**2)/(2*a**4*x**2 + 2*a**3*b*x**3) + 3
*b**2*(log(x) - log(a/b + x))/a**4
```

GIAC/XCAS [A] time = 0.219615, size = 86, normalized size = 1.48

$$-\frac{3\,b^2\ln\left(|bx + a|\right)}{a^4} + \frac{3\,b^2\ln\left(|x|\right)}{a^4} + \frac{6\,ab^2x^2 + 3\,a^2bx - a^3}{2\,(bx + a)a^4x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2)^2,x, algorithm="giac")
```

```
[Out] -3*b^2*ln(abs(b*x + a))/a^4 + 3*b^2*ln(abs(x))/a^4 + 1/2*(6*a*b^2
*x^2 + 3*a^2*b*x - a^3)/((b*x + a)*a^4*x^2)
```

3.230 $\int \frac{1}{(ax^2+bx^3)^2} dx$

Optimal. Leaf size=69

$$-\frac{4b^3\log(x)}{a^5}+\frac{4b^3\log(a+bx)}{a^5}-\frac{b^3}{a^4(a+bx)}-\frac{3b^2}{a^4x}+\frac{b}{a^3x^2}-\frac{1}{3a^2x^3}$$

```
[Out] -1/(3*a^2*x^3) + b/(a^3*x^2) - (3*b^2)/(a^4*x) - b^3/(a^4*(a + b*
x)) - (4*b^3*Log[x])/a^5 + (4*b^3*Log[a + b*x])/a^5
```

Rubi [A] time = 0.0847027, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$

$$-\frac{4b^3\log(x)}{a^5}+\frac{4b^3\log(a+bx)}{a^5}-\frac{b^3}{a^4(a+bx)}-\frac{3b^2}{a^4x}+\frac{b}{a^3x^2}-\frac{1}{3a^2x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(-2),x]
```

```
[Out] -1/(3*a^2*x^3) + b/(a^3*x^2) - (3*b^2)/(a^4*x) - b^3/(a^4*(a + b*
x)) - (4*b^3*Log[x])/a^5 + (4*b^3*Log[a + b*x])/a^5
```

Rubi in Sympy [A] time = 27.1774, size = 66, normalized size = 0.96

$$-\frac{1}{3a^2x^3}+\frac{b}{a^3x^2}-\frac{b^3}{a^4(a+bx)}-\frac{3b^2}{a^4x}-\frac{4b^3\log(x)}{a^5}+\frac{4b^3\log(a+bx)}{a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a*x**2)**2,x)
```

```
[Out] -1/(3*a**2*x**3) + b/(a**3*x**2) - b**3/(a**4*(a + b*x)) - 3*b**2
/(a**4*x) - 4*b**3*log(x)/a**5 + 4*b**3*log(a + b*x)/a**5
```

Mathematica [A] time = 0.0906102, size = 66, normalized size = 0.96

$$-\frac{\frac{a(a^3-2a^2bx+6ab^2x^2+12b^3x^3)}{x^3(a+bx)}-12b^3\log(a+bx)+12b^3\log(x)}{3a^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(-2),x]
```

```
[Out] -((a*(a^3 - 2*a^2*b*x + 6*a*b^2*x^2 + 12*b^3*x^3))/(x^3*(a + b*x)
) + 12*b^3*Log[x] - 12*b^3*Log[a + b*x])/(3*a^5)
```

Maple [A] time = 0.014, size = 68, normalized size = 1.

$$-\frac{1}{3\,a^2x^3}+\frac{b}{x^2a^3}-3\,\frac{b^2}{a^4x}-\frac{b^3}{a^4\,(bx+a)}-4\,\frac{b^3\ln(x)}{a^5}+4\,\frac{b^3\ln(bx+a)}{a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a*x^2)^2,x)
```

```
[Out] -1/3/a^2/x^3+b/a^3/x^2-3*b^2/a^4/x-b^3/a^4/(b*x+a)-4*b^3*ln(x)/a^
5+4*b^3*ln(b*x+a)/a^5
```

Maxima [A] time = 1.39163, size = 99, normalized size = 1.43

$$-\frac{12\,b^3x^3 + 6\,ab^2x^2 - 2\,a^2bx + a^3}{3\,(a^4bx^4 + a^5x^3)} + \frac{4\,b^3\log(bx + a)}{a^5} - \frac{4\,b^3\log(x)}{a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(-2),x, algorithm="maxima")
```

```
[Out] -1/3*(12*b^3*x^3 + 6*a*b^2*x^2 - 2*a^2*b*x + a^3)/(a^4*b*x^4 + a^
5*x^3) + 4*b^3*log(b*x + a)/a^5 - 4*b^3*log(x)/a^5
```

Fricas [A] time = 0.218723, size = 128, normalized size = 1.86

$$-\frac{12\,ab^3x^3 + 6\,a^2b^2x^2 - 2\,a^3bx + a^4 - 12\left(b^4x^4 + ab^3x^3\right)\log(bx + a) + 12\left(b^4x^4 + ab^3x^3\right)\log(x)}{3\,(a^5bx^4 + a^6x^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(-2),x, algorithm="fricas")
```

```
[Out] -1/3*(12*a*b^3*x^3 + 6*a^2*b^2*x^2 - 2*a^3*b*x + a^4 - 12*(b^4*x^
4 + a*b^3*x^3)*log(b*x + a) + 12*(b^4*x^4 + a*b^3*x^3)*log(x))/(a
^5*b*x^4 + a^6*x^3)
```

Sympy [A] time = 1.84199, size = 66, normalized size = 0.96

$$-\frac{a^3 - 2a^2bx + 6ab^2x^2 + 12b^3x^3}{3a^5x^3 + 3a^4bx^4} + \frac{4b^3\left(-\log(x) + \log\left(\frac{a}{b} + x\right)\right)}{a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a*x**2)**2,x)
```

```
[Out] -(a**3 - 2*a**2*b*x + 6*a*b**2*x**2 + 12*b**3*x**3)/(3*a**5*x**3
+ 3*a**4*b*x**4) + 4*b**3*(-log(x) + log(a/b + x))/a**5
```

GIAC/XCAS [A] time = 0.217952, size = 99, normalized size = 1.43

$$\frac{4\,b^3\ln(|bx + a|)}{a^5} - \frac{4\,b^3\ln(|x|)}{a^5} - \frac{12\,ab^3x^3 + 6\,a^2b^2x^2 - 2\,a^3bx + a^4}{3\,(bx + a)a^5x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(-2),x, algorithm="giac")
```

```
[Out] 4*b^3*ln(abs(b*x + a))/a^5 - 4*b^3*ln(abs(x))/a^5 - 1/3*(12*a*b^3
*x^3 + 6*a^2*b^2*x^2 - 2*a^3*b*x + a^4)/((b*x + a)*a^5*x^3)
```

3.231 $\int \frac{1}{x(ax^2+bx^3)^2} \, dx$

Optimal. Leaf size=84

$$\frac{5b^4\log(x)}{a^6}-\frac{5b^4\log(a+bx)}{a^6}+\frac{b^4}{a^5(a+bx)}+\frac{4b^3}{a^5x}-\frac{3b^2}{2a^4x^2}+\frac{2b}{3a^3x^3}-\frac{1}{4a^2x^4}$$

```
[Out] -1/(4*a^2*x^4) + (2*b)/(3*a^3*x^3) - (3*b^2)/(2*a^4*x^2) + (4*b^3
)/(a^5*x) + b^4/(a^5*(a + b*x)) + (5*b^4*Log[x])/a^6 - (5*b^4*Log
[a + b*x])/a^6
```

Rubi [A] time = 0.103632, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$\frac{5b^4\log(x)}{a^6}-\frac{5b^4\log(a+bx)}{a^6}+\frac{b^4}{a^5(a+bx)}+\frac{4b^3}{a^5x}-\frac{3b^2}{2a^4x^2}+\frac{2b}{3a^3x^3}-\frac{1}{4a^2x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a*x^2 + b*x^3)^2),x]
```

```
[Out] -1/(4*a^2*x^4) + (2*b)/(3*a^3*x^3) - (3*b^2)/(2*a^4*x^2) + (4*b^3
)/(a^5*x) + b^4/(a^5*(a + b*x)) + (5*b^4*Log[x])/a^6 - (5*b^4*Log
[a + b*x])/a^6
```

Rubi in Sympy [A] time = 17.5986, size = 83, normalized size = 0.99

$$-\frac{1}{4a^2x^4}+\frac{2b}{3a^3x^3}-\frac{3b^2}{2a^4x^2}+\frac{b^4}{a^5\left(a+bx\right)}+\frac{4b^3}{a^5x}+\frac{5b^4\log\left(x\right)}{a^6}-\frac{5b^4\log\left(a+bx\right)}{a^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a*x**2)**2,x)
```

```
[Out] -1/(4*a**2*x**4) + 2*b/(3*a**3*x**3) - 3*b**2/(2*a**4*x**2) + b**
4/(a**5*(a + b*x)) + 4*b**3/(a**5*x) + 5*b**4*log(x)/a**6 - 5*b**
4*log(a + b*x)/a**6
```

Mathematica [A] time = 0.0762171, size = 79, normalized size = 0.94

$$\frac{\frac{a(-3a^4+5a^3bx-10a^2b^2x^2+30ab^3x^3+60b^4x^4)}{x^4(a+bx)}-60b^4\log(a+bx)+60b^4\log(x)}{12a^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a*x^2 + b*x^3)^2),x]
```

```
[Out] ((a*(-3*a^4 + 5*a^3*b*x - 10*a^2*b^2*x^2 + 30*a*b^3*x^3 + 60*b^4*
x^4))/(x^4*(a + b*x)) + 60*b^4*Log[x] - 60*b^4*Log[a + b*x])/(12*
a^6)
```

Maple [A] time = 0.017, size = 79, normalized size = 0.9

$$-\frac{1}{4\,a^2x^4}+\frac{2\,b}{3\,a^3x^3}-\frac{3\,b^2}{2\,a^4x^2}+4\,\frac{b^3}{a^5x}+\frac{b^4}{a^5\left(bx+a\right)}+5\,\frac{b^4\ln\left(x\right)}{a^6}-5\,\frac{b^4\ln\left(bx+a\right)}{a^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a*x^2)^2,x)
```

```
[Out] -1/4/a^2/x^4+2/3*b/a^3/x^3-3/2*b^2/a^4/x^2+4*b^3/a^5/x+b^4/a^5/(b
*x+a)+5*b^4*ln(x)/a^6-5*b^4*ln(b*x+a)/a^6
```

Maxima [A] time = 1.43526, size = 116, normalized size = 1.38

$$\frac{60\,b^4x^4 + 30\,ab^3x^3 - 10\,a^2b^2x^2 + 5\,a^3bx - 3\,a^4}{12\,(a^5bx^5 + a^6x^4)} - \frac{5\,b^4\log{(bx + a)}}{a^6} + \frac{5\,b^4\log{(x)}}{a^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^2*x),x, algorithm="maxima")
```

```
[Out] 1/12*(60*b^4*x^4 + 30*a*b^3*x^3 - 10*a^2*b^2*x^2 + 5*a^3*b*x - 3*
a^4)/(a^5*b*x^5 + a^6*x^4) - 5*b^4*log(b*x + a)/a^6 + 5*b^4*log(x
)/a^6
```

Fricas [A] time = 0.216461, size = 146, normalized size = 1.74

$$\frac{60\,ab^4x^4 + 30\,a^2b^3x^3 - 10\,a^3b^2x^2 + 5\,a^4bx - 3\,a^5 - 60\,\left(b^5x^5 + ab^4x^4\right)\log{(bx + a)} + 60\,\left(b^5x^5 + ab^4x^4\right)\log{(x)}}{12\,(a^6bx^5 + a^7x^4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^2*x),x, algorithm="fricas")
```

```
[Out] 1/12*(60*a*b^4*x^4 + 30*a^2*b^3*x^3 - 10*a^3*b^2*x^2 + 5*a^4*b*x
- 3*a^5 - 60*(b^5*x^5 + a*b^4*x^4)*log(b*x + a) + 60*(b^5*x^5 + a
*b^4*x^4)*log(x))/(a^6*b*x^5 + a^7*x^4)
```

Sympy [A] time = 1.99998, size = 80, normalized size = 0.95

$$\frac{-3a^4 + 5a^3bx - 10a^2b^2x^2 + 30ab^3x^3 + 60b^4x^4}{12a^6x^4 + 12a^5bx^5} + \frac{5b^4\left(\log{(x)} - \log{\left(\frac{a}{b} + x\right)}\right)}{a^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a*x**2)**2,x)
```

```
[Out] (-3*a**4 + 5*a**3*b*x - 10*a**2*b**2*x**2 + 30*a*b**3*x**3 + 60*b
**4*x**4)/(12*a**6*x**4 + 12*a**5*b*x**5) + 5*b**4*(log(x) - log(
a/b + x))/a**6
```

GIAC/XCAS [A] time = 0.219436, size = 116, normalized size = 1.38

$$-\frac{5\,b^4\ln{(|bx + a|)}}{a^6} + \frac{5\,b^4\ln{(|x|)}}{a^6} + \frac{60\,ab^4x^4 + 30\,a^2b^3x^3 - 10\,a^3b^2x^2 + 5\,a^4bx - 3\,a^5}{12\,(bx + a)a^6x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^2*x),x, algorithm="giac")
```

```
[Out] -5*b^4*ln(abs(b*x + a))/a^6 + 5*b^4*ln(abs(x))/a^6 + 1/12*(60*a*b
^4*x^4 + 30*a^2*b^3*x^3 - 10*a^3*b^2*x^2 + 5*a^4*b*x - 3*a^5)/((b
*x + a)*a^6*x^4)
```

3.232 $\int x^2\sqrt{ax^2+bx^3}\,dx$

Optimal. Leaf size=105

$$-\frac{32a^3\left(ax^2+bx^3\right)^{3/2}}{315b^4x^3}+\frac{16a^2\left(ax^2+bx^3\right)^{3/2}}{105b^3x^2}-\frac{4a\left(ax^2+bx^3\right)^{3/2}}{21b^2x}+\frac{2\left(ax^2+bx^3\right)^{3/2}}{9b}$$

```
[Out] (2*(a*x^2 + b*x^3)^(3/2))/(9*b) - (32*a^3*(a*x^2 + b*x^3)^(3/2))/
(315*b^4*x^3) + (16*a^2*(a*x^2 + b*x^3)^(3/2))/(105*b^3*x^2) - (4
*a*(a*x^2 + b*x^3)^(3/2))/(21*b^2*x)
```

Rubi [A] time = 0.212287, antiderivative size = 105, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{32a^3\left(ax^2+bx^3\right)^{3/2}}{315b^4x^3}+\frac{16a^2\left(ax^2+bx^3\right)^{3/2}}{105b^3x^2}-\frac{4a\left(ax^2+bx^3\right)^{3/2}}{21b^2x}+\frac{2\left(ax^2+bx^3\right)^{3/2}}{9b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (2*(a*x^2 + b*x^3)^(3/2))/(9*b) - (32*a^3*(a*x^2 + b*x^3)^(3/2))/
(315*b^4*x^3) + (16*a^2*(a*x^2 + b*x^3)^(3/2))/(105*b^3*x^2) - (4
*a*(a*x^2 + b*x^3)^(3/2))/(21*b^2*x)
```

Rubi in Sympy [A] time = 21.6329, size = 95, normalized size = 0.9

$$-\frac{32a^3\left(ax^2+bx^3\right)^{\frac{3}{2}}}{315b^4x^3}+\frac{16a^2\left(ax^2+bx^3\right)^{\frac{3}{2}}}{105b^3x^2}-\frac{4a\left(ax^2+bx^3\right)^{\frac{3}{2}}}{21b^2x}+\frac{2\left(ax^2+bx^3\right)^{\frac{3}{2}}}{9b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -32*a**3*(a*x**2 + b*x**3)**(3/2)/(315*b**4*x**3) + 16*a**2*(a*x*
*2 + b*x**3)**(3/2)/(105*b**3*x**2) - 4*a*(a*x**2 + b*x**3)**(3/2
)/(21*b**2*x) + 2*(a*x**2 + b*x**3)**(3/2)/(9*b)
```

Mathematica [A] time = 0.0275515, size = 64, normalized size = 0.61

$$\frac{2\sqrt{x^2(a+bx)}\left(-16a^4+8a^3bx-6a^2b^2x^2+5ab^3x^3+35b^4x^4\right)}{315b^4x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (2*Sqrt[x^2*(a + b*x)]*(-16*a^4 + 8*a^3*b*x - 6*a^2*b^2*x^2 + 5*a
*b^3*x^3 + 35*b^4*x^4))/(315*b^4*x)
```

Maple [A] time = 0.008, size = 57, normalized size = 0.5

$$-\frac{(2\,bx+2\,a)\left(-35\,x^3b^3+30\,ab^2x^2-24\,a^2xb+16\,a^3\right)}{315\,b^4x}\sqrt{bx^3+ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2/315*(b*x+a)*(-35*b^3*x^3+30*a*b^2*x^2-24*a^2*b*x+16*a^3)*(b*x^
3+a*x^2)^(1/2)/b^4/x
```

Maxima [A] time = 1.43845, size = 72, normalized size = 0.69

$$\frac{2\left(35\,b^4x^4+5\,ab^3x^3-6\,a^2b^2x^2+8\,a^3bx-16\,a^4\right)\sqrt{bx+a}}{315\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)*x^2,x, algorithm="maxima")
```

```
[Out] 2/315*(35*b^4*x^4 + 5*a*b^3*x^3 - 6*a^2*b^2*x^2 + 8*a^3*b*x - 16*
a^4)*sqrt(b*x + a)/b^4
```

Fricas [A] time = 0.217481, size = 84, normalized size = 0.8

$$\frac{2\left(35\,b^4x^4+5\,ab^3x^3-6\,a^2b^2x^2+8\,a^3bx-16\,a^4\right)\sqrt{bx^3+ax^2}}{315\,b^4x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)*x^2,x, algorithm="fricas")
```

```
[Out] 2/315*(35*b^4*x^4 + 5*a*b^3*x^3 - 6*a^2*b^2*x^2 + 8*a^3*b*x - 16*
a^4)*sqrt(b*x^3 + a*x^2)/(b^4*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2\sqrt{x^2\left(a+bx\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**2*sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [A] time = 0.221052, size = 100, normalized size = 0.95

$$\frac{32\,a^{\frac{9}{2}}\operatorname{sign}\left(x\right)}{315\,b^4}+\frac{2\left(35\left(bx+a\right)^{\frac{9}{2}}b^{24}-135\left(bx+a\right)^{\frac{7}{2}}ab^{24}+189\left(bx+a\right)^{\frac{5}{2}}a^2b^{24}-105\left(bx+a\right)^{\frac{3}{2}}a^3b^{24}\right)\operatorname{sign}\left(x\right)}{315\,b^{28}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)*x^2,x, algorithm="giac")
```

```
[Out] 32/315*a^(9/2)*sign(x)/b^4 + 2/315*(35*(b*x + a)^(9/2)*b^24 - 135
*(b*x + a)^(7/2)*a*b^24 + 189*(b*x + a)^(5/2)*a^2*b^24 - 105*(b*x
 + a)^(3/2)*a^3*b^24)*sign(x)/b^28
```

3.233 $\int x\sqrt{ax^2+bx^3}\,dx$

Optimal. Leaf size=80

$$\frac{16a^2\left(ax^2+bx^3\right)^{3/2}}{105b^3x^3}-\frac{8a\left(ax^2+bx^3\right)^{3/2}}{35b^2x^2}+\frac{2\left(ax^2+bx^3\right)^{3/2}}{7bx}$$

```
[Out] (16*a^2*(a*x^2 + b*x^3)^(3/2))/(105*b^3*x^3) - (8*a*(a*x^2 + b*x^
3)^(3/2))/(35*b^2*x^2) + (2*(a*x^2 + b*x^3)^(3/2))/(7*b*x)
```

Rubi [A] time = 0.131132, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$\frac{16a^2\left(ax^2+bx^3\right)^{3/2}}{105b^3x^3}-\frac{8a\left(ax^2+bx^3\right)^{3/2}}{35b^2x^2}+\frac{2\left(ax^2+bx^3\right)^{3/2}}{7bx}$$

Antiderivative was successfully verified.

```
[In]  Int[x*Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (16*a^2*(a*x^2 + b*x^3)^(3/2))/(105*b^3*x^3) - (8*a*(a*x^2 + b*x^
3)^(3/2))/(35*b^2*x^2) + (2*(a*x^2 + b*x^3)^(3/2))/(7*b*x)
```

Rubi in Sympy [A] time = 13.9309, size = 71, normalized size = 0.89

$$\frac{16a^2\left(ax^2+bx^3\right)^{\frac{3}{2}}}{105b^3x^3}-\frac{8a\left(ax^2+bx^3\right)^{\frac{3}{2}}}{35b^2x^2}+\frac{2\left(ax^2+bx^3\right)^{\frac{3}{2}}}{7bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] 16*a**2*(a*x**2 + b*x**3)**(3/2)/(105*b**3*x**3) - 8*a*(a*x**2 +
b*x**3)**(3/2)/(35*b**2*x**2) + 2*(a*x**2 + b*x**3)**(3/2)/(7*b*x
)
```

Mathematica [A] time = 0.020636, size = 53, normalized size = 0.66

$$\frac{2\sqrt{x^2(a+bx)}\left(8a^3-4a^2bx+3ab^2x^2+15b^3x^3\right)}{105b^3x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (2*Sqrt[x^2*(a + b*x)]*(8*a^3 - 4*a^2*b*x + 3*a*b^2*x^2 + 15*b^3*
x^3))/(105*b^3*x)
```

Maple [A] time = 0.007, size = 46, normalized size = 0.6

$$\frac{(2\,bx+2\,a)\left(15\,b^2x^2-12\,abx+8\,a^2\right)}{105\,b^3x}\sqrt{bx^3+ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] 2/105*(b*x+a)*(15*b^2*x^2-12*a*b*x+8*a^2)*(b*x^3+a*x^2)^(1/2)/b^3
/x
```

Maxima [A] time = 1.39356, size = 57, normalized size = 0.71

$$\frac{2\left(15\,b^3x^3 + 3\,ab^2x^2 - 4\,a^2bx + 8\,a^3\right)\sqrt{bx + a}}{105\,b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)*x,x, algorithm="maxima")
```

```
[Out] 2/105*(15*b^3*x^3 + 3*a*b^2*x^2 - 4*a^2*b*x + 8*a^3)*sqrt(b*x + a
)/b^3
```

Fricas [A] time = 0.226787, size = 69, normalized size = 0.86

$$\frac{2\left(15\,b^3x^3 + 3\,ab^2x^2 - 4\,a^2bx + 8\,a^3\right)\sqrt{bx^3 + ax^2}}{105\,b^3x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)*x,x, algorithm="fricas")
```

```
[Out] 2/105*(15*b^3*x^3 + 3*a*b^2*x^2 - 4*a^2*b*x + 8*a^3)*sqrt(b*x^3 +
 a*x^2)/(b^3*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\sqrt{x^2\,(a + bx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(x*sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [A] time = 0.219522, size = 80, normalized size = 1.

$$-\frac{16\,a^{\frac{7}{2}}\,\mathrm{sign}\left(x\right)}{105\,b^3} + \frac{2\left(15\,(bx + a)^{\frac{7}{2}}b^{12} - 42\,(bx + a)^{\frac{5}{2}}ab^{12} + 35\,(bx + a)^{\frac{3}{2}}a^2b^{12}\right)\mathrm{sign}\left(x\right)}{105\,b^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)*x,x, algorithm="giac")
```

```
[Out] -16/105*a^(7/2)*sign(x)/b^3 + 2/105*(15*(b*x + a)^(7/2)*b^12 - 42
*(b*x + a)^(5/2)*a*b^12 + 35*(b*x + a)^(3/2)*a^2*b^12)*sign(x)/b^
15
```

3.234 $\int \sqrt{ax^2 + bx^3}\, dx$

Optimal. Leaf size=52

$$\frac{2\left(ax^2+bx^3\right)^{3/2}}{5bx^2}-\frac{4a\left(ax^2+bx^3\right)^{3/2}}{15b^2x^3}$$

```
[Out] (-4*a*(a*x^2 + b*x^3)^(3/2))/(15*b^2*x^3) + (2*(a*x^2 + b*x^3)^(3
/2))/(5*b*x^2)
```

Rubi [A] time = 0.0799932, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{2\left(ax^2+bx^3\right)^{3/2}}{5bx^2}-\frac{4a\left(ax^2+bx^3\right)^{3/2}}{15b^2x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (-4*a*(a*x^2 + b*x^3)^(3/2))/(15*b^2*x^3) + (2*(a*x^2 + b*x^3)^(3
/2))/(5*b*x^2)
```

Rubi in Sympy [A] time = 8.54183, size = 46, normalized size = 0.88

$$-\frac{4a\left(ax^2+bx^3\right)^{\frac{3}{2}}}{15b^2x^3}+\frac{2\left(ax^2+bx^3\right)^{\frac{3}{2}}}{5bx^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -4*a*(a*x**2 + b*x**3)**(3/2)/(15*b**2*x**3) + 2*(a*x**2 + b*x**3
)**(3/2)/(5*b*x**2)
```

Mathematica [A] time = 0.0151346, size = 41, normalized size = 0.79

$$\frac{2\sqrt{x^2(a+bx)}\left(-2a^2+abx+3b^2x^2\right)}{15b^2x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (2*Sqrt[x^2*(a + b*x)]*(-2*a^2 + a*b*x + 3*b^2*x^2))/(15*b^2*x)
```

Maple [A] time = 0.005, size = 35, normalized size = 0.7

$$-\frac{(2\,bx+2\,a)(-3\,bx+2\,a)}{15\,b^2x}\sqrt{bx^3+ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2/15*(b*x+a)*(-3*b*x+2*a)*(b*x^3+a*x^2)^(1/2)/b^2/x
```

Maxima [A] time = 1.40548, size = 41, normalized size = 0.79

$$\frac{2\left(3\,b^2x^2+abx-2\,a^2\right)\sqrt{bx+a}}{15\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] 2/15*(3*b^2*x^2 + a*b*x - 2*a^2)*sqrt(b*x + a)/b^2
```

Fricas [A] time = 0.216243, size = 53, normalized size = 1.02

$$\frac{2\left(3\,b^2x^2+abx-2\,a^2\right)\sqrt{bx^3+ax^2}}{15\,b^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] 2/15*(3*b^2*x^2 + a*b*x - 2*a^2)*sqrt(b*x^3 + a*x^2)/(b^2*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{ax^2+bx^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(sqrt(a*x**2 + b*x**3), x)
```

GIAC/XCAS [A] time = 0.217484, size = 51, normalized size = 0.98

$$\frac{4\,a^{\frac{5}{2}}\,\mathrm{sign}\left(x\right)}{15\,b^2}+\frac{2\left(3\,(bx+a)^{\frac{5}{2}}-5\,(bx+a)^{\frac{3}{2}}a\right)\mathrm{sign}\left(x\right)}{15\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] 4/15*a^(5/2)*sign(x)/b^2 + 2/15*(3*(b*x + a)^(5/2) - 5*(b*x + a)^
(3/2)*a)*sign(x)/b^2
```

3.235 $\int \frac{\sqrt{ax^2+bx^3}}{x}\,dx$

Optimal. Leaf size=25

$$\frac{2\left(ax^2+bx^3\right)^{3/2}}{3bx^3}$$

```
[Out] (2*(a*x^2 + b*x^3)^(3/2))/(3*b*x^3)
```

Rubi [A] time = 0.0654432, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053

$$\frac{2\left(ax^2+bx^3\right)^{3/2}}{3bx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^2 + b*x^3]/x,x]

[Out] (2*(a*x^2 + b*x^3)^(3/2))/(3*b*x^3)
```

Rubi in Sympy [A] time = 7.50002, size = 20, normalized size = 0.8

$$\frac{2\left(ax^2+bx^3\right)^{\frac{3}{2}}}{3bx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(1/2)/x,x)

[Out] 2*(a*x**2 + b*x**3)**(3/2)/(3*b*x**3)
```

Mathematica [A] time = 0.0172141, size = 23, normalized size = 0.92

$$\frac{2\left(x^2(a+bx)\right)^{3/2}}{3bx^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^2 + b*x^3]/x,x]

[Out] (2*(x^2*(a + b*x))^(3/2))/(3*b*x^3)
```

Maple [A] time = 0.003, size = 27, normalized size = 1.1

$$\frac{2\,bx+2\,a}{3\,bx}\sqrt{bx^3+ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(1/2)/x,x)

[Out] 2/3*(b*x+a)*(b*x^3+a*x^2)^(1/2)/b/x
```

Maxima [A] time = 1.41592, size = 16, normalized size = 0.64

$$\frac{2\,(bx+a)^{\frac{3}{2}}}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x,x, algorithm="maxima")
```

```
[Out] 2/3*(b*x + a)^(3/2)/b
```

Fricas [A] time = 0.224671, size = 35, normalized size = 1.4

$$\frac{2\,\sqrt{bx^3+ax^2}(bx+a)}{3\,bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x,x, algorithm="fricas")
```

```
[Out] 2/3*sqrt(b*x^3 + a*x^2)*(b*x + a)/(b*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{x^2\,(a+bx)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(1/2)/x,x)
```

```
[Out] Integral(sqrt(x**2*(a + b*x))/x, x)
```

GIAC/XCAS [A] time = 0.218038, size = 34, normalized size = 1.36

$$\frac{2\,(bx+a)^{\frac{3}{2}}\operatorname{sign}(x)}{3\,b}-\frac{2\,a^{\frac{3}{2}}\operatorname{sign}(x)}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x,x, algorithm="giac")
```

```
[Out] 2/3*(b*x + a)^(3/2)*sign(x)/b - 2/3*a^(3/2)*sign(x)/b
```

3.236 $\int \frac{\sqrt{ax^2+bx^3}}{x^2}\,dx$

Optimal. Leaf size=51

$$\frac{2\sqrt{ax^2+bx^3}}{x}-2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}\,x}{\sqrt{ax^2+bx^3}}\right)$$

```
[Out] (2*Sqrt[a*x^2 + b*x^3])/x - 2*Sqrt[a]*ArcTanh[(Sqrt[a]*x)/Sqrt[a*
x^2 + b*x^3]]
```

Rubi [A] time = 0.0895152, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{2\sqrt{ax^2+bx^3}}{x}-2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}\,x}{\sqrt{ax^2+bx^3}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^2 + b*x^3]/x^2,x]
```

```
[Out] (2*Sqrt[a*x^2 + b*x^3])/x - 2*Sqrt[a]*ArcTanh[(Sqrt[a]*x)/Sqrt[a*
x^2 + b*x^3]]
```

Rubi in Sympy [A] time = 9.26357, size = 44, normalized size = 0.86

$$-2\sqrt{a}\,\mathrm{atanh}\left(\frac{\sqrt{a}\,x}{\sqrt{ax^2+bx^3}}\right)+\frac{2\sqrt{ax^2+bx^3}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(1/2)/x**2,x)
```

```
[Out] -2*sqrt(a)*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3)) + 2*sqrt(a*x**2
 + b*x**3)/x
```

Mathematica [A] time = 0.0512277, size = 53, normalized size = 1.04

$$\frac{2x\left(-\sqrt{a}\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)+a+bx\right)}{\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^2 + b*x^3]/x^2,x]
```

```
[Out] (2*x*(a + b*x - Sqrt[a]*Sqrt[a + b*x]*ArcTanh[Sqrt[a + b*x]/Sqrt[
a]]))/Sqrt[x^2*(a + b*x)]
```

Maple [A] time = 0.007, size = 52, normalized size = 1.

$$-2\,\frac{\sqrt{bx^3+ax^2}}{x\sqrt{bx+a}}\left(\sqrt{a}Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)-\sqrt{bx+a}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(1/2)/x^2,x)
```

```
[Out] -2*(b*x^3+a*x^2)^(1/2)*(a^(1/2)*arctanh((b*x+a)^(1/2)/a^(1/2))-(b
*x+a)^(1/2))/x/(b*x+a)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.226711, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{a}x\log\left(\frac{bx^2+2\,ax-2\,\sqrt{bx^3+ax^2}\sqrt{a}}{x^2}\right)+2\,\sqrt{bx^3+ax^2}}{x}, -\frac{2\left(\sqrt{-a}x\arctan\left(\frac{\sqrt{bx^3+ax^2}}{\sqrt{-a}x}\right)-\sqrt{bx^3+ax^2}\right)}{x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^2,x, algorithm="fricas")
```

```
[Out] [(sqrt(a)*x*log((b*x^2 + 2*a*x - 2*sqrt(b*x^3 + a*x^2)*sqrt(a))/x
^2) + 2*sqrt(b*x^3 + a*x^2))/x, -2*(sqrt(-a)*x*arctan(sqrt(b*x^3
+ a*x^2)/(sqrt(-a)*x)) - sqrt(b*x^3 + a*x^2))/x]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x^2(a+bx)}}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(1/2)/x**2,x)
```

```
[Out] Integral(sqrt(x**2*(a + b*x))/x**2, x)
```

GIAC/XCAS [A] time = 0.223553, size = 88, normalized size = 1.73

$$2\left(\frac{a\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)}{\sqrt{-a}}+\sqrt{bx+a}\right)\mathrm{sign}(x)-\frac{2\left(a\arctan\left(\frac{\sqrt{a}}{\sqrt{-a}}\right)+\sqrt{-a}\sqrt{a}\right)\mathrm{sign}(x)}{\sqrt{-a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^2,x, algorithm="giac")
```

```
[Out] 2*(a*arctan(sqrt(b*x + a)/sqrt(-a))/sqrt(-a) + sqrt(b*x + a))*sig
n(x) - 2*(a*arctan(sqrt(a)/sqrt(-a)) + sqrt(-a)*sqrt(a))*sign(x)/
sqrt(-a)
```

3.237 $\int \frac{\sqrt{ax^2+bx^3}}{x^3}\,dx$

Optimal. Leaf size=52

$$-\frac{\sqrt{ax^2+bx^3}}{x^2}-\frac{b\tanh^{-1}\left(\frac{\sqrt{a}\,x}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{a}}$$

```
[Out] -(Sqrt[a*x^2 + b*x^3]/x^2) - (b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 +
b*x^3]])/Sqrt[a]
```

Rubi [A] time = 0.0930168, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{\sqrt{ax^2+bx^3}}{x^2}-\frac{b\tanh^{-1}\left(\frac{\sqrt{a}\,x}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{a}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^2 + b*x^3]/x^3,x]
```

```
[Out] -(Sqrt[a*x^2 + b*x^3]/x^2) - (b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 +
b*x^3]])/Sqrt[a]
```

Rubi in Sympy [A] time = 9.35665, size = 46, normalized size = 0.88

$$-\frac{\sqrt{ax^2+bx^3}}{x^2}-\frac{b\,\operatorname{atanh}\left(\frac{\sqrt{a}\,x}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(1/2)/x**3,x)
```

```
[Out] -sqrt(a*x**2 + b*x**3)/x**2 - b*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x
**3))/sqrt(a)
```

Mathematica [A] time = 0.0440057, size = 64, normalized size = 1.23

$$-\frac{\sqrt{a+bx}\left(\sqrt{a}\sqrt{a+bx}+bx\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)\right)}{\sqrt{a}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^2 + b*x^3]/x^3,x]
```

```
[Out] -((Sqrt[a + b*x]*(Sqrt[a]*Sqrt[a + b*x] + b*x*ArcTanh[Sqrt[a + b*
x]/Sqrt[a]]))/(Sqrt[a]*Sqrt[x^2*(a + b*x)]))
```

Maple [A] time = 0.01, size = 56, normalized size = 1.1

$$-\frac{1}{x^2}\sqrt{bx^3+ax^2}\left(Artanh\left(1\sqrt{bx+a}\frac{1}{\sqrt{a}}\right)xb+\sqrt{bx+a}\sqrt{a}\right)\frac{1}{\sqrt{bx+a}}\frac{1}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(1/2)/x^3,x)
```

```
[Out] -(b*x^3+a*x^2)^(1/2)*(arctanh((b*x+a)^(1/2)/a^(1/2))*x*b+(b*x+a)^
(1/2)*a^(1/2))/x^2/(b*x+a)^(1/2)/a^(1/2)
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A]   time = 0.229019, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{a}bx^2\log\left(\frac{(bx^2+2\,ax)\sqrt{a}-2\sqrt{bx^3+ax^2}a}{x^2}\right)-2\sqrt{bx^3+ax^2}a}{2\,ax^2}, -\frac{\sqrt{-a}bx^2\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)+\sqrt{bx^3+ax^2}a}{ax^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^3,x, algorithm="fricas")
```

```
[Out] [1/2*(sqrt(a)*b*x^2*log(((b*x^2 + 2*a*x)*sqrt(a) - 2*sqrt(b*x^3 +
 a*x^2)*a)/x^2) - 2*sqrt(b*x^3 + a*x^2)*a)/(a*x^2), -(sqrt(-a)*b*
x^2*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt(-a))) + sqrt(b*x^3 + a*x
^2)*a)/(a*x^2)]
```

Sympy [F]   time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{x^2\,(a+bx)}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(1/2)/x**3,x)
```

```
[Out] Integral(sqrt(x**2*(a + b*x))/x**3, x)
```

GIAC/XCAS [A]   time = 0.23909, size = 58, normalized size = 1.12

$$\frac{\left(\frac{b^2\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)}{\sqrt{-a}}-\frac{\sqrt{bx+a}b}{x}\right)\mathrm{sign}\left(x\right)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^3,x, algorithm="giac")
```

```
[Out] (b^2*arctan(sqrt(b*x + a)/sqrt(-a))/sqrt(-a) - sqrt(b*x + a)*b/x)
*sign(x)/b
```

3.238 $\int \frac{\sqrt{ax^2+bx^3}}{x^4} dx$

Optimal. Leaf size=84

$$\frac{b^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{3/2}}-\frac{b\sqrt{ax^2+bx^3}}{4ax^2}-\frac{\sqrt{ax^2+bx^3}}{2x^3}$$

```
[Out] -Sqrt[a*x^2 + b*x^3]/(2*x^3) - (b*Sqrt[a*x^2 + b*x^3])/(4*a*x^2)
+ (b^2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(4*a^(3/2))
```

Rubi [A] time = 0.167857, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$\frac{b^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{3/2}}-\frac{b\sqrt{ax^2+bx^3}}{4ax^2}-\frac{\sqrt{ax^2+bx^3}}{2x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^2 + b*x^3]/x^4,x]
```

```
[Out] -Sqrt[a*x^2 + b*x^3]/(2*x^3) - (b*Sqrt[a*x^2 + b*x^3])/(4*a*x^2)
+ (b^2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(4*a^(3/2))
```

Rubi in Sympy [A] time = 17.0402, size = 71, normalized size = 0.85

$$-\frac{\sqrt{ax^2+bx^3}}{2x^3}-\frac{b\sqrt{ax^2+bx^3}}{4ax^2}+\frac{b^2\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(1/2)/x**4,x)
```

```
[Out] -sqrt(a*x**2 + b*x**3)/(2*x**3) - b*sqrt(a*x**2 + b*x**3)/(4*a*x*
*2) + b**2*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3))/(4*a**(3/2))
```

Mathematica [A] time = 0.0607862, size = 81, normalized size = 0.96

$$\frac{\sqrt{x^2(a+bx)}\left(b^2x^2\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)-\sqrt{a}\sqrt{a+bx}(2a+bx)\right)}{4a^{3/2}x^3\sqrt{a+bx}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^2 + b*x^3]/x^4,x]
```

```
[Out] (Sqrt[x^2*(a + b*x)]*(-(Sqrt[a]*Sqrt[a + b*x]*(2*a + b*x)) + b^2*
x^2*ArcTanh[Sqrt[a + b*x]/Sqrt[a]]))/(4*a^(3/2)*x^3*Sqrt[a + b*x]
)
```

Maple [A] time = 0.008, size = 73, normalized size = 0.9

$$-\frac{1}{4x^3}\sqrt{bx^3+ax^2}\left((bx+a)^{\frac{3}{2}}a^{\frac{3}{2}}-Artanh\left(1\sqrt{bx+a}\frac{1}{\sqrt{a}}\right)ab^2x^2+\sqrt{bx+a}a^{\frac{5}{2}}\right)\frac{1}{\sqrt{bx+a}}a^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(1/2)/x^4,x)
```

```
[Out] -1/4*(b*x^3+a*x^2)^(1/2)*((b*x+a)^(3/2)*a^(3/2)-arctanh((b*x+a)^(
1/2)/a^(1/2))*a*b^2*x^2+(b*x+a)^(1/2)*a^(5/2))/x^3/(b*x+a)^(1/2)/
a^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238143, size = 1, normalized size = 0.01

$$\left[\frac{\sqrt{a}b^2x^3\log\left(\frac{(bx^2+2\,ax)\sqrt{a}+2\,\sqrt{bx^3+ax^2}a}{x^2}\right)-2\,\sqrt{bx^3+ax^2}\left(abx+2\,a^2\right)}{8\,a^2x^3},\ \frac{\sqrt{-a}b^2x^3\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)-\sqrt{bx^3+ax^2}\left(abx+\right.}{4\,a^2x^3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^4,x, algorithm="fricas")
```

```
[Out] [1/8*(sqrt(a)*b^2*x^3*log(((b*x^2 + 2*a*x)*sqrt(a) + 2*sqrt(b*x^3
 + a*x^2)*a)/x^2) - 2*sqrt(b*x^3 + a*x^2)*(a*b*x + 2*a^2))/(a^2*x
^3), 1/4*(sqrt(-a)*b^2*x^3*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt(-
a))) - sqrt(b*x^3 + a*x^2)*(a*b*x + 2*a^2))/(a^2*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{x^2\,(a+bx)}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(1/2)/x**4,x)
```

```
[Out] Integral(sqrt(x**2*(a + b*x))/x**4, x)
```

GIAC/XCAS [A] time = 0.242657, size = 92, normalized size = 1.1

$$-\frac{\left(\frac{b^3\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)}{\sqrt{-a}a}+\frac{(bx+a)^{\frac{3}{2}}b^3+\sqrt{bx+a}ab^3}{ab^2x^2}\right)\mathrm{sign}\left(x\right)}{4\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^4,x, algorithm="giac")
```

```
[Out] -1/4*(b^3*arctan(sqrt(b*x + a)/sqrt(-a))/(sqrt(-a)*a) + ((b*x + a
)^(3/2)*b^3 + sqrt(b*x + a)*a*b^3)/(a*b^2*x^2))*sign(x)/b
```

3.239 $\int \frac{\sqrt{ax^2+bx^3}}{x^5}\,dx$

Optimal. Leaf size=112

$$-\frac{b^3\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{5/2}}+\frac{b^2\sqrt{ax^2+bx^3}}{8a^2x^2}-\frac{b\sqrt{ax^2+bx^3}}{12ax^3}-\frac{\sqrt{ax^2+bx^3}}{3x^4}$$

```
[Out] -Sqrt[a*x^2 + b*x^3]/(3*x^4) - (b*Sqrt[a*x^2 + b*x^3])/(12*a*x^3)
 + (b^2*Sqrt[a*x^2 + b*x^3])/(8*a^2*x^2) - (b^3*ArcTanh[(Sqrt[a]*
x)/Sqrt[a*x^2 + b*x^3]])/(8*a^(5/2))
```

Rubi [A] time = 0.244532, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$-\frac{b^3\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{5/2}}+\frac{b^2\sqrt{ax^2+bx^3}}{8a^2x^2}-\frac{b\sqrt{ax^2+bx^3}}{12ax^3}-\frac{\sqrt{ax^2+bx^3}}{3x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^2 + b*x^3]/x^5,x]
```

```
[Out] -Sqrt[a*x^2 + b*x^3]/(3*x^4) - (b*Sqrt[a*x^2 + b*x^3])/(12*a*x^3)
 + (b^2*Sqrt[a*x^2 + b*x^3])/(8*a^2*x^2) - (b^3*ArcTanh[(Sqrt[a]*
x)/Sqrt[a*x^2 + b*x^3]])/(8*a^(5/2))
```

Rubi in Sympy [A] time = 24.5579, size = 97, normalized size = 0.87

$$-\frac{\sqrt{ax^2+bx^3}}{3x^4}-\frac{b\sqrt{ax^2+bx^3}}{12ax^3}+\frac{b^2\sqrt{ax^2+bx^3}}{8a^2x^2}-\frac{b^3\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(1/2)/x**5,x)
```

```
[Out] -sqrt(a*x**2 + b*x**3)/(3*x**4) - b*sqrt(a*x**2 + b*x**3)/(12*a*x
**3) + b**2*sqrt(a*x**2 + b*x**3)/(8*a**2*x**2) - b**3*atanh(sqrt
(a)*x/sqrt(a*x**2 + b*x**3))/(8*a**(5/2))
```

Mathematica [A] time = 0.0748293, size = 93, normalized size = 0.83

$$-\frac{\sqrt{x^2(a+bx)}\left(\sqrt{a}\sqrt{a+bx}\left(8a^2+2abx-3b^2x^2\right)+3b^3x^3\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)\right)}{24a^{5/2}x^4\sqrt{a+bx}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^2 + b*x^3]/x^5,x]
```

```
[Out] -(Sqrt[x^2*(a + b*x)]*(Sqrt[a]*Sqrt[a + b*x]*(8*a^2 + 2*a*b*x - 3
*b^2*x^2) + 3*b^3*x^3*ArcTanh[Sqrt[a + b*x]/Sqrt[a]]))/(24*a^(5/2
)*x^4*Sqrt[a + b*x])
```

Maple [A] time = 0.008, size = 89, normalized size = 0.8

$$-\frac{1}{24x^4}\sqrt{bx^3+ax^2}\left(3a^{9/2}\sqrt{bx+a}+8a^{7/2}(bx+a)^{3/2}-3a^{5/2}(bx+a)^{5/2}+3\,Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)a^2b^3x^3\right)a^{-\frac{9}{2}}\frac{1}{\sqrt{bx+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((b*x^3+a*x^2)^(1/2)/x^5,x)
```

```
[Out] -1/24*(b*x^3+a*x^2)^(1/2)*(3*a^(9/2)*(b*x+a)^(1/2)+8*a^(7/2)*(b*x
+a)^(3/2)-3*a^(5/2)*(b*x+a)^(5/2)+3*arctanh((b*x+a)^(1/2)/a^(1/2)
)*a^2*b^3*x^3)/x^4/(b*x+a)^(1/2)/a^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(b*x^3 + a*x^2)/x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240109, size = 1, normalized size = 0.01

$$\left[\frac{3\sqrt{a}b^3x^4\log\left(\frac{(bx^2+2ax)\sqrt{a}-2\sqrt{bx^3+ax^2}a}{x^2}\right)+2\left(3ab^2x^2-2a^2bx-8a^3\right)\sqrt{bx^3+ax^2}}{48a^3x^4},\right.$$
$$\left.-\frac{3\sqrt{-a}b^3x^4\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)-\left(3ab^2x^2-2a^2bx-8a^3\right)\sqrt{bx^3+ax^2}}{24a^3x^4}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt(b*x^3 + a*x^2)/x^5,x, algorithm="fricas")
```

```
[Out] [1/48*(3*sqrt(a)*b^3*x^4*log(((b*x^2 + 2*a*x)*sqrt(a) - 2*sqrt(b*
x^3 + a*x^2)*a)/x^2) + 2*(3*a*b^2*x^2 - 2*a^2*b*x - 8*a^3)*sqrt(b
*x^3 + a*x^2))/(a^3*x^4), -1/24*(3*sqrt(-a)*b^3*x^4*arctan(a*x/(s
qrt(b*x^3 + a*x^2)*sqrt(-a))) - (3*a*b^2*x^2 - 2*a^2*b*x - 8*a^3)
*sqrt(b*x^3 + a*x^2))/(a^3*x^4)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\sqrt{x^2(a+bx)}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x**3+a*x**2)**(1/2)/x**5,x)
```

```
[Out] Integral(sqrt(x**2*(a + b*x))/x**5, x)
```

GIAC/XCAS [A] time = 0.261642, size = 116, normalized size = 1.04

$$\frac{\left(\frac{3\,b^4\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)}{\sqrt{-a}a^2}+\frac{3\,(bx+a)^{\frac{5}{2}}b^4-8\,(bx+a)^{\frac{3}{2}}ab^4-3\,\sqrt{bx+a}a^2b^4}{a^2b^3x^3}\right)\mathrm{sign}\left(x\right)}{24\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^3 + a*x^2)/x^5,x, algorithm="giac")
```

```
[Out] 1/24*(3*b^4*arctan(sqrt(b*x + a)/sqrt(-a))/(sqrt(-a)*a^2) + (3*(b
*x + a)^(5/2)*b^4 - 8*(b*x + a)^(3/2)*a*b^4 - 3*sqrt(b*x + a)*a^2
*b^4)/(a^2*b^3*x^3))*sign(x)/b
```

3.240 $\int x^2 \left(ax^2+bx^3\right)^{3/2} dx$

Optimal. Leaf size=161

$$-\frac{512a^5\left(ax^2+bx^3\right)^{5/2}}{45045b^6x^5}+\frac{256a^4\left(ax^2+bx^3\right)^{5/2}}{9009b^5x^4}-\frac{64a^3\left(ax^2+bx^3\right)^{5/2}}{1287b^4x^3}+\frac{32a^2\left(ax^2+bx^3\right)^{5/2}}{429b^3x^2}-\frac{4a\left(ax^2+bx^3\right)^{5/2}}{39b^2x}+\frac{2\left(ax^2+bx^3\right)^{5/2}}{15b}$$

```
[Out] (2*(a*x^2 + b*x^3)^(5/2))/(15*b) - (512*a^5*(a*x^2 + b*x^3)^(5/2)
)/(45045*b^6*x^5) + (256*a^4*(a*x^2 + b*x^3)^(5/2))/(9009*b^5*x^4
) - (64*a^3*(a*x^2 + b*x^3)^(5/2))/(1287*b^4*x^3) + (32*a^2*(a*x^
2 + b*x^3)^(5/2))/(429*b^3*x^2) - (4*a*(a*x^2 + b*x^3)^(5/2))/(39
*b^2*x)
```

Rubi [A] time = 0.357242, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$-\frac{512a^5\left(ax^2+bx^3\right)^{5/2}}{45045b^6x^5}+\frac{256a^4\left(ax^2+bx^3\right)^{5/2}}{9009b^5x^4}-\frac{64a^3\left(ax^2+bx^3\right)^{5/2}}{1287b^4x^3}+\frac{32a^2\left(ax^2+bx^3\right)^{5/2}}{429b^3x^2}-\frac{4a\left(ax^2+bx^3\right)^{5/2}}{39b^2x}+\frac{2\left(ax^2+bx^3\right)^{5/2}}{15b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2*(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*(a*x^2 + b*x^3)^(5/2))/(15*b) - (512*a^5*(a*x^2 + b*x^3)^(5/2)
)/(45045*b^6*x^5) + (256*a^4*(a*x^2 + b*x^3)^(5/2))/(9009*b^5*x^4
) - (64*a^3*(a*x^2 + b*x^3)^(5/2))/(1287*b^4*x^3) + (32*a^2*(a*x^
2 + b*x^3)^(5/2))/(429*b^3*x^2) - (4*a*(a*x^2 + b*x^3)^(5/2))/(39
*b^2*x)
```

Rubi in Sympy [A] time = 38.5697, size = 150, normalized size = 0.93

$$-\frac{512a^5\left(ax^2+bx^3\right)^{\frac{5}{2}}}{45045b^6x^5}+\frac{256a^4\left(ax^2+bx^3\right)^{\frac{5}{2}}}{9009b^5x^4}-\frac{64a^3\left(ax^2+bx^3\right)^{\frac{5}{2}}}{1287b^4x^3}+\frac{32a^2\left(ax^2+bx^3\right)^{\frac{5}{2}}}{429b^3x^2}-\frac{4a\left(ax^2+bx^3\right)^{\frac{5}{2}}}{39b^2x}+\frac{2\left(ax^2+bx^3\right)^{\frac{5}{2}}}{15b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] -512*a**5*(a*x**2 + b*x**3)**(5/2)/(45045*b**6*x**5) + 256*a**4*(
a*x**2 + b*x**3)**(5/2)/(9009*b**5*x**4) - 64*a**3*(a*x**2 + b*x*
*3)**(5/2)/(1287*b**4*x**3) + 32*a**2*(a*x**2 + b*x**3)**(5/2)/(4
29*b**3*x**2) - 4*a*(a*x**2 + b*x**3)**(5/2)/(39*b**2*x) + 2*(a*x
**2 + b*x**3)**(5/2)/(15*b)
```

Mathematica [A] time = 0.0467646, size = 80, normalized size = 0.5

$$\frac{2x(a+bx)^3\left(-256a^5+640a^4bx-1120a^3b^2x^2+1680a^2b^3x^3-2310ab^4x^4+3003b^5x^5\right)}{45045b^6\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2*(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(a + b*x)^3*(-256*a^5 + 640*a^4*b*x - 1120*a^3*b^2*x^2 + 168
0*a^2*b^3*x^3 - 2310*a*b^4*x^4 + 3003*b^5*x^5))/(45045*b^6*Sqrt[x
^2*(a + b*x)])
```

Maple [A] time = 0.009, size = 79, normalized size = 0.5

$$-\frac{(2\,bx+2\,a)\left(-3003\,x^5b^5+2310\,ax^4b^4-1680\,a^2x^3b^3+1120\,x^2a^3b^2-640\,a^4xb+256\,a^5\right)}{45045\,b^6x^3}\left(bx^3+ax^2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] -2/45045*(b*x+a)*(-3003*b^5*x^5+2310*a*b^4*x^4-1680*a^2*b^3*x^3+1
120*a^3*b^2*x^2-640*a^4*b*x+256*a^5)*(b*x^3+a*x^2)^(3/2)/b^6/x^3
```

Maxima [A] time = 1.41135, size = 116, normalized size = 0.72

$$\frac{2\left(3003\,b^7x^7+3696\,ab^6x^6+63\,a^2b^5x^5-70\,a^3b^4x^4+80\,a^4b^3x^3-96\,a^5b^2x^2+128\,a^6bx-256\,a^7\right)\sqrt{bx+a}}{45045\,b^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)*x^2,x, algorithm="maxima")
```

```
[Out] 2/45045*(3003*b^7*x^7 + 3696*a*b^6*x^6 + 63*a^2*b^5*x^5 - 70*a^3*
b^4*x^4 + 80*a^4*b^3*x^3 - 96*a^5*b^2*x^2 + 128*a^6*b*x - 256*a^7
)*sqrt(b*x + a)/b^6
```

Fricas [A] time = 0.216184, size = 128, normalized size = 0.8

$$\frac{2\left(3003\,b^7x^7+3696\,ab^6x^6+63\,a^2b^5x^5-70\,a^3b^4x^4+80\,a^4b^3x^3-96\,a^5b^2x^2+128\,a^6bx-256\,a^7\right)\sqrt{bx^3+ax^2}}{45045\,b^6x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)*x^2,x, algorithm="fricas")
```

```
[Out] 2/45045*(3003*b^7*x^7 + 3696*a*b^6*x^6 + 63*a^2*b^5*x^5 - 70*a^3*
b^4*x^4 + 80*a^4*b^3*x^3 - 96*a^5*b^2*x^2 + 128*a^6*b*x - 256*a^7
)*sqrt(b*x^3 + a*x^2)/(b^6*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2\left(x^2\,(a+bx)\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral(x**2*(x**2*(a + b*x))**(3/2), x)
```

GIAC/XCAS [A] time = 0.228395, size = 294, normalized size = 1.83

$$\frac{512\, a^{\frac{15}{2}}\operatorname{sign}(x)}{45045\, b^6} + \frac{2\left(\frac{5\left(693\,(bx+a)^{\frac{13}{2}}b^{60}-4095\,(bx+a)^{\frac{11}{2}}ab^{60}+10010\,(bx+a)^{\frac{9}{2}}a^2b^{60}-12870\,(bx+a)^{\frac{7}{2}}a^3b^{60}+9009\,(bx+a)^{\frac{5}{2}}a^4b^{60}-3003\,(bx+a)^{\frac{3}{2}}a^5b^{60}\right)a\operatorname{sign}(x)}{b^{65}} + \frac{\left(3003\,(bx+a)\right.}{}\right.}{45045\, b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)*x^2,x, algorithm="giac")
```

```
[Out] 512/45045*a^(15/2)*sign(x)/b^6 + 2/45045*(5*(693*(b*x + a)^(13/2)
*b^60 - 4095*(b*x + a)^(11/2)*a*b^60 + 10010*(b*x + a)^(9/2)*a^2*
b^60 - 12870*(b*x + a)^(7/2)*a^3*b^60 + 9009*(b*x + a)^(5/2)*a^4*
b^60 - 3003*(b*x + a)^(3/2)*a^5*b^60)*a*sign(x)/b^65 + (3003*(b*x
 + a)^(15/2)*b^84 - 20790*(b*x + a)^(13/2)*a*b^84 + 61425*(b*x +
a)^(11/2)*a^2*b^84 - 100100*(b*x + a)^(9/2)*a^3*b^84 + 96525*(b*x
 + a)^(7/2)*a^4*b^84 - 54054*(b*x + a)^(5/2)*a^5*b^84 + 15015*(b*
x + a)^(3/2)*a^6*b^84)*sign(x)/b^89)/b
```

3.241 $\int x\left(ax^2+bx^3\right)^{3/2}dx$

Optimal. Leaf size=136

$$\frac{256a^4\left(ax^2+bx^3\right)^{5/2}}{15015b^5x^5}-\frac{128a^3\left(ax^2+bx^3\right)^{5/2}}{3003b^4x^4}+\frac{32a^2\left(ax^2+bx^3\right)^{5/2}}{429b^3x^3}-\frac{16a\left(ax^2+bx^3\right)^{5/2}}{143b^2x^2}+\frac{2\left(ax^2+bx^3\right)^{5/2}}{13bx}$$

```
[Out] (256*a^4*(a*x^2 + b*x^3)^(5/2))/(15015*b^5*x^5) - (128*a^3*(a*x^2
 + b*x^3)^(5/2))/(3003*b^4*x^4) + (32*a^2*(a*x^2 + b*x^3)^(5/2))/
(429*b^3*x^3) - (16*a*(a*x^2 + b*x^3)^(5/2))/(143*b^2*x^2) + (2*(
a*x^2 + b*x^3)^(5/2))/(13*b*x)
```

Rubi [A] time = 0.278172, antiderivative size = 136, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$\frac{256a^4\left(ax^2+bx^3\right)^{5/2}}{15015b^5x^5}-\frac{128a^3\left(ax^2+bx^3\right)^{5/2}}{3003b^4x^4}+\frac{32a^2\left(ax^2+bx^3\right)^{5/2}}{429b^3x^3}-\frac{16a\left(ax^2+bx^3\right)^{5/2}}{143b^2x^2}+\frac{2\left(ax^2+bx^3\right)^{5/2}}{13bx}$$

Antiderivative was successfully verified.

```
[In]  Int[x*(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (256*a^4*(a*x^2 + b*x^3)^(5/2))/(15015*b^5*x^5) - (128*a^3*(a*x^2
 + b*x^3)^(5/2))/(3003*b^4*x^4) + (32*a^2*(a*x^2 + b*x^3)^(5/2))/
(429*b^3*x^3) - (16*a*(a*x^2 + b*x^3)^(5/2))/(143*b^2*x^2) + (2*(
a*x^2 + b*x^3)^(5/2))/(13*b*x)
```

Rubi in Sympy [A] time = 28.9365, size = 126, normalized size = 0.93

$$\frac{256a^4\left(ax^2+bx^3\right)^{\frac{5}{2}}}{15015b^5x^5}-\frac{128a^3\left(ax^2+bx^3\right)^{\frac{5}{2}}}{3003b^4x^4}+\frac{32a^2\left(ax^2+bx^3\right)^{\frac{5}{2}}}{429b^3x^3}-\frac{16a\left(ax^2+bx^3\right)^{\frac{5}{2}}}{143b^2x^2}+\frac{2\left(ax^2+bx^3\right)^{\frac{5}{2}}}{13bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] 256*a**4*(a*x**2 + b*x**3)**(5/2)/(15015*b**5*x**5) - 128*a**3*(a
*x**2 + b*x**3)**(5/2)/(3003*b**4*x**4) + 32*a**2*(a*x**2 + b*x**
3)**(5/2)/(429*b**3*x**3) - 16*a*(a*x**2 + b*x**3)**(5/2)/(143*b*
*2*x**2) + 2*(a*x**2 + b*x**3)**(5/2)/(13*b*x)
```

Mathematica [A] time = 0.0394142, size = 69, normalized size = 0.51

$$\frac{2x(a+bx)^3\left(128a^4-320a^3bx+560a^2b^2x^2-840ab^3x^3+1155b^4x^4\right)}{15015b^5\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(a + b*x)^3*(128*a^4 - 320*a^3*b*x + 560*a^2*b^2*x^2 - 840*a
*b^3*x^3 + 1155*b^4*x^4))/(15015*b^5*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.008, size = 68, normalized size = 0.5

$$\frac{(2\,bx+2\,a)\left(1155\,x^4b^4-840\,ab^3x^3+560\,a^2x^2b^2-320\,xa^3b+128\,a^4\right)}{15015\,b^5x^3}\left(bx^3+ax^2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] 2/15015*(b*x+a)*(1155*b^4*x^4-840*a*b^3*x^3+560*a^2*b^2*x^2-320*a
^3*b*x+128*a^4)*(b*x^3+a*x^2)^(3/2)/b^5/x^3
```

Maxima [A] time = 1.40243, size = 101, normalized size = 0.74

$$\frac{2\left(1155\,b^6x^6+1470\,ab^5x^5+35\,a^2b^4x^4-40\,a^3b^3x^3+48\,a^4b^2x^2-64\,a^5bx+128\,a^6\right)\sqrt{bx+a}}{15015\,b^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)*x,x, algorithm="maxima")
```

```
[Out] 2/15015*(1155*b^6*x^6 + 1470*a*b^5*x^5 + 35*a^2*b^4*x^4 - 40*a^3*
b^3*x^3 + 48*a^4*b^2*x^2 - 64*a^5*b*x + 128*a^6)*sqrt(b*x + a)/b^
5
```

Fricas [A] time = 0.226774, size = 113, normalized size = 0.83

$$\frac{2\left(1155\,b^6x^6+1470\,ab^5x^5+35\,a^2b^4x^4-40\,a^3b^3x^3+48\,a^4b^2x^2-64\,a^5bx+128\,a^6\right)\sqrt{bx^3+ax^2}}{15015\,b^5x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)*x,x, algorithm="fricas")
```

```
[Out] 2/15015*(1155*b^6*x^6 + 1470*a*b^5*x^5 + 35*a^2*b^4*x^4 - 40*a^3*
b^3*x^3 + 48*a^4*b^2*x^2 - 64*a^5*b*x + 128*a^6)*sqrt(b*x^3 + a*x
^2)/(b^5*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\left(x^2\,(a+bx)\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral(x*(x**2*(a + b*x))**(3/2), x)
```

GIAC/XCAS [A] time = 0.223762, size = 255, normalized size = 1.88

$$-\frac{256\,a^{\frac{13}{2}}\,\mathrm{sign}\,(x)}{15015\,b^5}+\frac{2\left(\frac{13\left(315\,(bx+a)^{\frac{11}{2}}\,b^{40}-1540\,(bx+a)^{\frac{9}{2}}\,ab^{40}+2970\,(bx+a)^{\frac{7}{2}}\,a^2b^{40}-2772\,(bx+a)^{\frac{5}{2}}\,a^3b^{40}+1155\,(bx+a)^{\frac{3}{2}}\,a^4b^{40}\right)a\mathrm{sign}(x)}{b^{44}}+\frac{5\left(693\,(bx+a)^{\frac{13}{2}}\,b^{60}-4095\,(bx+a)^{\frac{11}{2}}\,a\right.}{}\right.}{45045\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)*x,x, algorithm="giac")
```

```
[Out] -256/15015*a^(13/2)*sign(x)/b^5 + 2/45045*(13*(315*(b*x + a)^(11/
2)*b^40 - 1540*(b*x + a)^(9/2)*a*b^40 + 2970*(b*x + a)^(7/2)*a^2*
b^40 - 2772*(b*x + a)^(5/2)*a^3*b^40 + 1155*(b*x + a)^(3/2)*a^4*b
^40)*a*sign(x)/b^44 + 5*(693*(b*x + a)^(13/2)*b^60 - 4095*(b*x +
a)^(11/2)*a*b^60 + 10010*(b*x + a)^(9/2)*a^2*b^60 - 12870*(b*x +
a)^(7/2)*a^3*b^60 + 9009*(b*x + a)^(5/2)*a^4*b^60 - 3003*(b*x + a
)^(3/2)*a^5*b^60)*sign(x)/b^64)/b
```

3.242 $\int \left(ax^2+bx^3\right)^{3/2} dx$

Optimal. Leaf size=108

$$-\frac{32a^3\left(ax^2+bx^3\right)^{5/2}}{1155b^4x^5}+\frac{16a^2\left(ax^2+bx^3\right)^{5/2}}{231b^3x^4}-\frac{4a\left(ax^2+bx^3\right)^{5/2}}{33b^2x^3}+\frac{2\left(ax^2+bx^3\right)^{5/2}}{11bx^2}$$

```
[Out] (-32*a^3*(a*x^2 + b*x^3)^(5/2))/(1155*b^4*x^5) + (16*a^2*(a*x^2 +
 b*x^3)^(5/2))/(231*b^3*x^4) - (4*a*(a*x^2 + b*x^3)^(5/2))/(33*b^
2*x^3) + (2*(a*x^2 + b*x^3)^(5/2))/(11*b*x^2)
```

Rubi [A] time = 0.227371, antiderivative size = 108, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$-\frac{32a^3\left(ax^2+bx^3\right)^{5/2}}{1155b^4x^5}+\frac{16a^2\left(ax^2+bx^3\right)^{5/2}}{231b^3x^4}-\frac{4a\left(ax^2+bx^3\right)^{5/2}}{33b^2x^3}+\frac{2\left(ax^2+bx^3\right)^{5/2}}{11bx^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (-32*a^3*(a*x^2 + b*x^3)^(5/2))/(1155*b^4*x^5) + (16*a^2*(a*x^2 +
 b*x^3)^(5/2))/(231*b^3*x^4) - (4*a*(a*x^2 + b*x^3)^(5/2))/(33*b^
2*x^3) + (2*(a*x^2 + b*x^3)^(5/2))/(11*b*x^2)
```

Rubi in Sympy [A] time = 22.2781, size = 100, normalized size = 0.93

$$-\frac{32a^3\left(ax^2+bx^3\right)^{\frac{5}{2}}}{1155b^4x^5}+\frac{16a^2\left(ax^2+bx^3\right)^{\frac{5}{2}}}{231b^3x^4}-\frac{4a\left(ax^2+bx^3\right)^{\frac{5}{2}}}{33b^2x^3}+\frac{2\left(ax^2+bx^3\right)^{\frac{5}{2}}}{11bx^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2),x)
```

```
[Out] -32*a**3*(a*x**2 + b*x**3)**(5/2)/(1155*b**4*x**5) + 16*a**2*(a*x
**2 + b*x**3)**(5/2)/(231*b**3*x**4) - 4*a*(a*x**2 + b*x**3)**(5/
2)/(33*b**2*x**3) + 2*(a*x**2 + b*x**3)**(5/2)/(11*b*x**2)
```

Mathematica [A] time = 0.034378, size = 58, normalized size = 0.54

$$\frac{2x(a+bx)^3\left(-16a^3+40a^2bx-70ab^2x^2+105b^3x^3\right)}{1155b^4\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(a + b*x)^3*(-16*a^3 + 40*a^2*b*x - 70*a*b^2*x^2 + 105*b^3*x
^3))/(1155*b^4*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.007, size = 57, normalized size = 0.5

$$-\frac{(2\,bx+2\,a)\left(-105\,x^3b^3+70\,ab^2x^2-40\,a^2xb+16\,a^3\right)}{1155\,b^4x^3}\left(bx^3+ax^2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2),x)
```

```
[Out] -2/1155*(b*x+a)*(-105*b^3*x^3+70*a*b^2*x^2-40*a^2*b*x+16*a^3)*(b*
x^3+a*x^2)^(3/2)/b^4/x^3
```

Maxima [A] time = 1.40514, size = 86, normalized size = 0.8

$$\frac{2\,\left(105\,b^{5}x^{5} + 140\,ab^{4}x^{4} + 5\,a^{2}b^{3}x^{3} - 6\,a^{3}b^{2}x^{2} + 8\,a^{4}bx - 16\,a^{5}\right)\sqrt{bx + a}}{1155\,b^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] 2/1155*(105*b^5*x^5 + 140*a*b^4*x^4 + 5*a^2*b^3*x^3 - 6*a^3*b^2*x
^2 + 8*a^4*b*x - 16*a^5)*sqrt(b*x + a)/b^4
```

Fricas [A] time = 0.219558, size = 99, normalized size = 0.92

$$\frac{2\,\left(105\,b^{5}x^{5} + 140\,ab^{4}x^{4} + 5\,a^{2}b^{3}x^{3} - 6\,a^{3}b^{2}x^{2} + 8\,a^{4}bx - 16\,a^{5}\right)\sqrt{bx^{3} + ax^{2}}}{1155\,b^{4}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] 2/1155*(105*b^5*x^5 + 140*a*b^4*x^4 + 5*a^2*b^3*x^3 - 6*a^3*b^2*x
^2 + 8*a^4*b*x - 16*a^5)*sqrt(b*x^3 + a*x^2)/(b^4*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax^{2} + bx^{3}\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral((a*x**2 + b*x**3)**(3/2), x)
```

GIAC/XCAS [A] time = 0.227004, size = 213, normalized size = 1.97

$$\frac{32\,a^{\frac{11}{2}}\,\mathrm{sign}\,(x)}{1155\,b^{4}} + \frac{2\left(\frac{11\left(35\,(bx+a)^{\frac{9}{2}}\,b^{24} - 135\,(bx+a)^{\frac{7}{2}}\,ab^{24} + 189\,(bx+a)^{\frac{5}{2}}\,a^{2}b^{24} - 105\,(bx+a)^{\frac{3}{2}}\,a^{3}b^{24}\right)a\mathrm{sign}(x)}{b^{27}} + \frac{\left(315\,(bx+a)^{\frac{11}{2}}\,b^{40} - 1540\,(bx+a)^{\frac{9}{2}}\,ab^{40} + 2970\,(bx+a)^{\frac{7}{2}}\,a^{2}b^{40} - 27\right.}{b^{43}}}{3465\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2),x, algorithm="giac")
```

```
[Out] 32/1155*a^(11/2)*sign(x)/b^4 + 2/3465*(11*(35*(b*x + a)^(9/2)*b^2
4 - 135*(b*x + a)^(7/2)*a*b^24 + 189*(b*x + a)^(5/2)*a^2*b^24 - 1
05*(b*x + a)^(3/2)*a^3*b^24)*a*sign(x)/b^27 + (315*(b*x + a)^(11/
2)*b^40 - 1540*(b*x + a)^(9/2)*a*b^40 + 2970*(b*x + a)^(7/2)*a^2*
b^40 - 2772*(b*x + a)^(5/2)*a^3*b^40 + 1155*(b*x + a)^(3/2)*a^4*b
^40)*sign(x)/b^43)/b
```

3.243 $\int \frac{(ax^2+bx^3)^{3/2}}{x} dx$

Optimal. Leaf size=80

$$\frac{16a^2(ax^2+bx^3)^{5/2}}{315b^3x^5} - \frac{8a(ax^2+bx^3)^{5/2}}{63b^2x^4} + \frac{2(ax^2+bx^3)^{5/2}}{9bx^3}$$

```
[Out] (16*a^2*(a*x^2 + b*x^3)^(5/2))/(315*b^3*x^5) - (8*a*(a*x^2 + b*x^
3)^(5/2))/(63*b^2*x^4) + (2*(a*x^2 + b*x^3)^(5/2))/(9*b*x^3)
```

Rubi [A] time = 0.204826, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{16a^2(ax^2+bx^3)^{5/2}}{315b^3x^5} - \frac{8a(ax^2+bx^3)^{5/2}}{63b^2x^4} + \frac{2(ax^2+bx^3)^{5/2}}{9bx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2)/x,x]
```

```
[Out] (16*a^2*(a*x^2 + b*x^3)^(5/2))/(315*b^3*x^5) - (8*a*(a*x^2 + b*x^
3)^(5/2))/(63*b^2*x^4) + (2*(a*x^2 + b*x^3)^(5/2))/(9*b*x^3)
```

Rubi in Sympy [A] time = 19.5802, size = 73, normalized size = 0.91

$$\frac{16a^2(ax^2+bx^3)^{\frac{5}{2}}}{315b^3x^5} - \frac{8a(ax^2+bx^3)^{\frac{5}{2}}}{63b^2x^4} + \frac{2(ax^2+bx^3)^{\frac{5}{2}}}{9bx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2)/x,x)
```

```
[Out] 16*a**2*(a*x**2 + b*x**3)**(5/2)/(315*b**3*x**5) - 8*a*(a*x**2 +
b*x**3)**(5/2)/(63*b**2*x**4) + 2*(a*x**2 + b*x**3)**(5/2)/(9*b*x
**3)
```

Mathematica [A] time = 0.0342203, size = 47, normalized size = 0.59

$$\frac{2x(a+bx)^3(8a^2-20abx+35b^2x^2)}{315b^3\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2)/x,x]
```

```
[Out] (2*x*(a + b*x)^3*(8*a^2 - 20*a*b*x + 35*b^2*x^2))/(315*b^3*Sqrt[x
^2*(a + b*x)])
```

Maple [A] time = 0.007, size = 46, normalized size = 0.6

$$\frac{(2\,bx+2\,a)(35\,b^2x^2-20\,abx+8\,a^2)}{315\,b^3x^3}(bx^3+ax^2)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x,x)
```

```
[Out] 2/315*(b*x+a)*(35*b^2*x^2-20*a*b*x+8*a^2)*(b*x^3+a*x^2)^(3/2)/b^3
/x^3
```

Maxima [A] time = 1.40266, size = 72, normalized size = 0.9

$$\frac{2 \left(35 \, b^{4} x^{4} + 50 \, a b^{3} x^{3} + 3 \, a^{2} b^{2} x^{2} - 4 \, a^{3} b x + 8 \, a^{4}\right) \sqrt{b x + a}}{315 \, b^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x,x, algorithm="maxima")
```

```
[Out] 2/315*(35*b^4*x^4 + 50*a*b^3*x^3 + 3*a^2*b^2*x^2 - 4*a^3*b*x + 8*
a^4)*sqrt(b*x + a)/b^3
```

Fricas [A] time = 0.215316, size = 84, normalized size = 1.05

$$\frac{2 \left(35 \, b^{4} x^{4} + 50 \, a b^{3} x^{3} + 3 \, a^{2} b^{2} x^{2} - 4 \, a^{3} b x + 8 \, a^{4}\right) \sqrt{b x^{3} + a x^{2}}}{315 \, b^{3} x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x,x, algorithm="fricas")
```

```
[Out] 2/315*(35*b^4*x^4 + 50*a*b^3*x^3 + 3*a^2*b^2*x^2 - 4*a^3*b*x + 8*
a^4)*sqrt(b*x^3 + a*x^2)/(b^3*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x^{2} \left(a + b x\right)\right)^{\frac{3}{2}}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x, x)
```

GIAC/XCAS [A] time = 0.223062, size = 173, normalized size = 2.16

$$-\frac{16 \, a^{\frac{9}{2}} \mathrm{sign}\left(x\right)}{315 \, b^{3}} + \frac{2 \, \left(\frac{3 \, \left(15 \, {\left(b x + a\right)}^{\frac{7}{2}} b^{12} - 42 \, {\left(b x + a\right)}^{\frac{5}{2}} a b^{12} + 35 \, {\left(b x + a\right)}^{\frac{3}{2}} a^{2} b^{12}\right)} a \mathrm{sign}\left(x\right)}{b^{14}} + \frac{{\left(35 \, {\left(b x + a\right)}^{\frac{9}{2}} b^{24} - 135 \, {\left(b x + a\right)}^{\frac{7}{2}} a b^{24} + 189 \, {\left(b x + a\right)}^{\frac{5}{2}} a^{2} b^{24} - 105 \, {\left(b x + a\right)}^{\frac{3}{2}} a^{3} b^{24}\right)} \mathrm{sign}\left(x\right)}{b^{26}}\right)}{315 \, b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x,x, algorithm="giac")
```

```
[Out] -16/315*a^(9/2)*sign(x)/b^3 + 2/315*(3*(15*(b*x + a)^(7/2)*b^12 -
 42*(b*x + a)^(5/2)*a*b^12 + 35*(b*x + a)^(3/2)*a^2*b^12)*a*sign(
x)/b^14 + (35*(b*x + a)^(9/2)*b^24 - 135*(b*x + a)^(7/2)*a*b^24 +
 189*(b*x + a)^(5/2)*a^2*b^24 - 105*(b*x + a)^(3/2)*a^3*b^24)*sig
n(x)/b^26)/b
```

3.244 $\int \frac{(ax^2+bx^3)^{3/2}}{x^2} dx$

Optimal. Leaf size=52

$$\frac{2\left(ax^2+bx^3\right)^{5/2}}{7bx^4}-\frac{4a\left(ax^2+bx^3\right)^{5/2}}{35b^2x^5}$$

```
[Out] (-4*a*(a*x^2 + b*x^3)^(5/2))/(35*b^2*x^5) + (2*(a*x^2 + b*x^3)^(5
/2))/(7*b*x^4)
```

Rubi [A] time = 0.133765, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{2\left(ax^2+bx^3\right)^{5/2}}{7bx^4}-\frac{4a\left(ax^2+bx^3\right)^{5/2}}{35b^2x^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2)/x^2,x]
```

```
[Out] (-4*a*(a*x^2 + b*x^3)^(5/2))/(35*b^2*x^5) + (2*(a*x^2 + b*x^3)^(5
/2))/(7*b*x^4)
```

Rubi in Sympy [A] time = 12.8951, size = 46, normalized size = 0.88

$$-\frac{4a\left(ax^2+bx^3\right)^{\frac{5}{2}}}{35b^2x^5}+\frac{2\left(ax^2+bx^3\right)^{\frac{5}{2}}}{7bx^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2)/x**2,x)
```

```
[Out] -4*a*(a*x**2 + b*x**3)**(5/2)/(35*b**2*x**5) + 2*(a*x**2 + b*x**3
)**(5/2)/(7*b*x**4)
```

Mathematica [A] time = 0.0319589, size = 36, normalized size = 0.69

$$\frac{2x(a+bx)^3(5bx-2a)}{35b^2\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2)/x^2,x]
```

```
[Out] (2*x*(a + b*x)^3*(-2*a + 5*b*x))/(35*b^2*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.004, size = 35, normalized size = 0.7

$$-\frac{(2\,bx+2\,a)(-5\,bx+2\,a)}{35\,b^2x^3}\left(bx^3+ax^2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x^2,x)
```

```
[Out] -2/35*(b*x+a)*(-5*b*x+2*a)*(b*x^3+a*x^2)^(3/2)/b^2/x^3
```

Maxima [A] time = 1.39396, size = 55, normalized size = 1.06

$$\frac{2\left(5\,b^3x^3+8\,ab^2x^2+a^2bx-2\,a^3\right)\sqrt{bx+a}}{35\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^2,x, algorithm="maxima")
```

```
[Out] 2/35*(5*b^3*x^3 + 8*a*b^2*x^2 + a^2*b*x - 2*a^3)*sqrt(b*x + a)/b^
2
```

Fricas [A] time = 0.233846, size = 68, normalized size = 1.31

$$\frac{2\left(5\,b^3x^3+8\,ab^2x^2+a^2bx-2\,a^3\right)\sqrt{bx^3+ax^2}}{35\,b^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^2,x, algorithm="fricas")
```

```
[Out] 2/35*(5*b^3*x^3 + 8*a*b^2*x^2 + a^2*b*x - 2*a^3)*sqrt(b*x^3 + a*x
^2)/(b^2*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(x^2\left(a+bx\right)\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x**2,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x**2, x)
```

GIAC/XCAS [A] time = 0.225105, size = 124, normalized size = 2.38

$$\frac{4\,a^{\frac{7}{2}}\operatorname{sign}\left(x\right)}{35\,b^2}+\frac{2\left(\frac{7\left(3\left(bx+a\right)^{\frac{5}{2}}-5\left(bx+a\right)^{\frac{3}{2}}a\right)a\operatorname{sign}(x)}{b}+\frac{\left(15\left(bx+a\right)^{\frac{7}{2}}b^{12}-42\left(bx+a\right)^{\frac{5}{2}}ab^{12}+35\left(bx+a\right)^{\frac{3}{2}}a^2b^{12}\right)\operatorname{sign}(x)}{b^{13}}\right)}{105\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^2,x, algorithm="giac")
```

```
[Out] 4/35*a^(7/2)*sign(x)/b^2 + 2/105*(7*(3*(b*x + a)^(5/2) - 5*(b*x +
 a)^(3/2)*a)*a*sign(x)/b + (15*(b*x + a)^(7/2)*b^12 - 42*(b*x + a
)^(5/2)*a*b^12 + 35*(b*x + a)^(3/2)*a^2*b^12)*sign(x)/b^13)/b
```

3.245 $\int \frac{(ax^2+bx^3)^{3/2}}{x^3} \, dx$

Optimal. Leaf size=25

$$\frac{2(ax^2+bx^3)^{5/2}}{5bx^5}$$

```
[Out] (2*(a*x^2 + b*x^3)^(5/2))/(5*b*x^5)
```

Rubi [A] time = 0.0671833, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.053$

$$\frac{2(ax^2+bx^3)^{5/2}}{5bx^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2)/x^3,x]

[Out] (2*(a*x^2 + b*x^3)^(5/2))/(5*b*x^5)
```

Rubi in Sympy [A] time = 7.45821, size = 20, normalized size = 0.8

$$\frac{2(ax^2+bx^3)^{\frac{5}{2}}}{5bx^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2)/x**3,x)

[Out] 2*(a*x**2 + b*x**3)**(5/2)/(5*b*x**5)
```

Mathematica [A] time = 0.0215035, size = 23, normalized size = 0.92

$$\frac{2(x^2(a+bx))^{5/2}}{5bx^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2)/x^3,x]

[Out] (2*(x^2*(a + b*x))^(5/2))/(5*b*x^5)
```

Maple [A] time = 0.003, size = 27, normalized size = 1.1

$$\frac{2bx+2a}{5bx^3}\left(bx^3+ax^2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x^3,x)
```

```
[Out] 2/5*(b*x+a)*(b*x^3+a*x^2)^(3/2)/b/x^3
```

Maxima [A] time = 1.51756, size = 38, normalized size = 1.52

$$\frac{2\left(b^2x^2+2\,abx+a^2\right)\sqrt{bx+a}}{5\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^3,x, algorithm="maxima")
```

```
[Out] 2/5*(b^2*x^2 + 2*a*b*x + a^2)*sqrt(b*x + a)/b
```

Fricas [A] time = 0.22818, size = 50, normalized size = 2.

$$\frac{2\left(b^2x^2+2\,abx+a^2\right)\sqrt{bx^3+ax^2}}{5\,bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^3,x, algorithm="fricas")
```

```
[Out] 2/5*(b^2*x^2 + 2*a*b*x + a^2)*sqrt(b*x^3 + a*x^2)/(b*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(x^2\left(a+bx\right)\right)^{\frac{3}{2}}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x**3,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x**3, x)
```

GIAC/XCAS [A] time = 0.221377, size = 70, normalized size = 2.8

$$-\frac{2\,a^{\frac{5}{2}}\,\mathrm{sign}\left(x\right)}{5\,b}+\frac{2\left(5\left(bx+a\right)^{\frac{3}{2}}a\,\mathrm{sign}\left(x\right)+\left(3\left(bx+a\right)^{\frac{5}{2}}-5\left(bx+a\right)^{\frac{3}{2}}a\right)\mathrm{sign}\left(x\right)\right)}{15\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^3,x, algorithm="giac")
```

```
[Out] -2/5*a^(5/2)*sign(x)/b + 2/15*(5*(b*x + a)^(3/2)*a*sign(x) + (3*(
b*x + a)^(5/2) - 5*(b*x + a)^(3/2)*a)*sign(x))/b
```

3.246 $\int \frac{(ax^2+bx^3)^{3/2}}{x^4} \, dx$

Optimal. Leaf size=74

$$-2a^{3/2}\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)+\frac{2a\sqrt{ax^2+bx^3}}{x}+\frac{2\left(ax^2+bx^3\right)^{3/2}}{3x^3}$$

```
[Out] (2*a*Sqrt[a*x^2 + b*x^3])/x + (2*(a*x^2 + b*x^3)^(3/2))/(3*x^3) -
 2*a^(3/2)*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]]
```

Rubi [A] time = 0.162869, antiderivative size = 74, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-2a^{3/2}\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)+\frac{2a\sqrt{ax^2+bx^3}}{x}+\frac{2\left(ax^2+bx^3\right)^{3/2}}{3x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a*x^2 + b*x^3)^(3/2)/x^4,x]
```

```
[Out] (2*a*Sqrt[a*x^2 + b*x^3])/x + (2*(a*x^2 + b*x^3)^(3/2))/(3*x^3) -
 2*a^(3/2)*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]]
```

Rubi in Sympy [A] time = 15.9066, size = 66, normalized size = 0.89

$$-2a^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)+\frac{2a\sqrt{ax^2+bx^3}}{x}+\frac{2\left(ax^2+bx^3\right)^{\frac{3}{2}}}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**3+a*x**2)**(3/2)/x**4,x)
```

```
[Out] -2*a**(3/2)*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3)) + 2*a*sqrt(a*x
**2 + b*x**3)/x + 2*(a*x**2 + b*x**3)**(3/2)/(3*x**3)
```

Mathematica [A] time = 0.0819198, size = 68, normalized size = 0.92

$$\frac{2x\sqrt{a+bx}\left(\sqrt{a+bx}(4a+bx)-3a^{3/2}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)\right)}{3\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*x^2 + b*x^3)^(3/2)/x^4,x]
```

```
[Out] (2*x*Sqrt[a + b*x]*(Sqrt[a + b*x]*(4*a + b*x) - 3*a^(3/2)*ArcTanh
[Sqrt[a + b*x]/Sqrt[a]]))/(3*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.006, size = 61, normalized size = 0.8

$$\frac{2}{3\,x^3}\left(bx^3+ax^2\right)^{\frac{3}{2}}\left(-3\,a^{3/2}Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)+(bx+a)^{\frac{3}{2}}+3\,a\sqrt{bx+a}\right)(bx+a)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x^4,x)
```

```
[Out] 2/3*(b*x^3+a*x^2)^(3/2)*(-3*a^(3/2)*arctanh((b*x+a)^(1/2)/a^(1/2)
)+(b*x+a)^(3/2)+3*a*(b*x+a)^(1/2))/x^3/(b*x+a)^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.22724, size = 1, normalized size = 0.01

$$\left[\frac{3\,a^{\frac{3}{2}}x\log\left(\frac{bx^2+2\,ax-2\,\sqrt{bx^3+ax^2}\sqrt{a}}{x^2}\right)+2\,\sqrt{bx^3+ax^2}(bx+4\,a)}{3\,x},\; -\frac{2\left(3\,\sqrt{-a}ax\arctan\left(\frac{\sqrt{bx^3+ax^2}}{\sqrt{-a}x}\right)-\sqrt{bx^3+ax^2}(bx+4\,a)\right)}{3\,x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^4,x, algorithm="fricas")
```

```
[Out] [1/3*(3*a^(3/2)*x*log((b*x^2 + 2*a*x - 2*sqrt(b*x^3 + a*x^2)*sqrt
(a))/x^2) + 2*sqrt(b*x^3 + a*x^2)*(b*x + 4*a))/x, -2/3*(3*sqrt(-a
)*a*x*arctan(sqrt(b*x^3 + a*x^2)/(sqrt(-a)*x)) - sqrt(b*x^3 + a*x
^2)*(b*x + 4*a))/x]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x^2\left(a+bx\right)\right)^{\frac{3}{2}}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x**4,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x**4, x)
```

GIAC/XCAS [A] time = 0.226192, size = 115, normalized size = 1.55

$$\frac{2\,a^2\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)\operatorname{sign}(x)}{\sqrt{-a}}+\frac{2}{3}\,(bx+a)^{\frac{3}{2}}\operatorname{sign}(x)+2\,\sqrt{bx+a}a\operatorname{sign}(x)-\frac{2\left(3\,a^2\arctan\left(\frac{\sqrt{a}}{\sqrt{-a}}\right)+4\,\sqrt{-a}a^{\frac{3}{2}}\right)\operatorname{sign}(x)}{3\,\sqrt{-a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^4,x, algorithm="giac")
```

```
[Out] 2*a^2*arctan(sqrt(b*x + a)/sqrt(-a))*sign(x)/sqrt(-a) + 2/3*(b*x
+ a)^(3/2)*sign(x) + 2*sqrt(b*x + a)*a*sign(x) - 2/3*(3*a^2*arcta
n(sqrt(a)/sqrt(-a)) + 4*sqrt(-a)*a^(3/2))*sign(x)/sqrt(-a)
```

3.247 $\int \frac{\left(ax^2+bx^3\right)^{3/2}}{x^5}\,dx$

Optimal. Leaf size=73

$$\frac{3b\sqrt{ax^2+bx^3}}{x}-3\sqrt{a}b\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)-\frac{\left(ax^2+bx^3\right)^{3/2}}{x^4}$$

```
[Out] (3*b*Sqrt[a*x^2 + b*x^3])/x - (a*x^2 + b*x^3)^(3/2)/x^4 - 3*Sqrt[
a]*b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]]
```

Rubi [A] time = 0.159179, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{3b\sqrt{ax^2+bx^3}}{x}-3\sqrt{a}b\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)-\frac{\left(ax^2+bx^3\right)^{3/2}}{x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2)/x^5,x]
```

```
[Out] (3*b*Sqrt[a*x^2 + b*x^3])/x - (a*x^2 + b*x^3)^(3/2)/x^4 - 3*Sqrt[
a]*b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]]
```

Rubi in Sympy [A] time = 15.951, size = 65, normalized size = 0.89

$$-3\sqrt{a}b\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)+\frac{3b\sqrt{ax^2+bx^3}}{x}-\frac{\left(ax^2+bx^3\right)^{\frac{3}{2}}}{x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2)/x**5,x)
```

```
[Out] -3*sqrt(a)*b*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3)) + 3*b*sqrt(a*
x**2 + b*x**3)/x - (a*x**2 + b*x**3)**(3/2)/x**4
```

Mathematica [A] time = 0.0751285, size = 66, normalized size = 0.9

$$-\frac{\sqrt{a+bx}\left(\sqrt{a+bx}(a-2bx)+3\sqrt{a}bx\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)\right)}{\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2)/x^5,x]
```

```
[Out] -((Sqrt[a + b*x]*((a - 2*b*x)*Sqrt[a + b*x] + 3*Sqrt[a]*b*x*ArcTa
nh[Sqrt[a + b*x]/Sqrt[a]]))/Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.016, size = 72, normalized size = 1.

$$-\frac{1}{x^4}\left(bx^3+ax^2\right)^{\frac{3}{2}}\left(\sqrt{bx+a}a^{\frac{3}{2}}-2\sqrt{bx+a}xb\sqrt{a}+3\,Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)xab\right)(bx+a)^{-\frac{3}{2}}\frac{1}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x^5,x)
```

```
[Out] -(b*x^3+a*x^2)^(3/2)*((b*x+a)^(1/2)*a^(3/2)-2*(b*x+a)^(1/2)*x*b*a
^(1/2)+3*arctanh((b*x+a)^(1/2)/a^(1/2))*x*a*b)/x^4/(b*x+a)^(3/2)/
a^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240975, size = 1, normalized size = 0.01

$$\left[\frac{3\sqrt{a}bx^2\log\left(\frac{bx^2+2\,ax-2\,\sqrt{bx^3+ax^2}\sqrt{a}}{x^2}\right)+2\,\sqrt{bx^3+ax^2}(2\,bx-a)}{2\,x^2}, -\frac{3\,\sqrt{-a}bx^2\arctan\left(\frac{\sqrt{bx^3+ax^2}}{\sqrt{-a}x}\right)-\sqrt{bx^3+ax^2}(2\,bx-a)}{x^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^5,x, algorithm="fricas")
```

```
[Out] [1/2*(3*sqrt(a)*b*x^2*log((b*x^2 + 2*a*x - 2*sqrt(b*x^3 + a*x^2)*
sqrt(a))/x^2) + 2*sqrt(b*x^3 + a*x^2)*(2*b*x - a))/x^2, -(3*sqrt(
-a)*b*x^2*arctan(sqrt(b*x^3 + a*x^2)/(sqrt(-a)*x)) - sqrt(b*x^3 +
 a*x^2)*(2*b*x - a))/x^2]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(x^2\left(a+bx\right)\right)^{\frac{3}{2}}}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x**5,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x**5, x)
```

GIAC/XCAS [A] time = 0.243206, size = 84, normalized size = 1.15

$$\frac{\frac{3\,ab^2\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)\mathrm{sign}(x)}{\sqrt{-a}}+2\,\sqrt{bx+a}b^2\mathrm{sign}\,(x)-\frac{\sqrt{bx+a}ab\mathrm{sign}(x)}{x}}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^5,x, algorithm="giac")
```

```
[Out] (3*a*b^2*arctan(sqrt(b*x + a)/sqrt(-a))*sign(x)/sqrt(-a) + 2*sqrt
(b*x + a)*b^2*sign(x) - sqrt(b*x + a)*a*b*sign(x)/x)/b
```

3.248 $\int \frac{(ax^2+bx^3)^{3/2}}{x^6}\,dx$

Optimal. Leaf size=81

$$-\frac{3b^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4\sqrt{a}}-\frac{3b\sqrt{ax^2+bx^3}}{4x^2}-\frac{(ax^2+bx^3)^{3/2}}{2x^5}$$

```
[Out] (-3*b*Sqrt[a*x^2 + b*x^3])/(4*x^2) - (a*x^2 + b*x^3)^(3/2)/(2*x^5
) - (3*b^2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(4*Sqrt[a])
```

Rubi [A] time = 0.160324, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$-\frac{3b^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4\sqrt{a}}-\frac{3b\sqrt{ax^2+bx^3}}{4x^2}-\frac{(ax^2+bx^3)^{3/2}}{2x^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2)/x^6,x]
```

```
[Out] (-3*b*Sqrt[a*x^2 + b*x^3])/(4*x^2) - (a*x^2 + b*x^3)^(3/2)/(2*x^5
) - (3*b^2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(4*Sqrt[a])
```

Rubi in Sympy [A] time = 16.3087, size = 75, normalized size = 0.93

$$-\frac{3b\sqrt{ax^2+bx^3}}{4x^2}-\frac{(ax^2+bx^3)^{\frac{3}{2}}}{2x^5}-\frac{3b^2\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2)/x**6,x)
```

```
[Out] -3*b*sqrt(a*x**2 + b*x**3)/(4*x**2) - (a*x**2 + b*x**3)**(3/2)/(2
*x**5) - 3*b**2*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3))/(4*sqrt(a)
)
```

Mathematica [A] time = 0.069556, size = 82, normalized size = 1.01

$$-\frac{\sqrt{x^2(a+bx)}\left(3b^2x^2\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)+\sqrt{a}\sqrt{a+bx}(2a+5bx)\right)}{4\sqrt{a}x^3\sqrt{a+bx}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2)/x^6,x]
```

```
[Out] -(Sqrt[x^2*(a + b*x)]*(Sqrt[a]*Sqrt[a + b*x]*(2*a + 5*b*x) + 3*b^
2*x^2*ArcTanh[Sqrt[a + b*x]/Sqrt[a]]))/(4*Sqrt[a]*x^3*Sqrt[a + b*
x])
```

Maple [A] time = 0.017, size = 74, normalized size = 0.9

$$-\frac{1}{4x^5}\left(bx^3+ax^2\right)^{\frac{3}{2}}\left(3\,Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)x^2b^2+5\,(bx+a)^{3/2}\sqrt{a}-3\sqrt{bx+a}a^{3/2}\right)(bx+a)^{-\frac{3}{2}}\frac{1}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x^6,x)
```

```
[Out] -1/4*(b*x^3+a*x^2)^(3/2)*(3*arctanh((b*x+a)^(1/2)/a^(1/2))*x^2*b^
2+5*(b*x+a)^(3/2)*a^(1/2)-3*(b*x+a)^(1/2)*a^(3/2))/x^5/(b*x+a)^(3
/2)/a^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^6,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.25484, size = 1, normalized size = 0.01

$$\left[\frac{3\,\sqrt{a}b^2x^3\log\left(\frac{(bx^2+2\,ax)\sqrt{a}-2\,\sqrt{bx^3+ax^2}a}{x^2}\right)-2\,\sqrt{bx^3+ax^2}\left(5\,abx+2\,a^2\right)}{8\,ax^3},\right.$$
$$\left.-\frac{3\,\sqrt{-a}b^2x^3\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)+\sqrt{bx^3+ax^2}\left(5\,abx+2\,a^2\right)}{4\,ax^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^6,x, algorithm="fricas")
```

```
[Out] [1/8*(3*sqrt(a)*b^2*x^3*log(((b*x^2 + 2*a*x)*sqrt(a) - 2*sqrt(b*x
^3 + a*x^2)*a)/x^2) - 2*sqrt(b*x^3 + a*x^2)*(5*a*b*x + 2*a^2))/(a
*x^3), -1/4*(3*sqrt(-a)*b^2*x^3*arctan(a*x/(sqrt(b*x^3 + a*x^2)*s
qrt(-a))) + sqrt(b*x^3 + a*x^2)*(5*a*b*x + 2*a^2))/(a*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(x^2\,(a+bx)\right)^{\frac{3}{2}}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x**6,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x**6, x)
```

GIAC/XCAS [A] time = 0.248436, size = 95, normalized size = 1.17

$$\frac{\frac{3\,b^3\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)\mathrm{sign}(x)}{\sqrt{-a}}-\frac{5\,(bx+a)^{\frac{3}{2}}b^3\mathrm{sign}(x)-3\,\sqrt{bx+a}ab^3\mathrm{sign}(x)}{b^2x^2}}{4\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^6,x, algorithm="giac")
```

```
[Out] 1/4*(3*b^3*arctan(sqrt(b*x + a)/sqrt(-a))*sign(x)/sqrt(-a) - (5*(
b*x + a)^(3/2)*b^3*sign(x) - 3*sqrt(b*x + a)*a*b^3*sign(x))/(b^2*
x^2))/b
```

3.249 $\int \frac{(ax^2+bx^3)^{3/2}}{x^7}\,dx$

Optimal. Leaf size=109

$$\frac{b^3\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{3/2}}-\frac{b^2\sqrt{ax^2+bx^3}}{8ax^2}-\frac{b\sqrt{ax^2+bx^3}}{4x^3}-\frac{(ax^2+bx^3)^{3/2}}{3x^6}$$

```
[Out] -(b*Sqrt[a*x^2 + b*x^3])/(4*x^3) - (b^2*Sqrt[a*x^2 + b*x^3])/(8*a
*x^2) - (a*x^2 + b*x^3)^(3/2)/(3*x^6) + (b^3*ArcTanh[(Sqrt[a]*x)/
Sqrt[a*x^2 + b*x^3]])/(8*a^(3/2))
```

Rubi [A] time = 0.23508, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$\frac{b^3\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{3/2}}-\frac{b^2\sqrt{ax^2+bx^3}}{8ax^2}-\frac{b\sqrt{ax^2+bx^3}}{4x^3}-\frac{(ax^2+bx^3)^{3/2}}{3x^6}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2)/x^7,x]
```

```
[Out] -(b*Sqrt[a*x^2 + b*x^3])/(4*x^3) - (b^2*Sqrt[a*x^2 + b*x^3])/(8*a
*x^2) - (a*x^2 + b*x^3)^(3/2)/(3*x^6) + (b^3*ArcTanh[(Sqrt[a]*x)/
Sqrt[a*x^2 + b*x^3]])/(8*a^(3/2))
```

Rubi in Sympy [A] time = 24.603, size = 94, normalized size = 0.86

$$-\frac{b\sqrt{ax^2+bx^3}}{4x^3}-\frac{(ax^2+bx^3)^{\frac{3}{2}}}{3x^6}-\frac{b^2\sqrt{ax^2+bx^3}}{8ax^2}+\frac{b^3\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2)/x**7,x)
```

```
[Out] -b*sqrt(a*x**2 + b*x**3)/(4*x**3) - (a*x**2 + b*x**3)**(3/2)/(3*x
**6) - b**2*sqrt(a*x**2 + b*x**3)/(8*a*x**2) + b**3*atanh(sqrt(a)
*x/sqrt(a*x**2 + b*x**3))/(8*a**(3/2))
```

Mathematica [A] time = 0.0874827, size = 94, normalized size = 0.86

$$\frac{\sqrt{x^2(a+bx)}\left(3b^3x^3\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)-\sqrt{a}\sqrt{a+bx}\left(8a^2+14abx+3b^2x^2\right)\right)}{24a^{3/2}x^4\sqrt{a+bx}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2)/x^7,x]
```

```
[Out] (Sqrt[x^2*(a + b*x)]*(-(Sqrt[a]*Sqrt[a + b*x]*(8*a^2 + 14*a*b*x +
 3*b^2*x^2)) + 3*b^3*x^3*ArcTanh[Sqrt[a + b*x]/Sqrt[a]]))/(24*a^(
3/2)*x^4*Sqrt[a + b*x])
```

Maple [A] time = 0.019, size = 87, normalized size = 0.8

$$-\frac{1}{24\,x^{6}}\left(bx^{3}+ax^{2}\right)^{\frac{3}{2}}\left(3\,(bx+a)^{5/2}a^{3/2}-3\,Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)x^{3}ab^{3}+8\,(bx+a)^{3/2}a^{5/2}-3\,\sqrt{bx+a}a^{7/2}\right)(bx+a)^{-\frac{3}{2}}a^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x^7,x)
```

```
[Out] -1/24*(b*x^3+a*x^2)^(3/2)*(3*(b*x+a)^(5/2)*a^(3/2)-3*arctanh((b*x
+a)^(1/2)/a^(1/2))*x^3*a*b^3+8*(b*x+a)^(3/2)*a^(5/2)-3*(b*x+a)^(1
/2)*a^(7/2))/x^6/(b*x+a)^(3/2)/a^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^7,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.241384, size = 1, normalized size = 0.01

$$\left[\frac{3\,\sqrt{a}b^{3}x^{4}\log\left(\frac{(bx^{2}+2\,ax)\sqrt{a}+2\,\sqrt{bx^{3}+ax^{2}}a}{x^{2}}\right)-2\left(3\,ab^{2}x^{2}+14\,a^{2}bx+8\,a^{3}\right)\sqrt{bx^{3}+ax^{2}}}{48\,a^{2}x^{4}},\frac{3\,\sqrt{-a}b^{3}x^{4}\arctan\left(\frac{ax}{\sqrt{bx^{3}+ax^{2}}\sqrt{-a}}\right)-(3}{24\,a^{2}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^7,x, algorithm="fricas")
```

```
[Out] [1/48*(3*sqrt(a)*b^3*x^4*log(((b*x^2 + 2*a*x)*sqrt(a) + 2*sqrt(b*
x^3 + a*x^2)*a)/x^2) - 2*(3*a*b^2*x^2 + 14*a^2*b*x + 8*a^3)*sqrt(
b*x^3 + a*x^2))/(a^2*x^4), 1/24*(3*sqrt(-a)*b^3*x^4*arctan(a*x/(s
qrt(b*x^3 + a*x^2)*sqrt(-a))) - (3*a*b^2*x^2 + 14*a^2*b*x + 8*a^3
)*sqrt(b*x^3 + a*x^2))/(a^2*x^4)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(x^{2}\,(a+bx)\right)^{\frac{3}{2}}}{x^{7}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x**7,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x**7, x)
```

GIAC/XCAS [A] time = 0.266586, size = 124, normalized size = 1.14

$$-\frac{\frac{3\,b^{4}\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)\mathrm{sign}(x)}{\sqrt{-a}a}+\frac{3\,(bx+a)^{\frac{5}{2}}b^{4}\mathrm{sign}(x)+8\,(bx+a)^{\frac{3}{2}}ab^{4}\mathrm{sign}(x)-3\,\sqrt{bx+a}a^{2}b^{4}\mathrm{sign}(x)}{ab^{3}x^{3}}}{24\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^7,x, algorithm="giac")
```

```
[Out] -1/24*(3*b^4*arctan(sqrt(b*x + a)/sqrt(-a))*sign(x)/(sqrt(-a)*a)
+ (3*(b*x + a)^(5/2)*b^4*sign(x) + 8*(b*x + a)^(3/2)*a*b^4*sign(x
) - 3*sqrt(b*x + a)*a^2*b^4*sign(x))/(a*b^3*x^3))/b
```

3.250 $\int \frac{\left(ax^2+bx^3\right)^{3/2}}{x^8}\,dx$

Optimal. Leaf size=137

$$-\frac{3b^4\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{64a^{5/2}}+\frac{3b^3\sqrt{ax^2+bx^3}}{64a^2x^2}-\frac{b^2\sqrt{ax^2+bx^3}}{32ax^3}-\frac{\left(ax^2+bx^3\right)^{3/2}}{4x^7}-\frac{b\sqrt{ax^2+bx^3}}{8x^4}$$

```
[Out] -(b*Sqrt[a*x^2 + b*x^3])/(8*x^4) - (b^2*Sqrt[a*x^2 + b*x^3])/(32*
a*x^3) + (3*b^3*Sqrt[a*x^2 + b*x^3])/(64*a^2*x^2) - (a*x^2 + b*x^
3)^(3/2)/(4*x^7) - (3*b^4*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]
])/(64*a^(5/2))
```

Rubi [A] time = 0.319166, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.21

$$-\frac{3b^4\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{64a^{5/2}}+\frac{3b^3\sqrt{ax^2+bx^3}}{64a^2x^2}-\frac{b^2\sqrt{ax^2+bx^3}}{32ax^3}-\frac{\left(ax^2+bx^3\right)^{3/2}}{4x^7}-\frac{b\sqrt{ax^2+bx^3}}{8x^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2)/x^8,x]
```

```
[Out] -(b*Sqrt[a*x^2 + b*x^3])/(8*x^4) - (b^2*Sqrt[a*x^2 + b*x^3])/(32*
a*x^3) + (3*b^3*Sqrt[a*x^2 + b*x^3])/(64*a^2*x^2) - (a*x^2 + b*x^
3)^(3/2)/(4*x^7) - (3*b^4*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]
])/(64*a^(5/2))
```

Rubi in Sympy [A] time = 32.6452, size = 122, normalized size = 0.89

$$-\frac{b\sqrt{ax^2+bx^3}}{8x^4}-\frac{\left(ax^2+bx^3\right)^{\frac{3}{2}}}{4x^7}-\frac{b^2\sqrt{ax^2+bx^3}}{32ax^3}+\frac{3b^3\sqrt{ax^2+bx^3}}{64a^2x^2}-\frac{3b^4\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{64a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2)/x**8,x)
```

```
[Out] -b*sqrt(a*x**2 + b*x**3)/(8*x**4) - (a*x**2 + b*x**3)**(3/2)/(4*x
**7) - b**2*sqrt(a*x**2 + b*x**3)/(32*a*x**3) + 3*b**3*sqrt(a*x**
2 + b*x**3)/(64*a**2*x**2) - 3*b**4*atanh(sqrt(a)*x/sqrt(a*x**2 +
 b*x**3))/(64*a**(5/2))
```

Mathematica [A] time = 0.0931592, size = 104, normalized size = 0.76

$$-\frac{\sqrt{x^2(a+bx)}\left(\sqrt{a}\sqrt{a+bx}\left(16a^3+24a^2bx+2ab^2x^2-3b^3x^3\right)+3b^4x^4\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)\right)}{64a^{5/2}x^5\sqrt{a+bx}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2)/x^8,x]
```

```
[Out] -(Sqrt[x^2*(a + b*x)]*(Sqrt[a]*Sqrt[a + b*x]*(16*a^3 + 24*a^2*b*x
 + 2*a*b^2*x^2 - 3*b^3*x^3) + 3*b^4*x^4*ArcTanh[Sqrt[a + b*x]/Sqr
t[a]]))/(64*a^(5/2)*x^5*Sqrt[a + b*x])
```

Maple [A] time = 0.018, size = 101, normalized size = 0.7

$$\frac{1}{64 x^7} \left(bx^3 + ax^2\right)^{\frac{3}{2}} \left(3 (bx + a)^{7/2} a^{5/2} - 11 (bx + a)^{5/2} a^{7/2} - 3 \, Artanh\left(\frac{\sqrt{bx + a}}{\sqrt{a}}\right) a^2 x^4 b^4 - 11 (bx + a)^{3/2} a^{9/2} + 3 \sqrt{bx + a}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x^8,x)
```

```
[Out] 1/64*(b*x^3+a*x^2)^(3/2)*(3*(b*x+a)^(7/2)*a^(5/2)-11*(b*x+a)^(5/2
)*a^(7/2)-3*arctanh((b*x+a)^(1/2)/a^(1/2))*a^2*x^4*b^4-11*(b*x+a)
^(3/2)*a^(9/2)+3*(b*x+a)^(1/2)*a^(11/2))/x^7/(b*x+a)^(3/2)/a^(9/2
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^8,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.236194, size = 1, normalized size = 0.01

$$\left[\frac{3 \sqrt{a} b^4 x^5 \log\left(\frac{(bx^2 + 2 ax)\sqrt{a} - 2 \sqrt{bx^3 + ax^2} a}{x^2}\right) + 2 \left(3 ab^3 x^3 - 2 a^2 b^2 x^2 - 24 a^3 bx - 16 a^4\right) \sqrt{bx^3 + ax^2}}{128 a^3 x^5}, -\frac{3 \sqrt{-a} b^4 x^5 \arctan\left(\frac{ax}{\sqrt{bx^3 + ax^2} \sqrt{-a}}\right) - \left(3 ab^3 x^3 - 2 a^2 b^2 x^2 - 24 a^3 bx - 16 a^4\right) \sqrt{bx^3 + ax^2}}{64 a^3 x^5}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^8,x, algorithm="fricas")
```

```
[Out] [1/128*(3*sqrt(a)*b^4*x^5*log(((b*x^2 + 2*a*x)*sqrt(a) - 2*sqrt(b
*x^3 + a*x^2)*a)/x^2) + 2*(3*a*b^3*x^3 - 2*a^2*b^2*x^2 - 24*a^3*b
*x - 16*a^4)*sqrt(b*x^3 + a*x^2))/(a^3*x^5), -1/64*(3*sqrt(-a)*b^
4*x^5*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt(-a))) - (3*a*b^3*x^3 -
 2*a^2*b^2*x^2 - 24*a^3*b*x - 16*a^4)*sqrt(b*x^3 + a*x^2))/(a^3*x
^5)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(x^2 (a + bx)\right)^{\frac{3}{2}}}{x^8}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x**8,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x**8, x)
```

GIAC/XCAS [A] time = 0.262168, size = 147, normalized size = 1.07

$$\frac{\frac{3\,b^{5}\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)\mathrm{sign}(x)}{\sqrt{-a}a^{2}} + \frac{3\,(bx+a)^{\frac{7}{2}}\,b^{5}\mathrm{sign}(x) - 11\,(bx+a)^{\frac{5}{2}}\,ab^{5}\mathrm{sign}(x) - 11\,(bx+a)^{\frac{3}{2}}\,a^{2}b^{5}\mathrm{sign}(x) + 3\,\sqrt{bx+a}a^{3}b^{5}\mathrm{sign}(x)}{a^{2}b^{4}x^{4}}}{64\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^8,x, algorithm="giac")
```

```
[Out] 1/64*(3*b^5*arctan(sqrt(b*x + a)/sqrt(-a))*sign(x)/(sqrt(-a)*a^2)
 + (3*(b*x + a)^(7/2)*b^5*sign(x) - 11*(b*x + a)^(5/2)*a*b^5*sign
(x) - 11*(b*x + a)^(3/2)*a^2*b^5*sign(x) + 3*sqrt(b*x + a)*a^3*b^
5*sign(x))/(a^2*b^4*x^4))/b
```

3.251 $\int \frac{(ax^2+bx^3)^{3/2}}{x^9}\,dx$

Optimal. Leaf size=165

$$\frac{3b^5\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{128a^{7/2}}-\frac{3b^4\sqrt{ax^2+bx^3}}{128a^3x^2}+\frac{b^3\sqrt{ax^2+bx^3}}{64a^2x^3}-\frac{b^2\sqrt{ax^2+bx^3}}{80ax^4}-\frac{(ax^2+bx^3)^{3/2}}{5x^8}-\frac{3b\sqrt{ax^2+bx^3}}{40x^5}$$

```
[Out] (-3*b*Sqrt[a*x^2 + b*x^3])/(40*x^5) - (b^2*Sqrt[a*x^2 + b*x^3])/(
80*a*x^4) + (b^3*Sqrt[a*x^2 + b*x^3])/(64*a^2*x^3) - (3*b^4*Sqrt[
a*x^2 + b*x^3])/(128*a^3*x^2) - (a*x^2 + b*x^3)^(3/2)/(5*x^8) + (
3*b^5*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(128*a^(7/2))
```

Rubi [A] time = 0.404075, antiderivative size = 165, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$\frac{3b^5\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{128a^{7/2}}-\frac{3b^4\sqrt{ax^2+bx^3}}{128a^3x^2}+\frac{b^3\sqrt{ax^2+bx^3}}{64a^2x^3}-\frac{b^2\sqrt{ax^2+bx^3}}{80ax^4}-\frac{(ax^2+bx^3)^{3/2}}{5x^8}-\frac{3b\sqrt{ax^2+bx^3}}{40x^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(3/2)/x^9,x]
```

```
[Out] (-3*b*Sqrt[a*x^2 + b*x^3])/(40*x^5) - (b^2*Sqrt[a*x^2 + b*x^3])/(
80*a*x^4) + (b^3*Sqrt[a*x^2 + b*x^3])/(64*a^2*x^3) - (3*b^4*Sqrt[
a*x^2 + b*x^3])/(128*a^3*x^2) - (a*x^2 + b*x^3)^(3/2)/(5*x^8) + (
3*b^5*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(128*a^(7/2))
```

Rubi in Sympy [A] time = 41.6561, size = 150, normalized size = 0.91

$$-\frac{3b\sqrt{ax^2+bx^3}}{40x^5}-\frac{(ax^2+bx^3)^{\frac{3}{2}}}{5x^8}-\frac{b^2\sqrt{ax^2+bx^3}}{80ax^4}+\frac{b^3\sqrt{ax^2+bx^3}}{64a^2x^3}-\frac{3b^4\sqrt{ax^2+bx^3}}{128a^3x^2}+\frac{3b^5\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{128a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**(3/2)/x**9,x)
```

```
[Out] -3*b*sqrt(a*x**2 + b*x**3)/(40*x**5) - (a*x**2 + b*x**3)**(3/2)/(
5*x**8) - b**2*sqrt(a*x**2 + b*x**3)/(80*a*x**4) + b**3*sqrt(a*x*
*2 + b*x**3)/(64*a**2*x**3) - 3*b**4*sqrt(a*x**2 + b*x**3)/(128*a
**3*x**2) + 3*b**5*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3))/(128*a*
*(7/2))
```

Mathematica [A] time = 0.119842, size = 116, normalized size = 0.7

$$\frac{\sqrt{x^2(a+bx)}\left(15b^5x^5\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)-\sqrt{a}\sqrt{a+bx}\left(128a^4+176a^3bx+8a^2b^2x^2-10ab^3x^3+15b^4x^4\right)\right)}{640a^{7/2}x^6\sqrt{a+bx}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(3/2)/x^9,x]
```

```
[Out] (Sqrt[x^2*(a + b*x)]*(-(Sqrt[a]*Sqrt[a + b*x]*(128*a^4 + 176*a^3*
b*x + 8*a^2*b^2*x^2 - 10*a*b^3*x^3 + 15*b^4*x^4)) + 15*b^5*x^5*Ar
cTanh[Sqrt[a + b*x]/Sqrt[a]]))/(640*a^(7/2)*x^6*Sqrt[a + b*x])
```

Maple [A] time = 0.02, size = 113, normalized size = 0.7

$$-\frac{1}{640\,x^{8}}\left(bx^{3}+ax^{2}\right)^{\frac{3}{2}}\left(15\,\left(bx+a\right)^{9/2}a^{7/2}-70\,\left(bx+a\right)^{7/2}a^{9/2}+128\,\left(bx+a\right)^{5/2}a^{11/2}-15\,Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)a^{3}b^{5}x^{5}+70\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^(3/2)/x^9,x)
```

```
[Out] -1/640*(b*x^3+a*x^2)^(3/2)*(15*(b*x+a)^(9/2)*a^(7/2)-70*(b*x+a)^(
7/2)*a^(9/2)+128*(b*x+a)^(5/2)*a^(11/2)-15*arctanh((b*x+a)^(1/2)/
a^(1/2))*a^3*b^5*x^5+70*(b*x+a)^(3/2)*a^(13/2)-15*(b*x+a)^(1/2)*a
^(15/2))/x^8/(b*x+a)^(3/2)/a^(13/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^9,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.232044, size = 1, normalized size = 0.01

$$\left[\frac{15\,\sqrt{a}b^{5}x^{6}\log\left(\frac{(bx^{2}+2\,ax)\sqrt{a}+2\,\sqrt{bx^{3}+ax^{2}}a}{x^{2}}\right)-2\left(15\,ab^{4}x^{4}-10\,a^{2}b^{3}x^{3}+8\,a^{3}b^{2}x^{2}+176\,a^{4}bx+128\,a^{5}\right)\sqrt{bx^{3}+ax^{2}}}{1280\,a^{4}x^{6}},\ \frac{15\,\sqrt{-ab}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^9,x, algorithm="fricas")
```

```
[Out] [1/1280*(15*sqrt(a)*b^5*x^6*log(((b*x^2 + 2*a*x)*sqrt(a) + 2*sqrt
(b*x^3 + a*x^2)*a)/x^2) - 2*(15*a*b^4*x^4 - 10*a^2*b^3*x^3 + 8*a^
3*b^2*x^2 + 176*a^4*b*x + 128*a^5)*sqrt(b*x^3 + a*x^2))/(a^4*x^6)
, 1/640*(15*sqrt(-a)*b^5*x^6*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt
(-a))) - (15*a*b^4*x^4 - 10*a^2*b^3*x^3 + 8*a^3*b^2*x^2 + 176*a^4
*b*x + 128*a^5)*sqrt(b*x^3 + a*x^2))/(a^4*x^6)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\left(x^{2}\left(a+bx\right)\right)^{\frac{3}{2}}}{x^{9}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**(3/2)/x**9,x)
```

```
[Out] Integral((x**2*(a + b*x))**(3/2)/x**9, x)
```

GIAC/XCAS [A] time = 0.285097, size = 170, normalized size = 1.03

$$-\frac{\frac{15\,b^{6}\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)\operatorname{sign}(x)}{\sqrt{-a}a^{3}}+\frac{15\,(bx+a)^{\frac{9}{2}}\,b^{6}\operatorname{sign}(x)-70\,(bx+a)^{\frac{7}{2}}\,ab^{6}\operatorname{sign}(x)+128\,(bx+a)^{\frac{5}{2}}\,a^{2}b^{6}\operatorname{sign}(x)+70\,(bx+a)^{\frac{3}{2}}\,a^{3}b^{6}\operatorname{sign}(x)-15\,\sqrt{bx+a}a^{4}b^{6}\operatorname{sign}(x)}{a^{3}b^{5}x^{5}}}{640\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(3/2)/x^9,x, algorithm="giac")
```

```
[Out] -1/640*(15*b^6*arctan(sqrt(b*x + a)/sqrt(-a))*sign(x)/(sqrt(-a)*a
^3) + (15*(b*x + a)^(9/2)*b^6*sign(x) - 70*(b*x + a)^(7/2)*a*b^6*
sign(x) + 128*(b*x + a)^(5/2)*a^2*b^6*sign(x) + 70*(b*x + a)^(3/2
)*a^3*b^6*sign(x) - 15*sqrt(b*x + a)*a^4*b^6*sign(x))/(a^3*b^5*x^
5))/b
```

3.252 $\int \frac{x^4}{\sqrt{ax^2+bx^3}} dx$

Optimal. Leaf size=103

$$-\frac{32a^3\sqrt{ax^2+bx^3}}{35b^4x}+\frac{16a^2\sqrt{ax^2+bx^3}}{35b^3}-\frac{12ax\sqrt{ax^2+bx^3}}{35b^2}+\frac{2x^2\sqrt{ax^2+bx^3}}{7b}$$

```
[Out] (16*a^2*Sqrt[a*x^2 + b*x^3])/(35*b^3) - (32*a^3*Sqrt[a*x^2 + b*x^
3])/(35*b^4*x) - (12*a*x*Sqrt[a*x^2 + b*x^3])/(35*b^2) + (2*x^2*S
qrt[a*x^2 + b*x^3])/(7*b)
```

Rubi [A] time = 0.242352, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$

$$-\frac{32a^3\sqrt{ax^2+bx^3}}{35b^4x}+\frac{16a^2\sqrt{ax^2+bx^3}}{35b^3}-\frac{12ax\sqrt{ax^2+bx^3}}{35b^2}+\frac{2x^2\sqrt{ax^2+bx^3}}{7b}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (16*a^2*Sqrt[a*x^2 + b*x^3])/(35*b^3) - (32*a^3*Sqrt[a*x^2 + b*x^
3])/(35*b^4*x) - (12*a*x*Sqrt[a*x^2 + b*x^3])/(35*b^2) + (2*x^2*S
qrt[a*x^2 + b*x^3])/(7*b)
```

Rubi in Sympy [A] time = 26.6727, size = 94, normalized size = 0.91

$$-\frac{32a^3\sqrt{ax^2+bx^3}}{35b^4x}+\frac{16a^2\sqrt{ax^2+bx^3}}{35b^3}-\frac{12ax\sqrt{ax^2+bx^3}}{35b^2}+\frac{2x^2\sqrt{ax^2+bx^3}}{7b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**4/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -32*a**3*sqrt(a*x**2 + b*x**3)/(35*b**4*x) + 16*a**2*sqrt(a*x**2
+ b*x**3)/(35*b**3) - 12*a*x*sqrt(a*x**2 + b*x**3)/(35*b**2) + 2*
x**2*sqrt(a*x**2 + b*x**3)/(7*b)
```

Mathematica [A] time = 0.0334075, size = 53, normalized size = 0.51

$$\frac{2\sqrt{x^2(a+bx)}\left(-16a^3+8a^2bx-6ab^2x^2+5b^3x^3\right)}{35b^4x}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (2*Sqrt[x^2*(a + b*x)]*(-16*a^3 + 8*a^2*b*x - 6*a*b^2*x^2 + 5*b^3
*x^3))/(35*b^4*x)
```

Maple [A] time = 0.006, size = 55, normalized size = 0.5

$$-\frac{(2\,bx+2\,a)\left(-5\,x^3b^3+6\,ab^2x^2-8\,a^2xb+16\,a^3\right)x}{35\,b^4}\frac{1}{\sqrt{bx^3+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2/35*(b*x+a)*(-5*b^3*x^3+6*a*b^2*x^2-8*a^2*b*x+16*a^3)*x/b^4/(b*
x^3+a*x^2)^(1/2)
```

Maxima [A] time = 1.39796, size = 72, normalized size = 0.7

$$\frac{2\left(5\,b^4x^4 - ab^3x^3 + 2\,a^2b^2x^2 - 8\,a^3bx - 16\,a^4\right)}{35\,\sqrt{bx + a}b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] 2/35*(5*b^4*x^4 - a*b^3*x^3 + 2*a^2*b^2*x^2 - 8*a^3*b*x - 16*a^4)
/(sqrt(b*x + a)*b^4)
```

Fricas [A] time = 0.211633, size = 69, normalized size = 0.67

$$\frac{2\left(5\,b^3x^3 - 6\,ab^2x^2 + 8\,a^2bx - 16\,a^3\right)\sqrt{bx^3 + ax^2}}{35\,b^4x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] 2/35*(5*b^3*x^3 - 6*a*b^2*x^2 + 8*a^2*b*x - 16*a^3)*sqrt(b*x^3 +
a*x^2)/(b^4*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{x^2\,(a + bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**4/sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{bx^3 + ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^4/sqrt(b*x^3 + a*x^2), x)
```

3.253 $\int \frac{x^3}{\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=75

$$\frac{16a^2\sqrt{ax^2+bx^3}}{15b^3x}-\frac{8a\sqrt{ax^2+bx^3}}{15b^2}+\frac{2x\sqrt{ax^2+bx^3}}{5b}$$

```
[Out] (-8*a*Sqrt[a*x^2 + b*x^3])/(15*b^2) + (16*a^2*Sqrt[a*x^2 + b*x^3]
)/(15*b^3*x) + (2*x*Sqrt[a*x^2 + b*x^3])/(5*b)
```

Rubi [A] time = 0.160626, antiderivative size = 75, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{16a^2\sqrt{ax^2+bx^3}}{15b^3x}-\frac{8a\sqrt{ax^2+bx^3}}{15b^2}+\frac{2x\sqrt{ax^2+bx^3}}{5b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (-8*a*Sqrt[a*x^2 + b*x^3])/(15*b^2) + (16*a^2*Sqrt[a*x^2 + b*x^3]
)/(15*b^3*x) + (2*x*Sqrt[a*x^2 + b*x^3])/(5*b)
```

Rubi in Sympy [A] time = 19.0388, size = 66, normalized size = 0.88

$$\frac{16a^2\sqrt{ax^2+bx^3}}{15b^3x}-\frac{8a\sqrt{ax^2+bx^3}}{15b^2}+\frac{2x\sqrt{ax^2+bx^3}}{5b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] 16*a**2*sqrt(a*x**2 + b*x**3)/(15*b**3*x) - 8*a*sqrt(a*x**2 + b*x
**3)/(15*b**2) + 2*x*sqrt(a*x**2 + b*x**3)/(5*b)
```

Mathematica [A] time = 0.0259506, size = 42, normalized size = 0.56

$$\frac{2\sqrt{x^2(a+bx)}\left(8a^2-4abx+3b^2x^2\right)}{15b^3x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (2*Sqrt[x^2*(a + b*x)]*(8*a^2 - 4*a*b*x + 3*b^2*x^2))/(15*b^3*x)
```

Maple [A] time = 0.009, size = 44, normalized size = 0.6

$$\frac{(2\,bx+2\,a)\left(3\,b^2x^2-4\,abx+8\,a^2\right)x}{15\,b^3}\frac{1}{\sqrt{bx^3+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] 2/15*(b*x+a)*(3*b^2*x^2-4*a*b*x+8*a^2)*x/b^3/(b*x^3+a*x^2)^(1/2)
```

Maxima [A] time = 1.39806, size = 57, normalized size = 0.76

$$\frac{2\left(3\,b^{3}x^{3}-ab^{2}x^{2}+4\,a^{2}bx+8\,a^{3}\right)}{15\,\sqrt{bx+a}b^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] 2/15*(3*b^3*x^3 - a*b^2*x^2 + 4*a^2*b*x + 8*a^3)/(sqrt(b*x + a)*b
^3)
```

Fricas [A] time = 0.218333, size = 54, normalized size = 0.72

$$\frac{2\left(3\,b^{2}x^{2}-4\,abx+8\,a^{2}\right)\sqrt{bx^{3}+ax^{2}}}{15\,b^{3}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] 2/15*(3*b^2*x^2 - 4*a*b*x + 8*a^2)*sqrt(b*x^3 + a*x^2)/(b^3*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^{3}}{\sqrt{x^{2}\left(a+bx\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**3/sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^{3}}{\sqrt{bx^{3}+ax^{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^3/sqrt(b*x^3 + a*x^2), x)
```

3.254 $\int \frac{x^2}{\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=49

$$\frac{2\sqrt{ax^2+bx^3}}{3b}-\frac{4a\sqrt{ax^2+bx^3}}{3b^2x}$$

```
[Out] (2*Sqrt[a*x^2 + b*x^3])/(3*b) - (4*a*Sqrt[a*x^2 + b*x^3])/(3*b^2*
x)
```

Rubi [A] time = 0.0853487, antiderivative size = 49, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{2\sqrt{ax^2+bx^3}}{3b}-\frac{4a\sqrt{ax^2+bx^3}}{3b^2x}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (2*Sqrt[a*x^2 + b*x^3])/(3*b) - (4*a*Sqrt[a*x^2 + b*x^3])/(3*b^2*
x)
```

Rubi in Sympy [A] time = 12.1699, size = 41, normalized size = 0.84

$$-\frac{4a\sqrt{ax^2+bx^3}}{3b^2x}+\frac{2\sqrt{ax^2+bx^3}}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -4*a*sqrt(a*x**2 + b*x**3)/(3*b**2*x) + 2*sqrt(a*x**2 + b*x**3)/(
3*b)
```

Mathematica [A] time = 0.0212126, size = 30, normalized size = 0.61

$$\frac{2(bx-2a)\sqrt{x^2(a+bx)}}{3b^2x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (2*(-2*a + b*x)*Sqrt[x^2*(a + b*x)])/(3*b^2*x)
```

Maple [A] time = 0.005, size = 33, normalized size = 0.7

$$-\frac{(2\,bx+2\,a)(-bx+2\,a)\,x}{3\,b^2}\frac{1}{\sqrt{bx^3+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2/3*(b*x+a)*(-b*x+2*a)*x/b^2/(b*x^3+a*x^2)^(1/2)
```

Maxima [A] time = 1.40394, size = 41, normalized size = 0.84

$$\frac{2\left(b^2x^2 - abx - 2a^2\right)}{3\sqrt{bx+a}b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] 2/3*(b^2*x^2 - a*b*x - 2*a^2)/(sqrt(b*x + a)*b^2)
```

Fricas [A] time = 0.216694, size = 38, normalized size = 0.78

$$\frac{2\sqrt{bx^3+ax^2}(bx-2a)}{3b^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] 2/3*sqrt(b*x^3 + a*x^2)*(b*x - 2*a)/(b^2*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{x^2(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{bx^3+ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^2/sqrt(b*x^3 + a*x^2), x)
```

3.255 $\int \frac{x}{\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=23

$$\frac{2\sqrt{ax^2+bx^3}}{bx}$$

```
[Out] (2*Sqrt[a*x^2 + b*x^3])/(b*x)
```

Rubi [A] time = 0.0128112, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059

$$\frac{2\sqrt{ax^2+bx^3}}{bx}$$

Antiderivative was successfully verified.

```
[In]  Int[x/Sqrt[a*x^2 + b*x^3],x]

[Out] (2*Sqrt[a*x^2 + b*x^3])/(b*x)
```

Rubi in Sympy [A] time = 6.19769, size = 17, normalized size = 0.74

$$\frac{2\sqrt{ax^2+bx^3}}{bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a*x**2)**(1/2),x)

[Out] 2*sqrt(a*x**2 + b*x**3)/(b*x)
```

Mathematica [A] time = 0.012336, size = 21, normalized size = 0.91

$$\frac{2\sqrt{x^2(a+bx)}}{bx}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/Sqrt[a*x^2 + b*x^3],x]

[Out] (2*Sqrt[x^2*(a + b*x)])/(b*x)
```

Maple [A] time = 0.004, size = 25, normalized size = 1.1

$$2\,\frac{x\,(bx+a)}{b\sqrt{bx^3+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a*x^2)^(1/2),x)

[Out] 2*x*(b*x+a)/b/(b*x^3+a*x^2)^(1/2)
```

Maxima [A] time = 1.40528, size = 16, normalized size = 0.7

$$\frac{2\sqrt{bx+a}}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] 2*sqrt(b*x + a)/b
```

Fricas [A] time = 0.214438, size = 28, normalized size = 1.22

$$\frac{2\sqrt{bx^3+ax^2}}{bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] 2*sqrt(b*x^3 + a*x^2)/(b*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{x^2\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(x/sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [A] time = 0.225545, size = 35, normalized size = 1.52

$$\frac{2}{\sqrt{\frac{b}{x}+\frac{a}{x^2}}-\frac{\sqrt{a}}{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] 2/(sqrt(b/x + a/x^2) - sqrt(a)/x)
```

3.256 $\int \frac{1}{\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=30

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{a}}$$

```
[Out] (-2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/Sqrt[a]
```

Rubi [A] time = 0.0257414, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{a}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[a*x^2 + b*x^3],x]

[Out] (-2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/Sqrt[a]
```

Rubi in Sympy [A] time = 2.35305, size = 29, normalized size = 0.97

$$-\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a*x**2)**(1/2),x)

[Out] -2*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3))/sqrt(a)
```

Mathematica [A] time = 0.022106, size = 46, normalized size = 1.53

$$-\frac{2x\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)}{\sqrt{a}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[a*x^2 + b*x^3],x]

[Out] (-2*x*Sqrt[a + b*x]*ArcTanh[Sqrt[a + b*x]/Sqrt[a]])/(Sqrt[a]*Sqrt
[x^2*(a + b*x)])
```

Maple [A] time = 0.007, size = 39, normalized size = 1.3

$$-2\,{\frac{x\sqrt{bx+a}}{\sqrt{bx^3+ax^2}\sqrt{a}}}{\it Artanh}\left({\frac{\sqrt{bx+a}}{\sqrt{a}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2/(b*x^3+a*x^2)^(1/2)*x*(b*x+a)^(1/2)/a^(1/2)*arctanh((b*x+a)^(1
/2)/a^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.220927, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(\frac{(bx^2+2\,ax)\sqrt{a}-2\,\sqrt{bx^3+ax^2}a}{x^2}\right)}{\sqrt{a}}, -\frac{2\,\sqrt{-a}\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)}{a}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] [log(((b*x^2 + 2*a*x)*sqrt(a) - 2*sqrt(b*x^3 + a*x^2)*a)/x^2)/sqr
t(a), -2*sqrt(-a)*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt(-a)))/a]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax^2 + bx^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/sqrt(a*x**2 + b*x**3), x)
```

GIAC/XCAS [A] time = 0.223326, size = 61, normalized size = 2.03

$$-\frac{2\,\arctan\left(\frac{\sqrt{a}}{\sqrt{-a}}\right)\mathrm{sign}\left(x\right)}{\sqrt{-a}} + \frac{2\,\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)}{\sqrt{-a}\mathrm{sign}\left(x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] -2*arctan(sqrt(a)/sqrt(-a))*sign(x)/sqrt(-a) + 2*arctan(sqrt(b*x
+ a)/sqrt(-a))/(sqrt(-a)*sign(x))
```

3.257 $\int \frac{1}{x\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=54

$$\frac{b\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{3/2}}-\frac{\sqrt{ax^2+bx^3}}{ax^2}$$

```
[Out] -(Sqrt[a*x^2 + b*x^3]/(a*x^2)) + (b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^
2 + b*x^3]])/a^(3/2)
```

Rubi [A] time = 0.0979404, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{b\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{3/2}}-\frac{\sqrt{ax^2+bx^3}}{ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] -(Sqrt[a*x^2 + b*x^3]/(a*x^2)) + (b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^
2 + b*x^3]])/a^(3/2)
```

Rubi in Sympy [A] time = 9.84841, size = 46, normalized size = 0.85

$$-\frac{\sqrt{ax^2+bx^3}}{ax^2}+\frac{b\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -sqrt(a*x**2 + b*x**3)/(a*x**2) + b*atanh(sqrt(a)*x/sqrt(a*x**2 +
 b*x**3))/a**(3/2)
```

Mathematica [A] time = 0.0453275, size = 60, normalized size = 1.11

$$\frac{bx\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)-\sqrt{a}(a+bx)}{a^{3/2}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (-(Sqrt[a]*(a + b*x)) + b*x*Sqrt[a + b*x]*ArcTanh[Sqrt[a + b*x]/S
qrt[a]])/(a^(3/2)*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.013, size = 55, normalized size = 1.

$$-1\sqrt{bx+a}\left(\sqrt{bx+a}a^{\frac{3}{2}}-Artanh\left(1\sqrt{bx+a}\frac{1}{\sqrt{a}}\right)xab\right)\frac{1}{\sqrt{bx^3+ax^2}}a^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -(b*x+a)^(1/2)*((b*x+a)^(1/2)*a^(3/2)-arctanh((b*x+a)^(1/2)/a^(1/
2))*x*a*b)/(b*x^3+a*x^2)^(1/2)/a^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229143, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{a}bx^2\log\left(\frac{(bx^2+2\,ax)\sqrt{a}+2\sqrt{bx^3+ax^2}a}{x^2}\right)-2\sqrt{bx^3+ax^2}a}{2\,a^2x^2}, \frac{\sqrt{-a}bx^2\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)-\sqrt{bx^3+ax^2}a}{a^2x^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x),x, algorithm="fricas")
```

```
[Out] [1/2*(sqrt(a)*b*x^2*log(((b*x^2 + 2*a*x)*sqrt(a) + 2*sqrt(b*x^3 +
 a*x^2)*a)/x^2) - 2*sqrt(b*x^3 + a*x^2)*a)/(a^2*x^2), (sqrt(-a)*b
*x^2*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt(-a))) - sqrt(b*x^3 + a*
x^2)*a)/(a^2*x^2)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{x^2\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(x**2*(a + b*x))), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.258 $\int \frac{1}{x^2\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=87

$$-\frac{3b^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{5/2}}+\frac{3b\sqrt{ax^2+bx^3}}{4a^2x^2}-\frac{\sqrt{ax^2+bx^3}}{2ax^3}$$

```
[Out] -Sqrt[a*x^2 + b*x^3]/(2*a*x^3) + (3*b*Sqrt[a*x^2 + b*x^3])/(4*a^2
*x^2) - (3*b^2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(4*a^(5/
2))
```

Rubi [A] time = 0.163753, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{3b^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{5/2}}+\frac{3b\sqrt{ax^2+bx^3}}{4a^2x^2}-\frac{\sqrt{ax^2+bx^3}}{2ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] -Sqrt[a*x^2 + b*x^3]/(2*a*x^3) + (3*b*Sqrt[a*x^2 + b*x^3])/(4*a^2
*x^2) - (3*b^2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(4*a^(5/
2))
```

Rubi in Sympy [A] time = 16.7196, size = 78, normalized size = 0.9

$$-\frac{\sqrt{ax^2+bx^3}}{2ax^3}+\frac{3b\sqrt{ax^2+bx^3}}{4a^2x^2}-\frac{3b^2\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -sqrt(a*x**2 + b*x**3)/(2*a*x**3) + 3*b*sqrt(a*x**2 + b*x**3)/(4*
a**2*x**2) - 3*b**2*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3))/(4*a**
(5/2))
```

Mathematica [A] time = 0.0586238, size = 83, normalized size = 0.95

$$\frac{\sqrt{a}\left(-2a^2+abx+3b^2x^2\right)-3b^2x^2\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)}{4a^{5/2}x\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (Sqrt[a]*(-2*a^2 + a*b*x + 3*b^2*x^2) - 3*b^2*x^2*Sqrt[a + b*x]*A
rcTanh[Sqrt[a + b*x]/Sqrt[a]])/(4*a^(5/2)*x*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.008, size = 77, normalized size = 0.9

$$-\frac{1}{4\,x}\sqrt{bx+a}\left(2\,\sqrt{bx+a}a^{5/2}-3\,\sqrt{bx+a}a^{3/2}xb+3\,Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)ab^2x^2\right)\frac{1}{\sqrt{bx^3+ax^2}}a^{-\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -1/4*(b*x+a)^(1/2)*(2*(b*x+a)^(1/2)*a^(5/2)-3*(b*x+a)^(1/2)*a^(3/
2)*x*b+3*arctanh((b*x+a)^(1/2)/a^(1/2))*a*b^2*x^2)/x/(b*x^3+a*x^2
)^(1/2)/a^(7/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.233406, size = 1, normalized size = 0.01

$$\left[\frac{3\sqrt{a}b^2x^3\log\left(\frac{(bx^2+2\,ax)\sqrt{a}-2\sqrt{bx^3+ax^2}a}{x^2}\right)+2\sqrt{bx^3+ax^2}\left(3\,abx-2\,a^2\right)}{8\,a^3x^3},\right.$$
$$\left.-\frac{3\sqrt{-a}b^2x^3\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)-\sqrt{bx^3+ax^2}\left(3\,abx-2\,a^2\right)}{4\,a^3x^3}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^2),x, algorithm="fricas")
```

```
[Out] [1/8*(3*sqrt(a)*b^2*x^3*log(((b*x^2 + 2*a*x)*sqrt(a) - 2*sqrt(b*x
^3 + a*x^2)*a)/x^2) + 2*sqrt(b*x^3 + a*x^2)*(3*a*b*x - 2*a^2))/(a
^3*x^3), -1/4*(3*sqrt(-a)*b^2*x^3*arctan(a*x/(sqrt(b*x^3 + a*x^2)
*sqrt(-a))) - sqrt(b*x^3 + a*x^2)*(3*a*b*x - 2*a^2))/(a^3*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{x^2\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(x**2*(a + b*x))), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^2),x, algorithm="giac")

[Out] Exception raised: NotImplementedError
```

3.259 $\int \frac{1}{x^3\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=115

$$\frac{5b^3\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{7/2}}-\frac{5b^2\sqrt{ax^2+bx^3}}{8a^3x^2}+\frac{5b\sqrt{ax^2+bx^3}}{12a^2x^3}-\frac{\sqrt{ax^2+bx^3}}{3ax^4}$$

```
[Out] -Sqrt[a*x^2 + b*x^3]/(3*a*x^4) + (5*b*Sqrt[a*x^2 + b*x^3])/(12*a^
2*x^3) - (5*b^2*Sqrt[a*x^2 + b*x^3])/(8*a^3*x^2) + (5*b^3*ArcTanh
[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(8*a^(7/2))
```

Rubi [A] time = 0.23733, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{5b^3\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{7/2}}-\frac{5b^2\sqrt{ax^2+bx^3}}{8a^3x^2}+\frac{5b\sqrt{ax^2+bx^3}}{12a^2x^3}-\frac{\sqrt{ax^2+bx^3}}{3ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] -Sqrt[a*x^2 + b*x^3]/(3*a*x^4) + (5*b*Sqrt[a*x^2 + b*x^3])/(12*a^
2*x^3) - (5*b^2*Sqrt[a*x^2 + b*x^3])/(8*a^3*x^2) + (5*b^3*ArcTanh
[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(8*a^(7/2))
```

Rubi in Sympy [A] time = 24.3666, size = 105, normalized size = 0.91

$$-\frac{\sqrt{ax^2+bx^3}}{3ax^4}+\frac{5b\sqrt{ax^2+bx^3}}{12a^2x^3}-\frac{5b^2\sqrt{ax^2+bx^3}}{8a^3x^2}+\frac{5b^3\,\text{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -sqrt(a*x**2 + b*x**3)/(3*a*x**4) + 5*b*sqrt(a*x**2 + b*x**3)/(12
*a**2*x**3) - 5*b**2*sqrt(a*x**2 + b*x**3)/(8*a**3*x**2) + 5*b**3
*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3))/(8*a**(7/2))
```

Mathematica [A] time = 0.0623039, size = 96, normalized size = 0.83

$$\frac{15b^3x^3\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)-\sqrt{a}\left(8a^3-2a^2bx+5ab^2x^2+15b^3x^3\right)}{24a^{7/2}x^2\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (-(Sqrt[a]*(8*a^3 - 2*a^2*b*x + 5*a*b^2*x^2 + 15*b^3*x^3)) + 15*b
^3*x^3*Sqrt[a + b*x]*ArcTanh[Sqrt[a + b*x]/Sqrt[a]])/(24*a^(7/2)*
x^2*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.013, size = 95, normalized size = 0.8

$$-\frac{1}{24\,x^{2}}\sqrt{bx+a}\left(15\,\sqrt{bx+a}a^{3/2}x^{2}b^{2}-15\,Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)x^{3}ab^{3}-10\,\sqrt{bx+a}a^{5/2}xb+8\,\sqrt{bx+a}a^{7/2}\right)\frac{1}{\sqrt{bx^{3}+ax^{2}}}a^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -1/24/x^2*(b*x+a)^(1/2)*(15*(b*x+a)^(1/2)*a^(3/2)*x^2*b^2-15*arct
anh((b*x+a)^(1/2)/a^(1/2))*x^3*a*b^3-10*(b*x+a)^(1/2)*a^(5/2)*x*b
+8*(b*x+a)^(1/2)*a^(7/2))/(b*x^3+a*x^2)^(1/2)/a^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240169, size = 1, normalized size = 0.01

$$\left[\frac{15\,\sqrt{a}b^{3}x^{4}\log\left(\frac{(bx^{2}+2\,ax)\sqrt{a}+2\,\sqrt{bx^{3}+ax^{2}}a}{x^{2}}\right)-2\left(15\,ab^{2}x^{2}-10\,a^{2}bx+8\,a^{3}\right)\sqrt{bx^{3}+ax^{2}}}{48\,a^{4}x^{4}},\ \frac{15\,\sqrt{-a}b^{3}x^{4}\arctan\left(\frac{ax}{\sqrt{bx^{3}+ax^{2}}\sqrt{-a}}\right)\cdots}{2\cdots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^3),x, algorithm="fricas")
```

```
[Out] [1/48*(15*sqrt(a)*b^3*x^4*log(((b*x^2 + 2*a*x)*sqrt(a) + 2*sqrt(b
*x^3 + a*x^2)*a)/x^2) - 2*(15*a*b^2*x^2 - 10*a^2*b*x + 8*a^3)*sqr
t(b*x^3 + a*x^2))/(a^4*x^4), 1/24*(15*sqrt(-a)*b^3*x^4*arctan(a*x
/(sqrt(b*x^3 + a*x^2)*sqrt(-a))) - (15*a*b^2*x^2 - 10*a^2*b*x + 8
*a^3)*sqrt(b*x^3 + a*x^2))/(a^4*x^4)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^{3}\sqrt{x^{2}\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(x**2*(a + b*x))), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^3),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.260 $\int \frac{x^6}{(ax^2+bx^3)^{3/2}} \, dx$

Optimal. Leaf size=98

$$\frac{32a^2\sqrt{ax^2+bx^3}}{5b^4x} - \frac{16a\sqrt{ax^2+bx^3}}{5b^3} + \frac{12x\sqrt{ax^2+bx^3}}{5b^2} - \frac{2x^4}{b\sqrt{ax^2+bx^3}}$$

```
[Out] (-2*x^4)/(b*Sqrt[a*x^2 + b*x^3]) - (16*a*Sqrt[a*x^2 + b*x^3])/(5*
b^3) + (32*a^2*Sqrt[a*x^2 + b*x^3])/(5*b^4*x) + (12*x*Sqrt[a*x^2
+ b*x^3])/(5*b^2)
```

Rubi [A] time = 0.235677, antiderivative size = 98, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$\frac{32a^2\sqrt{ax^2+bx^3}}{5b^4x} - \frac{16a\sqrt{ax^2+bx^3}}{5b^3} + \frac{12x\sqrt{ax^2+bx^3}}{5b^2} - \frac{2x^4}{b\sqrt{ax^2+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (-2*x^4)/(b*Sqrt[a*x^2 + b*x^3]) - (16*a*Sqrt[a*x^2 + b*x^3])/(5*
b^3) + (32*a^2*Sqrt[a*x^2 + b*x^3])/(5*b^4*x) + (12*x*Sqrt[a*x^2
+ b*x^3])/(5*b^2)
```

Rubi in Sympy [A] time = 27.3296, size = 88, normalized size = 0.9

$$\frac{32a^2\sqrt{ax^2+bx^3}}{5b^4x} - \frac{16a\sqrt{ax^2+bx^3}}{5b^3} - \frac{2x^4}{b\sqrt{ax^2+bx^3}} + \frac{12x\sqrt{ax^2+bx^3}}{5b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] 32*a**2*sqrt(a*x**2 + b*x**3)/(5*b**4*x) - 16*a*sqrt(a*x**2 + b*x
**3)/(5*b**3) - 2*x**4/(b*sqrt(a*x**2 + b*x**3)) + 12*x*sqrt(a*x*
*2 + b*x**3)/(5*b**2)
```

Mathematica [A] time = 0.0313513, size = 50, normalized size = 0.51

$$\frac{2x\left(16a^3+8a^2bx-2ab^2x^2+b^3x^3\right)}{5b^4\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^6/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(16*a^3 + 8*a^2*b*x - 2*a*b^2*x^2 + b^3*x^3))/(5*b^4*Sqrt[x^
2*(a + b*x)])
```

Maple [A] time = 0.008, size = 56, normalized size = 0.6

$$\frac{(2\,bx+2\,a)\left(x^3b^3-2\,ab^2x^2+8\,a^2xb+16\,a^3\right)x^3}{5\,b^4}\left(bx^3+ax^2\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] 2/5*(b*x+a)*(b^3*x^3-2*a*b^2*x^2+8*a^2*b*x+16*a^3)*x^3/b^4/(b*x^3
+a*x^2)^(3/2)
```

Maxima [A] time = 1.60463, size = 55, normalized size = 0.56

$$\frac{2\,\left(b^3x^3-2\,ab^2x^2+8\,a^2bx+16\,a^3\right)}{5\,\sqrt{bx+a}b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] 2/5*(b^3*x^3 - 2*a*b^2*x^2 + 8*a^2*b*x + 16*a^3)/(sqrt(b*x + a)*b
^4)
```

Fricas [A] time = 0.226407, size = 81, normalized size = 0.83

$$\frac{2\,\left(b^3x^3-2\,ab^2x^2+8\,a^2bx+16\,a^3\right)\sqrt{bx^3+ax^2}}{5\,\left(b^5x^2+ab^4x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] 2/5*(b^3*x^3 - 2*a*b^2*x^2 + 8*a^2*b*x + 16*a^3)*sqrt(b*x^3 + a*x
^2)/(b^5*x^2 + a*b^4*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^6}{\left(x^2\,(a+bx)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral(x**6/(x**2*(a + b*x))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^6}{\left(bx^3+ax^2\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/(b*x^3 + a*x^2)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^6/(b*x^3 + a*x^2)^(3/2), x)
```

3.261 $\int \frac{x^5}{(ax^2+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=72

$$-\frac{16a\sqrt{ax^2+bx^3}}{3b^3x}+\frac{8\sqrt{ax^2+bx^3}}{3b^2}-\frac{2x^3}{b\sqrt{ax^2+bx^3}}$$

```
[Out] (-2*x^3)/(b*Sqrt[a*x^2 + b*x^3]) + (8*Sqrt[a*x^2 + b*x^3])/(3*b^2
) - (16*a*Sqrt[a*x^2 + b*x^3])/(3*b^3*x)
```

Rubi [A] time = 0.159348, antiderivative size = 72, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{16a\sqrt{ax^2+bx^3}}{3b^3x}+\frac{8\sqrt{ax^2+bx^3}}{3b^2}-\frac{2x^3}{b\sqrt{ax^2+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (-2*x^3)/(b*Sqrt[a*x^2 + b*x^3]) + (8*Sqrt[a*x^2 + b*x^3])/(3*b^2
) - (16*a*Sqrt[a*x^2 + b*x^3])/(3*b^3*x)
```

Rubi in Sympy [A] time = 19.2613, size = 63, normalized size = 0.88

$$-\frac{16a\sqrt{ax^2+bx^3}}{3b^3x}-\frac{2x^3}{b\sqrt{ax^2+bx^3}}+\frac{8\sqrt{ax^2+bx^3}}{3b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] -16*a*sqrt(a*x**2 + b*x**3)/(3*b**3*x) - 2*x**3/(b*sqrt(a*x**2 +
b*x**3)) + 8*sqrt(a*x**2 + b*x**3)/(3*b**2)
```

Mathematica [A] time = 0.0247084, size = 39, normalized size = 0.54

$$\frac{2x\left(-8a^2-4abx+b^2x^2\right)}{3b^3\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^5/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(-8*a^2 - 4*a*b*x + b^2*x^2))/(3*b^3*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.007, size = 46, normalized size = 0.6

$$-\frac{(2\,bx+2\,a)\left(-b^2x^2+4\,abx+8\,a^2\right)x^3}{3\,b^3}\left(bx^3+ax^2\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] -2/3*(b*x+a)*(-b^2*x^2+4*a*b*x+8*a^2)*x^3/b^3/(b*x^3+a*x^2)^(3/2)
```

Maxima [A] time = 1.42052, size = 41, normalized size = 0.57

$$\frac{2\left(b^2x^2 - 4\,abx - 8\,a^2\right)}{3\,\sqrt{bx + a}b^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] 2/3*(b^2*x^2 - 4*a*b*x - 8*a^2)/(sqrt(b*x + a)*b^3)
```

Fricas [A] time = 0.220812, size = 66, normalized size = 0.92

$$\frac{2\left(b^2x^2 - 4\,abx - 8\,a^2\right)\sqrt{bx^3 + ax^2}}{3\left(b^4x^2 + ab^3x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] 2/3*(b^2*x^2 - 4*a*b*x - 8*a^2)*sqrt(b*x^3 + a*x^2)/(b^4*x^2 + a*
b^3*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\left(x^2\left(a + bx\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral(x**5/(x**2*(a + b*x))**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\left(bx^3 + ax^2\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/(b*x^3 + a*x^2)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^5/(b*x^3 + a*x^2)^(3/2), x)
```

3.262 $\int \frac{x^4}{(ax^2+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=47

$$\frac{4\sqrt{ax^2+bx^3}}{b^2x}-\frac{2x^2}{b\sqrt{ax^2+bx^3}}$$

```
[Out] (-2*x^2)/(b*Sqrt[a*x^2 + b*x^3]) + (4*Sqrt[a*x^2 + b*x^3])/(b^2*x
)
```

Rubi [A] time = 0.0896215, antiderivative size = 47, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{4\sqrt{ax^2+bx^3}}{b^2x}-\frac{2x^2}{b\sqrt{ax^2+bx^3}}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (-2*x^2)/(b*Sqrt[a*x^2 + b*x^3]) + (4*Sqrt[a*x^2 + b*x^3])/(b^2*x
)
```

Rubi in Sympy [A] time = 12.6772, size = 39, normalized size = 0.83

$$-\frac{2x^2}{b\sqrt{ax^2+bx^3}}+\frac{4\sqrt{ax^2+bx^3}}{b^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**4/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] -2*x**2/(b*sqrt(a*x**2 + b*x**3)) + 4*sqrt(a*x**2 + b*x**3)/(b**2
*x)
```

Mathematica [A] time = 0.0204661, size = 26, normalized size = 0.55

$$\frac{2x(2a+bx)}{b^2\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(2*a + b*x))/(b^2*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.005, size = 34, normalized size = 0.7

$$2\,\frac{(bx+a)(bx+2\,a)\,x^3}{b^2\,(bx^3+ax^2)^{3/2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^3+a*x^2)^(3/2),x)

[Out] 2*(b*x+a)*(b*x+2*a)*x^3/b^2/(b*x^3+a*x^2)^(3/2)
```

Maxima [A] time = 1.4382, size = 26, normalized size = 0.55

$$\frac{2\,(bx + 2\,a)}{\sqrt{bx + a}b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2)^(3/2),x, algorithm="maxima")

[Out] 2*(b*x + 2*a)/(sqrt(b*x + a)*b^2)
```

Fricas [A] time = 0.215033, size = 51, normalized size = 1.09

$$\frac{2\,\sqrt{bx^3 + ax^2}(bx + 2\,a)}{b^3x^2 + ab^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2)^(3/2),x, algorithm="fricas")

[Out] 2*sqrt(b*x^3 + a*x^2)*(b*x + 2*a)/(b^3*x^2 + a*b^2*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\left(x^2\,(a + bx)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**3+a*x**2)**(3/2),x)

[Out] Integral(x**4/(x**2*(a + b*x))**(3/2), x)
```

GIAC/XCAS [A] time = 0.228636, size = 38, normalized size = 0.81

$$\frac{2\left(\frac{1}{b} + \frac{2\,a}{b^2x}\right)}{\sqrt{\frac{b}{x} + \frac{a}{x^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/(b*x^3 + a*x^2)^(3/2),x, algorithm="giac")

[Out] 2*(1/b + 2*a/(b^2*x))/sqrt(b/x + a/x^2)
```

3.263 $\int \frac{x^3}{(ax^2+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=21

$$-\frac{2x}{b\sqrt{ax^2+bx^3}}$$

```
[Out] (-2*x)/(b*Sqrt[a*x^2 + b*x^3])
```

Rubi [A] time = 0.0140457, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053

$$-\frac{2x}{b\sqrt{ax^2+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/(a*x^2 + b*x^3)^(3/2),x]

[Out] (-2*x)/(b*Sqrt[a*x^2 + b*x^3])
```

Rubi in Sympy [A] time = 7.62374, size = 19, normalized size = 0.9

$$-\frac{2x}{b\sqrt{ax^2+bx^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**3+a*x**2)**(3/2),x)

[Out] -2*x/(b*sqrt(a*x**2 + b*x**3))
```

Mathematica [A] time = 0.00869586, size = 19, normalized size = 0.9

$$-\frac{2x}{b\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/(a*x^2 + b*x^3)^(3/2),x]

[Out] (-2*x)/(b*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.004, size = 27, normalized size = 1.3

$$-2\,\frac{(bx+a)\,x^3}{b\,(bx^3+ax^2)^{3/2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^3+a*x^2)^(3/2),x)

[Out] -2*(b*x+a)*x^3/b/(b*x^3+a*x^2)^(3/2)
```

Maxima [A] time = 1.45696, size = 16, normalized size = 0.76

$$-\frac{2}{\sqrt{bx+a}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2)^(3/2),x, algorithm="maxima")

[Out] -2/(sqrt(b*x + a)*b)
```

Fricas [A] time = 0.211749, size = 39, normalized size = 1.86

$$-\frac{2\sqrt{bx^3+ax^2}}{b^2x^2+abx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2)^(3/2),x, algorithm="fricas")

[Out] -2*sqrt(b*x^3 + a*x^2)/(b^2*x^2 + a*b*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\left(x^2\left(a+bx\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**3+a*x**2)**(3/2),x)

[Out] Integral(x**3/(x**2*(a + b*x))**(3/2), x)
```

GIAC/XCAS [A] time = 0.232624, size = 50, normalized size = 2.38

$$\frac{2}{\left(\sqrt{a}\left(\sqrt{\frac{b}{x}+\frac{a}{x^2}}-\frac{\sqrt{a}}{x}\right)-b\right)\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/(b*x^3 + a*x^2)^(3/2),x, algorithm="giac")

[Out] 2/((sqrt(a)*(sqrt(b/x + a/x^2) - sqrt(a)/x) - b)*sqrt(a))
```

3.264 $\int \frac{x^2}{(ax^2+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=52

$$\frac{2x}{a\sqrt{ax^2+bx^3}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{3/2}}$$

```
[Out] (2*x)/(a*Sqrt[a*x^2 + b*x^3]) - (2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2
 + b*x^3]])/a^(3/2)
```

Rubi [A] time = 0.098892, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{2x}{a\sqrt{ax^2+bx^3}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*x)/(a*Sqrt[a*x^2 + b*x^3]) - (2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2
 + b*x^3]])/a^(3/2)
```

Rubi in Sympy [A] time = 9.86185, size = 46, normalized size = 0.88

$$\frac{2x}{a\sqrt{ax^2+bx^3}}-\frac{2\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] 2*x/(a*sqrt(a*x**2 + b*x**3)) - 2*atanh(sqrt(a)*x/sqrt(a*x**2 + b
*x**3))/a**(3/2)
```

Mathematica [A] time = 0.0314246, size = 54, normalized size = 1.04

$$\frac{2x\left(\sqrt{a}-\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)\right)}{a^{3/2}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (2*x*(Sqrt[a] - Sqrt[a + b*x]*ArcTanh[Sqrt[a + b*x]/Sqrt[a]]))/(a
^(3/2)*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.007, size = 54, normalized size = 1.

$$-2\,\frac{x^3\,(bx+a)}{(bx^3+ax^2)^{3/2}\,a^{5/2}}\left(Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)a\sqrt{bx+a}-a^{3/2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] -2*x^3*(b*x+a)*(arctanh((b*x+a)^(1/2)/a^(1/2))*a*(b*x+a)^(1/2)-a^
(3/2))/(b*x^3+a*x^2)^(3/2)/a^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231069, size = 1, normalized size = 0.02

$$\left[\frac{\left(bx^2+ax\right)\sqrt{a}\log\left(\frac{\left(bx^2+2\,ax\right)\sqrt{a}-2\,\sqrt{bx^3+ax^2}a}{x^2}\right)+2\,\sqrt{bx^3+ax^2}a}{a^2bx^2+a^3x},\right.$$
$$\left.-\frac{2\left(\left(bx^2+ax\right)\sqrt{-a}\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)-\sqrt{bx^3+ax^2}a\right)}{a^2bx^2+a^3x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] [((b*x^2 + a*x)*sqrt(a)*log(((b*x^2 + 2*a*x)*sqrt(a) - 2*sqrt(b*x
^3 + a*x^2)*a)/x^2) + 2*sqrt(b*x^3 + a*x^2)*a)/(a^2*b*x^2 + a^3*x
), -2*((b*x^2 + a*x)*sqrt(-a)*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqr
t(-a))) - sqrt(b*x^3 + a*x^2)*a)/(a^2*b*x^2 + a^3*x)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\left(x^2\left(a+bx\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral(x**2/(x**2*(a + b*x))**(3/2), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/(b*x^3 + a*x^2)^(3/2),x, algorithm="giac")

[Out] Exception raised: TypeError
```

3.265 $\int \frac{x}{(ax^2+bx^3)^{3/2}} dx$

Optimal. Leaf size=75

$$\frac{3b\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{5/2}}-\frac{3\sqrt{ax^2+bx^3}}{a^2x^2}+\frac{2}{a\sqrt{ax^2+bx^3}}$$

```
[Out] 2/(a*Sqrt[a*x^2 + b*x^3]) - (3*Sqrt[a*x^2 + b*x^3])/(a^2*x^2) + (
3*b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/a^(5/2)
```

Rubi [A] time = 0.145773, antiderivative size = 75, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$\frac{3b\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{5/2}}-\frac{3\sqrt{ax^2+bx^3}}{a^2x^2}+\frac{2}{a\sqrt{ax^2+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] 2/(a*Sqrt[a*x^2 + b*x^3]) - (3*Sqrt[a*x^2 + b*x^3])/(a^2*x^2) + (
3*b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/a^(5/2)
```

Rubi in Sympy [A] time = 15.6944, size = 68, normalized size = 0.91

$$\frac{2}{a\sqrt{ax^2+bx^3}}-\frac{3\sqrt{ax^2+bx^3}}{a^2x^2}+\frac{3b\,\text{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{a^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] 2/(a*sqrt(a*x**2 + b*x**3)) - 3*sqrt(a*x**2 + b*x**3)/(a**2*x**2)
 + 3*b*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3))/a**(5/2)
```

Mathematica [A] time = 0.0486013, size = 62, normalized size = 0.83

$$\frac{3bx\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)-\sqrt{a}(a+3bx)}{a^{5/2}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(a*x^2 + b*x^3)^(3/2),x]
```

```
[Out] (-(Sqrt[a]*(a + 3*b*x)) + 3*b*x*Sqrt[a + b*x]*ArcTanh[Sqrt[a + b*
x]/Sqrt[a]])/(a^(5/2)*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.02, size = 62, normalized size = 0.8

$$x^2(bx+a)\left(3\sqrt{bx+a}\,a\text{Artanh}\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)xb-3xb\sqrt{a}-a^{\frac{3}{2}}\right)\left(bx^3+ax^2\right)^{-\frac{3}{2}}a^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] x^2*(b*x+a)*(3*(b*x+a)^(1/2)*arctanh((b*x+a)^(1/2)/a^(1/2))*x*b-3
*x*b*a^(1/2)-a^(3/2))/(b*x^3+a*x^2)^(3/2)/a^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231096, size = 1, normalized size = 0.01

$$\left[\frac{3\,\left(b^2x^3+abx^2\right)\sqrt{a}\log\left(\frac{\left(bx^2+2\,ax\right)\sqrt{a}+2\,\sqrt{bx^3+ax^2}a}{x^2}\right)-2\,\sqrt{bx^3+ax^2}\left(3\,abx+a^2\right)}{2\,\left(a^3bx^3+a^4x^2\right)},\ \frac{3\,\left(b^2x^3+abx^2\right)\sqrt{-a}\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)}{a^3bx^3+a^4x^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2)^(3/2),x, algorithm="fricas")
```

```
[Out] [1/2*(3*(b^2*x^3 + a*b*x^2)*sqrt(a)*log(((b*x^2 + 2*a*x)*sqrt(a)
+ 2*sqrt(b*x^3 + a*x^2)*a)/x^2) - 2*sqrt(b*x^3 + a*x^2)*(3*a*b*x
+ a^2))/(a^3*b*x^3 + a^4*x^2), (3*(b^2*x^3 + a*b*x^2)*sqrt(-a)*ar
ctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt(-a))) - sqrt(b*x^3 + a*x^2)*(3
*a*b*x + a^2))/(a^3*b*x^3 + a^4*x^2)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(x^2\left(a+bx\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral(x/(x**2*(a + b*x))**(3/2), x)
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^3 + a*x^2)^(3/2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.266 $\int \frac{1}{(ax^2+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=110

$$-\frac{15b^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{7/2}}+\frac{15b\sqrt{ax^2+bx^3}}{4a^3x^2}-\frac{5\sqrt{ax^2+bx^3}}{2a^2x^3}+\frac{2}{ax\sqrt{ax^2+bx^3}}$$

```
[Out] 2/(a*x*Sqrt[a*x^2 + b*x^3]) - (5*Sqrt[a*x^2 + b*x^3])/(2*a^2*x^3)
 + (15*b*Sqrt[a*x^2 + b*x^3])/(4*a^3*x^2) - (15*b^2*ArcTanh[(Sqrt
[a]*x)/Sqrt[a*x^2 + b*x^3]])/(4*a^(7/2))
```

Rubi [A] time = 0.190556, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.267

$$-\frac{15b^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{7/2}}+\frac{15b\sqrt{ax^2+bx^3}}{4a^3x^2}-\frac{5\sqrt{ax^2+bx^3}}{2a^2x^3}+\frac{2}{ax\sqrt{ax^2+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^(-3/2),x]
```

```
[Out] 2/(a*x*Sqrt[a*x^2 + b*x^3]) - (5*Sqrt[a*x^2 + b*x^3])/(2*a^2*x^3)
 + (15*b*Sqrt[a*x^2 + b*x^3])/(4*a^3*x^2) - (15*b^2*ArcTanh[(Sqrt
[a]*x)/Sqrt[a*x^2 + b*x^3]])/(4*a^(7/2))
```

Rubi in Sympy [A] time = 18.9372, size = 100, normalized size = 0.91

$$\frac{2}{ax\sqrt{ax^2+bx^3}}-\frac{5\sqrt{ax^2+bx^3}}{2a^2x^3}+\frac{15b\sqrt{ax^2+bx^3}}{4a^3x^2}-\frac{15b^2\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{4a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] 2/(a*x*sqrt(a*x**2 + b*x**3)) - 5*sqrt(a*x**2 + b*x**3)/(2*a**2*x
**3) + 15*b*sqrt(a*x**2 + b*x**3)/(4*a**3*x**2) - 15*b**2*atanh(s
qrt(a)*x/sqrt(a*x**2 + b*x**3))/(4*a**(7/2))
```

Mathematica [A] time = 0.0592093, size = 84, normalized size = 0.76

$$\frac{\sqrt{a}\left(-2a^2+5abx+15b^2x^2\right)-15b^2x^2\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)}{4a^{7/2}x\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^(-3/2),x]
```

```
[Out] (Sqrt[a]*(-2*a^2 + 5*a*b*x + 15*b^2*x^2) - 15*b^2*x^2*Sqrt[a + b*
x]*ArcTanh[Sqrt[a + b*x]/Sqrt[a]])/(4*a^(7/2)*x*Sqrt[x^2*(a + b*x
)])
```

Maple [A] time = 0.021, size = 76, normalized size = 0.7

$$-\frac{x(bx+a)}{4}\left(15\sqrt{bx+a}Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)x^2b^2-5a^{3/2}xb-15x^2b^2\sqrt{a}+2a^{5/2}\right)\left(bx^3+ax^2\right)^{-\frac{3}{2}}a^{-\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] -1/4*x*(b*x+a)*(15*(b*x+a)^(1/2)*arctanh((b*x+a)^(1/2)/a^(1/2))*x
^2*b^2-5*a^(3/2)*x*b-15*x^2*b^2*a^(1/2)+2*a^(5/2))/(b*x^3+a*x^2)^
(3/2)/a^(7/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x^3 + a*x^2)^(-3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231385, size = 1, normalized size = 0.01

$$\left[\frac{15\left(b^3x^4+ab^2x^3\right)\sqrt{a}\log\left(\frac{(bx^2+2ax)\sqrt{a}-2\sqrt{bx^3+ax^2}a}{x^2}\right)+2\left(15ab^2x^2+5a^2bx-2a^3\right)\sqrt{bx^3+ax^2}}{8\left(a^4bx^4+a^5x^3\right)},\right.$$
$$\left.-\frac{15\left(b^3x^4+ab^2x^3\right)\sqrt{-a}\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)-\left(15ab^2x^2+5a^2bx-2a^3\right)\sqrt{bx^3+ax^2}}{4\left(a^4bx^4+a^5x^3\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x^3 + a*x^2)^(-3/2),x, algorithm="fricas")
```

```
[Out] [1/8*(15*(b^3*x^4 + a*b^2*x^3)*sqrt(a)*log(((b*x^2 + 2*a*x)*sqrt(
a) - 2*sqrt(b*x^3 + a*x^2)*a)/x^2) + 2*(15*a*b^2*x^2 + 5*a^2*b*x
- 2*a^3)*sqrt(b*x^3 + a*x^2))/(a^4*b*x^4 + a^5*x^3), -1/4*(15*(b^
3*x^4 + a*b^2*x^3)*sqrt(-a)*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt(
-a))) - (15*a*b^2*x^2 + 5*a^2*b*x - 2*a^3)*sqrt(b*x^3 + a*x^2))/(
a^4*b*x^4 + a^5*x^3)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{\left(ax^2+bx^3\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral((a*x**2 + b*x**3)**(-3/2), x)
```

GIAC/XCAS [A] time = 0.556074, size = 4, normalized size = 0.04

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^(-3/2),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.267 $\int \frac{1}{x(ax^2+bx^3)^{3/2}} dx$

Optimal. Leaf size=138

$$\frac{35b^3 \tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{9/2}} - \frac{35b^2\sqrt{ax^2+bx^3}}{8a^4x^2} + \frac{35b\sqrt{ax^2+bx^3}}{12a^3x^3} - \frac{7\sqrt{ax^2+bx^3}}{3a^2x^4} + \frac{2}{ax^2\sqrt{ax^2+bx^3}}$$

```
[Out] 2/(a*x^2*Sqrt[a*x^2 + b*x^3]) - (7*Sqrt[a*x^2 + b*x^3])/(3*a^2*x^
4) + (35*b*Sqrt[a*x^2 + b*x^3])/(12*a^3*x^3) - (35*b^2*Sqrt[a*x^2
 + b*x^3])/(8*a^4*x^2) + (35*b^3*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 +
 b*x^3]])/(8*a^(9/2))
```

Rubi [A] time = 0.323491, antiderivative size = 138, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$\frac{35b^3 \tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{9/2}} - \frac{35b^2\sqrt{ax^2+bx^3}}{8a^4x^2} + \frac{35b\sqrt{ax^2+bx^3}}{12a^3x^3} - \frac{7\sqrt{ax^2+bx^3}}{3a^2x^4} + \frac{2}{ax^2\sqrt{ax^2+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*(a*x^2 + b*x^3)^(3/2)),x]
```

```
[Out] 2/(a*x^2*Sqrt[a*x^2 + b*x^3]) - (7*Sqrt[a*x^2 + b*x^3])/(3*a^2*x^
4) + (35*b*Sqrt[a*x^2 + b*x^3])/(12*a^3*x^3) - (35*b^2*Sqrt[a*x^2
 + b*x^3])/(8*a^4*x^2) + (35*b^3*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 +
 b*x^3]])/(8*a^(9/2))
```

Rubi in Sympy [A] time = 31.8653, size = 129, normalized size = 0.93

$$\frac{2}{ax^2\sqrt{ax^2+bx^3}} - \frac{7\sqrt{ax^2+bx^3}}{3a^2x^4} + \frac{35b\sqrt{ax^2+bx^3}}{12a^3x^3} - \frac{35b^2\sqrt{ax^2+bx^3}}{8a^4x^2} + \frac{35b^3 \operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{8a^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] 2/(a*x**2*sqrt(a*x**2 + b*x**3)) - 7*sqrt(a*x**2 + b*x**3)/(3*a**
2*x**4) + 35*b*sqrt(a*x**2 + b*x**3)/(12*a**3*x**3) - 35*b**2*sqr
t(a*x**2 + b*x**3)/(8*a**4*x**2) + 35*b**3*atanh(sqrt(a)*x/sqrt(a
*x**2 + b*x**3))/(8*a**(9/2))
```

Mathematica [A] time = 0.068429, size = 96, normalized size = 0.7

$$\frac{105b^3x^3\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right) - \sqrt{a}\left(8a^3 - 14a^2bx + 35ab^2x^2 + 105b^3x^3\right)}{24a^{9/2}x^2\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*(a*x^2 + b*x^3)^(3/2)),x]
```

```
[Out] (-(Sqrt[a]*(8*a^3 - 14*a^2*b*x + 35*a*b^2*x^2 + 105*b^3*x^3)) + 1
05*b^3*x^3*Sqrt[a + b*x]*ArcTanh[Sqrt[a + b*x]/Sqrt[a]])/(24*a^(9
/2)*x^2*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.023, size = 86, normalized size = 0.6

$$\frac{bx+a}{24}\left(105\sqrt{bx+a}Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)x^3b^3+14\,a^{5/2}xb-35\,a^{3/2}x^2b^2-105\,b^3x^3\sqrt{a}-8\,a^{7/2}\right)\left(bx^3+ax^2\right)^{-\frac{3}{2}}a^{-\frac{9}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] 1/24*(b*x+a)*(105*(b*x+a)^(1/2)*arctanh((b*x+a)^(1/2)/a^(1/2))*x^
3*b^3+14*a^(5/2)*x*b-35*a^(3/2)*x^2*b^2-105*b^3*x^3*a^(1/2)-8*a^(
7/2))/(b*x^3+a*x^2)^(3/2)/a^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^(3/2)*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.230694, size = 1, normalized size = 0.01

$$\left[\frac{105\left(b^4x^5+ab^3x^4\right)\sqrt{a}\log\left(\frac{\left(bx^2+2\,ax\right)\sqrt{a}+2\,\sqrt{bx^3+ax^2}a}{x^2}\right)-2\left(105\,ab^3x^3+35\,a^2b^2x^2-14\,a^3bx+8\,a^4\right)\sqrt{bx^3+ax^2}}{48\left(a^5bx^5+a^6x^4\right)},\ \frac{105\left(b^4x^5\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^(3/2)*x),x, algorithm="fricas")
```

```
[Out] [1/48*(105*(b^4*x^5 + a*b^3*x^4)*sqrt(a)*log(((b*x^2 + 2*a*x)*sqr
t(a) + 2*sqrt(b*x^3 + a*x^2)*a)/x^2) - 2*(105*a*b^3*x^3 + 35*a^2*
b^2*x^2 - 14*a^3*b*x + 8*a^4)*sqrt(b*x^3 + a*x^2))/(a^5*b*x^5 + a
^6*x^4), 1/24*(105*(b^4*x^5 + a*b^3*x^4)*sqrt(-a)*arctan(a*x/(sqr
t(b*x^3 + a*x^2)*sqrt(-a))) - (105*a*b^3*x^3 + 35*a^2*b^2*x^2 - 1
4*a^3*b*x + 8*a^4)*sqrt(b*x^3 + a*x^2))/(a^5*b*x^5 + a^6*x^4)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(x^2\left(a+bx\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral(1/(x*(x**2*(a + b*x))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^3 + ax^2\right)^{\frac{3}{2}} x} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^(3/2)*x),x, algorithm="giac")

[Out] integrate(1/((b*x^3 + a*x^2)^(3/2)*x), x)
```

3.268 $\int \frac{1}{x^2(ax^2+bx^3)^{3/2}}\,dx$

Optimal. Leaf size=166

$$-\frac{315b^4\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{64a^{11/2}}+\frac{315b^3\sqrt{ax^2+bx^3}}{64a^5x^2}-\frac{105b^2\sqrt{ax^2+bx^3}}{32a^4x^3}+\frac{21b\sqrt{ax^2+bx^3}}{8a^3x^4}-\frac{9\sqrt{ax^2+bx^3}}{4a^2x^5}+\frac{2}{ax^3\sqrt{ax^2+bx^3}}$$

```
[Out] 2/(a*x^3*Sqrt[a*x^2 + b*x^3]) - (9*Sqrt[a*x^2 + b*x^3])/(4*a^2*x^
5) + (21*b*Sqrt[a*x^2 + b*x^3])/(8*a^3*x^4) - (105*b^2*Sqrt[a*x^2
 + b*x^3])/(32*a^4*x^3) + (315*b^3*Sqrt[a*x^2 + b*x^3])/(64*a^5*x
^2) - (315*b^4*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(64*a^(1
1/2))
```

Rubi [A] time = 0.405005, antiderivative size = 166, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$-\frac{315b^4\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{64a^{11/2}}+\frac{315b^3\sqrt{ax^2+bx^3}}{64a^5x^2}-\frac{105b^2\sqrt{ax^2+bx^3}}{32a^4x^3}+\frac{21b\sqrt{ax^2+bx^3}}{8a^3x^4}-\frac{9\sqrt{ax^2+bx^3}}{4a^2x^5}+\frac{2}{ax^3\sqrt{ax^2+bx^3}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*(a*x^2 + b*x^3)^(3/2)),x]
```

```
[Out] 2/(a*x^3*Sqrt[a*x^2 + b*x^3]) - (9*Sqrt[a*x^2 + b*x^3])/(4*a^2*x^
5) + (21*b*Sqrt[a*x^2 + b*x^3])/(8*a^3*x^4) - (105*b^2*Sqrt[a*x^2
 + b*x^3])/(32*a^4*x^3) + (315*b^3*Sqrt[a*x^2 + b*x^3])/(64*a^5*x
^2) - (315*b^4*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^3]])/(64*a^(1
1/2))
```

Rubi in Sympy [A] time = 40.5994, size = 156, normalized size = 0.94

$$\frac{2}{ax^3\sqrt{ax^2+bx^3}}-\frac{9\sqrt{ax^2+bx^3}}{4a^2x^5}+\frac{21b\sqrt{ax^2+bx^3}}{8a^3x^4}-\frac{105b^2\sqrt{ax^2+bx^3}}{32a^4x^3}+\frac{315b^3\sqrt{ax^2+bx^3}}{64a^5x^2}-\frac{315b^4\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^3}}\right)}{64a^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] 2/(a*x**3*sqrt(a*x**2 + b*x**3)) - 9*sqrt(a*x**2 + b*x**3)/(4*a**
2*x**5) + 21*b*sqrt(a*x**2 + b*x**3)/(8*a**3*x**4) - 105*b**2*sqr
t(a*x**2 + b*x**3)/(32*a**4*x**3) + 315*b**3*sqrt(a*x**2 + b*x**3
)/(64*a**5*x**2) - 315*b**4*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**3)
)/(64*a**(11/2))
```

Mathematica [A] time = 0.0766567, size = 106, normalized size = 0.64

$$\frac{\sqrt{a}\left(-16a^4+24a^3bx-42a^2b^2x^2+105ab^3x^3+315b^4x^4\right)-315b^4x^4\sqrt{a+bx}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)}{64a^{11/2}x^3\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*(a*x^2 + b*x^3)^(3/2)),x]
```

```
[Out] (Sqrt[a]*(-16*a^4 + 24*a^3*b*x - 42*a^2*b^2*x^2 + 105*a*b^3*x^3 +
 315*b^4*x^4) - 315*b^4*x^4*Sqrt[a + b*x]*ArcTanh[Sqrt[a + b*x]/S
qrt[a]])/(64*a^(11/2)*x^3*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.025, size = 100, normalized size = 0.6

$$-\frac{bx+a}{64\,x}\left(315\,\sqrt{bx+a}Artanh\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)x^4b^4-24\,a^{7/2}xb+42\,a^{5/2}x^2b^2-105\,a^{3/2}x^3b^3-315\,x^4b^4\sqrt{a}+16\,a^{9/2}\right)\left(bx^3+ax\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^3+a*x^2)^(3/2),x)
```

```
[Out] -1/64*(b*x+a)*(315*(b*x+a)^(1/2)*arctanh((b*x+a)^(1/2)/a^(1/2))*x
^4*b^4-24*a^(7/2)*x*b+42*a^(5/2)*x^2*b^2-105*a^(3/2)*x^3*b^3-315*
x^4*b^4*a^(1/2)+16*a^(9/2))/x/(b*x^3+a*x^2)^(3/2)/a^(11/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^(3/2)*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.232443, size = 1, normalized size = 0.01

$$\left[\frac{315\left(b^5x^6+ab^4x^5\right)\sqrt{a}\log\left(\frac{\left(bx^2+2\,ax\right)\sqrt{a}-2\,\sqrt{bx^3+ax^2}a}{x^2}\right)+2\left(315\,ab^4x^4+105\,a^2b^3x^3-42\,a^3b^2x^2+24\,a^4bx-16\,a^5\right)\sqrt{bx^3+a}}{128\left(a^6bx^6+a^7x^5\right)}\right.$$

$$\left.-\frac{315\left(b^5x^6+ab^4x^5\right)\sqrt{-a}\arctan\left(\frac{ax}{\sqrt{bx^3+ax^2}\sqrt{-a}}\right)-\left(315\,ab^4x^4+105\,a^2b^3x^3-42\,a^3b^2x^2+24\,a^4bx-16\,a^5\right)\sqrt{bx^3+ax^2}}{64\left(a^6bx^6+a^7x^5\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^(3/2)*x^2),x, algorithm="fricas")
```

```
[Out] [1/128*(315*(b^5*x^6 + a*b^4*x^5)*sqrt(a)*log(((b*x^2 + 2*a*x)*sq
rt(a) - 2*sqrt(b*x^3 + a*x^2)*a)/x^2) + 2*(315*a*b^4*x^4 + 105*a^
2*b^3*x^3 - 42*a^3*b^2*x^2 + 24*a^4*b*x - 16*a^5)*sqrt(b*x^3 + a*
x^2))/(a^6*b*x^6 + a^7*x^5), -1/64*(315*(b^5*x^6 + a*b^4*x^5)*sqr
t(-a)*arctan(a*x/(sqrt(b*x^3 + a*x^2)*sqrt(-a))) - (315*a*b^4*x^4
 + 105*a^2*b^3*x^3 - 42*a^3*b^2*x^2 + 24*a^4*b*x - 16*a^5)*sqrt(b
*x^3 + a*x^2))/(a^6*b*x^6 + a^7*x^5)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \left(x^2 \left(a+bx\right)\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**3+a*x**2)**(3/2),x)
```

```
[Out] Integral(1/(x**2*(x**2*(a + b*x))**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^3+ax^2\right)^{\frac{3}{2}} x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^3 + a*x^2)^(3/2)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^3 + a*x^2)^(3/2)*x^2), x)
```

3.269 $\int \frac{x^{7/2}}{\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=125

$$-\frac{5a^3\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax^2+bx^3}}\right)}{8b^{7/2}}+\frac{5a^2\sqrt{ax^2+bx^3}}{8b^3\sqrt{x}}-\frac{5a\sqrt{x}\sqrt{ax^2+bx^3}}{12b^2}+\frac{x^{3/2}\sqrt{ax^2+bx^3}}{3b}$$

```
[Out] (5*a^2*Sqrt[a*x^2 + b*x^3])/(8*b^3*Sqrt[x]) - (5*a*Sqrt[x]*Sqrt[a
*x^2 + b*x^3])/(12*b^2) + (x^(3/2)*Sqrt[a*x^2 + b*x^3])/(3*b) - (
5*a^3*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x^2 + b*x^3]])/(8*b^(7/2))
```

Rubi [A] time = 0.294237, antiderivative size = 125, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$-\frac{5a^3\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax^2+bx^3}}\right)}{8b^{7/2}}+\frac{5a^2\sqrt{ax^2+bx^3}}{8b^3\sqrt{x}}-\frac{5a\sqrt{x}\sqrt{ax^2+bx^3}}{12b^2}+\frac{x^{3/2}\sqrt{ax^2+bx^3}}{3b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(7/2)/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (5*a^2*Sqrt[a*x^2 + b*x^3])/(8*b^3*Sqrt[x]) - (5*a*Sqrt[x]*Sqrt[a
*x^2 + b*x^3])/(12*b^2) + (x^(3/2)*Sqrt[a*x^2 + b*x^3])/(3*b) - (
5*a^3*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x^2 + b*x^3]])/(8*b^(7/2))
```

Rubi in Sympy [A] time = 27.9983, size = 114, normalized size = 0.91

$$-\frac{5a^3\operatorname{atanh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{ax^2+bx^3}}\right)}{8b^{\frac{7}{2}}}+\frac{5a^2\sqrt{ax^2+bx^3}}{8b^3\sqrt{x}}-\frac{5a\sqrt{x}\sqrt{ax^2+bx^3}}{12b^2}+\frac{x^{\frac{3}{2}}\sqrt{ax^2+bx^3}}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(7/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -5*a**3*atanh(sqrt(b)*x**(3/2)/sqrt(a*x**2 + b*x**3))/(8*b**(7/2)
) + 5*a**2*sqrt(a*x**2 + b*x**3)/(8*b**3*sqrt(x)) - 5*a*sqrt(x)*s
qrt(a*x**2 + b*x**3)/(12*b**2) + x**(3/2)*sqrt(a*x**2 + b*x**3)/(
3*b)
```

Mathematica [A] time = 0.0707073, size = 103, normalized size = 0.82

$$\frac{\sqrt{b}x^{3/2}\left(15a^3+5a^2bx-2ab^2x^2+8b^3x^3\right)-15a^3x\sqrt{a+bx}\log\left(\sqrt{b}\sqrt{a+bx}+b\sqrt{x}\right)}{24b^{7/2}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(7/2)/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (Sqrt[b]*x^(3/2)*(15*a^3 + 5*a^2*b*x - 2*a*b^2*x^2 + 8*b^3*x^3) -
 15*a^3*x*Sqrt[a + b*x]*Log[b*Sqrt[x] + Sqrt[b]*Sqrt[a + b*x]])/(
24*b^(7/2)*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.012, size = 103, normalized size = 0.8

$$-\frac{1}{48}\sqrt{x}\left(-16\,b^{9/2}x^{4}+4\,b^{7/2}x^{3}a-10\,b^{5/2}x^{2}a^{2}-30\,b^{3/2}xa^{3}+15\,\ln\left(1/2\,\frac{2\,\sqrt{bx^{2}+ax}\sqrt{b}+2\,bx+a}{\sqrt{b}}\right)\sqrt{x\,(bx+a)}a^{3}b\right)\frac{1}{\sqrt{bx^{3}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(7/2)/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -1/48*x^(1/2)*(-16*b^(9/2)*x^4+4*b^(7/2)*x^3*a-10*b^(5/2)*x^2*a^2
-30*b^(3/2)*x*a^3+15*ln(1/2*(2*(b*x^2+a*x)^(1/2)*b^(1/2)+2*b*x+a)
/b^(1/2))*(x*(b*x+a))^(1/2)*a^3*b)/(b*x^3+a*x^2)^(1/2)/b^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231409, size = 1, normalized size = 0.01

$$\left[\frac{15\,a^{3}\sqrt{b}x\log\left(-\frac{2\,\sqrt{bx^{3}+ax^{2}}b\sqrt{x}-(2\,bx^{2}+ax)\,\sqrt{b}}{x}\right)+2\,\left(8\,b^{3}x^{2}-10\,ab^{2}x+15\,a^{2}b\right)\sqrt{bx^{3}+ax^{2}}\sqrt{x}}{48\,b^{4}x},\ \frac{15\,a^{3}\sqrt{-b}x\arctan\left(\frac{\sqrt{bx^{3}+ax^{2}}\sqrt{-b}}{bx^{\frac{3}{2}}}\right)\cdots}{\cdots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] [1/48*(15*a^3*sqrt(b)*x*log(-(2*sqrt(b*x^3 + a*x^2)*b*sqrt(x) - (
2*b*x^2 + a*x)*sqrt(b))/x) + 2*(8*b^3*x^2 - 10*a*b^2*x + 15*a^2*b
)*sqrt(b*x^3 + a*x^2)*sqrt(x))/(b^4*x), 1/24*(15*a^3*sqrt(-b)*x*a
rctan(sqrt(b*x^3 + a*x^2)*sqrt(-b)/(b*x^(3/2))) + (8*b^3*x^2 - 10
*a*b^2*x + 15*a^2*b)*sqrt(b*x^3 + a*x^2)*sqrt(x))/(b^4*x)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(7/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.226656, size = 86, normalized size = 0.69

$$\frac{1}{24}\sqrt{bx+a}\left(2\,x\left(\frac{4\,x}{b}-\frac{5\,a}{b^{2}}\right)+\frac{15\,a^{2}}{b^{3}}\right)\sqrt{x}+\frac{5\,a^{3}\ln\left(\left|-\sqrt{b}\sqrt{x}+\sqrt{bx+a}\right|\right)}{8\,b^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] 1/24*sqrt(b*x + a)*(2*x*(4*x/b - 5*a/b^2) + 15*a^2/b^3)*sqrt(x) +
 5/8*a^3*ln(abs(-sqrt(b)*sqrt(x) + sqrt(b*x + a)))/b^(7/2)
```

3.270 $\int \frac{x^{5/2}}{\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=95

$$\frac{3a^2\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax^2+bx^3}}\right)}{4b^{5/2}}-\frac{3a\sqrt{ax^2+bx^3}}{4b^2\sqrt{x}}+\frac{\sqrt{x}\sqrt{ax^2+bx^3}}{2b}$$

```
[Out] (-3*a*Sqrt[a*x^2 + b*x^3])/(4*b^2*Sqrt[x]) + (Sqrt[x]*Sqrt[a*x^2
+ b*x^3])/(2*b) + (3*a^2*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x^2 + b
*x^3]])/(4*b^(5/2))
```

Rubi [A] time = 0.219881, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$\frac{3a^2\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax^2+bx^3}}\right)}{4b^{5/2}}-\frac{3a\sqrt{ax^2+bx^3}}{4b^2\sqrt{x}}+\frac{\sqrt{x}\sqrt{ax^2+bx^3}}{2b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(5/2)/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (-3*a*Sqrt[a*x^2 + b*x^3])/(4*b^2*Sqrt[x]) + (Sqrt[x]*Sqrt[a*x^2
+ b*x^3])/(2*b) + (3*a^2*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x^2 + b
*x^3]])/(4*b^(5/2))
```

Rubi in Sympy [A] time = 20.7359, size = 85, normalized size = 0.89

$$\frac{3a^2\operatorname{atanh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{ax^2+bx^3}}\right)}{4b^{\frac{5}{2}}}-\frac{3a\sqrt{ax^2+bx^3}}{4b^2\sqrt{x}}+\frac{\sqrt{x}\sqrt{ax^2+bx^3}}{2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] 3*a**2*atanh(sqrt(b)*x**(3/2)/sqrt(a*x**2 + b*x**3))/(4*b**(5/2))
 - 3*a*sqrt(a*x**2 + b*x**3)/(4*b**2*sqrt(x)) + sqrt(x)*sqrt(a*x*
*2 + b*x**3)/(2*b)
```

Mathematica [A] time = 0.0510325, size = 92, normalized size = 0.97

$$\frac{\sqrt{b}x^{3/2}\left(-3a^2-abx+2b^2x^2\right)+3a^2x\sqrt{a+bx}\log\left(\sqrt{b}\sqrt{a+bx}+b\sqrt{x}\right)}{4b^{5/2}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(5/2)/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (Sqrt[b]*x^(3/2)*(-3*a^2 - a*b*x + 2*b^2*x^2) + 3*a^2*x*Sqrt[a +
b*x]*Log[b*Sqrt[x] + Sqrt[b]*Sqrt[a + b*x]])/(4*b^(5/2)*Sqrt[x^2*
(a + b*x)])
```

Maple [A] time = 0.009, size = 92, normalized size = 1.

$$\frac{1}{8}\sqrt{x}\left(4\,b^{7/2}x^{3}-2\,b^{5/2}x^{2}a-6\,b^{3/2}xa^{2}+3\,\sqrt{x\,(bx+a)}\ln\left(1/2\,\frac{2\,\sqrt{bx^{2}+ax}\sqrt{b}+2\,bx+a}{\sqrt{b}}\right)a^{2}b\right)\frac{1}{\sqrt{bx^{3}+ax^{2}}}b^{-\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] 1/8*x^(1/2)*(4*b^(7/2)*x^3-2*b^(5/2)*x^2*a-6*b^(3/2)*x*a^2+3*(x*(
b*x+a))^(1/2)*ln(1/2*(2*(b*x^2+a*x)^(1/2)*b^(1/2)+2*b*x+a)/b^(1/2
))*a^2*b)/(b*x^3+a*x^2)^(1/2)/b^(7/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.22852, size = 1, normalized size = 0.01

$$\left[\frac{3\,a^{2}\sqrt{b}x\log\left(\frac{2\,\sqrt{bx^{3}+ax^{2}}b\sqrt{x}+\left(2\,bx^{2}+ax\right)\sqrt{b}}{x}\right)+2\,\sqrt{bx^{3}+ax^{2}}\left(2\,b^{2}x-3\,ab\right)\sqrt{x}}{8\,b^{3}x},\right.$$
$$\left.-\frac{3\,a^{2}\sqrt{-b}x\arctan\left(\frac{\sqrt{bx^{3}+ax^{2}}\sqrt{-b}}{bx^{\frac{3}{2}}}\right)-\sqrt{bx^{3}+ax^{2}}\left(2\,b^{2}x-3\,ab\right)\sqrt{x}}{4\,b^{3}x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] [1/8*(3*a^2*sqrt(b)*x*log((2*sqrt(b*x^3 + a*x^2)*b*sqrt(x) + (2*b
*x^2 + a*x)*sqrt(b))/x) + 2*sqrt(b*x^3 + a*x^2)*(2*b^2*x - 3*a*b)
*sqrt(x))/(b^3*x), -1/4*(3*a^2*sqrt(-b)*x*arctan(sqrt(b*x^3 + a*x
^2)*sqrt(-b)/(b*x^(3/2))) - sqrt(b*x^3 + a*x^2)*(2*b^2*x - 3*a*b)
*sqrt(x))/(b^3*x)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^{\frac{5}{2}}}{\sqrt{x^{2}\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**(5/2)/sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [A] time = 0.226209, size = 70, normalized size = 0.74

$$\frac{1}{4}\sqrt{bx+a}\sqrt{x}\left(\frac{2x}{b}-\frac{3a}{b^2}\right)-\frac{3a^2\ln\left(\left|-\sqrt{b}\sqrt{x}+\sqrt{bx+a}\right|\right)}{4b^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] 1/4*sqrt(b*x + a)*sqrt(x)*(2*x/b - 3*a/b^2) - 3/4*a^2*ln(abs(-sqr
t(b)*sqrt(x) + sqrt(b*x + a)))/b^(5/2)
```

3.271 $\int \frac{x^{3/2}}{\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=60

$$\frac{\sqrt{ax^2+bx^3}}{b\sqrt{x}}-\frac{a\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax^2+bx^3}}\right)}{b^{3/2}}$$

```
[Out] Sqrt[a*x^2 + b*x^3]/(b*Sqrt[x]) - (a*ArcTanh[(Sqrt[b]*x^(3/2))/Sq
rt[a*x^2 + b*x^3]])/b^(3/2)
```

Rubi [A] time = 0.144633, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{\sqrt{ax^2+bx^3}}{b\sqrt{x}}-\frac{a\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax^2+bx^3}}\right)}{b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(3/2)/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] Sqrt[a*x^2 + b*x^3]/(b*Sqrt[x]) - (a*ArcTanh[(Sqrt[b]*x^(3/2))/Sq
rt[a*x^2 + b*x^3]])/b^(3/2)
```

Rubi in Sympy [A] time = 14.0691, size = 51, normalized size = 0.85

$$-\frac{a\,\mathrm{atanh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{ax^2+bx^3}}\right)}{b^{\frac{3}{2}}}+\frac{\sqrt{ax^2+bx^3}}{b\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -a*atanh(sqrt(b)*x**(3/2)/sqrt(a*x**2 + b*x**3))/b**(3/2) + sqrt(
a*x**2 + b*x**3)/(b*sqrt(x))
```

Mathematica [A] time = 0.045076, size = 73, normalized size = 1.22

$$\frac{\sqrt{b}x^{3/2}(a+bx)-ax\sqrt{a+bx}\log\left(\sqrt{b}\sqrt{a+bx}+b\sqrt{x}\right)}{b^{3/2}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(3/2)/Sqrt[a*x^2 + b*x^3],x]
```

```
[Out] (Sqrt[b]*x^(3/2)*(a + b*x) - a*x*Sqrt[a + b*x]*Log[b*Sqrt[x] + Sq
rt[b]*Sqrt[a + b*x]])/(b^(3/2)*Sqrt[x^2*(a + b*x)])
```

Maple [A] time = 0.007, size = 78, normalized size = 1.3

$$-\frac{1}{2}\sqrt{x}\left(-2\,b^{5/2}x^2-2\,b^{3/2}xa+a\sqrt{x\,(bx+a)}\ln\left(\frac{1}{2}\left(2\sqrt{bx^2+ax}\sqrt{b}+2\,bx+a\right)\frac{1}{\sqrt{b}}\right)b\right)\frac{1}{\sqrt{bx^3+ax^2}}b^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -1/2*x^(1/2)*(-2*b^(5/2)*x^2-2*b^(3/2)*x*a+a*(x*(b*x+a))^(1/2)*ln
(1/2*(2*(b*x^2+a*x)^(1/2)*b^(1/2)+2*b*x+a)/b^(1/2))*b)/(b*x^3+a*x
^2)^(1/2)/b^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.227414, size = 1, normalized size = 0.02

$$\left[\frac{a\sqrt{b}x\log\left(-\frac{2\sqrt{bx^3+ax^2}b\sqrt{x}-(2\,bx^2+ax)\sqrt{b}}{x}\right)+2\sqrt{bx^3+ax^2}b\sqrt{x}}{2\,b^2x},\ \frac{a\sqrt{-b}x\arctan\left(\frac{\sqrt{bx^3+ax^2}\sqrt{-b}}{bx^{\frac{3}{2}}}\right)+\sqrt{bx^3+ax^2}b\sqrt{x}}{b^2x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] [1/2*(a*sqrt(b)*x*log(-(2*sqrt(b*x^3 + a*x^2)*b*sqrt(x) - (2*b*x^
2 + a*x)*sqrt(b))/x) + 2*sqrt(b*x^3 + a*x^2)*b*sqrt(x))/(b^2*x),
(a*sqrt(-b)*x*arctan(sqrt(b*x^3 + a*x^2)*sqrt(-b)/(b*x^(3/2))) +
sqrt(b*x^3 + a*x^2)*b*sqrt(x))/(b^2*x)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{3}{2}}}{\sqrt{x^2\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**(3/2)/sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [A] time = 0.225756, size = 51, normalized size = 0.85

$$\frac{a\ln\left(\left|-\sqrt{b}\sqrt{x}+\sqrt{bx+a}\right|\right)}{b^{\frac{3}{2}}}+\frac{\sqrt{bx+a}\sqrt{x}}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] a*ln(abs(-sqrt(b)*sqrt(x) + sqrt(b*x + a)))/b^(3/2) + sqrt(b*x +
a)*sqrt(x)/b
```

3.272 $\int \frac{\sqrt{x}}{\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=34

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{b}}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x^2 + b*x^3]])/Sqrt[b]
```

Rubi [A] time = 0.0773505, antiderivative size = 34, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x]/Sqrt[a*x^2 + b*x^3],x]

[Out] (2*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a*x^2 + b*x^3]])/Sqrt[b]
```

Rubi in Sympy [A] time = 8.40381, size = 31, normalized size = 0.91

$$\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{b}x^{\frac{3}{2}}}{\sqrt{ax^2+bx^3}}\right)}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(1/2)/(b*x**3+a*x**2)**(1/2),x)

[Out] 2*atanh(sqrt(b)*x**(3/2)/sqrt(a*x**2 + b*x**3))/sqrt(b)
```

Mathematica [A] time = 0.0224151, size = 54, normalized size = 1.59

$$\frac{2x\sqrt{a+bx}\log\left(\sqrt{b}\sqrt{a+bx}+b\sqrt{x}\right)}{\sqrt{b}\sqrt{x^2(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x]/Sqrt[a*x^2 + b*x^3],x]

[Out] (2*x*Sqrt[a + b*x]*Log[b*Sqrt[x] + Sqrt[b]*Sqrt[a + b*x]])/(Sqrt[
b]*Sqrt[x^2*(a + b*x)])
```

Maple [B] time = 0.008, size = 58, normalized size = 1.7

$$1\sqrt{x}\sqrt{x\,(bx+a)}\ln\left(\frac{1}{2}\left(2\sqrt{bx^2+ax}\sqrt{b}+2\,bx+a\right)\frac{1}{\sqrt{b}}\right)\frac{1}{\sqrt{bx^3+ax^2}}\frac{1}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1/2)/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] 1/(b*x^3+a*x^2)^(1/2)*x^(1/2)*(x*(b*x+a))^(1/2)*ln(1/2*(2*(b*x^2+
a*x)^(1/2)*b^(1/2)+2*b*x+a)/b^(1/2))/b^(1/2)
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(b*x^3 + a*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A]   time = 0.225469, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(\frac{2\sqrt{bx^3+ax^2}b\sqrt{x}+(2bx^2+ax)\sqrt{b}}{x}\right)}{\sqrt{b}}, -\frac{2\sqrt{-b}\arctan\left(\frac{\sqrt{bx^3+ax^2}\sqrt{-b}}{bx^{\frac{3}{2}}}\right)}{b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(b*x^3 + a*x^2),x, algorithm="fricas")
```

```
[Out] [log((2*sqrt(b*x^3 + a*x^2)*b*sqrt(x) + (2*b*x^2 + a*x)*sqrt(b))/
x)/sqrt(b), -2*sqrt(-b)*arctan(sqrt(b*x^3 + a*x^2)*sqrt(-b)/(b*x^
(3/2)))/b]
```

Sympy [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x}}{\sqrt{x^2(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(1/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(sqrt(x)/sqrt(x**2*(a + b*x)), x)
```

GIAC/XCAS [A]   time = 0.223977, size = 31, normalized size = 0.91

$$-\frac{2\ln\left(\left|-\sqrt{b}\sqrt{x}+\sqrt{bx+a}\right|\right)}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(b*x^3 + a*x^2),x, algorithm="giac")
```

```
[Out] -2*ln(abs(-sqrt(b)*sqrt(x) + sqrt(b*x + a)))/sqrt(b)
```

3.273 $\int \frac{1}{\sqrt{x}\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=25

$$-\frac{2\sqrt{ax^2+bx^3}}{ax^{3/2}}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^3])/(a*x^(3/2))
```

Rubi [A] time = 0.0660682, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048

$$-\frac{2\sqrt{ax^2+bx^3}}{ax^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[x]*Sqrt[a*x^2 + b*x^3]),x]

[Out] (-2*Sqrt[a*x^2 + b*x^3])/(a*x^(3/2))
```

Rubi in Sympy [A] time = 7.31027, size = 22, normalized size = 0.88

$$-\frac{2\sqrt{ax^2+bx^3}}{ax^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(1/2)/(b*x**3+a*x**2)**(1/2),x)

[Out] -2*sqrt(a*x**2 + b*x**3)/(a*x**(3/2))
```

Mathematica [A] time = 0.022267, size = 23, normalized size = 0.92

$$-\frac{2\sqrt{x^2(a+bx)}}{ax^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(Sqrt[x]*Sqrt[a*x^2 + b*x^3]),x]

[Out] (-2*Sqrt[x^2*(a + b*x)])/(a*x^(3/2))
```

Maple [A] time = 0.006, size = 27, normalized size = 1.1

$$-2\,\frac{\sqrt{x}\,(bx+a)}{a\sqrt{bx^3+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(1/2)/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2*x^(1/2)*(b*x+a)/a/(b*x^3+a*x^2)^(1/2)
```

Maxima [A] time = 1.42923, size = 20, normalized size = 0.8

$$-\frac{2\sqrt{bx+a}}{a\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*sqrt(x)),x, algorithm="maxima")
```

```
[Out] -2*sqrt(b*x + a)/(a*sqrt(x))
```

Fricas [A] time = 0.227814, size = 28, normalized size = 1.12

$$-\frac{2\sqrt{bx^3+ax^2}}{ax^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*sqrt(x)),x, algorithm="fricas")
```

```
[Out] -2*sqrt(b*x^3 + a*x^2)/(a*x^(3/2))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x}\sqrt{x^2\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(1/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(sqrt(x)*sqrt(x**2*(a + b*x))), x)
```

GIAC/XCAS [A] time = 0.219929, size = 41, normalized size = 1.64

$$\frac{4\sqrt{b}}{\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^2-a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*sqrt(x)),x, algorithm="giac")
```

```
[Out] 4*sqrt(b)/((sqrt(b)*sqrt(x) - sqrt(b*x + a))^2 - a)
```

3.274 $\int \frac{1}{x^{3/2}\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=56

$$\frac{4b\sqrt{ax^2+bx^3}}{3a^2x^{3/2}}-\frac{2\sqrt{ax^2+bx^3}}{3ax^{5/2}}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^3])/(3*a*x^(5/2)) + (4*b*Sqrt[a*x^2 + b*x^3]
)/(3*a^2*x^(3/2))
```

Rubi [A] time = 0.132949, antiderivative size = 56, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{4b\sqrt{ax^2+bx^3}}{3a^2x^{3/2}}-\frac{2\sqrt{ax^2+bx^3}}{3ax^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(3/2)*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (-2*Sqrt[a*x^2 + b*x^3])/(3*a*x^(5/2)) + (4*b*Sqrt[a*x^2 + b*x^3]
)/(3*a^2*x^(3/2))
```

Rubi in Sympy [A] time = 12.7822, size = 49, normalized size = 0.88

$$-\frac{2\sqrt{ax^2+bx^3}}{3ax^{\frac{5}{2}}}+\frac{4b\sqrt{ax^2+bx^3}}{3a^2x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(3/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**2 + b*x**3)/(3*a*x**(5/2)) + 4*b*sqrt(a*x**2 + b*x**
3)/(3*a**2*x**(3/2))
```

Mathematica [A] time = 0.0319001, size = 31, normalized size = 0.55

$$-\frac{2(a-2bx)\sqrt{x^2(a+bx)}}{3a^2x^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(3/2)*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (-2*(a - 2*b*x)*Sqrt[x^2*(a + b*x)])/(3*a^2*x^(5/2))
```

Maple [A] time = 0.007, size = 33, normalized size = 0.6

$$-\frac{(2\,bx+2\,a)\,(-2\,bx+a)}{3\,a^2}\frac{1}{\sqrt{x}}\frac{1}{\sqrt{bx^3+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(3/2)/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2/3*(b*x+a)*(-2*b*x+a)/x^(1/2)/a^2/(b*x^3+a*x^2)^(1/2)
```

Maxima [A] time = 1.42852, size = 42, normalized size = 0.75

$$\frac{2\left(\frac{3\sqrt{bx+a}b}{\sqrt{x}}-\frac{(bx+a)^{\frac{3}{2}}}{x^{\frac{3}{2}}}\right)}{3a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^(3/2)),x, algorithm="maxima")
```

```
[Out] 2/3*(3*sqrt(b*x + a)*b/sqrt(x) - (b*x + a)^(3/2)/x^(3/2))/a^2
```

Fricas [A] time = 0.2192, size = 39, normalized size = 0.7

$$\frac{2\sqrt{bx^3+ax^2}(2bx-a)}{3a^2x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^(3/2)),x, algorithm="fricas")
```

```
[Out] 2/3*sqrt(b*x^3 + a*x^2)*(2*b*x - a)/(a^2*x^(5/2))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^{\frac{3}{2}}\sqrt{x^2(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(3/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**(3/2)*sqrt(x**2*(a + b*x))), x)
```

GIAC/XCAS [A] time = 0.226319, size = 74, normalized size = 1.32

$$\frac{8\left(3\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^2-a\right)b^{\frac{3}{2}}}{3\left(\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^2-a\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^3 + a*x^2)*x^(3/2)),x, algorithm="giac")
```

```
[Out] 8/3*(3*(sqrt(b)*sqrt(x) - sqrt(b*x + a))^2 - a)*b^(3/2)/((sqrt(b)
*sqrt(x) - sqrt(b*x + a))^2 - a)^3
```

3.275 $\int \frac{1}{x^{5/2}\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=86

$$-\frac{16b^2\sqrt{ax^2+bx^3}}{15a^3x^{3/2}}+\frac{8b\sqrt{ax^2+bx^3}}{15a^2x^{5/2}}-\frac{2\sqrt{ax^2+bx^3}}{5ax^{7/2}}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^3])/(5*a*x^(7/2)) + (8*b*Sqrt[a*x^2 + b*x^3]
)/(15*a^2*x^(5/2)) - (16*b^2*Sqrt[a*x^2 + b*x^3])/(15*a^3*x^(3/2)
)
```

Rubi [A] time = 0.200527, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$-\frac{16b^2\sqrt{ax^2+bx^3}}{15a^3x^{3/2}}+\frac{8b\sqrt{ax^2+bx^3}}{15a^2x^{5/2}}-\frac{2\sqrt{ax^2+bx^3}}{5ax^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(5/2)*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (-2*Sqrt[a*x^2 + b*x^3])/(5*a*x^(7/2)) + (8*b*Sqrt[a*x^2 + b*x^3]
)/(15*a^2*x^(5/2)) - (16*b^2*Sqrt[a*x^2 + b*x^3])/(15*a^3*x^(3/2)
)
```

Rubi in Sympy [A] time = 19.1327, size = 78, normalized size = 0.91

$$-\frac{2\sqrt{ax^2+bx^3}}{5ax^{\frac{7}{2}}}+\frac{8b\sqrt{ax^2+bx^3}}{15a^2x^{\frac{5}{2}}}-\frac{16b^2\sqrt{ax^2+bx^3}}{15a^3x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(5/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**2 + b*x**3)/(5*a*x**(7/2)) + 8*b*sqrt(a*x**2 + b*x**
3)/(15*a**2*x**(5/2)) - 16*b**2*sqrt(a*x**2 + b*x**3)/(15*a**3*x*
*(3/2))
```

Mathematica [A] time = 0.0345092, size = 44, normalized size = 0.51

$$-\frac{2\sqrt{x^2(a+bx)}\left(3a^2-4abx+8b^2x^2\right)}{15a^3x^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(5/2)*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (-2*Sqrt[x^2*(a + b*x)]*(3*a^2 - 4*a*b*x + 8*b^2*x^2))/(15*a^3*x^
(7/2))
```

Maple [A] time = 0.007, size = 46, normalized size = 0.5

$$-\frac{(2\,bx+2\,a)\left(8\,b^2x^2-4\,abx+3\,a^2\right)}{15\,a^3}x^{-\frac{3}{2}}\frac{1}{\sqrt{bx^3+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^(5/2)/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2/15*(b*x+a)*(8*b^2*x^2-4*a*b*x+3*a^2)/x^(3/2)/a^3/(b*x^3+a*x^2)
^(1/2)
```

Maxima [A] time = 1.41875, size = 62, normalized size = 0.72

$$-\frac{2\left(\frac{15\sqrt{bx+a}b^2}{\sqrt{x}}-\frac{10(bx+a)^{\frac{3}{2}}b}{x^{\frac{3}{2}}}+\frac{3(bx+a)^{\frac{5}{2}}}{x^{\frac{5}{2}}}\right)}{15a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^3 + a*x^2)*x^(5/2)),x, algorithm="maxima")
```

```
[Out] -2/15*(15*sqrt(b*x + a)*b^2/sqrt(x) - 10*(b*x + a)^(3/2)*b/x^(3/2
) + 3*(b*x + a)^(5/2)/x^(5/2))/a^3
```

Fricas [A] time = 0.215156, size = 54, normalized size = 0.63

$$-\frac{2\left(8b^2x^2-4abx+3a^2\right)\sqrt{bx^3+ax^2}}{15a^3x^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^3 + a*x^2)*x^(5/2)),x, algorithm="fricas")
```

```
[Out] -2/15*(8*b^2*x^2 - 4*a*b*x + 3*a^2)*sqrt(b*x^3 + a*x^2)/(a^3*x^(7
/2))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^{\frac{5}{2}}\sqrt{x^2(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x**(5/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**(5/2)*sqrt(x**2*(a + b*x))), x)
```

GIAC/XCAS [A] time = 0.224477, size = 104, normalized size = 1.21

$$\frac{32\left(10\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^4-5a\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^2+a^2\right)b^{\frac{5}{2}}}{15\left(\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^2-a\right)^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^3 + a*x^2)*x^(5/2)),x, algorithm="giac")
```

```
[Out] 32/15*(10*(sqrt(b)*sqrt(x) - sqrt(b*x + a))^4 - 5*a*(sqrt(b)*sqrt
(x) - sqrt(b*x + a))^2 + a^2)*b^(5/2)/((sqrt(b)*sqrt(x) - sqrt(b*
x + a))^2 - a)^5
```

3.276 $\int \frac{1}{x^{7/2}\sqrt{ax^2+bx^3}}\,dx$

Optimal. Leaf size=116

$$\frac{32b^3\sqrt{ax^2+bx^3}}{35a^4x^{3/2}}-\frac{16b^2\sqrt{ax^2+bx^3}}{35a^3x^{5/2}}+\frac{12b\sqrt{ax^2+bx^3}}{35a^2x^{7/2}}-\frac{2\sqrt{ax^2+bx^3}}{7ax^{9/2}}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^3])/(7*a*x^(9/2)) + (12*b*Sqrt[a*x^2 + b*x^3
])/(35*a^2*x^(7/2)) - (16*b^2*Sqrt[a*x^2 + b*x^3])/(35*a^3*x^(5/2
)) + (32*b^3*Sqrt[a*x^2 + b*x^3])/(35*a^4*x^(3/2))
```

Rubi [A] time = 0.27566, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{32b^3\sqrt{ax^2+bx^3}}{35a^4x^{3/2}}-\frac{16b^2\sqrt{ax^2+bx^3}}{35a^3x^{5/2}}+\frac{12b\sqrt{ax^2+bx^3}}{35a^2x^{7/2}}-\frac{2\sqrt{ax^2+bx^3}}{7ax^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(7/2)*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (-2*Sqrt[a*x^2 + b*x^3])/(7*a*x^(9/2)) + (12*b*Sqrt[a*x^2 + b*x^3
])/(35*a^2*x^(7/2)) - (16*b^2*Sqrt[a*x^2 + b*x^3])/(35*a^3*x^(5/2
)) + (32*b^3*Sqrt[a*x^2 + b*x^3])/(35*a^4*x^(3/2))
```

Rubi in Sympy [A] time = 26.1991, size = 107, normalized size = 0.92

$$-\frac{2\sqrt{ax^2+bx^3}}{7ax^{\frac{9}{2}}}+\frac{12b\sqrt{ax^2+bx^3}}{35a^2x^{\frac{7}{2}}}-\frac{16b^2\sqrt{ax^2+bx^3}}{35a^3x^{\frac{5}{2}}}+\frac{32b^3\sqrt{ax^2+bx^3}}{35a^4x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(7/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**2 + b*x**3)/(7*a*x**(9/2)) + 12*b*sqrt(a*x**2 + b*x*
*3)/(35*a**2*x**(7/2)) - 16*b**2*sqrt(a*x**2 + b*x**3)/(35*a**3*x
**(5/2)) + 32*b**3*sqrt(a*x**2 + b*x**3)/(35*a**4*x**(3/2))
```

Mathematica [A] time = 0.0399614, size = 55, normalized size = 0.47

$$\frac{2\sqrt{x^2(a+bx)}\left(-5a^3+6a^2bx-8ab^2x^2+16b^3x^3\right)}{35a^4x^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(7/2)*Sqrt[a*x^2 + b*x^3]),x]
```

```
[Out] (2*Sqrt[x^2*(a + b*x)]*(-5*a^3 + 6*a^2*b*x - 8*a*b^2*x^2 + 16*b^3
*x^3))/(35*a^4*x^(9/2))
```

Maple [A] time = 0.007, size = 57, normalized size = 0.5

$$-\frac{(2\,bx+2\,a)\left(-16\,b^3x^3+8\,ab^2x^2-6\,bxa^2+5\,a^3\right)}{35\,a^4}x^{-\frac{5}{2}}\frac{1}{\sqrt{bx^3+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^(7/2)/(b*x^3+a*x^2)^(1/2),x)
```

```
[Out] -2/35*(b*x+a)*(-16*b^3*x^3+8*a*b^2*x^2-6*a^2*b*x+5*a^3)/x^(5/2)/a
^4/(b*x^3+a*x^2)^(1/2)
```

Maxima [A] time = 1.4258, size = 82, normalized size = 0.71

$$\frac{2\left(\frac{35\sqrt{bx+a}b^3}{\sqrt{x}}-\frac{35\,(bx+a)^{\frac{3}{2}}b^2}{x^{\frac{3}{2}}}+\frac{21\,(bx+a)^{\frac{5}{2}}b}{x^{\frac{5}{2}}}-\frac{5\,(bx+a)^{\frac{7}{2}}}{x^{\frac{7}{2}}}\right)}{35\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^3 + a*x^2)*x^(7/2)),x, algorithm="maxima")
```

```
[Out] 2/35*(35*sqrt(b*x + a)*b^3/sqrt(x) - 35*(b*x + a)^(3/2)*b^2/x^(3/
2) + 21*(b*x + a)^(5/2)*b/x^(5/2) - 5*(b*x + a)^(7/2)/x^(7/2))/a^
4
```

Fricas [A] time = 0.215173, size = 69, normalized size = 0.59

$$\frac{2\left(16\,b^3x^3-8\,ab^2x^2+6\,a^2bx-5\,a^3\right)\sqrt{bx^3+ax^2}}{35\,a^4x^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^3 + a*x^2)*x^(7/2)),x, algorithm="fricas")
```

```
[Out] 2/35*(16*b^3*x^3 - 8*a*b^2*x^2 + 6*a^2*b*x - 5*a^3)*sqrt(b*x^3 +
a*x^2)/(a^4*x^(9/2))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^{\frac{7}{2}}\sqrt{x^2\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x**(7/2)/(b*x**3+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**(7/2)*sqrt(x**2*(a + b*x))), x)
```

GIAC/XCAS [A] time = 0.227214, size = 139, normalized size = 1.2

$$\frac{64\left(35\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^6-21\,a\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^4+7\,a^2\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^2-a^3\right)b^{\frac{7}{2}}}{35\left(\left(\sqrt{b}\sqrt{x}-\sqrt{bx+a}\right)^2-a\right)^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^3 + a*x^2)*x^(7/2)),x, algorithm="giac")
```

```
[Out] 64/35*(35*(sqrt(b)*sqrt(x) - sqrt(b*x + a))^6 - 21*a*(sqrt(b)*sqr
t(x) - sqrt(b*x + a))^4 + 7*a^2*(sqrt(b)*sqrt(x) - sqrt(b*x + a))
^2 - a^3)*b^(7/2)/((sqrt(b)*sqrt(x) - sqrt(b*x + a))^2 - a)^7
```

3.277 $\int x^{1-3n} \left(ax^2+bx^3\right)^n \, dx$

Optimal. Leaf size=61

$$\frac{x^{2-3n} \left(\frac{bx}{a}+1\right)^{-n} \left(ax^2+bx^3\right)^n {}_2F_1\left(2-n,-n;3-n;-\frac{bx}{a}\right)}{2-n}$$

```
[Out] (x^(2 - 3*n)*(a*x^2 + b*x^3)^n*Hypergeometric2F1[2 - n, -n, 3 - n
, -((b*x)/a)])/((2 - n)*(1 + (b*x)/a)^n)
```

Rubi [A] time = 0.0843174, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{x^{2-3n} \left(\frac{bx}{a}+1\right)^{-n} \left(ax^2+bx^3\right)^n {}_2F_1\left(2-n,-n;3-n;-\frac{bx}{a}\right)}{2-n}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(1 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] (x^(2 - 3*n)*(a*x^2 + b*x^3)^n*Hypergeometric2F1[2 - n, -n, 3 - n
, -((b*x)/a)])/((2 - n)*(1 + (b*x)/a)^n)
```

Rubi in Sympy [A] time = 13.914, size = 46, normalized size = 0.75

$$\frac{x^{-2n} x^{-n+2} \left(1+\frac{bx}{a}\right)^{-n} \left(ax^2+bx^3\right)^n {}_2F_1\left(\begin{matrix} -n,-n+2 \\ -n+3 \end{matrix}\middle| -\frac{bx}{a}\right)}{-n+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(1-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] x**(-2*n)*x**(-n + 2)*(1 + b*x/a)**(-n)*(a*x**2 + b*x**3)**n*hype
r((-n, -n + 2), (-n + 3,), -b*x/a)/(-n + 2)
```

Mathematica [A] time = 0.0433721, size = 58, normalized size = 0.95

$$-\frac{x^{2-3n} \left(x^2(a+bx)\right)^n \left(\frac{bx}{a}+1\right)^{-n} {}_2F_1\left(2-n,-n;3-n;-\frac{bx}{a}\right)}{n-2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(1 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -((x^(2 - 3*n)*(x^2*(a + b*x))^n*Hypergeometric2F1[2 - n, -n, 3 -
 n, -((b*x)/a)])/((-2 + n)*(1 + (b*x)/a)^n))
```

Maple [F] time = 0.12, size = 0, normalized size = 0.

$$\int x^{1-3n} \left(bx^3+ax^2\right)^n \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1-3*n)*(b*x^3+a*x^2)^n,x)
```

```
[Out] int(x^(1-3*n)*(b*x^3+a*x^2)^n,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax^2\right)^n x^{-3\,n+1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n + 1),x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n + 1), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(bx^3 + ax^2\right)^n x^{-3\,n+1}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n + 1),x, algorithm="fricas")
```

```
[Out] integral((b*x^3 + a*x^2)^n*x^(-3*n + 1), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^{-3n+1} \left(x^2 \left(a + bx\right)\right)^n\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(1-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] Integral(x**(-3*n + 1)*(x**2*(a + b*x))**n, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax^2\right)^n x^{-3\,n+1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n + 1),x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n + 1), x)
```

3.278 $\int x^{-3n} \left(ax^2+bx^3\right)^n \, dx$

Optimal. Leaf size=48

$$\frac{x^{-3n-1} \left(ax^2+bx^3\right)^{n+1} {}_2F_1\left(1,2;2-n;-\frac{bx}{a}\right)}{a(1-n)}$$

```
[Out] (x^(-1 - 3*n)*(a*x^2 + b*x^3)^(1 + n)*Hypergeometric2F1[1, 2, 2 -
 n, -((b*x)/a)])/(a*(1 - n))
```

Rubi [A] time = 0.0806328, antiderivative size = 61, normalized size of antiderivative = 1.27, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{x^{1-3n} \left(\frac{bx}{a}+1\right)^{-n} \left(ax^2+bx^3\right)^n {}_2F_1\left(1-n,-n;2-n;-\frac{bx}{a}\right)}{1-n}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^3)^n/x^(3*n),x]
```

```
[Out] (x^(1 - 3*n)*(a*x^2 + b*x^3)^n*Hypergeometric2F1[1 - n, -n, 2 - n
, -((b*x)/a)])/((1 - n)*(1 + (b*x)/a)^n)
```

Rubi in Sympy [A] time = 13.4949, size = 46, normalized size = 0.96

$$\frac{x^{-2n} x^{-n+1} \left(1+\frac{bx}{a}\right)^{-n} \left(ax^2+bx^3\right)^n {}_2F_1\left(\begin{matrix} -n,-n+1 \\ -n+2 \end{matrix}\middle| -\frac{bx}{a}\right)}{-n+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**3+a*x**2)**n/(x**(3*n)),x)
```

```
[Out] x**(-2*n)*x**(-n + 1)*(1 + b*x/a)**(-n)*(a*x**2 + b*x**3)**n*hype
r((-n, -n + 1), (-n + 2,), -b*x/a)/(-n + 1)
```

Mathematica [A] time = 0.0310566, size = 58, normalized size = 1.21

$$-\frac{x^{1-3n} \left(x^2(a+bx)\right)^n \left(\frac{bx}{a}+1\right)^{-n} {}_2F_1\left(1-n,-n;2-n;-\frac{bx}{a}\right)}{n-1}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^3)^n/x^(3*n),x]
```

```
[Out] -((x^(1 - 3*n)*(x^2*(a + b*x))^n*Hypergeometric2F1[1 - n, -n, 2 -
 n, -((b*x)/a)])/((-1 + n)*(1 + (b*x)/a)^n))
```

Maple [F] time = 0.093, size = 0, normalized size = 0.

$$\int \frac{\left(bx^3+ax^2\right)^n}{x^{3\,n}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^3+a*x^2)^n/(x^(3*n)),x)
```

```
[Out] int((b*x^3+a*x^2)^n/(x^(3*n)),x)
```

Maxima [F]   time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3+ax^2\right)^n x^{-3\,n}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n/x^(3*n),x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n), x)
```

Fricas [F]   time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(bx^3+ax^2\right)^n}{x^{3\,n}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n/x^(3*n),x, algorithm="fricas")
```

```
[Out] integral((b*x^3 + a*x^2)^n/x^(3*n), x)
```

Sympy [F]   time = 0., size = 0, normalized size = 0.

$$\int x^{-3n}\left(x^2\left(a+bx\right)\right)^n\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**3+a*x**2)**n/(x**(3*n)),x)
```

```
[Out] Integral(x**(-3*n)*(x**2*(a + b*x))**n, x)
```

GIAC/XCAS [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(bx^3+ax^2\right)^n}{x^{3\,n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n/x^(3*n),x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x^2)^n/x^(3*n), x)
```

3.279 $\int x^{-1-3n} \left(ax^2+bx^3\right)^n \, dx$

Optimal. Leaf size=54

$$-\frac{x^{-3n} \left(\frac{bx}{a}+1\right)^{-n} \left(ax^2+bx^3\right)^n {}_2F_1\left(-n,-n;1-n;-\frac{bx}{a}\right)}{n}$$

```
[Out] -(((a*x^2 + b*x^3)^n*Hypergeometric2F1[-n, -n, 1 - n, -((b*x)/a)]
)/(n*x^(3*n)*(1 + (b*x)/a)^n))
```

Rubi [A] time = 0.0807893, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$-\frac{x^{-3n} \left(\frac{bx}{a}+1\right)^{-n} \left(ax^2+bx^3\right)^n {}_2F_1\left(-n,-n;1-n;-\frac{bx}{a}\right)}{n}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -(((a*x^2 + b*x^3)^n*Hypergeometric2F1[-n, -n, 1 - n, -((b*x)/a)]
)/(n*x^(3*n)*(1 + (b*x)/a)^n))
```

Rubi in Sympy [A] time = 13.2475, size = 41, normalized size = 0.76

$$-\frac{x^{-3n} \left(1+\frac{bx}{a}\right)^{-n} \left(ax^2+bx^3\right)^n {}_2F_1\left(\begin{matrix} -n,-n \\ -n+1 \end{matrix}\middle| -\frac{bx}{a}\right)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] -x**(-3*n)*(1 + b*x/a)**(-n)*(a*x**2 + b*x**3)**n*hyper((-n, -n),
 (-n + 1,), -b*x/a)/n
```

Mathematica [A] time = 0.0298013, size = 52, normalized size = 0.96

$$-\frac{x^{-3n} \left(x^2(a+bx)\right)^n \left(\frac{bx}{a}+1\right)^{-n} {}_2F_1\left(-n,-n;1-n;-\frac{bx}{a}\right)}{n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -(((x^2*(a + b*x))^n*Hypergeometric2F1[-n, -n, 1 - n, -((b*x)/a)]
)/(n*x^(3*n)*(1 + (b*x)/a)^n))
```

Maple [F] time = 0.081, size = 0, normalized size = 0.

$$\int x^{-1-3\,n} \left(bx^3+ax^2\right)^n \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1-3*n)*(b*x^3+a*x^2)^n,x)
```

```
[Out] int(x^(-1-3*n)*(b*x^3+a*x^2)^n,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax^2\right)^n x^{-3\,n-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 1),x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n - 1), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(bx^3 + ax^2\right)^n x^{-3\,n-1}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 1),x, algorithm="fricas")
```

```
[Out] integral((b*x^3 + a*x^2)^n*x^(-3*n - 1), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax^2\right)^n x^{-3\,n-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 1),x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n - 1), x)
```

3.280 $\int x^{-2-3n} \left(ax^2 + bx^3\right)^n \, dx$

Optimal. Leaf size=32

$$-\frac{x^{-3(n+1)} \left(ax^2 + bx^3\right)^{n+1}}{a(n + 1)}$$

```
[Out] -((a*x^2 + b*x^3)^(1 + n)/(a*(1 + n)*x^(3*(1 + n))))
```

Rubi [A] time = 0.0475127, antiderivative size = 32, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048

$$-\frac{x^{-3(n+1)} \left(ax^2 + bx^3\right)^{n+1}}{a(n + 1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-2 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -((a*x^2 + b*x^3)^(1 + n)/(a*(1 + n)*x^(3*(1 + n))))
```

Rubi in Sympy [A] time = 8.28362, size = 27, normalized size = 0.84

$$-\frac{x^{-3n-3} \left(ax^2 + bx^3\right)^{n+1}}{a\,(n + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-2-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] -x**(-3*n - 3)*(a*x**2 + b*x**3)**(n + 1)/(a*(n + 1))
```

Mathematica [A] time = 0.0405953, size = 30, normalized size = 0.94

$$-\frac{x^{-3(n+1)} \left(x^2(a + bx)\right)^{n+1}}{a(n + 1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-2 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -((x^2*(a + b*x))^(1 + n)/(a*(1 + n)*x^(3*(1 + n))))
```

Maple [A] time = 0.005, size = 36, normalized size = 1.1

$$-\frac{x^{-1-3\,n} \left(bx + a\right) \left(bx^3 + ax^2\right)^n}{a\,(1 + n)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-2-3*n)*(b*x^3+a*x^2)^n,x)
```

```
[Out] -x^(-1-3*n)*(b*x+a)/a/(1+n)*(b*x^3+a*x^2)^n
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax^2\right)^n x^{-3n-2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 2),x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n - 2), x)
```

Fricas [A] time = 0.246111, size = 51, normalized size = 1.59

$$-\frac{\left(bx^2 + ax\right)\left(bx^3 + ax^2\right)^n x^{-3n-2}}{an + a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 2),x, algorithm="fricas")
```

```
[Out] -(b*x^2 + a*x)*(b*x^3 + a*x^2)^n*x^(-3*n - 2)/(a*n + a)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-2-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax^2\right)^n x^{-3n-2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 2),x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n - 2), x)
```

3.281 $\int x^{-3-3n}\left(ax^2+bx^3\right)^n\,dx$

Optimal. Leaf size=70

$$\frac{bx^{-3(n+1)}\left(ax^2+bx^3\right)^{n+1}}{a^2(n+1)(n+2)}-\frac{x^{-3n-4}\left(ax^2+bx^3\right)^{n+1}}{a(n+2)}$$

```
[Out] -((x^(-4 - 3*n)*(a*x^2 + b*x^3)^(1 + n))/(a*(2 + n))) + (b*(a*x^2
 + b*x^3)^(1 + n))/(a^2*(1 + n)*(2 + n)*x^(3*(1 + n)))
```

Rubi [A] time = 0.107746, antiderivative size = 70, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{bx^{-3(n+1)}\left(ax^2+bx^3\right)^{n+1}}{a^2(n+1)(n+2)}-\frac{x^{-3n-4}\left(ax^2+bx^3\right)^{n+1}}{a(n+2)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-3 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -((x^(-4 - 3*n)*(a*x^2 + b*x^3)^(1 + n))/(a*(2 + n))) + (b*(a*x^2
 + b*x^3)^(1 + n))/(a^2*(1 + n)*(2 + n)*x^(3*(1 + n)))
```

Rubi in Sympy [A] time = 16.9052, size = 60, normalized size = 0.86

$$-\frac{x^{-3n-4}\left(ax^2+bx^3\right)^{n+1}}{a\left(n+2\right)}+\frac{bx^{-3n-3}\left(ax^2+bx^3\right)^{n+1}}{a^2\left(n+1\right)\left(n+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-3-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] -x**(-3*n - 4)*(a*x**2 + b*x**3)**(n + 1)/(a*(n + 2)) + b*x**(-3*
n - 3)*(a*x**2 + b*x**3)**(n + 1)/(a**2*(n + 1)*(n + 2))
```

Mathematica [C] time = 0.0441535, size = 58, normalized size = 0.83

$$-\frac{x^{-3n-2}\left(x^2(a+bx)\right)^n\left(\frac{bx}{a}+1\right)^{-n}{}_2F_1\left(-n-2,-n;-n-1;-\frac{bx}{a}\right)}{n+2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-3 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -((x^(-2 - 3*n)*(x^2*(a + b*x))^n*Hypergeometric2F1[-2 - n, -n, -
1 - n, -((b*x)/a)])/((2 + n)*(1 + (b*x)/a)^n))
```

Maple [A] time = 0.006, size = 50, normalized size = 0.7

$$-\frac{x^{-2-3\,n}\left(bx^3+ax^2\right)^n\left(an-bx+a\right)\left(bx+a\right)}{\left(2+n\right)\left(1+n\right)a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-3-3*n)*(b*x^3+a*x^2)^n,x)
```

```
[Out] -(b*x^3+a*x^2)^n*x^(-2-3*n)*(a*n-b*x+a)*(b*x+a)/(2+n)/(1+n)/a^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax^2\right)^n x^{-3n-3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 3),x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n - 3), x)
```

Fricas [A] time = 0.237836, size = 95, normalized size = 1.36

$$-\frac{\left(abnx^2 - b^2x^3 + \left(a^2n + a^2\right)x\right)\left(bx^3 + ax^2\right)^n x^{-3n-3}}{a^2n^2 + 3a^2n + 2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 3),x, algorithm="fricas")
```

```
[Out] -(a*b*n*x^2 - b^2*x^3 + (a^2*n + a^2)*x)*(b*x^3 + a*x^2)^n*x^(-3*
n - 3)/(a^2*n^2 + 3*a^2*n + 2*a^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-3-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^3 + ax^2\right)^n x^{-3n-3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 3),x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n - 3), x)
```

3.282 $\int x^{-4-3n} \left(ax^2+bx^3\right)^n \, dx$

Optimal. Leaf size=116

$$-\frac{2b^2x^{-3(n+1)}\left(ax^2+bx^3\right)^{n+1}}{a^3(n+1)(n+2)(n+3)}+\frac{2bx^{-3n-4}\left(ax^2+bx^3\right)^{n+1}}{a^2(n+2)(n+3)}-\frac{x^{-3n-5}\left(ax^2+bx^3\right)^{n+1}}{a(n+3)}$$

```
[Out] -((x^(-5 - 3*n)*(a*x^2 + b*x^3)^(1 + n))/(a*(3 + n))) + (2*b*x^(-
4 - 3*n)*(a*x^2 + b*x^3)^(1 + n))/(a^2*(2 + n)*(3 + n)) - (2*b^2*
(a*x^2 + b*x^3)^(1 + n))/(a^3*(1 + n)*(2 + n)*(3 + n)*x^(3*(1 + n
)))
```

Rubi [A] time = 0.187031, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$

$$-\frac{2b^2x^{-3(n+1)}\left(ax^2+bx^3\right)^{n+1}}{a^3(n+1)(n+2)(n+3)}+\frac{2bx^{-3n-4}\left(ax^2+bx^3\right)^{n+1}}{a^2(n+2)(n+3)}-\frac{x^{-3n-5}\left(ax^2+bx^3\right)^{n+1}}{a(n+3)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-4 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -((x^(-5 - 3*n)*(a*x^2 + b*x^3)^(1 + n))/(a*(3 + n))) + (2*b*x^(-
4 - 3*n)*(a*x^2 + b*x^3)^(1 + n))/(a^2*(2 + n)*(3 + n)) - (2*b^2*
(a*x^2 + b*x^3)^(1 + n))/(a^3*(1 + n)*(2 + n)*(3 + n)*x^(3*(1 + n
)))
```

Rubi in Sympy [A] time = 29.587, size = 102, normalized size = 0.88

$$-\frac{x^{-3n-5}\left(ax^2+bx^3\right)^{n+1}}{a\,(n+3)}+\frac{2bx^{-3n-4}\left(ax^2+bx^3\right)^{n+1}}{a^2\,(n+2)\,(n+3)}-\frac{2b^2x^{-3n-3}\left(ax^2+bx^3\right)^{n+1}}{a^3\,(n+1)\,(n+2)\,(n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-4-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] -x**(-3*n - 5)*(a*x**2 + b*x**3)**(n + 1)/(a*(n + 3)) + 2*b*x**(-
3*n - 4)*(a*x**2 + b*x**3)**(n + 1)/(a**2*(n + 2)*(n + 3)) - 2*b*
*2*x**(-3*n - 3)*(a*x**2 + b*x**3)**(n + 1)/(a**3*(n + 1)*(n + 2)
*(n + 3))
```

Mathematica [A] time = 0.0785437, size = 72, normalized size = 0.62

$$-\frac{x^{-3(n+1)}(a+bx)\left(x^2(a+bx)\right)^n\left(a^2\left(n^2+3n+2\right)-2ab(n+1)x+2b^2x^2\right)}{a^3(n+1)(n+2)(n+3)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-4 - 3*n)*(a*x^2 + b*x^3)^n,x]
```

```
[Out] -(((a + b*x)*(x^2*(a + b*x))^n*(a^2*(2 + 3*n + n^2) - 2*a*b*(1 +
n)*x + 2*b^2*x^2))/(a^3*(1 + n)*(2 + n)*(3 + n)*x^(3*(1 + n))))
```

Maple [A] time = 0.008, size = 84, normalized size = 0.7

$$-\frac{(bx+a)\,x^{-3-3\,n}\left(a^{2}n^{2}-2\,abnx+2\,b^{2}x^{2}+3\,a^{2}n-2\,abx+2\,a^{2}\right)\left(bx^{3}+ax^{2}\right)^{n}}{(3+n)\,(2+n)\,(1+n)\,a^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-4-3*n)*(b*x^3+a*x^2)^n,x)
```

```
[Out] -(b*x+a)*x^(-3-3*n)*(a^2*n^2-2*a*b*n*x+2*b^2*x^2+3*a^2*n-2*a*b*x+
2*a^2)*(b*x^3+a*x^2)^n/(3+n)/(2+n)/(1+n)/a^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^{3}+ax^{2}\right)^{n}x^{-3\,n-4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 4),x, algorithm="maxima")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n - 4), x)
```

Fricas [A] time = 0.240372, size = 150, normalized size = 1.29

$$\frac{\left(2\,ab^{2}nx^{3}-2\,b^{3}x^{4}-\left(a^{2}bn^{2}+a^{2}bn\right)x^{2}-\left(a^{3}n^{2}+3\,a^{3}n+2\,a^{3}\right)x\right)\left(bx^{3}+ax^{2}\right)^{n}x^{-3\,n-4}}{a^{3}n^{3}+6\,a^{3}n^{2}+11\,a^{3}n+6\,a^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 4),x, algorithm="fricas")
```

```
[Out] (2*a*b^2*n*x^3 - 2*b^3*x^4 - (a^2*b*n^2 + a^2*b*n)*x^2 - (a^3*n^2
 + 3*a^3*n + 2*a^3)*x)*(b*x^3 + a*x^2)^n*x^(-3*n - 4)/(a^3*n^3 +
6*a^3*n^2 + 11*a^3*n + 6*a^3)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-4-3*n)*(b*x**3+a*x**2)**n,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^{3}+ax^{2}\right)^{n}x^{-3\,n-4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^3 + a*x^2)^n*x^(-3*n - 4),x, algorithm="giac")
```

```
[Out] integrate((b*x^3 + a*x^2)^n*x^(-3*n - 4), x)
```

3.283 $\int \frac{x^{11}}{(ax^2+bx^5)^3}\,dx$

Optimal. Leaf size=19

$$\frac{x^6}{6a\,(a+bx^3)^2}$$

```
[Out] x^6/(6*a*(a + b*x^3)^2)
```

Rubi [A] time = 0.0233002, antiderivative size = 19, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{x^6}{6a\,(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[x^11/(a*x^2 + b*x^5)^3,x]
```

```
[Out] x^6/(6*a*(a + b*x^3)^2)
```

Rubi in Sympy [A] time = 4.17219, size = 14, normalized size = 0.74

$$\frac{x^6}{6a\,(a+bx^3)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**11/(b*x**5+a*x**2)**3,x)
```

```
[Out] x**6/(6*a*(a + b*x**3)**2)
```

Mathematica [A] time = 0.0139781, size = 24, normalized size = 1.26

$$-\frac{a+2bx^3}{6b^2\,(a+bx^3)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^11/(a*x^2 + b*x^5)^3,x]
```

```
[Out] -(a + 2*b*x^3)/(6*b^2*(a + b*x^3)^2)
```

Maple [A] time = 0.006, size = 31, normalized size = 1.6

$$\frac{a}{6\,b^2\,(bx^3+a)^2}-\frac{1}{(3\,bx^3+3\,a)\,b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^11/(b*x^5+a*x^2)^3,x)
```

```
[Out] 1/6*a/b^2/(b*x^3+a)^2-1/3/(b*x^3+a)/b^2
```

Maxima [A] time = 1.39128, size = 49, normalized size = 2.58

$$-\frac{2\,bx^3+a}{6\,(b^4x^6+2\,ab^3x^3+a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/(b*x^5 + a*x^2)^3,x, algorithm="maxima")
```

```
[Out] -1/6*(2*b*x^3 + a)/(b^4*x^6 + 2*a*b^3*x^3 + a^2*b^2)
```

Fricas [A] time = 0.203786, size = 49, normalized size = 2.58

$$-\frac{2\,bx^3+a}{6\,(b^4x^6+2\,ab^3x^3+a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/(b*x^5 + a*x^2)^3,x, algorithm="fricas")
```

```
[Out] -1/6*(2*b*x^3 + a)/(b^4*x^6 + 2*a*b^3*x^3 + a^2*b^2)
```

Sympy [A] time = 2.26541, size = 36, normalized size = 1.89

$$-\frac{a+2bx^3}{6a^2b^2+12ab^3x^3+6b^4x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**11/(b*x**5+a*x**2)**3,x)
```

```
[Out] -(a + 2*b*x**3)/(6*a**2*b**2 + 12*a*b**3*x**3 + 6*b**4*x**6)
```

GIAC/XCAS [A] time = 0.220741, size = 30, normalized size = 1.58

$$-\frac{2\,bx^3+a}{6\,(bx^3+a)^2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^11/(b*x^5 + a*x^2)^3,x, algorithm="giac")
```

```
[Out] -1/6*(2*b*x^3 + a)/((b*x^3 + a)^2*b^2)
```

3.284 $\int \frac{x^9}{\sqrt{ax^2+bx^5}} dx$

Optimal. Leaf size=80

$$\frac{16a^2\sqrt{ax^2+bx^5}}{45b^3x} - \frac{8ax^2\sqrt{ax^2+bx^5}}{45b^2} + \frac{2x^5\sqrt{ax^2+bx^5}}{15b}$$

```
[Out] (16*a^2*Sqrt[a*x^2 + b*x^5])/(45*b^3*x) - (8*a*x^2*Sqrt[a*x^2 + b
*x^5])/(45*b^2) + (2*x^5*Sqrt[a*x^2 + b*x^5])/(15*b)
```

Rubi [A] time = 0.170969, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{16a^2\sqrt{ax^2+bx^5}}{45b^3x} - \frac{8ax^2\sqrt{ax^2+bx^5}}{45b^2} + \frac{2x^5\sqrt{ax^2+bx^5}}{15b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^9/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (16*a^2*Sqrt[a*x^2 + b*x^5])/(45*b^3*x) - (8*a*x^2*Sqrt[a*x^2 + b
*x^5])/(45*b^2) + (2*x^5*Sqrt[a*x^2 + b*x^5])/(15*b)
```

Rubi in Sympy [A] time = 18.7473, size = 71, normalized size = 0.89

$$\frac{16a^2\sqrt{ax^2+bx^5}}{45b^3x} - \frac{8ax^2\sqrt{ax^2+bx^5}}{45b^2} + \frac{2x^5\sqrt{ax^2+bx^5}}{15b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**9/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] 16*a**2*sqrt(a*x**2 + b*x**5)/(45*b**3*x) - 8*a*x**2*sqrt(a*x**2
+ b*x**5)/(45*b**2) + 2*x**5*sqrt(a*x**2 + b*x**5)/(15*b)
```

Mathematica [A] time = 0.0371276, size = 46, normalized size = 0.57

$$\frac{2\sqrt{x^2(a+bx^3)}\left(8a^2-4abx^3+3b^2x^6\right)}{45b^3x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^9/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (2*Sqrt[x^2*(a + b*x^3)]*(8*a^2 - 4*a*b*x^3 + 3*b^2*x^6))/(45*b^3
*x)
```

Maple [A] time = 0.008, size = 48, normalized size = 0.6

$$\frac{\left(2\,bx^3+2\,a\right)\left(3\,b^2x^6-4\,abx^3+8\,a^2\right)x}{45\,b^3}\frac{1}{\sqrt{bx^5+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^9/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 2/45*(b*x^3+a)*(3*b^2*x^6-4*a*b*x^3+8*a^2)*x/b^3/(b*x^5+a*x^2)^(1
/2)
```

Maxima [A] time = 1.41135, size = 62, normalized size = 0.78

$$\frac{2\left(3\,b^{3}x^{9} - ab^{2}x^{6} + 4\,a^{2}bx^{3} + 8\,a^{3}\right)}{45\,\sqrt{bx^{3} + a}b^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] 2/45*(3*b^3*x^9 - a*b^2*x^6 + 4*a^2*b*x^3 + 8*a^3)/(sqrt(b*x^3 +
a)*b^3)
```

Fricas [A] time = 0.216324, size = 57, normalized size = 0.71

$$\frac{2\left(3\,b^{2}x^{6} - 4\,abx^{3} + 8\,a^{2}\right)\sqrt{bx^{5} + ax^{2}}}{45\,b^{3}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] 2/45*(3*b^2*x^6 - 4*a*b*x^3 + 8*a^2)*sqrt(b*x^5 + a*x^2)/(b^3*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{9}}{\sqrt{x^{2}\left(a + bx^{3}\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**9/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**9/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{9}}{\sqrt{bx^{5} + ax^{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^9/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^9/sqrt(b*x^5 + a*x^2), x)
```

3.285 $\int \frac{x^6}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=52

$$\frac{2x^2\sqrt{ax^2+bx^5}}{9b}-\frac{4a\sqrt{ax^2+bx^5}}{9b^2x}$$

```
[Out] (-4*a*Sqrt[a*x^2 + b*x^5])/(9*b^2*x) + (2*x^2*Sqrt[a*x^2 + b*x^5]
)/(9*b)
```

Rubi [A] time = 0.0939998, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{2x^2\sqrt{ax^2+bx^5}}{9b}-\frac{4a\sqrt{ax^2+bx^5}}{9b^2x}$$

Antiderivative was successfully verified.

```
[In]  Int[x^6/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (-4*a*Sqrt[a*x^2 + b*x^5])/(9*b^2*x) + (2*x^2*Sqrt[a*x^2 + b*x^5]
)/(9*b)
```

Rubi in Sympy [A] time = 12.4219, size = 44, normalized size = 0.85

$$-\frac{4a\sqrt{ax^2+bx^5}}{9b^2x}+\frac{2x^2\sqrt{ax^2+bx^5}}{9b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**6/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -4*a*sqrt(a*x**2 + b*x**5)/(9*b**2*x) + 2*x**2*sqrt(a*x**2 + b*x*
*5)/(9*b)
```

Mathematica [A] time = 0.0271154, size = 34, normalized size = 0.65

$$\frac{2\left(bx^3-2a\right)\sqrt{x^2\left(a+bx^3\right)}}{9b^2x}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^6/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (2*(-2*a + b*x^3)*Sqrt[x^2*(a + b*x^3)])/(9*b^2*x)
```

Maple [A] time = 0.007, size = 37, normalized size = 0.7

$$-\frac{\left(2\,bx^3+2\,a\right)\left(-bx^3+2\,a\right)x}{9\,b^2}\frac{1}{\sqrt{bx^5+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^6/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -2/9*(b*x^3+a)*(-b*x^3+2*a)*x/b^2/(b*x^5+a*x^2)^(1/2)
```

Maxima [A] time = 1.4616, size = 46, normalized size = 0.88

$$\frac{2\left(b^2x^6 - abx^3 - 2a^2\right)}{9\sqrt{bx^3 + a}b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] 2/9*(b^2*x^6 - a*b*x^3 - 2*a^2)/(sqrt(b*x^3 + a)*b^2)
```

Fricas [A] time = 0.21409, size = 41, normalized size = 0.79

$$\frac{2\sqrt{bx^5 + ax^2}\left(bx^3 - 2a\right)}{9b^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] 2/9*sqrt(b*x^5 + a*x^2)*(b*x^3 - 2*a)/(b^2*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\sqrt{x^2\left(a + bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**6/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**6/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\sqrt{bx^5 + ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^6/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^6/sqrt(b*x^5 + a*x^2), x)
```

3.286 $\int \frac{x^3}{\sqrt{ax^2+bx^5}} dx$

Optimal. Leaf size=25

$$\frac{2\sqrt{ax^2+bx^5}}{3bx}$$

```
[Out] (2*Sqrt[a*x^2 + b*x^5])/(3*b*x)
```

Rubi [A] time = 0.0149602, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.053$

$$\frac{2\sqrt{ax^2+bx^5}}{3bx}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/Sqrt[a*x^2 + b*x^5],x]

[Out] (2*Sqrt[a*x^2 + b*x^5])/(3*b*x)
```

Rubi in Sympy [A] time = 7.05235, size = 19, normalized size = 0.76

$$\frac{2\sqrt{ax^2+bx^5}}{3bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**3/(b*x**5+a*x**2)**(1/2),x)

[Out] 2*sqrt(a*x**2 + b*x**5)/(3*b*x)
```

Mathematica [A] time = 0.0148376, size = 25, normalized size = 1.

$$\frac{2\sqrt{x^2\left(a+bx^3\right)}}{3bx}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/Sqrt[a*x^2 + b*x^5],x]

[Out] (2*Sqrt[x^2*(a + b*x^3)])/(3*b*x)
```

Maple [A] time = 0.008, size = 27, normalized size = 1.1

$$\frac{2\,x\left(bx^3+a\right)}{3\,b}\frac{1}{\sqrt{bx^5+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/(b*x^5+a*x^2)^(1/2),x)

[Out] 2/3*x*(b*x^3+a)/b/(b*x^5+a*x^2)^(1/2)
```

Maxima [A] time = 1.39405, size = 19, normalized size = 0.76

$$\frac{2\sqrt{bx^3+a}}{3\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] 2/3*sqrt(b*x^3 + a)/b
```

Fricas [A] time = 0.215296, size = 28, normalized size = 1.12

$$\frac{2\sqrt{bx^5+ax^2}}{3\,bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] 2/3*sqrt(b*x^5 + a*x^2)/(b*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{x^2\,(a+bx^3)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**3/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{bx^5+ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^3/sqrt(b*x^5 + a*x^2), x)
```

3.287 $\int \frac{1}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=32

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^5}}\right)}{3\sqrt{a}}$$

```
[Out] (-2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^5]])/(3*Sqrt[a])
```

Rubi [A] time = 0.0266031, antiderivative size = 32, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^5}}\right)}{3\sqrt{a}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[a*x^2 + b*x^5],x]

[Out] (-2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^5]])/(3*Sqrt[a])
```

Rubi in Sympy [A] time = 2.32906, size = 31, normalized size = 0.97

$$-\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^5}}\right)}{3\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**5+a*x**2)**(1/2),x)

[Out] -2*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**5))/(3*sqrt(a))
```

Mathematica [A] time = 0.0613647, size = 54, normalized size = 1.69

$$-\frac{2\sqrt{x^2\left(a+bx^3\right)}\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{3ax\sqrt{\frac{bx^3}{a}+1}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[a*x^2 + b*x^5],x]

[Out] (-2*Sqrt[x^2*(a + b*x^3)]*ArcTanh[Sqrt[1 + (b*x^3)/a]])/(3*a*x*Sq
rt[1 + (b*x^3)/a])
```

Maple [A] time = 0.008, size = 43, normalized size = 1.3

$$-\frac{2\,x}{3}\sqrt{bx^3+a}Artanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)\frac{1}{\sqrt{bx^5+ax^2}}\frac{1}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -2/3/(b*x^5+a*x^2)^(1/2)*x*(b*x^3+a)^(1/2)*arctanh((b*x^3+a)^(1/2
)/a^(1/2))/a^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.223321, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(\frac{(bx^4+2\,ax)\sqrt{a}-2\,\sqrt{bx^5+ax^2}a}{x^4}\right)}{3\,\sqrt{a}}, -\frac{2\,\sqrt{-a}\arctan\left(\frac{ax}{\sqrt{bx^5+ax^2}\sqrt{-a}}\right)}{3\,a}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] [1/3*log(((b*x^4 + 2*a*x)*sqrt(a) - 2*sqrt(b*x^5 + a*x^2)*a)/x^4)
/sqrt(a), -2/3*sqrt(-a)*arctan(a*x/(sqrt(b*x^5 + a*x^2)*sqrt(-a))
)/a]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax^2+bx^5}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/sqrt(a*x**2 + b*x**5), x)
```

GIAC/XCAS [A] time = 0.222081, size = 63, normalized size = 1.97

$$-\frac{2\,\arctan\left(\frac{\sqrt{a}}{\sqrt{-a}}\right)\mathrm{sign}\,(x)}{3\,\sqrt{-a}}+\frac{2\,\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{3\,\sqrt{-a}\mathrm{sign}\,(x)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] -2/3*arctan(sqrt(a)/sqrt(-a))*sign(x)/sqrt(-a) + 2/3*arctan(sqrt(
b*x^3 + a)/sqrt(-a))/(sqrt(-a)*sign(x))
```

3.288 $\int \frac{1}{x^3\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=59

$$\frac{b\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^5}}\right)}{3a^{3/2}}-\frac{\sqrt{ax^2+bx^5}}{3ax^4}$$

```
[Out] -Sqrt[a*x^2 + b*x^5]/(3*a*x^4) + (b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^
2 + b*x^5]])/(3*a^(3/2))
```

Rubi [A] time = 0.0997995, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{b\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^5}}\right)}{3a^{3/2}}-\frac{\sqrt{ax^2+bx^5}}{3ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] -Sqrt[a*x^2 + b*x^5]/(3*a*x^4) + (b*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^
2 + b*x^5]])/(3*a^(3/2))
```

Rubi in Sympy [A] time = 9.05481, size = 49, normalized size = 0.83

$$-\frac{\sqrt{ax^2+bx^5}}{3ax^4}+\frac{b\,\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^5}}\right)}{3a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -sqrt(a*x**2 + b*x**5)/(3*a*x**4) + b*atanh(sqrt(a)*x/sqrt(a*x**2
 + b*x**5))/(3*a**(3/2))
```

Mathematica [A] time = 0.204733, size = 63, normalized size = 1.07

$$\frac{\sqrt{x^2\left(a+bx^3\right)}\left(\frac{bx^3\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{\sqrt{\frac{bx^3}{a}+1}}-a\right)}{3a^2x^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (Sqrt[x^2*(a + b*x^3)]*(-a + (b*x^3*ArcTanh[Sqrt[1 + (b*x^3)/a]])
/Sqrt[1 + (b*x^3)/a]))/(3*a^2*x^4)
```

Maple [A] time = 0.008, size = 66, normalized size = 1.1

$$-\frac{1}{3\,x^2}\sqrt{bx^3+a}\left(-bArtanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)x^3a+\sqrt{bx^3+a}a^{\frac{3}{2}}\right)\frac{1}{\sqrt{bx^5+ax^2}}a^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^3/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -1/3/x^2*(b*x^3+a)^(1/2)*(-b*arctanh((b*x^3+a)^(1/2)/a^(1/2))*x^3
*a+(b*x^3+a)^(1/2)*a^(3/2))/(b*x^5+a*x^2)^(1/2)/a^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^5 + a*x^2)*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.231216, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{a}bx^4\log\left(\frac{(bx^4+2\,ax)\sqrt{a}+2\sqrt{bx^5+ax^2}a}{x^4}\right)-2\sqrt{bx^5+ax^2}a}{6\,a^2x^4},\ \frac{\sqrt{-a}bx^4\arctan\left(\frac{ax}{\sqrt{bx^5+ax^2}\sqrt{-a}}\right)-\sqrt{bx^5+ax^2}a}{3\,a^2x^4}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^5 + a*x^2)*x^3),x, algorithm="fricas")
```

```
[Out] [1/6*(sqrt(a)*b*x^4*log(((b*x^4 + 2*a*x)*sqrt(a) + 2*sqrt(b*x^5 +
 a*x^2)*a)/x^4) - 2*sqrt(b*x^5 + a*x^2)*a)/(a^2*x^4), 1/3*(sqrt(-
a)*b*x^4*arctan(a*x/(sqrt(b*x^5 + a*x^2)*sqrt(-a))) - sqrt(b*x^5
+ a*x^2)*a)/(a^2*x^4)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x^3\sqrt{x^2\,(a+bx^3)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x**3/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(x**2*(a + b*x**3))), x)
```

GIAC/XCAS [A] time = 0.234218, size = 77, normalized size = 1.31

$$-\frac{b\arctan\left(\frac{\sqrt{bx^3+a}}{\sqrt{-a}}\right)}{3\sqrt{-a}a\mathrm{sign}\left(x\right)}-\frac{\sqrt{\frac{b}{x}+\frac{a}{x^4}}}{3\,ax\mathrm{sign}\left(x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^5 + a*x^2)*x^3),x, algorithm="giac")
```

```
[Out] -1/3*b*arctan(sqrt(b*x^3 + a)/sqrt(-a))/(sqrt(-a)*a*sign(x)) - 1/
3*sqrt(b/x + a/x^4)/(a*x*sign(x))
```

3.289 $\int \frac{x^4}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=238

$$\frac{2\sqrt{ax^2+bx^5}}{5b}-\frac{4\sqrt{2+\sqrt{3}}\,ax\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\,F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{5\sqrt[4]{3}\,b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}$$

```
[Out] (2*Sqrt[a*x^2 + b*x^5])/(5*b) - (4*Sqrt[2 + Sqrt[3]]*a*x*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(5*3^(1/4)*b^(4/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3
)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.273866, antiderivative size = 238, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{2\sqrt{ax^2+bx^5}}{5b}-\frac{4\sqrt{2+\sqrt{3}}\,ax\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\,F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)\middle|-7-4\sqrt{3}\right)}{5\sqrt[4]{3}\,b^{4/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (2*Sqrt[a*x^2 + b*x^5])/(5*b) - (4*Sqrt[2 + Sqrt[3]]*a*x*(a^(1/3)
 + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((
1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[
3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7
 - 4*Sqrt[3]])/(5*3^(1/4)*b^(4/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3
)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 21.1946, size = 216, normalized size = 0.91

$$-\frac{4\cdot 3^{\frac{3}{4}}a\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{15b^{\frac{4}{3}}x\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(a+bx^3\right)}+\frac{2\sqrt{ax^2+bx^5}}{5b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -4*3**(3/4)*a*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**
2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a
**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(asin((-a**
(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(
```

```
1/3)*x)), -7 - 4*sqrt(3))/(15*b**(4/3)*x*sqrt(a**(1/3)*(a**(1/3)
+ b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a + b*x*
*3)) + 2*sqrt(a*x**2 + b*x**5)/(5*b)
```

Mathematica [C] time = 0.509121, size = 165, normalized size = 0.69

$$\frac{-6\sqrt[3]{-b}x^2\left(a+bx^3\right)+4i3^{3/4}a^{4/3}x\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)}{15(-b)^{4/3}\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^4/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (-6*(-b)^(1/3)*x^2*(a + b*x^3) + (4*I)*3^(3/4)*a^(4/3)*x*Sqrt[(-1
)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^
(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/
6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/(15*(-b)^(4
/3)*Sqrt[x^2*(a + b*x^3)])
```

Maple [A] time = 0.055, size = 248, normalized size = 1.

$$\frac{2x}{15b^2}\left(ia\sqrt{3}\sqrt[3]{-ab^2}\sqrt{-i\sqrt{3}\left(i\sqrt{3}\sqrt[3]{-ab^2}-2bx-\sqrt[3]{-ab^2}\right)\frac{1}{\sqrt[3]{-ab^2}}}\sqrt{-2\frac{-bx+\sqrt[3]{-ab^2}}{\sqrt[3]{-ab^2}\left(i\sqrt{3}-3\right)}}\sqrt{-i\sqrt{3}\left(i\sqrt{3}\sqrt[3]{-ab^2}+2bx+\sqrt[3]{-ab^2}\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 2/15*x*(I*a*3^(1/2)*(-a*b^2)^(1/3)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*(-2*(-b*x+(-a
*b^2)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3))^(1/2)*(-I*(I*3^(1/2)*(
-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)
*EllipticF(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2),2^(1/2)*(I*3^(1/2
)/(I*3^(1/2)-3))^(1/2))+3*b^2*x^4+3*a*b*x)/(b*x^5+a*x^2)^(1/2)/b^
2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{bx^5+ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] integrate(x^4/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^4}{\sqrt{bx^5+ax^2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] integral(x^4/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{x^2\left(a + bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**4/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{bx^5 + ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^4/sqrt(b*x^5 + a*x^2), x)
```

3.290 $\int \frac{x}{\sqrt{ax^2+bx^5}} dx$

Optimal. Leaf size=212

$$\frac{2\sqrt{2+\sqrt{3}}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}$$

```
[Out] (2*Sqrt[2 + Sqrt[3]]*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(1/3)*Sq
rt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.143649, antiderivative size = 212, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$\frac{2\sqrt{2+\sqrt{3}}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}\sqrt[3]{b}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (2*Sqrt[2 + Sqrt[3]]*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(1/3)*Sq
rt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/
3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 12.7927, size = 196, normalized size = 0.92

$$\frac{2\cdot 3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{3\sqrt[3]{b}x\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] 2*3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/
(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(sqrt(3) + 2)*(a**(
1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(asin((-a**(1/
3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3
)*x)), -7 - 4*sqrt(3))/(3*b**(1/3)*x*sqrt(a**(1/3)*(a**(1/3) + b*
*(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a + b*x**3))
```

Mathematica [C] time = 0.1596, size = 141, normalized size = 0.67

$$\frac{2i\sqrt[3]{a}x\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{\sqrt[4]{3}\sqrt[3]{-b}\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] ((2*I)*a^(1/3)*x*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*S
qrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*Ellipt
icF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)],
 (-1)^(1/3)])/(3^(1/4)*(-b)^(1/3)*Sqrt[x^2*(a + b*x^3)])
```

Maple [A] time = 0.007, size = 231, normalized size = 1.1

$$\frac{-\frac{i}{3}x\sqrt{3}}{b}\sqrt[3]{-ab^2}\sqrt{-i\sqrt{3}\left(i\sqrt{3}\sqrt[3]{-ab^2}-2\,bx-\sqrt[3]{-ab^2}\right)\frac{1}{\sqrt[3]{-ab^2}}}\sqrt{-2\,\frac{-bx+\sqrt[3]{-ab^2}}{\sqrt[3]{-ab^2}\left(i\sqrt{3}-3\right)}}\sqrt{-i\sqrt{3}\left(i\sqrt{3}\sqrt[3]{-ab^2}+2\,bx+\sqrt[3]{-ab^2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -1/3*I/(b*x^5+a*x^2)^(1/2)*x*3^(1/2)/b*(-a*b^2)^(1/3)*(-I*(I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^
(1/2)*(-2*(-b*x+(-a*b^2)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3))^(1/
2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/2)/(-
a*b^2)^(1/3))^(1/2)*EllipticF(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*
(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2
),2^(1/2)*(I*3^(1/2)/(I*3^(1/2)-3))^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{bx^5+ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] integrate(x/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x}{\sqrt{bx^5+ax^2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] integral(x/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{x^2\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{bx^5+ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x/sqrt(b*x^5 + a*x^2), x)
```

3.291 $\int \frac{1}{x^2\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=243

$$-\frac{\sqrt{2+\sqrt{3}}\,b^{2/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\,F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2\sqrt[4]{3}a\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{\sqrt{ax^2+bx^5}}{2ax^3}$$

```
[Out] -Sqrt[a*x^2 + b*x^5]/(2*a*x^3) - (Sqrt[2 + Sqrt[3]]*b^(2/3)*x*(a^
(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^
2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 -
Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
], -7 - 4*Sqrt[3]])/(2*3^(1/4)*a*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)
*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.259466, antiderivative size = 243, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{\sqrt{2+\sqrt{3}}\,b^{2/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\,F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2\sqrt[4]{3}a\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{\sqrt{ax^2+bx^5}}{2ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] -Sqrt[a*x^2 + b*x^5]/(2*a*x^3) - (Sqrt[2 + Sqrt[3]]*b^(2/3)*x*(a^
(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^
2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 -
Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)
], -7 - 4*Sqrt[3]])/(2*3^(1/4)*a*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)
*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 21.1858, size = 218, normalized size = 0.9

$$-\frac{3^{\frac{3}{4}}b^{\frac{2}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}\,F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{6ax\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(a+bx^3\right)}-\frac{\sqrt{ax^2+bx^5}}{2ax^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -3**(3/4)*b**(2/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(sqrt(3) +
2)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(asin(
(-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) +
```

```
b**(1/3)*x)), -7 - 4*sqrt(3))/(6*a*x*sqrt(a**(1/3)*(a**(1/3) + b
**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a + b*x**3)
) - sqrt(a*x**2 + b*x**5)/(2*a*x**3)
```

Mathematica [C] time = 0.332844, size = 171, normalized size = 0.7

$$\frac{-3\sqrt[3]{-b}\left(a+bx^3\right)-i3^{3/4}\sqrt[3]{a}bx^2\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{6a\sqrt[3]{-b}x\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^2*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (-3*(-b)^(1/3)*(a + b*x^3) - I*3^(3/4)*a^(1/3)*b*x^2*Sqrt[(-1)^(5
/6)*(-1 + ((-b)^(1/3)*x)/a^(1/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3
) + ((-b)^(2/3)*x^2)/a^(2/3)]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) -
 (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)])/(6*a*(-b)^(1/3)
*x*Sqrt[x^2*(a + b*x^3)])
```

Maple [A] time = 0.01, size = 248, normalized size = 1.

$$\frac{1}{12\,ax}\left(i\sqrt{3}\sqrt[3]{-ab^2}\sqrt{-i\sqrt{3}\left(i\sqrt{3}\sqrt[3]{-ab^2}-2\,bx-\sqrt[3]{-ab^2}\right)\frac{1}{\sqrt[3]{-ab^2}}}\sqrt{-2\,\frac{-bx+\sqrt[3]{-ab^2}}{\sqrt[3]{-ab^2}\left(i\sqrt{3}-3\right)}}\sqrt{-i\sqrt{3}\left(i\sqrt{3}\sqrt[3]{-ab^2}+2\,bx+\sqrt[3]{-ab^2}\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 1/12*(I*3^(1/2)*(-a*b^2)^(1/3)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*(-2*(-b*x+(-a*b^2
)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3))^(1/2)*(-I*(I*3^(1/2)*(-a*b
^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*Ell
ipticF(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-
a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2),2^(1/2)*(I*3^(1/2)/(I
*3^(1/2)-3))^(1/2))*x^2-6*b*x^3-6*a)/x/(b*x^5+a*x^2)^(1/2)/a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5+ax^2}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^5+ax^2}x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^2),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^5 + a*x^2)*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{x^2\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(x**2*(a + b*x**3))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5+ax^2}\,x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x^2), x)
```

3.292 $\int \frac{x^5}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=514

$$-\frac{8\sqrt{2}a^{4/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{4\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{4/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{8ax\left(a+bx^3\right)}{7b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}+\frac{2x\sqrt{ax^2+bx^5}}{7b}$$

```
[Out] (-8*a*x*(a + b*x^3))/(7*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*
x)*Sqrt[a*x^2 + b*x^5]) + (2*x*Sqrt[a*x^2 + b*x^5])/(7*b) + (4*3^
(1/4)*Sqrt[2 - Sqrt[3]]*a^(4/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) +
b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*b^(5/
3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) +
b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) - (8*Sqrt[2]*a^(4/3)*x*(a^(1/3
) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt
[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -
7 - 4*Sqrt[3]])/(7*3^(1/4)*b^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/
3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]
)
```

Rubi [A] time = 0.599516, antiderivative size = 514, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$-\frac{8\sqrt{2}a^{4/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{4\sqrt[4]{3}\sqrt{2-\sqrt{3}}a^{4/3}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{7b^{5/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{8ax\left(a+bx^3\right)}{7b^{5/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}+\frac{2x\sqrt{ax^2+bx^5}}{7b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^5/Sqrt[a*x^2 + b*x^5],x]
```



```
[Out] (-8*a*x*(a + b*x^3))/(7*b^(5/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*
x)*Sqrt[a*x^2 + b*x^5]) + (2*x*Sqrt[a*x^2 + b*x^5])/(7*b) + (4*3^
```

```
(1/4)*Sqrt[2 - Sqrt[3]]*a^(4/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) +
b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x
)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(7*b^(5/
3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) +
b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) - (8*Sqrt[2]*a^(4/3)*x*(a^(1/3
) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt
[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -
7 - 4*Sqrt[3]])/(7*3^(1/4)*b^(5/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/
3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]
)
```

Rubi in Sympy [A] time = 52.5044, size = 462, normalized size = 0.9

$$\frac{4\sqrt[4]{3}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{7b^{\frac{5}{3}}x\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(a+bx^3\right)} - \frac{8\sqrt{2}\cdot 3^{\frac{3}{4}}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{21b^{\frac{5}{3}}x\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(a+bx^3\right)} - \frac{8a\sqrt{ax^2+bx^5}}{7b^{\frac{5}{3}}x\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)} + \frac{2x\sqrt{ax^2+bx^5}}{7b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**5/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] 4*3**(1/4)*a**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/
3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3)
+ 2)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_e(asi
n((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3))
 + b**(1/3)*x)), -7 - 4*sqrt(3))/(7*b**(5/3)*x*sqrt(a**(1/3)*(a**
(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a
+ b*x**3)) - 8*sqrt(2)*3**(3/4)*a**(4/3)*sqrt((a**(2/3) - a**(1/3
)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*
x)**2)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(a
sin((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3
)) + b**(1/3)*x)), -7 - 4*sqrt(3))/(21*b**(5/3)*x*sqrt(a**(1/3)*(
a**(1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*
(a + b*x**3)) - 8*a*sqrt(a*x**2 + b*x**5)/(7*b**(5/3)*x*(a**(1/3)
*(1 + sqrt(3)) + b**(1/3)*x)) + 2*x*sqrt(a*x**2 + b*x**5)/(7*b)
```

Mathematica [C] time = 3.29281, size = 228, normalized size = 0.44

$$\frac{2x\left(3x^2\left(a+bx^3\right)-\frac{4\sqrt[6]{-1}3^{3/4}a^{5/3}\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-}\cdots}{\sqrt[3]{\cdots}}}}{\cdots}\right.\right.\right.}{(-b)^{2/3}}\right)}{21b\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^5/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (2*x*(3*x^2*(a + b*x^3) - (4*(-1)^(1/6)*3^(3/4)*a^(5/3)*Sqrt[((-1
)^(5/6)*(-a^(1/3) + (-b)^(1/3)*x))/a^(1/3)]*Sqrt[1 + ((-b)^(1/3)*
x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*EllipticE[Ar
cSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^
(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(
1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(-b)^(2/3)))/(21*b*Sqrt[
x^2*(a + b*x^3)])
```

Maple [A] time = 0.011, size = 676, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^5/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -2/21*x*(3*I*(-a*b^2)^(2/3)*3^(1/2)*(-2*(-b*x+(-a*b^2)^(1/3))/(-a
*b^2)^(1/3)/(I*3^(1/2)-3))^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*EllipticE(1/6*3
^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
)*3^(1/2)/(-a*b^2)^(1/3))^(1/2),2^(1/2)*(I*3^(1/2)/(I*3^(1/2)-3))
^(1/2))*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/
2)/(-a*b^2)^(1/3))^(1/2)*a-2*I*(-a*b^2)^(2/3)*3^(1/2)*(-2*(-b*x+(
-a*b^2)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3))^(1/2)*(-I*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/
2)*EllipticF(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2),2^(1/2)*(I*3^(1
/2)/(I*3^(1/2)-3))^(1/2))*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a
*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*a-3*b^3*x^5+3*(-a*b^2)
^(2/3)*(-2*(-b*x+(-a*b^2)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3))^(1
/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/2)/(
-a*b^2)^(1/3))^(1/2)*EllipticE(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/
2),2^(1/2)*(I*3^(1/2)/(I*3^(1/2)-3))^(1/2))*(-I*(I*3^(1/2)*(-a*b^
2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*a-3*
a*b^2*x^2)/(b*x^5+a*x^2)^(1/2)/b^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\sqrt{bx^5 + ax^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] integrate(x^5/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^5}{\sqrt{bx^5 + ax^2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] integral(x^5/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\sqrt{x^2 (a + bx^3)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**5/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**5/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\sqrt{bx^5 + ax^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^5/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^5/sqrt(b*x^5 + a*x^2), x)
```

3.293 $\int \frac{x^2}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=484

$$\frac{2\sqrt{2}\sqrt[3]{a}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{2x\left(a+bx^3\right)}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}$$

```
[Out] (2*x*(a + b*x^3))/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)*Sq
rt[a*x^2 + b*x^5]) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*a^(1/3)*x*(a^(1/3
) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt
[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -
7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1
 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) + (2*Sqr
t[2]*a^(1/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellip
ticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^
(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*Sqrt[(a^(1
/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.425359, antiderivative size = 484, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.21$

$$\frac{2\sqrt{2}\sqrt[3]{a}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{a}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{2x\left(a+bx^3\right)}{b^{2/3}\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/Sqrt[a*x^2 + b*x^5],x]
```


```
[Out] (2*x*(a + b*x^3))/(b^(2/3)*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)*Sq
rt[a*x^2 + b*x^5]) - (3^(1/4)*Sqrt[2 - Sqrt[3]]*a^(1/3)*x*(a^(1/3
) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(
(1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*EllipticE[ArcSin[((1 - Sqrt
```

```
[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -
7 - 4*Sqrt[3]])/(b^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1
 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) + (2*Sqr
t[2]*a^(1/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1
/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]*Ellip
ticF[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqrt[3])*a^
(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(3^(1/4)*b^(2/3)*Sqrt[(a^(1
/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^2]
*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 38.7092, size = 435, normalized size = 0.9

$$-\frac{\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^{2}}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^{2}+bx^{5}}E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{b^{\frac{2}{3}}x\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^{2}}}\left(a+bx^{3}\right)}+\frac{2\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^{2}}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^{2}+bx^{5}}F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{3b^{\frac{2}{3}}x\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^{2}}}\left(a+bx^{3}\right)}+\frac{2\sqrt{ax^{2}+bx^{5}}}{b^{\frac{2}{3}}x\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -3**(1/4)*a**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) +
 2)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_e(asin
((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)), -7 - 4*sqrt(3))/(b**(2/3)*x*sqrt(a**(1/3)*(a**(1/
3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a + b
*x**3)) + 2*sqrt(2)*3**(3/4)*a**(1/3)*sqrt((a**(2/3) - a**(1/3)*b
**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)*
*2)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(asin
((-a**(1/3)*(-1 + sqrt(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3))
+ b**(1/3)*x)), -7 - 4*sqrt(3))/(3*b**(2/3)*x*sqrt(a**(1/3)*(a**(
1/3) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a +
 b*x**3)) + 2*sqrt(a*x**2 + b*x**5)/(b**(2/3)*x*(a**(1/3)*(1 + sq
rt(3)) + b**(1/3)*x))
```

Mathematica [C] time = 0.218631, size = 202, normalized size = 0.42

$$\frac{2\sqrt[6]{-1}a^{2/3}x\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}-1\right)}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\sin^{-1}\left(\sqrt{-\frac{i\sqrt[3]{\cdots}}{\sqrt[3]{\cdots}}}\cdots\right.\right.\right.}{\sqrt[4]{3}(-b)^{2/3}\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^2/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (2*(-1)^(1/6)*a^(2/3)*x*Sqrt[(-1)^(5/6)*(-1 + ((-b)^(1/3)*x)/a^(1
/3))]*Sqrt[1 + ((-b)^(1/3)*x)/a^(1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]
```

```
*((-I)*Sqrt[3]*EllipticE[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*
x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)] + (-1)^(1/3)*EllipticF[ArcSin[S
qrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]
))/(3^(1/4)*(-b)^(2/3)*Sqrt[x^2*(a + b*x^3)])
```

Maple [A] time = 0.007, size = 394, normalized size = 0.8

$$\frac{-\frac{i}{6}x\sqrt{3}}{b^2}\left(-ab^2\right)^{\frac{2}{3}}\sqrt{-i\sqrt{3}\left(i\sqrt{3}\sqrt[3]{-ab^2}-2\,bx-\sqrt[3]{-ab^2}\right)\frac{1}{\sqrt[3]{-ab^2}}}\sqrt{-2\,\frac{-bx+\sqrt[3]{-ab^2}}{\sqrt[3]{-ab^2}\left(i\sqrt{3}-3\right)}}\sqrt{-i\sqrt{3}\left(i\sqrt{3}\sqrt[3]{-ab^2}+2\,bx+\sqrt[3]{-ab^2}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -1/6*I*x*3^(1/2)*(-a*b^2)^(2/3)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*(-2*(-b*x+(-a*b^
2)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3))^(1/2)*(-I*(I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*(I
*EllipticE(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2),2^(1/2)*(I*3^(1/2
)/(I*3^(1/2)-3))^(1/2))*3^(1/2)-3*EllipticE(1/6*3^(1/2)*2^(1/2)*(
-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^
2)^(1/3))^(1/2),2^(1/2)*(I*3^(1/2)/(I*3^(1/2)-3))^(1/2))+2*Ellipt
icF(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b
^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2),2^(1/2)*(I*3^(1/2)/(I*3^
(1/2)-3))^(1/2)))/(b*x^5+a*x^2)^(1/2)/b^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{bx^5+ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{\sqrt{bx^5+ax^2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] integral(x^2/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{x^2\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{bx^5 + ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^2/sqrt(b*x^5 + a*x^2), x)
```

3.294 $\int \frac{1}{x\sqrt{ax^2+bx^5}} dx$

Optimal. Leaf size=510

$$\frac{\sqrt{2}\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}} - \frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}} - \frac{\sqrt{ax^2+bx^5}}{ax^2} + \frac{\sqrt[3]{b}x\left(a+bx^3\right)}{a\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}$$

```
[Out] (b^(1/3)*x*(a + b*x^3))/(a*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)*Sq
rt[a*x^2 + b*x^5]) - Sqrt[a*x^2 + b*x^5]/(a*x^2) - (3^(1/4)*Sqrt[
2 - Sqrt[3]]*b^(1/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(2*a^(2/3)*Sqrt[(a^
(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*Sqrt[a*x^2 + b*x^5]) + (Sqrt[2]*b^(1/3)*x*(a^(1/3) + b^(1/3)*x
)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3)
+ b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]
])/(3^(1/4)*a^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.572755, antiderivative size = 510, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263

$$\frac{\sqrt{2}\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}F\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{\sqrt[4]{3}a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}} - \frac{\sqrt[4]{3}\sqrt{2-\sqrt{3}}\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}E\left(\sin^{-1}\left(\frac{\sqrt[3]{b}x+\left(1-\sqrt{3}\right)\sqrt[3]{a}}{\sqrt[3]{b}x+\left(1+\sqrt{3}\right)\sqrt[3]{a}}\right)|-7-4\sqrt{3}\right)}{2a^{2/3}\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}} - \frac{\sqrt{ax^2+bx^5}}{ax^2} + \frac{\sqrt[3]{b}x\left(a+bx^3\right)}{a\left(\left(1+\sqrt{3}\right)\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (b^(1/3)*x*(a + b*x^3))/(a*((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)*Sq
rt[a*x^2 + b*x^5]) - Sqrt[a*x^2 + b*x^5]/(a*x^2) - (3^(1/4)*Sqrt[
2 - Sqrt[3]]*b^(1/3)*x*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1
```

```
/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*EllipticE[ArcSin[((1 - Sqrt[3])*a^(1/3) + b^(1/3)*x)/((1 + Sqr
t[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]])/(2*a^(2/3)*Sqrt[(a^
(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)^
2]*Sqrt[a*x^2 + b*x^5]) + (Sqrt[2]*b^(1/3)*x*(a^(1/3) + b^(1/3)*x
)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/((1 + Sqrt[3])
*a^(1/3) + b^(1/3)*x)^2]*EllipticF[ArcSin[((1 - Sqrt[3])*a^(1/3)
+ b^(1/3)*x)/((1 + Sqrt[3])*a^(1/3) + b^(1/3)*x)], -7 - 4*Sqrt[3]
])/(3^(1/4)*a^(2/3)*Sqrt[(a^(1/3)*(a^(1/3) + b^(1/3)*x))/((1 + Sq
rt[3])*a^(1/3) + b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 52.7247, size = 454, normalized size = 0.89

$$\frac{\sqrt[3]{b}\sqrt{ax^2+bx^5}}{ax\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)}-\frac{\sqrt{ax^2+bx^5}}{ax^2}-\frac{\sqrt[4]{3}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\sqrt{-\sqrt{3}+2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}E\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{2a^{\frac{2}{3}}x\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(a+bx^3\right)}+\frac{\sqrt{2}\cdot 3^{\frac{3}{4}}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{asin}\left(\frac{-\sqrt[3]{a}\left(-1+\sqrt{3}\right)+\sqrt[3]{b}x}{\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x}\right)\middle|-7-4\sqrt{3}\right)}{3a^{\frac{2}{3}}x\sqrt{\frac{\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}\left(1+\sqrt{3}\right)+\sqrt[3]{b}x\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] b**(1/3)*sqrt(a*x**2 + b*x**5)/(a*x*(a**(1/3)*(1 + sqrt(3)) + b**
(1/3)*x)) - sqrt(a*x**2 + b*x**5)/(a*x**2) - 3**(1/4)*b**(1/3)*sq
rt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3)*(1
+ sqrt(3)) + b**(1/3)*x)**2)*sqrt(-sqrt(3) + 2)*(a**(1/3) + b**(1
/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_e(asin((-a**(1/3)*(-1 + sqr
t(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 -
4*sqrt(3))/(2*a**(2/3)*x*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a
**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a + b*x**3)) + sqrt(2)*3
**(3/4)*b**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*
x**2)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a**(1/3) + b**(1
/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(asin((-a**(1/3)*(-1 + sqr
t(3)) + b**(1/3)*x)/(a**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)), -7 -
4*sqrt(3))/(3*a**(2/3)*x*sqrt(a**(1/3)*(a**(1/3) + b**(1/3)*x)/(a
**(1/3)*(1 + sqrt(3)) + b**(1/3)*x)**2)*(a + b*x**3))
```

Mathematica [C] time = 1.14591, size = 225, normalized size = 0.44

$$\frac{-3\left(a+bx^3\right)+\frac{\sqrt[6]{-1}3^{3/4}a^{2/3}bx\sqrt{\frac{(-1)^{5/6}\left(\sqrt[3]{-b}x-\sqrt[3]{a}\right)}{\sqrt[3]{a}}}\sqrt{\frac{(-b)^{2/3}x^2}{a^{2/3}}+\frac{\sqrt[3]{-b}x}{\sqrt[3]{a}}+1}\left(\sqrt[3]{-1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)\middle|\sqrt[3]{-1}\right)-i\sqrt{3}E\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-b}x}{\sqrt[3]{a}}-}}{\sqrt[4]{3}}\right.\right.\right.}{(-b)^{2/3}}}{3a\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (-3*(a + b*x^3) + ((-1)^(1/6)*3^(3/4)*a^(2/3)*b*x*Sqrt[((-1)^(5/6
)*(-a^(1/3) + (-b)^(1/3)*x))/a^(1/3)]*Sqrt[1 + ((-b)^(1/3)*x)/a^(
1/3) + ((-b)^(2/3)*x^2)/a^(2/3)]*((-I)*Sqrt[3]*EllipticE[ArcSin[S
qrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]
 + (-1)^(1/3)*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-b)^(1/3)*x
)/a^(1/3)]/3^(1/4)], (-1)^(1/3)]))/(-b)^(2/3))/(3*a*Sqrt[x^2*(a +
 b*x^3)])
```

Maple [A] time = 0.009, size = 673, normalized size = 1.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 1/12*(3*I*(-a*b^2)^(2/3)*3^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*(-2*(-b*x+(-a*b
^2)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3))^(1/2)*(-I*(I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2)*E
llipticE(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2),2^(1/2)*(I*3^(1/2)/
(I*3^(1/2)-3))^(1/2))*x-2*I*(-a*b^2)^(2/3)*3^(1/2)*(-I*(I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/
2)*(-2*(-b*x+(-a*b^2)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3))^(1/2)*
(-I*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/2)/(-a*b
^2)^(1/3))^(1/2)*EllipticF(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))^(1/2),2
^(1/2)*(I*3^(1/2)/(I*3^(1/2)-3))^(1/2))*x+3*(-a*b^2)^(2/3)*(-I*(I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1
/3))^(1/2)*(-2*(-b*x+(-a*b^2)^(1/3))/(-a*b^2)^(1/3)/(I*3^(1/2)-3)
)^(1/2)*(-I*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*3^(1/
2)/(-a*b^2)^(1/3))^(1/2)*EllipticE(1/6*3^(1/2)*2^(1/2)*(-I*(I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))*3^(1/2)/(-a*b^2)^(1/3))
^(1/2),2^(1/2)*(I*3^(1/2)/(I*3^(1/2)-3))^(1/2))*x-12*b^2*x^3-12*a
*b)/(b*x^5+a*x^2)^(1/2)/a/b
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5 + ax^2}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^5 + a*x^2)*x),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^5 + ax^2}x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(sqrt(b*x^5 + a*x^2)*x),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^5 + a*x^2)*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{x^2\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(x**2*(a + b*x**3))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5+ax^2}\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x), x)
```

3.295 $\int \frac{x^{13/2}}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=265

$$\frac{7a^{5/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{40\sqrt[4]{3}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{7a\sqrt{ax^2+bx^5}}{20b^2\sqrt{x}}+\frac{x^{5/2}\sqrt{ax^2+bx^5}}{5b}$$

```
[Out] (-7*a*Sqrt[a*x^2 + b*x^5])/(20*b^2*Sqrt[x]) + (x^(5/2)*Sqrt[a*x^2
 + b*x^5])/(5*b) + (7*a^(5/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[
(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[
3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/
3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(40
*3^(1/4)*b^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.560876, antiderivative size = 265, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.19

$$\frac{7a^{5/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{40\sqrt[4]{3}b^2\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{7a\sqrt{ax^2+bx^5}}{20b^2\sqrt{x}}+\frac{x^{5/2}\sqrt{ax^2+bx^5}}{5b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(13/2)/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (-7*a*Sqrt[a*x^2 + b*x^5])/(20*b^2*Sqrt[x]) + (x^(5/2)*Sqrt[a*x^2
 + b*x^5])/(5*b) + (7*a^(5/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[
(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[
3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/
3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(40
*3^(1/4)*b^2*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 34.0772, size = 243, normalized size = 0.92

$$\frac{7\cdot 3^{\frac{3}{4}}a^{\frac{5}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{120b^2\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}-\frac{7a\sqrt{ax^2+bx^5}}{20b^2\sqrt{x}}+\frac{x^{\frac{5}{2}}\sqrt{ax^2+bx^5}}{5b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(13/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] 7*3**(3/4)*a**(5/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/
3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b*
*(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(acos((a**(1/3) + b**(1
/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqr
t(3)/4 + 1/2)/(120*b**2*sqrt(x)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1
/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) -
7*a*sqrt(a*x**2 + b*x**5)/(20*b**2*sqrt(x)) + x**(5/2)*sqrt(a*x**
2 + b*x**5)/(5*b)
```

Mathematica [C] time = 0.442882, size = 194, normalized size = 0.73

$$\frac{x^{3/2}\left(-3\sqrt[3]{-a}\left(7a^2+3abx^3-4b^2x^6\right)-7i3^{3/4}a^2\sqrt[3]{b}x\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{\cdots}\right)\right)}{60\sqrt[3]{-a}b^2\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^(13/2)/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (x^(3/2)*(-3*(-a)^(1/3)*(7*a^2 + 3*a*b*x^3 - 4*b^2*x^6) - (7*I)*3
^(3/4)*a^2*b^(1/3)*Sqrt[(-1)^(5/6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))]
*x*Sqrt[((-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*
EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3
^(1/4)], (-1)^(1/3)]))/(60*(-a)^(1/3)*b^2*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.087, size = 2017, normalized size = 7.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(13/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 1/20*x^(3/2)*(b*x^3+a)*(-14*I*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*
3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a^2*b^2+28*I*(-a*b^2)^(1/3)*
3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)
+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellip
ticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2
))*x*a^2*b+4*I*(-a*b^2)^(1/3)*3^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/
3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-
a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(x*(b*x^3+a))^(1/2)*x^3
*b^2-14*I*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/
2)+1)/(I*3^(1/2)-3))^(1/2))*a^2+14*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x
+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3
^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(
```

```
-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(
1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a^2*b^2-28*(-a*b^2)^(1/3)*(-(I*
3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/
3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2
)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x*a^2*b-12
*x^3*(x*(b*x^3+a))^(1/2)*b^2*(-a*b^2)^(1/3)*(1/b^2*x*(-b*x+(-a*b^
2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)+14*(-a*b^2)^(2/3)
*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^
2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*
3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a^2-
7*I*(-a*b^2)^(1/3)*3^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1
/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3
)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(x*(b*x^3+a))^(1/2)*a*b+21*a*(x*(b
*x^3+a))^(1/2)*b*(-a*b^2)^(1/3)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I
*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)
^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2))/(b*x^5+a*x^2)^(1/2)/b^3/(-a*
b^2)^(1/3)/(x*(b*x^3+a))^(1/2)/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{13}{2}}}{\sqrt{bx^5 + ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(13/2)/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] integrate(x^(13/2)/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^{\frac{13}{2}}}{\sqrt{bx^5 + ax^2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(13/2)/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] integral(x^(13/2)/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(13/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{13}{2}}}{\sqrt{bx^5 + ax^2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(13/2)/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^(13/2)/sqrt(b*x^5 + a*x^2), x)
```

3.296 $\int \frac{x^{11/2}}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=525

$$\frac{5\left(1-\sqrt{3}\right)a^{4/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{16\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{5\sqrt[4]{3}a^{4/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{8b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{5\left(1+\sqrt{3}\right)ax^{3/2}\left(a+bx^3\right)}{8b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}+\frac{x^{3/2}\sqrt{ax^2+bx^5}}{4b}$$

```
[Out] (-5*(1 + Sqrt[3])*a*x^(3/2)*(a + b*x^3))/(8*b^(5/3)*(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)*Sqrt[a*x^2 + b*x^5]) + (x^(3/2)*Sqrt[a*x^2
 + b*x^5])/(4*b) + (5*3^(1/4)*a^(4/3)*x^(3/2)*(a^(1/3) + b^(1/3)*
x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3
])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])
/4])/(8*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) +
 (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) + (5*(1 - Sqrt[
3])*a^(4/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*
EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (
1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(16*3^(1/4)*b^(5/3)*S
qrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.97526, antiderivative size = 525, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$

$$\frac{5\left(1-\sqrt{3}\right)a^{4/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{16\sqrt[4]{3}b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{5\sqrt[4]{3}a^{4/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{8b^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{5\left(1+\sqrt{3}\right)ax^{3/2}\left(a+bx^3\right)}{8b^{5/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}+\frac{x^{3/2}\sqrt{ax^2+bx^5}}{4b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(11/2)/Sqrt[a*x^2 + b*x^5],x]
```


```
[Out] (-5*(1 + Sqrt[3])*a*x^(3/2)*(a + b*x^3))/(8*b^(5/3)*(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)*Sqrt[a*x^2 + b*x^5]) + (x^(3/2)*Sqrt[a*x^2
```

```
 + b*x^5])/(4*b) + (5*3^(1/4)*a^(4/3)*x^(3/2)*(a^(1/3) + b^(1/3)*
x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1
 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3
])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])
/4])/(8*b^(5/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) +
 (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) + (5*(1 - Sqrt[
3])*a^(4/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)
*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*
EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (
1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(16*3^(1/4)*b^(5/3)*S
qrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 56.2252, size = 478, normalized size = 0.91

$$\frac{5\sqrt[4]{3}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^{2}+bx^{5}}E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{8b^{\frac{5}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\left(a+bx^{3}\right)}+\frac{5\cdot 3^{\frac{3}{4}}a^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^{2}}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^{2}+bx^{5}}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{48b^{\frac{5}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^{2}}}\left(a+bx^{3}\right)}-\frac{a\left(\frac{5}{8}+\frac{5\sqrt{3}}{8}\right)\sqrt{ax^{2}+bx^{5}}}{b^{\frac{5}{3}}\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}+\frac{x^{\frac{3}{2}}\sqrt{ax^{2}+bx^{5}}}{4b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(11/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] 5*3**(1/4)*a**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/
3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b*
*(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_e(acos((a**(1/3) + b**(1
/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqr
t(3)/4 + 1/2)/(8*b**(5/3)*sqrt(x)*sqrt(b**(1/3)*x*(a**(1/3) + b**
(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3))
+ 5*3**(3/4)*a**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(
2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) +
1)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(acos(
(a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1
+ sqrt(3)))), sqrt(3)/4 + 1/2)/(48*b**(5/3)*sqrt(x)*sqrt(b**(1/3)
*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))*
*2)*(a + b*x**3)) - a*(5/8 + 5*sqrt(3)/8)*sqrt(a*x**2 + b*x**5)/(
b**(5/3)*sqrt(x)*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))) + x**(3/2
)*sqrt(a*x**2 + b*x**5)/(4*b)
```

Mathematica [C] time = 1.50462, size = 362, normalized size = 0.69

$$\frac{\sqrt{x}\left(5ax\left(-\frac{a^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{a}x}{\sqrt[3]{b}}-x^2\right)-\frac{5(-1)^{2/3}a^{4/3}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\left(1+i\sqrt{3}\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{\left(3+i\sqrt{3}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}}{\sqrt{2}}\right)\cdots\right.\right.}{2\left((-1)^{2/3}-1\right)b}\cdots\right)}{8b\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^(11/2)/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (Sqrt[x]*(5*a*x*(-(a^(2/3)/b^(2/3)) + (a^(1/3)*x)/b^(1/3) - x^2)
+ 2*x^3*(a + b*x^3) - (5*(-1)^(2/3)*a^(4/3)*(a^(1/3) + b^(1/3)*x)
^2*Sqrt[((1 + (-1)^(1/3))*b^(1/3)*x*(a^(1/3) - (-1)^(1/3)*b^(1/3)
*x))/(a^(1/3) + b^(1/3)*x)^2]*Sqrt[(a^(1/3) + (-1)^(2/3)*b^(1/3)*
x)/(a^(1/3) + b^(1/3)*x)]*((-3 - I*Sqrt[3])*EllipticE[ArcSin[Sqrt
[((3 + I*Sqrt[3])*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]/Sqrt[2]], (-I
 + Sqrt[3])/(I + Sqrt[3])] + (1 + I*Sqrt[3])*EllipticF[ArcSin[Sqr
t[((3 + I*Sqrt[3])*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]/Sqrt[2]], (-
I + Sqrt[3])/(I + Sqrt[3])]))/(2*(-1 + (-1)^(2/3))*b)))/(8*b*Sqrt
[x^2*(a + b*x^3)])
```

Maple [C] time = 0.065, size = 2586, normalized size = 4.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(11/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 1/4*x^(3/2)*(b*x^3+a)*(10*I*(-a*b^2)^(2/3)*3^(1/2)*((I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)
*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I
*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*x*a-5*I*(-a*b^2)^(1
/3)*3^(1/2)*x^2*a*b-10*(-a*b^2)^(1/3)*((I*3^(1/2)*(-a*b^2)^(1/3)+
2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(
I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*x^2*a*b+15*(-a*b^2)^(1/3)*((I*3^
(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/
2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*x^2*a*b+5*I
*3^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1
/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*El
lipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(
1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2)*a^2*b+20*(-a*b^2)^(2/3)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*
b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2
)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
```

```
x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+
1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*x*a-30*(-a*b^2)^(2/3)*((I*3^(1/2)*(-a*b^2)
^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/
2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*x*a-5*I*(-a*b^2)^(1/3)*3^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)
+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellip
ticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2
))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*x^2*a*b-5*I*(-a*b^2)^(2/3)*3^(1/2)*x*a+I*3^(1/2)*(1/b^2*x*(-b*x+
(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(
I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(x*(b*x^3+a
))^(1/2)*x^2*b^2+10*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/
3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^
2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^
(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*a^2*b-15*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)
^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-
a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(
I*3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*a^2*b-5*I*3^(1/2)*x^3*a*b^2-3*(1/b^2*x*(-b*x+(
-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(x*(b*x^3+a)
)^(1/2)*x^2*b^2+15*a*b^2*x^3+15*(-a*b^2)^(1/3)*x^2*a*b+15*(-a*b^2
)^(2/3)*x*a)/(b*x^5+a*x^2)^(1/2)/b^3/(x*(b*x^3+a))^(1/2)/(I*3^(1/
2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{11}{2}}}{\sqrt{bx^5 + ax^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(11/2)/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] integrate(x^(11/2)/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^{\frac{11}{2}}}{\sqrt{bx^5 + ax^2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(11/2)/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] integral(x^(11/2)/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(11/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{11}{2}}}{\sqrt{bx^5 + ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(11/2)/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^(11/2)/sqrt(b*x^5 + a*x^2), x)
```

3.297 $\int \frac{x^{9/2}}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=65

$$\frac{\sqrt{x}\sqrt{ax^2+bx^5}}{3b}-\frac{a\tanh^{-1}\left(\frac{\sqrt{b}x^{5/2}}{\sqrt{ax^2+bx^5}}\right)}{3b^{3/2}}$$

```
[Out] (Sqrt[x]*Sqrt[a*x^2 + b*x^5])/(3*b) - (a*ArcTanh[(Sqrt[b]*x^(5/2)
)/Sqrt[a*x^2 + b*x^5]])/(3*b^(3/2))
```

Rubi [A] time = 0.155294, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{\sqrt{x}\sqrt{ax^2+bx^5}}{3b}-\frac{a\tanh^{-1}\left(\frac{\sqrt{b}x^{5/2}}{\sqrt{ax^2+bx^5}}\right)}{3b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(9/2)/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (Sqrt[x]*Sqrt[a*x^2 + b*x^5])/(3*b) - (a*ArcTanh[(Sqrt[b]*x^(5/2)
)/Sqrt[a*x^2 + b*x^5]])/(3*b^(3/2))
```

Rubi in Sympy [A] time = 13.5411, size = 54, normalized size = 0.83

$$-\frac{a\,\text{atanh}\left(\frac{\sqrt{b}x^{\frac{5}{2}}}{\sqrt{ax^2+bx^5}}\right)}{3b^{\frac{3}{2}}}+\frac{\sqrt{x}\sqrt{ax^2+bx^5}}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(9/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -a*atanh(sqrt(b)*x**(5/2)/sqrt(a*x**2 + b*x**5))/(3*b**(3/2)) + s
qrt(x)*sqrt(a*x**2 + b*x**5)/(3*b)
```

Mathematica [A] time = 0.0813205, size = 81, normalized size = 1.25

$$\frac{\sqrt{b}x^{5/2}\left(a+bx^3\right)-ax\sqrt{a+bx^3}\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)}{3b^{3/2}\sqrt{x^2\left(a+bx^3\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(9/2)/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (Sqrt[b]*x^(5/2)*(a + b*x^3) - a*x*Sqrt[a + b*x^3]*ArcTanh[(Sqrt[
b]*x^(3/2))/Sqrt[a + b*x^3]])/(3*b^(3/2)*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.064, size = 3347, normalized size = 51.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(9/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 1/3/(b*x^5+a*x^2)^(1/2)*x^(3/2)*(b*x^3+a)/b^3*(6*I*3^(1/2)*(-(I*3
^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)
+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a*b^2-6
*I*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1
/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*El
lipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(
I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a*b^2-12*I*(-a*b^2)^(1/3)*
3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)
+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellip
ticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2
))*x*a*b+12*I*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*
3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x*a*
b+6*I*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1
)/(I*3^(1/2)-3))^(1/2))*a-6*I*(-a*b^2)^(2/3)*3^(1/2)*(-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I
*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)
-3))^(1/2))*a-6*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I
*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-
3))^(1/2))*x^2*a*b^2+6*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1
/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*
3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*a*b^2+12*(-a*b
^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/
2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ell
ipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1
/2))*x*a*b-12*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b
^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*EllipticPi((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2),(I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+
3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x*a*b+I*(x*(
b*x^3+a))^(1/2)*3^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3)))^(1/2)*x*b^2-6*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
```

```
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3
^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a+6*(-a*b^2)^(2/3)*
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2
)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticPi((-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3
^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1
)/(I*3^(1/2)-3))^(1/2))*a-3*x*(x*(b*x^3+a))^(1/2)*b^2*(1/b^2*x*(-
b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3
))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2))/(x*(b*
x^3+a))^(1/2)/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(
1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/
3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(9/2)/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.350323, size = 1, normalized size = 0.02

$$\left[\frac{a\sqrt{b}\log\left(4\sqrt{bx^5+ax^2}\left(2b^2x^3+ab\right)\sqrt{x}-\left(8b^2x^6+8abx^3+a^2\right)\sqrt{b}\right)+4\sqrt{bx^5+ax^2}b\sqrt{x}}{12b^2}, \frac{a\sqrt{-b}\arctan\left(\frac{2\sqrt{bx^5+ax^2}\sqrt{-b}\sqrt{x}}{2bx^3+a}\right)}{6b^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(9/2)/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] [1/12*(a*sqrt(b)*log(4*sqrt(b*x^5 + a*x^2)*(2*b^2*x^3 + a*b)*sqrt
(x) - (8*b^2*x^6 + 8*a*b*x^3 + a^2)*sqrt(b)) + 4*sqrt(b*x^5 + a*x
^2)*b*sqrt(x))/b^2, 1/6*(a*sqrt(-b)*arctan(2*sqrt(b*x^5 + a*x^2)*
sqrt(-b)*sqrt(x)/(2*b*x^3 + a)) + 2*sqrt(b*x^5 + a*x^2)*b*sqrt(x)
)/b^2]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(9/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.24778, size = 59, normalized size = 0.91

$$\frac{\sqrt{bx^3+a}x^{\frac{3}{2}}}{3b}+\frac{a\ln\left(\left|-\sqrt{b}x^{\frac{3}{2}}+\sqrt{bx^3+a}\right|\right)}{3b^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(9/2)/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] 1/3*sqrt(b*x^3 + a)*x^(3/2)/b + 1/3*a*ln(abs(-sqrt(b)*x^(3/2) + s
qrt(b*x^3 + a)))/b^(3/2)
```

3.298 $\int \frac{x^{7/2}}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=237

$$\frac{\sqrt{ax^2+bx^5}}{2b\sqrt{x}}-\frac{a^{2/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{4\sqrt[4]{3}b\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}$$

```
[Out] Sqrt[a*x^2 + b*x^5]/(2*b*Sqrt[x]) - (a^(2/3)*x^(3/2)*(a^(1/3) + b
^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 -
 Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + S
qrt[3])/4])/(4*3^(1/4)*b*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(
a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.437035, antiderivative size = 237, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.19

$$\frac{\sqrt{ax^2+bx^5}}{2b\sqrt{x}}-\frac{a^{2/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{4\sqrt[4]{3}b\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(7/2)/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] Sqrt[a*x^2 + b*x^5]/(2*b*Sqrt[x]) - (a^(2/3)*x^(3/2)*(a^(1/3) + b
^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/
3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 -
 Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + S
qrt[3])/4])/(4*3^(1/4)*b*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(
a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 25.1638, size = 212, normalized size = 0.89

$$-\frac{3^{\frac{3}{4}}a^{\frac{2}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{12b\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}+\frac{\sqrt{ax^2+bx^5}}{2b\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(7/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -3**(3/4)*a**(2/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**
(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(acos((a**(1/3) + b**(1/
3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt
(3)/4 + 1/2)/(12*b*sqrt(x)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x
)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) + sqrt(
```

```
a*x**2 + b*x**5)/(2*b*sqrt(x))
```

Mathematica [C] time = 0.434446, size = 178, normalized size = 0.75

$$\frac{x^{3/2}\left(3\sqrt[3]{-a}\left(a+bx^3\right)+i3^{3/4}a\sqrt[3]{b}x\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)\right)}{6\sqrt[3]{-a}b\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^(7/2)/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (x^(3/2)*(3*(-a)^(1/3)*(a + b*x^3) + I*3^(3/4)*a*b^(1/3)*Sqrt[(-1
)^(5/6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*x*Sqrt[((-a)^(2/3)/b^(2/3)
 + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)
^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)]))/(6*(
-a)^(1/3)*b*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.034, size = 1793, normalized size = 7.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(7/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 1/2/(b*x^5+a*x^2)^(1/2)*x^(3/2)*(b*x^3+a)/b^2/(-a*b^2)^(1/3)*(2*I
*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2
)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elli
pticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/
2))*x^2*a*b^2-4*I*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/
(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x*a*b+2*I*(-a*b^2)^(2/3)*3^(1
/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a
*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF
((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(
(I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a
-2*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*
b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF(
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((
I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^
2*a*b^2+4*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+
(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1
/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I
*3^(1/2)-3))^(1/2))*x*a*b-2*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)
```

```
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a+I*(-a*b^2)^(1/3)*3^(1/2)*
(x*(b*x^3+a))^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a
*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3)))^(1/2)*b-3*(x*(b*x^3+a))^(1/2)*b*(-a*b^2)^(1/3)*
(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1
/2))/(x*(b*x^3+a))^(1/2)/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1
/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(
-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{7}{2}}}{\sqrt{bx^5 + ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] integrate(x^(7/2)/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^{\frac{7}{2}}}{\sqrt{bx^5 + ax^2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] integral(x^(7/2)/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(7/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{7}{2}}}{\sqrt{bx^5 + ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(7/2)/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(x^(7/2)/sqrt(b*x^5 + a*x^2), x)
```

3.299 $\int \frac{x^{5/2}}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=492

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{2\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{\sqrt[4]{3}\sqrt[3]{a}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{\left(1+\sqrt{3}\right)x^{3/2}\left(a+bx^3\right)}{b^{2/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}$$

```
[Out] ((1 + Sqrt[3])*x^(3/2)*(a + b*x^3))/(b^(2/3)*(a^(1/3) + (1 + Sqrt
[3])*b^(1/3)*x)*Sqrt[a*x^2 + b*x^5]) - (3^(1/4)*a^(1/3)*x^(3/2)*(
a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*
x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(
1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*
x)], (2 + Sqrt[3])/4])/(b^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3
)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
 - ((1 - Sqrt[3])*a^(1/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*
b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x
)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(2*3^(1
/4)*b^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1
+ Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.799284, antiderivative size = 492, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{a}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{2\sqrt[4]{3}b^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{\sqrt[4]{3}\sqrt[3]{a}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{b^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{\left(1+\sqrt{3}\right)x^{3/2}\left(a+bx^3\right)}{b^{2/3}\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(5/2)/Sqrt[a*x^2 + b*x^5],x]
```


```
[Out] ((1 + Sqrt[3])*x^(3/2)*(a + b*x^3))/(b^(2/3)*(a^(1/3) + (1 + Sqrt
[3])*b^(1/3)*x)*Sqrt[a*x^2 + b*x^5]) - (3^(1/4)*a^(1/3)*x^(3/2)*(
```

```
a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*
x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(
1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*
x)], (2 + Sqrt[3])/4])/(b^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3
)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
 - ((1 - Sqrt[3])*a^(1/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(
2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*
b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x
)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(2*3^(1
/4)*b^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1
+ Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 44.0669, size = 444, normalized size = 0.9

$$-\frac{\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{b^{\frac{2}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}-\frac{3^{\frac{3}{4}}\sqrt[3]{a}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{6b^{\frac{2}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}+\frac{\left(1+\sqrt{3}\right)\sqrt{ax^2+bx^5}}{b^{\frac{2}{3}}\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(5/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -3**(1/4)*a**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**
(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_e(acos((a**(1/3) + b**(1/
3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt
(3)/4 + 1/2)/(b**(2/3)*sqrt(x)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/
3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) - 3
**(3/4)*a**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*
x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1)*(a
**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(acos((a**(
1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqr
t(3)))), sqrt(3)/4 + 1/2)/(6*b**(2/3)*sqrt(x)*sqrt(b**(1/3)*x*(a*
*(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a
 + b*x**3)) + (1 + sqrt(3))*sqrt(a*x**2 + b*x**5)/(b**(2/3)*sqrt(
x)*(a**(1/3) + b**(1/3)*x*(1 + sqrt(3))))
```

Mathematica [C] time = 1.34732, size = 340, normalized size = 0.69

$$\frac{\sqrt{x}\left(x\left(\frac{a^{2/3}}{b^{2/3}}-\frac{\sqrt[3]{a}x}{\sqrt[3]{b}}+x^2\right)+\frac{(-1)^{2/3}\sqrt[3]{a}\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\left(\left(1+i\sqrt{3}\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{\left(3+i\sqrt{3}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}}{\sqrt{2}}\right)\middle|\frac{-i}{i+\cdots}\right)\cdots\right)}{2\left((-1)^{2/3}-1\right)b}\right)}{\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[x^(5/2)/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (Sqrt[x]*(x*(a^(2/3)/b^(2/3) - (a^(1/3)*x)/b^(1/3) + x^2) + ((-1)
^(2/3)*a^(1/3)*(a^(1/3) + b^(1/3)*x)^2*Sqrt[((1 + (-1)^(1/3))*b^(
1/3)*x*(a^(1/3) - (-1)^(1/3)*b^(1/3)*x))/(a^(1/3) + b^(1/3)*x)^2]
*Sqrt[(a^(1/3) + (-1)^(2/3)*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]*((-
3 - I*Sqrt[3])*EllipticE[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/
(a^(1/3) + b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])] +
(1 + I*Sqrt[3])*EllipticF[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)
/(a^(1/3) + b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])]))
/(2*(-1 + (-1)^(2/3))*b)))/Sqrt[x^2*(a + b*x^3)]
```

Maple [C] time = 0.036, size = 2374, normalized size = 4.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(5/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -2*x^(3/2)*(b*x^3+a)*(-I*(-a*b^2)^(1/3)*3^(1/2)*EllipticE((-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/
2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)
*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*x^2*b+2*I*(-a*b^2)^(2/
3)*3^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^
2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))
/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^
(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*x-2*(-a*b^2)^(1/3)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*
3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*x^2*b+3*(-a*b^2)^(1/3)*EllipticE((-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)
*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3
)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*x^2*b+I*3^(1/2)*EllipticE((
-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I
*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(-(
I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3
^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(
1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*a*b+4*(-a*b^2)^(
2/3)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2
)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^
(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
x-6*(-a*b^2)^(2/3)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2
)+1)/(I*3^(1/2)-3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2
)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(
-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^
(1/3)))^(1/2)*x-I*3^(1/2)*x^3*b^2-I*(-a*b^2)^(1/3)*3^(1/2)*x^2*b+
2*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3
```

```
))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/
2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b
*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*a*b
-3*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-
3))^(1/2))*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)
))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1
/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*
b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*a*
b-I*(-a*b^2)^(2/3)*3^(1/2)*x+3*b^2*x^3+3*(-a*b^2)^(1/3)*x^2*b+3*(
-a*b^2)^(2/3)*x)/(b*x^5+a*x^2)^(1/2)/b^2/(x*(b*x^3+a))^(1/2)/(I*3
^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3
)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^
(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{5}{2}}}{\sqrt{bx^5 + ax^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")

[Out] integrate(x^(5/2)/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^{\frac{5}{2}}}{\sqrt{bx^5 + ax^2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")

[Out] integral(x^(5/2)/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{5}{2}}}{\sqrt{x^2 (a + bx^3)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(5/2)/(b*x**5+a*x**2)**(1/2),x)

[Out] Integral(x**(5/2)/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{5}{2}}}{\sqrt{bx^5 + ax^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(5/2)/sqrt(b*x^5 + a*x^2),x, algorithm="giac")

[Out] integrate(x^(5/2)/sqrt(b*x^5 + a*x^2), x)
```

3.300 $\int \frac{x^{3/2}}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=36

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x^{5/2}}{\sqrt{ax^2+bx^5}}\right)}{3\sqrt{b}}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x^(5/2))/Sqrt[a*x^2 + b*x^5]])/(3*Sqrt[b])
```

Rubi [A] time = 0.0831873, antiderivative size = 36, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x^{5/2}}{\sqrt{ax^2+bx^5}}\right)}{3\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(3/2)/Sqrt[a*x^2 + b*x^5],x]

[Out] (2*ArcTanh[(Sqrt[b]*x^(5/2))/Sqrt[a*x^2 + b*x^5]])/(3*Sqrt[b])
```

Rubi in Sympy [A] time = 8.01856, size = 32, normalized size = 0.89

$$\frac{2\,\text{atanh}\left(\frac{\sqrt{b}x^{\frac{5}{2}}}{\sqrt{ax^2+bx^5}}\right)}{3\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(3/2)/(b*x**5+a*x**2)**(1/2),x)

[Out] 2*atanh(sqrt(b)*x**(5/2)/sqrt(a*x**2 + b*x**5))/(3*sqrt(b))
```

Mathematica [A] time = 0.0378447, size = 59, normalized size = 1.64

$$\frac{2x\sqrt{a+bx^3}\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)}{3\sqrt{b}\sqrt{x^2(a+bx^3)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(3/2)/Sqrt[a*x^2 + b*x^5],x]

[Out] (2*x*Sqrt[a + b*x^3]*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a + b*x^3]])/
(3*Sqrt[b]*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.036, size = 480, normalized size = 13.3

$$-4\frac{x^{3/2}\left(bx^3+a\right)\left(i\sqrt{3}-1\right)\left(-bx+\sqrt[3]{-ab^2}\right)^2}{\sqrt{bx^5+ax^2}b^2\sqrt{x\left(bx^3+a\right)}\left(i\sqrt{3}-3\right)}\sqrt{-\frac{\left(i\sqrt{3}-3\right)xb}{\left(i\sqrt{3}-1\right)\left(-bx+\sqrt[3]{-ab^2}\right)}}\sqrt{\frac{i\sqrt{3}\sqrt[3]{-ab^2}+2\,bx+\sqrt[3]{-ab^2}}{\left(i\sqrt{3}+1\right)\left(-bx+\sqrt[3]{-ab^2}\right)}}\sqrt{\frac{i\sqrt{3}\sqrt[3]{-ab^2}-}{\left(i\sqrt{3}-1\right)\left(-\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(3/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -4*x^(3/2)*(b*x^3+a)*(I*3^(1/2)-1)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)
-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(-b*x+(-a*b^2)^(1/3))^2*((I*3^(1
/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(EllipticF((-(I*3^(
1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2
)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))-EllipticPi
((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(
I*3^(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2
)+1)/(I*3^(1/2)-3))^(1/2)))/(b*x^5+a*x^2)^(1/2)/b^2/(x*(b*x^3+a))
^(1/2)/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-
a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.337242, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(-4\sqrt{bx^5+ax^2}\left(2\,b^2x^3+ab\right)\sqrt{x}-\left(8\,b^2x^6+8\,abx^3+a^2\right)\sqrt{b}\right)}{6\sqrt{b}},\ -\frac{\sqrt{-b}\arctan\left(\frac{2\sqrt{bx^5+ax^2}\sqrt{-b}\sqrt{x}}{2\,bx^3+a}\right)}{3\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] [1/6*log(-4*sqrt(b*x^5 + a*x^2)*(2*b^2*x^3 + a*b)*sqrt(x) - (8*b^
2*x^6 + 8*a*b*x^3 + a^2)*sqrt(b))/sqrt(b), -1/3*sqrt(-b)*arctan(2
*sqrt(b*x^5 + a*x^2)*sqrt(-b)*sqrt(x)/(2*b*x^3 + a))/b]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{\frac{3}{2}}}{\sqrt{x^2\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(3/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x**(3/2)/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.229169, size = 55, normalized size = 1.53

$$-\frac{2\,\arctan\left(\frac{\sqrt{b+\frac{a}{x^3}}}{\sqrt{-b}}\right)}{3\,\sqrt{-b}}+\frac{2\,\arctan\left(\frac{\sqrt{b}}{\sqrt{-b}}\right)}{3\,\sqrt{-b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^(3/2)/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] -2/3*arctan(sqrt(b + a/x^3)/sqrt(-b))/sqrt(-b) + 2/3*arctan(sqrt(
b)/sqrt(-b))/sqrt(-b)
```

3.301 $\int \frac{\sqrt{x}}{\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=203

$$\frac{x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}$$

```
[Out] (x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[A
rcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3]
)*b^(1/3)*x)], (2 + Sqrt[3])/4])/(3^(1/4)*a^(1/3)*Sqrt[(b^(1/3)*x
*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sq
rt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.312816, antiderivative size = 203, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{\sqrt[4]{3}\sqrt[3]{a}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x]/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] (x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x
+ b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[A
rcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3]
)*b^(1/3)*x)], (2 + Sqrt[3])/4])/(3^(1/4)*a^(1/3)*Sqrt[(b^(1/3)*x
*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sq
rt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 17.2258, size = 189, normalized size = 0.93

$$\frac{3^{\frac{3}{4}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{3\sqrt[3]{a}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(1/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] 3**(3/4)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*s
qrt(a*x**2 + b*x**5)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqr
t(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/
2)/(3*a**(1/3)*sqrt(x)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a
**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3))
```

Mathematica [C] time = 0.200826, size = 151, normalized size = 0.74

$$-\frac{2i\sqrt[3]{b}x^{5/2}\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{(-a)^{2/3}}{b^{2/3}x^2}+\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}+1}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{\sqrt[4]{3}\sqrt[3]{-a}\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[Sqrt[x]/Sqrt[a*x^2 + b*x^5],x]
```

```
[Out] ((-2*I)*b^(1/3)*Sqrt[(-1)^(5/6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*Sq
rt[1 + (-a)^(2/3)/(b^(2/3)*x^2) + (-a)^(1/3)/(b^(1/3)*x)]*x^(5/2)
*EllipticF[ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/
3^(1/4)], (-1)^(1/3)])/(3^(1/4)*(-a)^(1/3)*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.062, size = 437, normalized size = 2.2

$$-4\,\frac{x^{3/2}\left(bx^3+a\right)\left(i\sqrt{3}x^2b^2-2\,i\sqrt[3]{-ab^2}\sqrt{3}xb+i\left(-ab^2\right)^{2/3}\sqrt{3}-b^2x^2+2\,\sqrt[3]{-ab^2}xb-\left(-ab^2\right)^{2/3}\right)}{\sqrt{bx^5+ax^2}\sqrt[3]{-ab^2}b\sqrt{x\left(bx^3+a\right)}\left(i\sqrt{3}-3\right)}\sqrt{-\frac{\left(i\sqrt{3}-3\right)xb}{\left(i\sqrt{3}-1\right)\left(-bx+\sqrt[3]{\cdots}\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(1/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -4/(b*x^5+a*x^2)^(1/2)*x^(3/2)*(b*x^3+a)/(-a*b^2)^(1/3)/b*(-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/
2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b
^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
)/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/
2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+
3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*(I*3^(1/2)*x
^2*b^2-2*I*(-a*b^2)^(1/3)*3^(1/2)*x*b+I*(-a*b^2)^(2/3)*3^(1/2)-b^
2*x^2+2*(-a*b^2)^(1/3)*x*b-(-a*b^2)^(2/3))/(x*(b*x^3+a))^(1/2)/(I
*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1
/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2
)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x}}{\sqrt{bx^5+ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(b*x^5 + a*x^2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(x)/sqrt(b*x^5 + a*x^2), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{x}}{\sqrt{bx^5+ax^2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(b*x^5 + a*x^2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(x)/sqrt(b*x^5 + a*x^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x}}{\sqrt{x^2\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(1/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(sqrt(x)/sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{x}}{\sqrt{bx^5+ax^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x)/sqrt(b*x^5 + a*x^2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(x)/sqrt(b*x^5 + a*x^2), x)
```

3.302 $\int \frac{1}{\sqrt{x}\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=519

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{\sqrt[4]{3}a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{2\sqrt[4]{3}\sqrt[3]{b}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{2\sqrt{ax^2+bx^5}}{ax^{3/2}}+\frac{2\left(1+\sqrt{3}\right)\sqrt[3]{b}x^{3/2}\left(a+bx^3\right)}{a\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}$$

```
[Out] (2*(1 + Sqrt[3])*b^(1/3)*x^(3/2)*(a + b*x^3))/(a*(a^(1/3) + (1 +
Sqrt[3])*b^(1/3)*x)*Sqrt[a*x^2 + b*x^5]) - (2*Sqrt[a*x^2 + b*x^5]
)/(a*x^(3/2)) - (2*3^(1/4)*b^(1/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*
Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 +
Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*
b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4]
)/(a^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 +
 Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) - ((1 - Sqrt[3])*b^(
1/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Ellipti
cF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqr
t[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(3^(1/4)*a^(2/3)*Sqrt[(b^(1/
3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.944423, antiderivative size = 519, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$

$$-\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{\sqrt[4]{3}a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{2\sqrt[4]{3}\sqrt[3]{b}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{a^{2/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{2\sqrt{ax^2+bx^5}}{ax^{3/2}}+\frac{2\left(1+\sqrt{3}\right)\sqrt[3]{b}x^{3/2}\left(a+bx^3\right)}{a\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[x]*Sqrt[a*x^2 + b*x^5]),x]
```


```
[Out] (2*(1 + Sqrt[3])*b^(1/3)*x^(3/2)*(a + b*x^3))/(a*(a^(1/3) + (1 +
Sqrt[3])*b^(1/3)*x)*Sqrt[a*x^2 + b*x^5]) - (2*Sqrt[a*x^2 + b*x^5]
```

```
)/(a*x^(3/2)) - (2*3^(1/4)*b^(1/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*
Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 +
Sqrt[3])*b^(1/3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*
b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4]
)/(a^(2/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 +
 Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) - ((1 - Sqrt[3])*b^(
1/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3
)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Ellipti
cF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqr
t[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(3^(1/4)*a^(2/3)*Sqrt[(b^(1/
3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2
]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 56.6651, size = 471, normalized size = 0.91

$$\frac{\sqrt[3]{b}\left(2+2\sqrt{3}\right)\sqrt{ax^2+bx^5}}{a\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}-\frac{2\sqrt{ax^2+bx^5}}{ax^{\frac{3}{2}}}-\frac{2\sqrt[4]{3}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{a^{\frac{2}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}-\frac{3^{\frac{3}{4}}\sqrt[3]{b}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{3a^{\frac{2}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(1/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] b**(1/3)*(2 + 2*sqrt(3))*sqrt(a*x**2 + b*x**5)/(a*sqrt(x)*(a**(1/
3) + b**(1/3)*x*(1 + sqrt(3)))) - 2*sqrt(a*x**2 + b*x**5)/(a*x**(
3/2)) - 2*3**(1/4)*b**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x
+ b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1
/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_e(acos((a**(1/3)
 + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)
))), sqrt(3)/4 + 1/2)/(a**(2/3)*sqrt(x)*sqrt(b**(1/3)*x*(a**(1/3)
 + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x
**3)) - 3**(3/4)*b**(1/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x +
b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3
) + 1)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(a
cos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x
*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(3*a**(2/3)*sqrt(x)*sqrt(b**(1
/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)
))**2)*(a + b*x**3))
```

Mathematica [C] time = 1.29316, size = 341, normalized size = 0.66

$$\frac{2\sqrt{x}\left(a^{2/3}\sqrt[3]{b}x-\sqrt[3]{a}b^{2/3}x^2+\frac{(-1)^{2/3}\sqrt[3]{a}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\left(1+i\sqrt{3}\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{\left(3+i\sqrt{3}\right)\sqrt[3]{b}x}{\sqrt[3]{b}x+\sqrt[3]{a}}}}{\sqrt{2}}\right)\right| \cdots}{2\left((-1)^{2/3}-1\right)}\right)}{a\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(Sqrt[x]*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (2*Sqrt[x]*(-a + a^(2/3)*b^(1/3)*x - a^(1/3)*b^(2/3)*x^2 + ((-1)^
(2/3)*a^(1/3)*(a^(1/3) + b^(1/3)*x)^2*Sqrt[((1 + (-1)^(1/3))*b^(1
/3)*x*(a^(1/3) - (-1)^(1/3)*b^(1/3)*x))/(a^(1/3) + b^(1/3)*x)^2]*
Sqrt[(a^(1/3) + (-1)^(2/3)*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]*((-3
 - I*Sqrt[3])*EllipticE[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/(
a^(1/3) + b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])] + (
1 + I*Sqrt[3])*EllipticF[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/
(a^(1/3) + b^(1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])]))/
(2*(-1 + (-1)^(2/3)))))/(a*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.042, size = 2860, normalized size = 5.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(1/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -2*x^(1/2)*(-2*I*(-a*b^2)^(1/3)*3^(1/2)*(x*(b*x^3+a))^(1/2)*x^2*b
-2*I*(-a*b^2)^(1/3)*3^(1/2)*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x
*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2
)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1
/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*b-4*(-a*b^2)^(1/3)
*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3
))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2
)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(
1/2)-3))^(1/2))*x^2*b+6*(-a*b^2)^(1/3)*(x*(b*x^3+a))^(1/2)*(-(I*3
^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1
/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)
+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^2*b+I*3^(
1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)
))^(1/2)*a*b+8*(-a*b^2)^(2/3)*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)
*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b
^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*
b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^
(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x-12*(-a*b^2)^(2/3)*
(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b
```

```
^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3)
)/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)
^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1
/2)-3))^(1/2))*x+4*I*(-a*b^2)^(2/3)*3^(1/2)*(x*(b*x^3+a))^(1/2)*(
-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)
^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^
(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x+I*3^
(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*
b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3
)))^(1/2)*x^3*b^2-2*I*(-a*b^2)^(2/3)*3^(1/2)*(x*(b*x^3+a))^(1/2)*
x+4*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*a*b-6*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/
(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(
1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*
3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)
-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*a*b-2*I*3^(1/2)*(x*(b*x^3
+a))^(1/2)*x^3*b^2+6*(x*(b*x^3+a))^(1/2)*x^3*b^2-3*(1/b^2*x*(-b*x
+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^3*b^2+6*
(-a*b^2)^(1/3)*(x*(b*x^3+a))^(1/2)*x^2*b+2*I*3^(1/2)*(x*(b*x^3+a)
)^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^
(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)
+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x
-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellip
ticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2
))*a*b+6*(-a*b^2)^(2/3)*(x*(b*x^3+a))^(1/2)*x-3*(1/b^2*x*(-b*x+(-
a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*
3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*a*b)/(b*x^5+a
*x^2)^(1/2)/b/a/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3
^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(
1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5 + ax^2}\sqrt{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*sqrt(x)),x, algorithm="maxima")

[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*sqrt(x)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^5 + ax^2}\sqrt{x}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*sqrt(x)),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^5 + a*x^2)*sqrt(x)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x}\sqrt{x^2\,(a+bx^3)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(1/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(sqrt(x)*sqrt(x**2*(a + b*x**3))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5+ax^2}\sqrt{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*sqrt(x)),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*sqrt(x)), x)
```

3.303 $\int \frac{1}{x^{3/2}\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=27

$$-\frac{2\sqrt{ax^2+bx^5}}{3ax^{5/2}}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^5])/(3*a*x^(5/2))
```

Rubi [A] time = 0.0703899, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$

$$-\frac{2\sqrt{ax^2+bx^5}}{3ax^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(3/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (-2*Sqrt[a*x^2 + b*x^5])/(3*a*x^(5/2))
```

Rubi in Sympy [A] time = 7.06877, size = 24, normalized size = 0.89

$$-\frac{2\sqrt{ax^2+bx^5}}{3ax^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(3/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**2 + b*x**5)/(3*a*x**(5/2))
```

Mathematica [A] time = 0.031877, size = 27, normalized size = 1.

$$-\frac{2\sqrt{x^2(a+bx^3)}}{3ax^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^(3/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (-2*Sqrt[x^2*(a + b*x^3)])/(3*a*x^(5/2))
```

Maple [A] time = 0.006, size = 29, normalized size = 1.1

$$-\frac{2\,bx^3+2\,a}{3\,a}\frac{1}{\sqrt{x}}\frac{1}{\sqrt{bx^5+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(3/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -2/3/x^(1/2)*(b*x^3+a)/a/(b*x^5+a*x^2)^(1/2)
```

Maxima [A] time = 1.40101, size = 35, normalized size = 1.3

$$-\frac{2\left(bx^4+ax\right)}{3\sqrt{bx^3+a}ax^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(3/2)),x, algorithm="maxima")
```

```
[Out] -2/3*(b*x^4 + a*x)/(sqrt(b*x^3 + a)*a*x^(5/2))
```

Fricas [A] time = 0.220732, size = 28, normalized size = 1.04

$$-\frac{2\sqrt{bx^5+ax^2}}{3\,ax^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(3/2)),x, algorithm="fricas")
```

```
[Out] -2/3*sqrt(b*x^5 + a*x^2)/(a*x^(5/2))
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{\frac{3}{2}}\sqrt{x^2\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(3/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**(3/2)*sqrt(x**2*(a + b*x**3))), x)
```

GIAC/XCAS [A] time = 0.22347, size = 31, normalized size = 1.15

$$-\frac{2\sqrt{b+\frac{a}{x^3}}}{3\,a}+\frac{2\sqrt{b}}{3\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(3/2)),x, algorithm="giac")
```

```
[Out] -2/3*sqrt(b + a/x^3)/a + 2/3*sqrt(b)/a
```

3.304 $\int \frac{1}{x^{5/2}\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=235

$$-\frac{2bx^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{5\sqrt[4]{3}a^{4/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{2\sqrt{ax^2+bx^5}}{5ax^{7/2}}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^5])/(5*a*x^(7/2)) - (2*b*x^(3/2)*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1
- Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
Sqrt[3])/4])/(5*3^(1/4)*a^(4/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3
)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.420054, antiderivative size = 235, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.19

$$-\frac{2bx^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{5\sqrt[4]{3}a^{4/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{2\sqrt{ax^2+bx^5}}{5ax^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(5/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (-2*Sqrt[a*x^2 + b*x^5])/(5*a*x^(7/2)) - (2*b*x^(3/2)*(a^(1/3) +
b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1
/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1
- Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 +
Sqrt[3])/4])/(5*3^(1/4)*a^(4/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3
)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 25.2231, size = 218, normalized size = 0.93

$$-\frac{2\sqrt{ax^2+bx^5}}{5ax^{\frac{7}{2}}}-\frac{2\cdot 3^{\frac{3}{4}}b\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{15a^{\frac{4}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(5/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**2 + b*x**5)/(5*a*x**(7/2)) - 2*3**(3/4)*b*sqrt((a**(
2/3) - a**(1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*
x*(1 + sqrt(3)))**2)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5
)*elliptic_f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3
) + b**(1/3)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(15*a**(4/3)*sqr
t(x)*sqrt(b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)
```

```
*x*(1 + sqrt(3)))**2)*(a + b*x**3))
```

Mathematica [C] time = 0.636934, size = 176, normalized size = 0.75

$$\frac{6\sqrt[3]{-a}\left(a+bx^3\right)-4i3^{3/4}b^{4/3}x^4\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{15(-a)^{4/3}x^{3/2}\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]   Integrate[1/(x^(5/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (6*(-a)^(1/3)*(a + b*x^3) - (4*I)*3^(3/4)*b^(4/3)*Sqrt[(-1)^(5/6)
*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*x^4*Sqrt[((-a)^(2/3)/b^(2/3) + ((
-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[ArcSin[Sqrt[-(-1)^(5/6
) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (-1)^(1/3)])/(15*(-a)^(
4/3)*x^(3/2)*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.041, size = 1795, normalized size = 7.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(1/x^(5/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 2/5/(b*x^5+a*x^2)^(1/2)/x^(3/2)*(b*x^3+a)/(-a*b^2)^(1/3)/a*(4*I*3
^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-
(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Ellipt
icF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2)
)*x^5*b^2-8*I*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3
^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^4*b+4*I*(-a*b^2)^(2/3)*3^(1/2)*
(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2
)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(
I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3
^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3-4
*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^
2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*
3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^5*
b^2+8*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3
))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2
)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2
)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(
1/2)-3))^(1/2))*x^4*b-4*(-a*b^2)^(2/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(
1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2
*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b
```

```
*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2
)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I
*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3-I*(-a*b^2)^(1/3)*3^(1/2)*(1
/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*
b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2
)*(x*(b*x^3+a))^(1/2)+3*(x*(b*x^3+a))^(1/2)*(-a*b^2)^(1/3)*(1/b^2
*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)
^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2))/(
x*(b*x^3+a))^(1/2)/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2
)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5 + ax^2}x^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(5/2)),x, algorithm="maxima")

[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x^(5/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^5 + ax^2}x^{\frac{5}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(5/2)),x, algorithm="fricas")

[Out] integral(1/(sqrt(b*x^5 + a*x^2)*x^(5/2)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{\frac{5}{2}}\sqrt{x^2\left(a + bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(5/2)/(b*x**5+a*x**2)**(1/2),x)

[Out] Integral(1/(x**(5/2)*sqrt(x**2*(a + b*x**3))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5 + ax^2}x^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(5/2)),x, algorithm="giac")

[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x^(5/2)), x)
```

3.305 $\int \frac{1}{x^{7/2}\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=555

$$\frac{4\left(1-\sqrt{3}\right)b^{4/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{7\sqrt[4]{3}a^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{8\sqrt[4]{3}b^{4/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{7a^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{8\left(1+\sqrt{3}\right)b^{4/3}x^{3/2}\left(a+bx^3\right)}{7a^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}+\frac{8b\sqrt{ax^2+bx^5}}{7a^2x^{3/2}}-\frac{2\sqrt{ax^2+bx^5}}{7ax^{9/2}}$$

```
[Out] (-8*(1 + Sqrt[3])*b^(4/3)*x^(3/2)*(a + b*x^3))/(7*a^2*(a^(1/3) +
(1 + Sqrt[3])*b^(1/3)*x)*Sqrt[a*x^2 + b*x^5]) - (2*Sqrt[a*x^2 + b
*x^5])/(7*a*x^(9/2)) + (8*b*Sqrt[a*x^2 + b*x^5])/(7*a^2*x^(3/2))
+ (8*3^(1/4)*b^(4/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3)
- a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^
(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(7*a^(5/3)*S
qrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) + (4*(1 - Sqrt[3])*b^(4/3)*x^(3/
2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2
/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[
(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1
/3)*x)], (2 + Sqrt[3])/4])/(7*3^(1/4)*a^(5/3)*Sqrt[(b^(1/3)*x*(a^
(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a
*x^2 + b*x^5])
```

Rubi [A] time = 1.1142, antiderivative size = 555, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286

$$\frac{4\left(1-\sqrt{3}\right)b^{4/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{7\sqrt[4]{3}a^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{8\sqrt[4]{3}b^{4/3}x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}E\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{7a^{5/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}-\frac{8\left(1+\sqrt{3}\right)b^{4/3}x^{3/2}\left(a+bx^3\right)}{7a^2\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}}+\frac{8b\sqrt{ax^2+bx^5}}{7a^2x^{3/2}}-\frac{2\sqrt{ax^2+bx^5}}{7ax^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(7/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (-8*(1 + Sqrt[3])*b^(4/3)*x^(3/2)*(a + b*x^3))/(7*a^2*(a^(1/3) +
(1 + Sqrt[3])*b^(1/3)*x)*Sqrt[a*x^2 + b*x^5]) - (2*Sqrt[a*x^2 + b
*x^5])/(7*a*x^(9/2)) + (8*b*Sqrt[a*x^2 + b*x^5])/(7*a^2*x^(3/2))
+ (8*3^(1/4)*b^(4/3)*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3)
- a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/
3)*x)^2]*EllipticE[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^
(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(7*a^(5/3)*S
qrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^
(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5]) + (4*(1 - Sqrt[3])*b^(4/3)*x^(3/
2)*(a^(1/3) + b^(1/3)*x)*Sqrt[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2
/3)*x^2)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[
(a^(1/3) + (1 - Sqrt[3])*b^(1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1
/3)*x)], (2 + Sqrt[3])/4])/(7*3^(1/4)*a^(5/3)*Sqrt[(b^(1/3)*x*(a^
(1/3) + b^(1/3)*x))/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a
*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 69.5922, size = 508, normalized size = 0.92

$$-\frac{2\sqrt{ax^2+bx^5}}{7ax^{\frac{9}{2}}}-\frac{b^{\frac{4}{3}}\left(\frac{8}{7}+\frac{8\sqrt{3}}{7}\right)\sqrt{ax^2+bx^5}}{a^2\sqrt{x}\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)}+\frac{8b\sqrt{ax^2+bx^5}}{7a^2x^{\frac{3}{2}}}$$
$$+\frac{8\sqrt[4]{3}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}E\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{7a^{\frac{5}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$
$$+\frac{4\cdot 3^{\frac{3}{4}}b^{\frac{4}{3}}\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(-\sqrt{3}+1\right)\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{21a^{\frac{5}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(7/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**2 + b*x**5)/(7*a*x**(9/2)) - b**(4/3)*(8/7 + 8*sqrt(
3)/7)*sqrt(a*x**2 + b*x**5)/(a**2*sqrt(x)*(a**(1/3) + b**(1/3)*x*
(1 + sqrt(3)))) + 8*b*sqrt(a*x**2 + b*x**5)/(7*a**2*x**(3/2)) + 8
*3**(1/4)*b**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2/3
)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a**(1/3) + b**
(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_e(acos((a**(1/3) + b**(1/
3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))), sqrt
(3)/4 + 1/2)/(7*a**(5/3)*sqrt(x)*sqrt(b**(1/3)*x*(a**(1/3) + b**(
1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(a + b*x**3)) +
 4*3**(3/4)*b**(4/3)*sqrt((a**(2/3) - a**(1/3)*b**(1/3)*x + b**(2
/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**2)*(-sqrt(3) + 1
)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_f(acos((
a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3)*x*(1 +
 sqrt(3)))), sqrt(3)/4 + 1/2)/(21*a**(5/3)*sqrt(x)*sqrt(b**(1/3)*
x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sqrt(3)))**
2)*(a + b*x**3))
```

Mathematica [C] time = 1.74079, size = 369, normalized size = 0.66

$$\frac{2\sqrt{x}\left(-4b^{4/3}x\left(a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2\right)+\frac{(a+bx^3)(4bx^3-a)}{x^3}-\frac{2(-1)^{2/3}\sqrt[3]{a}b\sqrt{\frac{\left(1+\sqrt[3]{-1}\right)\sqrt[3]{b}x\left(\sqrt[3]{a}-\sqrt[3]{-1}\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)^2}}\sqrt{\frac{\sqrt[3]{a}+(-1)^{2/3}\sqrt[3]{b}x}{\sqrt[3]{a}+\sqrt[3]{b}x}}\left(\sqrt[3]{a}+\sqrt[3]{\cdots}\right.}{\cdots}\right)}{7a^2\sqrt{x^2(a+bx^3)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^(7/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (2*Sqrt[x]*(-4*b^(4/3)*x*(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x
^2) + ((a + b*x^3)*(-a + 4*b*x^3))/x^3 - (2*(-1)^(2/3)*a^(1/3)*b*
(a^(1/3) + b^(1/3)*x)^2*Sqrt[((1 + (-1)^(1/3))*b^(1/3)*x*(a^(1/3)
 - (-1)^(1/3)*b^(1/3)*x))/(a^(1/3) + b^(1/3)*x)^2]*Sqrt[(a^(1/3)
+ (-1)^(2/3)*b^(1/3)*x)/(a^(1/3) + b^(1/3)*x)]*((-3 - I*Sqrt[3])*
EllipticE[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/(a^(1/3) + b^(1
/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])] + (1 + I*Sqrt[3])
*EllipticF[ArcSin[Sqrt[((3 + I*Sqrt[3])*b^(1/3)*x)/(a^(1/3) + b^(
1/3)*x)]/Sqrt[2]], (-I + Sqrt[3])/(I + Sqrt[3])]))/(-1 + (-1)^(2/
3))))/(7*a^2*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.046, size = 3048, normalized size = 5.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(7/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] 2/7*(8*I*3^(1/2)*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b
*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I
*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x
+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3
^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*a*b-8*I*(-a*b^2)^(1/3)*3^(1/2
)*(x*(b*x^3+a))^(1/2)*x^5*b-16*(-a*b^2)^(1/3)*(x*(b*x^3+a))^(1/2)
*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*(
(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b
*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^
2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-
(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*
3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^5*
b+24*(-a*b^2)^(1/3)*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+
2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/
2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(
I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^5*b+16*I*(-a*b^2)^(2/3)*3^(1
/2)*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(
-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(
1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*
b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*
3^(1/2)-3))^(1/2))*x^4+32*(-a*b^2)^(2/3)*(x*(b*x^3+a))^(1/2)*(-(I
*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-
```

```
a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1
/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^
(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/
2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^4-48*(-
a*b^2)^(2/3)*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1
)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(
-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a
*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/
2)+1)/(I*3^(1/2)-3))^(1/2))*x^4-I*3^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)
^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2
)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*a^2-8*I*(-a*b^2)^(1
/3)*3^(1/2)*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-
a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1
/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*
b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-
b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2
)+1)/(I*3^(1/2)-3))^(1/2))*x^5*b+3*I*3^(1/2)*(1/b^2*x*(-b*x+(-a*b
^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(
1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^3*a*b+16*(x*(b
*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(
1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*
3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3
)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2
)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3
))^(1/2))*x^3*a*b-24*(x*(b*x^3+a))^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3
^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)
*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(
-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticE((-(I*3^(1/2)-3)*x*b/(I*3^(1
/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/
(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^3*a*b-8*I*(-a*b^2)^(2/3)*3^
(1/2)*(x*(b*x^3+a))^(1/2)*x^4+24*(x*(b*x^3+a))^(1/2)*x^6*b^2-12*(
1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a
*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/
2)*x^6*b^2+24*(-a*b^2)^(1/3)*(x*(b*x^3+a))^(1/2)*x^5*b-8*I*3^(1/2
)*(x*(b*x^3+a))^(1/2)*x^6*b^2+24*(-a*b^2)^(2/3)*(x*(b*x^3+a))^(1/
2)*x^4-9*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)
+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(
1/3)))^(1/2)*x^3*a*b+4*I*3^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2
)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*x^6*b^2+3*(1/b^2*x*(-b*x+(-a
*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3
^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*a^2)/(b*x^5+a*
x^2)^(1/2)/x^(5/2)/a^2/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3
))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a
*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5 + ax^2}x^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^5 + a*x^2)*x^(7/2)),x, algorithm="maxima")

[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x^(7/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^5 + ax^2}x^{\frac{7}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^5 + a*x^2)*x^(7/2)),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^5 + a*x^2)*x^(7/2)), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{\frac{7}{2}}\sqrt{x^2\left(a+bx^3\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/x**(7/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(1/(x**(7/2)*sqrt(x**2*(a + b*x**3))), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5+ax^2}\,x^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(1/(sqrt(b*x^5 + a*x^2)*x^(7/2)),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x^(7/2)), x)
```

3.306 $\int \frac{1}{x^{9/2}\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=56

$$\frac{4b\sqrt{ax^2+bx^5}}{9a^2x^{5/2}}-\frac{2\sqrt{ax^2+bx^5}}{9ax^{11/2}}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^5])/(9*a*x^(11/2)) + (4*b*Sqrt[a*x^2 + b*x^5
])/(9*a^2*x^(5/2))
```

Rubi [A] time = 0.140636, antiderivative size = 56, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$

$$\frac{4b\sqrt{ax^2+bx^5}}{9a^2x^{5/2}}-\frac{2\sqrt{ax^2+bx^5}}{9ax^{11/2}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^(9/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (-2*Sqrt[a*x^2 + b*x^5])/(9*a*x^(11/2)) + (4*b*Sqrt[a*x^2 + b*x^5
])/(9*a^2*x^(5/2))
```

Rubi in Sympy [A] time = 12.27, size = 49, normalized size = 0.88

$$-\frac{2\sqrt{ax^2+bx^5}}{9ax^{\frac{11}{2}}}+\frac{4b\sqrt{ax^2+bx^5}}{9a^2x^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/x**(9/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**2 + b*x**5)/(9*a*x**(11/2)) + 4*b*sqrt(a*x**2 + b*x*
*5)/(9*a**2*x**(5/2))
```

Mathematica [A] time = 0.0441775, size = 35, normalized size = 0.62

$$-\frac{2\left(a-2bx^3\right)\sqrt{x^2\left(a+bx^3\right)}}{9a^2x^{11/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^(9/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (-2*(a - 2*b*x^3)*Sqrt[x^2*(a + b*x^3)])/(9*a^2*x^(11/2))
```

Maple [A] time = 0.007, size = 37, normalized size = 0.7

$$-\frac{\left(2\,bx^3+2\,a\right)\left(-2\,bx^3+a\right)}{9\,a^2}x^{-\frac{7}{2}}\frac{1}{\sqrt{bx^5+ax^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^(9/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -2/9*(b*x^3+a)*(-2*b*x^3+a)/x^(7/2)/a^2/(b*x^5+a*x^2)^(1/2)
```

Maxima [A] time = 1.39673, size = 51, normalized size = 0.91

$$\frac{2\left(2\,b^2x^7+abx^4-a^2x\right)}{9\,\sqrt{bx^3+a}a^2x^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(9/2)),x, algorithm="maxima")
```

```
[Out] 2/9*(2*b^2*x^7 + a*b*x^4 - a^2*x)/(sqrt(b*x^3 + a)*a^2*x^(11/2))
```

Fricas [A] time = 0.225956, size = 42, normalized size = 0.75

$$\frac{2\,\sqrt{bx^5+ax^2}\left(2\,bx^3-a\right)}{9\,a^2x^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(9/2)),x, algorithm="fricas")
```

```
[Out] 2/9*sqrt(b*x^5 + a*x^2)*(2*b*x^3 - a)/(a^2*x^(11/2))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(9/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.225247, size = 49, normalized size = 0.88

$$-\frac{4\,b^{\frac{3}{2}}}{9\,a^2}-\frac{2\left(\left(b+\frac{a}{x^3}\right)^{\frac{3}{2}}-3\,\sqrt{b+\frac{a}{x^3}}b\right)}{9\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(9/2)),x, algorithm="giac")
```

```
[Out] -4/9*b^(3/2)/a^2 - 2/9*((b + a/x^3)^(3/2) - 3*sqrt(b + a/x^3)*b)/
a^2
```

3.307 $\int \frac{1}{x^{11/2}\sqrt{ax^2+bx^5}}\,dx$

Optimal. Leaf size=265

$$\frac{16b^2x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{55\sqrt[4]{3}a^{7/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{16b\sqrt{ax^2+bx^5}}{55a^2x^{7/2}}-\frac{2\sqrt{ax^2+bx^5}}{11ax^{13/2}}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^5])/(11*a*x^(13/2)) + (16*b*Sqrt[a*x^2 + b*x
^5])/(55*a^2*x^(7/2)) + (16*b^2*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqr
t[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqr
t[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(
1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(
55*3^(1/4)*a^(7/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3
) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi [A] time = 0.521462, antiderivative size = 265, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.19$

$$\frac{16b^2x^{3/2}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{\frac{a^{2/3}-\sqrt[3]{a}\sqrt[3]{b}x+b^{2/3}x^2}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}F\left(\cos^{-1}\left(\frac{\left(1-\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}{\left(1+\sqrt{3}\right)\sqrt[3]{b}x+\sqrt[3]{a}}\right)|\frac{1}{4}\left(2+\sqrt{3}\right)\right)}{55\sqrt[4]{3}a^{7/3}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\left(1+\sqrt{3}\right)\sqrt[3]{b}x\right)^2}}\sqrt{ax^2+bx^5}}+\frac{16b\sqrt{ax^2+bx^5}}{55a^2x^{7/2}}-\frac{2\sqrt{ax^2+bx^5}}{11ax^{13/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^(11/2)*Sqrt[a*x^2 + b*x^5]),x]
```


```
[Out] (-2*Sqrt[a*x^2 + b*x^5])/(11*a*x^(13/2)) + (16*b*Sqrt[a*x^2 + b*x
^5])/(55*a^2*x^(7/2)) + (16*b^2*x^(3/2)*(a^(1/3) + b^(1/3)*x)*Sqr
t[(a^(2/3) - a^(1/3)*b^(1/3)*x + b^(2/3)*x^2)/(a^(1/3) + (1 + Sqr
t[3])*b^(1/3)*x)^2]*EllipticF[ArcCos[(a^(1/3) + (1 - Sqrt[3])*b^(
1/3)*x)/(a^(1/3) + (1 + Sqrt[3])*b^(1/3)*x)], (2 + Sqrt[3])/4])/(
55*3^(1/4)*a^(7/3)*Sqrt[(b^(1/3)*x*(a^(1/3) + b^(1/3)*x))/(a^(1/3
) + (1 + Sqrt[3])*b^(1/3)*x)^2]*Sqrt[a*x^2 + b*x^5])
```

Rubi in Sympy [A] time = 33.6655, size = 245, normalized size = 0.92

$$-\frac{2\sqrt{ax^2+bx^5}}{11ax^{\frac{13}{2}}}+\frac{16b\sqrt{ax^2+bx^5}}{55a^2x^{\frac{7}{2}}}+\frac{16\cdot 3^{\frac{3}{4}}b^2\sqrt{\frac{a^{\frac{2}{3}}-\sqrt[3]{a}\sqrt[3]{b}x+b^{\frac{2}{3}}x^2}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)\sqrt{ax^2+bx^5}F\left(\operatorname{acos}\left(\frac{\sqrt[3]{a}+\sqrt[3]{b}x\left(-\sqrt{3}+1\right)}{\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)}\right)\middle|\frac{\sqrt{3}}{4}+\frac{1}{2}\right)}{165a^{\frac{7}{3}}\sqrt{x}\sqrt{\frac{\sqrt[3]{b}x\left(\sqrt[3]{a}+\sqrt[3]{b}x\right)}{\left(\sqrt[3]{a}+\sqrt[3]{b}x\left(1+\sqrt{3}\right)\right)^2}}\left(a+bx^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**(11/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**2 + b*x**5)/(11*a*x**(13/2)) + 16*b*sqrt(a*x**2 + b*
x**5)/(55*a**2*x**(7/2)) + 16*3**(3/4)*b**2*sqrt((a**(2/3) - a**(
1/3)*b**(1/3)*x + b**(2/3)*x**2)/(a**(1/3) + b**(1/3)*x*(1 + sqrt
(3)))**2)*(a**(1/3) + b**(1/3)*x)*sqrt(a*x**2 + b*x**5)*elliptic_
f(acos((a**(1/3) + b**(1/3)*x*(-sqrt(3) + 1))/(a**(1/3) + b**(1/3
)*x*(1 + sqrt(3)))), sqrt(3)/4 + 1/2)/(165*a**(7/3)*sqrt(x)*sqrt(
b**(1/3)*x*(a**(1/3) + b**(1/3)*x)/(a**(1/3) + b**(1/3)*x*(1 + sq
rt(3)))**2)*(a + b*x**3))
```

Mathematica [C] time = 0.503924, size = 190, normalized size = 0.72

$$\frac{6\sqrt[3]{-a}\left(-5a^2+3abx^3+8b^2x^6\right)-32i3^{3/4}b^{7/3}x^7\sqrt{(-1)^{5/6}\left(\frac{\sqrt[3]{-a}}{\sqrt[3]{b}x}-1\right)}\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{\sqrt[3]{-a}x}{\sqrt[3]{b}}+x^2}{x^2}}F\left(\sin^{-1}\left(\frac{\sqrt{-\frac{i\sqrt[3]{-a}}{\sqrt[3]{b}x}-(-1)^{5/6}}}{\sqrt[4]{3}}\right)|\sqrt[3]{-1}\right)}{165(-a)^{7/3}x^{9/2}\sqrt{x^2\left(a+bx^3\right)}}$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[1/(x^(11/2)*Sqrt[a*x^2 + b*x^5]),x]
```

```
[Out] (6*(-a)^(1/3)*(-5*a^2 + 3*a*b*x^3 + 8*b^2*x^6) - (32*I)*3^(3/4)*b
^(7/3)*Sqrt[(-1)^(5/6)*(-1 + (-a)^(1/3)/(b^(1/3)*x))]*x^7*Sqrt[((
-a)^(2/3)/b^(2/3) + ((-a)^(1/3)*x)/b^(1/3) + x^2)/x^2]*EllipticF[
ArcSin[Sqrt[-(-1)^(5/6) - (I*(-a)^(1/3))/(b^(1/3)*x)]/3^(1/4)], (
-1)^(1/3)])/(165*(-a)^(7/3)*x^(9/2)*Sqrt[x^2*(a + b*x^3)])
```

Maple [C] time = 0.042, size = 2009, normalized size = 7.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^(11/2)/(b*x^5+a*x^2)^(1/2),x)
```

```
[Out] -2/55/(b*x^5+a*x^2)^(1/2)/x^(9/2)*(b*x^3+a)/(-a*b^2)^(1/3)/a^2*(3
2*I*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3
)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(
1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2
*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*E
llipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^
(1/2))*x^8*b^3-64*I*(-a*b^2)^(1/3)*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I
*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/
3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/
2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)
/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1
)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^7*b^2+32*I*(-a*b^2)^(2/3)
*3^(1/2)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))
^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2
)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*
x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*Elli
pticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1
/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/
2))*x^6*b-32*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^
(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-
2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*
EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3))
)^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))
```

```
^(1/2))*x^8*b^3+64*(-a*b^2)^(1/3)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-
1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+
(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^
(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(-
a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/
(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1
/2)+1)/(I*3^(1/2)-3))^(1/2))*x^7*b^2-32*(-a*b^2)^(2/3)*(-(I*3^(1/
2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*((I*3^(1/2)*
(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)
^(1/3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(
I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)*EllipticF((-(I*3^(1/2)-
3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)*
(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))*x^6*b-8*I*(-a*b
^2)^(1/3)*3^(1/2)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b
^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(
-a*b^2)^(1/3)))^(1/2)*(x*(b*x^3+a))^(1/2)*x^3*b+24*b*(x*(b*x^3+a)
)^(1/2)*x^3*(-a*b^2)^(1/3)*(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1
/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3
)-2*b*x-(-a*b^2)^(1/3)))^(1/2)+5*I*(-a*b^2)^(1/3)*3^(1/2)*(1/b^2*
x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^
(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)*(x*
(b*x^3+a))^(1/2)*a-15*(x*(b*x^3+a))^(1/2)*a*(-a*b^2)^(1/3)*(1/b^2
*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)
^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2))/(
x*(b*x^3+a))^(1/2)/(I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(
I*3^(1/2)*(-a*b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2
)^(1/3)-2*b*x-(-a*b^2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5 + ax^2}x^{\frac{11}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(11/2)),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x^(11/2)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\sqrt{bx^5 + ax^2}x^{\frac{11}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(11/2)),x, algorithm="fricas")
```

```
[Out] integral(1/(sqrt(b*x^5 + a*x^2)*x^(11/2)), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**(11/2)/(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^5 + ax^2}x^{\frac{11}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^5 + a*x^2)*x^(11/2)),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^5 + a*x^2)*x^(11/2)), x)
```

3.308 $\int \frac{x}{ax^3+bx^4}\,dx$

Optimal. Leaf size=28

$$-\frac{b\log(x)}{a^2}+\frac{b\log(a+bx)}{a^2}-\frac{1}{ax}$$

```
[Out] -(1/(a*x)) - (b*Log[x])/a^2 + (b*Log[a + b*x])/a^2
```

Rubi [A] time = 0.0395016, antiderivative size = 28, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$-\frac{b\log(x)}{a^2}+\frac{b\log(a+bx)}{a^2}-\frac{1}{ax}$$

Antiderivative was successfully verified.

```
[In]  Int[x/(a*x^3 + b*x^4),x]
```

```
[Out] -(1/(a*x)) - (b*Log[x])/a^2 + (b*Log[a + b*x])/a^2
```

Rubi in Sympy [A] time = 7.09402, size = 24, normalized size = 0.86

$$-\frac{1}{ax}-\frac{b\log\left(x\right)}{a^2}+\frac{b\log\left(a+bx\right)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**4+a*x**3),x)
```

```
[Out] -1/(a*x) - b*log(x)/a**2 + b*log(a + b*x)/a**2
```

Mathematica [A] time = 0.00741049, size = 28, normalized size = 1.

$$-\frac{b\log(x)}{a^2}+\frac{b\log(a+bx)}{a^2}-\frac{1}{ax}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/(a*x^3 + b*x^4),x]
```

```
[Out] -(1/(a*x)) - (b*Log[x])/a^2 + (b*Log[a + b*x])/a^2
```

Maple [A] time = 0.008, size = 29, normalized size = 1.

$$-\frac{1}{ax}-\frac{b\ln\left(x\right)}{a^2}+\frac{b\ln\left(bx+a\right)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^4+a*x^3),x)
```

```
[Out] -1/a/x-b*ln(x)/a^2+b*ln(b*x+a)/a^2
```

Maxima [A] time = 1.38354, size = 38, normalized size = 1.36

$$\frac{b\log(bx+a)}{a^2}-\frac{b\log(x)}{a^2}-\frac{1}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^4 + a*x^3),x, algorithm="maxima")

[Out] b*log(b*x + a)/a^2 - b*log(x)/a^2 - 1/(a*x)
```

Fricas [A] time = 0.22653, size = 35, normalized size = 1.25

$$\frac{bx\log(bx+a)-bx\log(x)-a}{a^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^4 + a*x^3),x, algorithm="fricas")

[Out] (b*x*log(b*x + a) - b*x*log(x) - a)/(a^2*x)
```

Sympy [A] time = 1.2624, size = 19, normalized size = 0.68

$$-\frac{1}{ax}+\frac{b\left(-\log(x)+\log\left(\frac{a}{b}+x\right)\right)}{a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**4+a*x**3),x)

[Out] -1/(a*x) + b*(-log(x) + log(a/b + x))/a**2
```

GIAC/XCAS [A] time = 0.220359, size = 41, normalized size = 1.46

$$\frac{b\ln(|bx+a|)}{a^2}-\frac{b\ln(|x|)}{a^2}-\frac{1}{ax}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x^4 + a*x^3),x, algorithm="giac")

[Out] b*ln(abs(b*x + a))/a^2 - b*ln(abs(x))/a^2 - 1/(a*x)
```

3.309 $\int \frac{1}{ax^3+bx^4}\,dx$

Optimal. Leaf size=42

$$\frac{b^2\log(x)}{a^3}-\frac{b^2\log(a+bx)}{a^3}+\frac{b}{a^2x}-\frac{1}{2ax^2}$$

```
[Out] -1/(2*a*x^2) + b/(a^2*x) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*x])/
a^3
```

Rubi [A] time = 0.0457588, antiderivative size = 42, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{b^2\log(x)}{a^3}-\frac{b^2\log(a+bx)}{a^3}+\frac{b}{a^2x}-\frac{1}{2ax^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a*x^3 + b*x^4)^(-1),x]
```

```
[Out] -1/(2*a*x^2) + b/(a^2*x) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*x])/
a^3
```

Rubi in Sympy [A] time = 8.1731, size = 37, normalized size = 0.88

$$-\frac{1}{2ax^2}+\frac{b}{a^2x}+\frac{b^2\log(x)}{a^3}-\frac{b^2\log(a+bx)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/(b*x**4+a*x**3),x)
```

```
[Out] -1/(2*a*x**2) + b/(a**2*x) + b**2*log(x)/a**3 - b**2*log(a + b*x)
/a**3
```

Mathematica [A] time = 0.00735257, size = 42, normalized size = 1.

$$\frac{b^2\log(x)}{a^3}-\frac{b^2\log(a+bx)}{a^3}+\frac{b}{a^2x}-\frac{1}{2ax^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*x^3 + b*x^4)^(-1),x]
```

```
[Out] -1/(2*a*x^2) + b/(a^2*x) + (b^2*Log[x])/a^3 - (b^2*Log[a + b*x])/
a^3
```

Maple [A] time = 0.008, size = 41, normalized size = 1.

$$-\frac{1}{2\,ax^2}+\frac{b}{a^2x}+\frac{b^2\ln(x)}{a^3}-\frac{b^2\ln(bx+a)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(b*x^4+a*x^3),x)
```

```
[Out] -1/2/a/x^2+b/a^2/x+b^2*ln(x)/a^3-b^2*ln(b*x+a)/a^3
```

Maxima [A] time = 1.42649, size = 54, normalized size = 1.29

$$-\frac{b^2 \log(bx+a)}{a^3} + \frac{b^2 \log(x)}{a^3} + \frac{2\,bx - a}{2\,a^2 x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^4 + a*x^3),x, algorithm="maxima")
```

```
[Out] -b^2*log(b*x + a)/a^3 + b^2*log(x)/a^3 + 1/2*(2*b*x - a)/(a^2*x^2
)
```

Fricas [A] time = 0.22616, size = 55, normalized size = 1.31

$$-\frac{2\,b^2 x^2 \log(bx+a) - 2\,b^2 x^2 \log(x) - 2\,abx + a^2}{2\,a^3 x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^4 + a*x^3),x, algorithm="fricas")
```

```
[Out] -1/2*(2*b^2*x^2*log(b*x + a) - 2*b^2*x^2*log(x) - 2*a*b*x + a^2)/
(a^3*x^2)
```

Sympy [A] time = 1.35652, size = 31, normalized size = 0.74

$$\frac{-a+2bx}{2a^2x^2} + \frac{b^2\left(\log(x) - \log\left(\frac{a}{b}+x\right)\right)}{a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**4+a*x**3),x)
```

```
[Out] (-a + 2*b*x)/(2*a**2*x**2) + b**2*(log(x) - log(a/b + x))/a**3
```

GIAC/XCAS [A] time = 0.219249, size = 61, normalized size = 1.45

$$-\frac{b^2 \ln(|bx+a|)}{a^3} + \frac{b^2 \ln(|x|)}{a^3} + \frac{2\,abx - a^2}{2\,a^3 x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^4 + a*x^3),x, algorithm="giac")
```

```
[Out] -b^2*ln(abs(b*x + a))/a^3 + b^2*ln(abs(x))/a^3 + 1/2*(2*a*b*x - a
^2)/(a^3*x^2)
```

3.310 $\int \frac{x^4}{\sqrt{ax^3+bx^4}}\,dx$

Optimal. Leaf size=112

$$-\frac{5a^3\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{8b^{7/2}}+\frac{5a^2\sqrt{ax^3+bx^4}}{8b^3x}-\frac{5a\sqrt{ax^3+bx^4}}{12b^2}+\frac{x\sqrt{ax^3+bx^4}}{3b}$$

```
[Out] (-5*a*Sqrt[a*x^3 + b*x^4])/(12*b^2) + (5*a^2*Sqrt[a*x^3 + b*x^4])
/(8*b^3*x) + (x*Sqrt[a*x^3 + b*x^4])/(3*b) - (5*a^3*ArcTanh[(Sqrt
[b]*x^2)/Sqrt[a*x^3 + b*x^4]])/(8*b^(7/2))
```

Rubi [A] time = 0.310282, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{5a^3\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{8b^{7/2}}+\frac{5a^2\sqrt{ax^3+bx^4}}{8b^3x}-\frac{5a\sqrt{ax^3+bx^4}}{12b^2}+\frac{x\sqrt{ax^3+bx^4}}{3b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^4/Sqrt[a*x^3 + b*x^4],x]
```

```
[Out] (-5*a*Sqrt[a*x^3 + b*x^4])/(12*b^2) + (5*a^2*Sqrt[a*x^3 + b*x^4])
/(8*b^3*x) + (x*Sqrt[a*x^3 + b*x^4])/(3*b) - (5*a^3*ArcTanh[(Sqrt
[b]*x^2)/Sqrt[a*x^3 + b*x^4]])/(8*b^(7/2))
```

Rubi in Sympy [A] time = 25.8014, size = 100, normalized size = 0.89

$$-\frac{5a^3\operatorname{atanh}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{8b^{\frac{7}{2}}}+\frac{5a^2\sqrt{ax^3+bx^4}}{8b^3x}-\frac{5a\sqrt{ax^3+bx^4}}{12b^2}+\frac{x\sqrt{ax^3+bx^4}}{3b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**4/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] -5*a**3*atanh(sqrt(b)*x**2/sqrt(a*x**3 + b*x**4))/(8*b**(7/2)) +
5*a**2*sqrt(a*x**3 + b*x**4)/(8*b**3*x) - 5*a*sqrt(a*x**3 + b*x**
4)/(12*b**2) + x*sqrt(a*x**3 + b*x**4)/(3*b)
```

Mathematica [A] time = 0.0734323, size = 105, normalized size = 0.94

$$\frac{\sqrt{b}x^2\left(15a^3+5a^2bx-2ab^2x^2+8b^3x^3\right)-15a^3x^{3/2}\sqrt{a+bx}\log\left(\sqrt{b}\sqrt{a+bx}+b\sqrt{x}\right)}{24b^{7/2}\sqrt{x^3(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^4/Sqrt[a*x^3 + b*x^4],x]
```

```
[Out] (Sqrt[b]*x^2*(15*a^3 + 5*a^2*b*x - 2*a*b^2*x^2 + 8*b^3*x^3) - 15*
a^3*x^(3/2)*Sqrt[a + b*x]*Log[b*Sqrt[x] + Sqrt[b]*Sqrt[a + b*x]])
/(24*b^(7/2)*Sqrt[x^3*(a + b*x)])
```

Maple [A] time = 0.01, size = 120, normalized size = 1.1

$$\frac{x}{48}\sqrt{x\,(bx+a)}\left(16\,x^2\sqrt{bx^2+ax}b^{7/2}-20\,\sqrt{bx^2+ax}b^{5/2}xa+30\,\sqrt{bx^2+ax}b^{3/2}a^2-15\,\ln\left(1/2\,\frac{2\,\sqrt{bx^2+ax}\sqrt{b}+2\,bx+a}{\sqrt{b}}\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^4/(b*x^4+a*x^3)^(1/2),x)
```

```
[Out] 1/48*x*(x*(b*x+a))^(1/2)*(16*x^2*(b*x^2+a*x)^(1/2)*b^(7/2)-20*(b*
x^2+a*x)^(1/2)*b^(5/2)*x*a+30*(b*x^2+a*x)^(1/2)*b^(3/2)*a^2-15*ln
(1/2*(2*(b*x^2+a*x)^(1/2)*b^(1/2)+2*b*x+a)/b^(1/2))*a^3*b)/(b*x^4
+a*x^3)^(1/2)/b^(9/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^4 + a*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238075, size = 1, normalized size = 0.01

$$\left[\frac{15\,a^3\sqrt{b}x\log\left(\frac{(2\,bx^2+ax)\sqrt{b}-2\,\sqrt{bx^4+ax^3}b}{x}\right)+2\left(8\,b^3x^2-10\,ab^2x+15\,a^2b\right)\sqrt{bx^4+ax^3}}{48\,b^4x},\ \frac{15\,a^3\sqrt{-b}x\arctan\left(\frac{\sqrt{bx^4+ax^3}\sqrt{-b}}{bx^2}\right)+\cdots}{24\cdots}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^4 + a*x^3),x, algorithm="fricas")
```

```
[Out] [1/48*(15*a^3*sqrt(b)*x*log(((2*b*x^2 + a*x)*sqrt(b) - 2*sqrt(b*x
^4 + a*x^3)*b)/x) + 2*(8*b^3*x^2 - 10*a*b^2*x + 15*a^2*b)*sqrt(b*
x^4 + a*x^3))/(b^4*x), 1/24*(15*a^3*sqrt(-b)*x*arctan(sqrt(b*x^4
+ a*x^3)*sqrt(-b)/(b*x^2)) + (8*b^3*x^2 - 10*a*b^2*x + 15*a^2*b)*
sqrt(b*x^4 + a*x^3))/(b^4*x)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^4}{\sqrt{x^3\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**4/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] Integral(x**4/sqrt(x**3*(a + b*x)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^4}{\sqrt{bx^4+ax^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^4/sqrt(b*x^4 + a*x^3),x, algorithm="giac")
```

```
[Out] integrate(x^4/sqrt(b*x^4 + a*x^3), x)
```

3.311 $\int \frac{x^3}{\sqrt{ax^3+bx^4}} \, dx$

Optimal. Leaf size=86

$$\frac{3a^2 \tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{4b^{5/2}} - \frac{3a\sqrt{ax^3+bx^4}}{4b^2x} + \frac{\sqrt{ax^3+bx^4}}{2b}$$

```
[Out] Sqrt[a*x^3 + b*x^4]/(2*b) - (3*a*Sqrt[a*x^3 + b*x^4])/(4*b^2*x) +
 (3*a^2*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x^3 + b*x^4]])/(4*b^(5/2))
```

Rubi [A] time = 0.219217, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$\frac{3a^2 \tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{4b^{5/2}} - \frac{3a\sqrt{ax^3+bx^4}}{4b^2x} + \frac{\sqrt{ax^3+bx^4}}{2b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^3/Sqrt[a*x^3 + b*x^4],x]
```

```
[Out] Sqrt[a*x^3 + b*x^4]/(2*b) - (3*a*Sqrt[a*x^3 + b*x^4])/(4*b^2*x) +
 (3*a^2*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x^3 + b*x^4]])/(4*b^(5/2))
```

Rubi in Sympy [A] time = 18.6513, size = 75, normalized size = 0.87

$$\frac{3a^2 \operatorname{atanh}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{4b^{\frac{5}{2}}} - \frac{3a\sqrt{ax^3+bx^4}}{4b^2x} + \frac{\sqrt{ax^3+bx^4}}{2b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] 3*a**2*atanh(sqrt(b)*x**2/sqrt(a*x**3 + b*x**4))/(4*b**(5/2)) - 3
*a*sqrt(a*x**3 + b*x**4)/(4*b**2*x) + sqrt(a*x**3 + b*x**4)/(2*b)
```

Mathematica [A] time = 0.0499583, size = 94, normalized size = 1.09

$$\frac{\sqrt{b}x^2\left(-3a^2-abx+2b^2x^2\right)+3a^2x^{3/2}\sqrt{a+bx}\log\left(\sqrt{b}\sqrt{a+bx}+b\sqrt{x}\right)}{4b^{5/2}\sqrt{x^3(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^3/Sqrt[a*x^3 + b*x^4],x]
```

```
[Out] (Sqrt[b]*x^2*(-3*a^2 - a*b*x + 2*b^2*x^2) + 3*a^2*x^(3/2)*Sqrt[a
+ b*x]*Log[b*Sqrt[x] + Sqrt[b]*Sqrt[a + b*x]])/(4*b^(5/2)*Sqrt[x^
3*(a + b*x)])
```

Maple [A] time = 0.01, size = 98, normalized size = 1.1

$$\frac{x}{8}\sqrt{x(bx+a)}\left(4x\sqrt{bx^2+ax}b^{5/2}-6\sqrt{bx^2+ax}b^{3/2}a+3\ln\left(1/2\frac{2\sqrt{bx^2+ax}\sqrt{b}+2bx+a}{\sqrt{b}}\right)a^2b\right)\frac{1}{\sqrt{bx^4+ax^3}}b^{-\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3/(b*x^4+a*x^3)^(1/2),x)
```

```
[Out] 1/8*x*(x*(b*x+a))^(1/2)*(4*x*(b*x^2+a*x)^(1/2)*b^(5/2)-6*(b*x^2+a
*x)^(1/2)*b^(3/2)*a+3*ln(1/2*(2*(b*x^2+a*x)^(1/2)*b^(1/2)+2*b*x+a
)/b^(1/2))*a^2*b)/(b*x^4+a*x^3)^(1/2)/b^(7/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^4 + a*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.235787, size = 1, normalized size = 0.01

$$\left[\frac{3\,a^2\sqrt{b}x\log\left(\frac{(2\,bx^2+ax)\sqrt{b}+2\,\sqrt{bx^4+ax^3}b}{x}\right)+2\,\sqrt{bx^4+ax^3}\left(2\,b^2x-3\,ab\right)}{8\,b^3x},\right.$$
$$\left.-\frac{3\,a^2\sqrt{-b}x\arctan\left(\frac{\sqrt{bx^4+ax^3}\sqrt{-b}}{bx^2}\right)-\sqrt{bx^4+ax^3}\left(2\,b^2x-3\,ab\right)}{4\,b^3x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^4 + a*x^3),x, algorithm="fricas")
```

```
[Out] [1/8*(3*a^2*sqrt(b)*x*log(((2*b*x^2 + a*x)*sqrt(b) + 2*sqrt(b*x^4
 + a*x^3)*b)/x) + 2*sqrt(b*x^4 + a*x^3)*(2*b^2*x - 3*a*b))/(b^3*x
), -1/4*(3*a^2*sqrt(-b)*x*arctan(sqrt(b*x^4 + a*x^3)*sqrt(-b)/(b*
x^2)) - sqrt(b*x^4 + a*x^3)*(2*b^2*x - 3*a*b))/(b^3*x)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{x^3\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] Integral(x**3/sqrt(x**3*(a + b*x)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{bx^4+ax^3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^3/sqrt(b*x^4 + a*x^3),x, algorithm="giac")

[Out] integrate(x^3/sqrt(b*x^4 + a*x^3), x)
```

3.312 $\int \frac{x^2}{\sqrt{ax^3+bx^4}}\,dx$

Optimal. Leaf size=56

$$\frac{\sqrt{ax^3+bx^4}}{bx}-\frac{a\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{b^{3/2}}$$

```
[Out] Sqrt[a*x^3 + b*x^4]/(b*x) - (a*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x^3 +
 b*x^4]])/b^(3/2)
```

Rubi [A] time = 0.138274, antiderivative size = 56, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{\sqrt{ax^3+bx^4}}{bx}-\frac{a\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{b^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^2/Sqrt[a*x^3 + b*x^4],x]
```

```
[Out] Sqrt[a*x^3 + b*x^4]/(b*x) - (a*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x^3 +
 b*x^4]])/b^(3/2)
```

Rubi in Sympy [A] time = 12.1087, size = 46, normalized size = 0.82

$$-\frac{a\,\mathrm{atanh}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{b^{\frac{3}{2}}}+\frac{\sqrt{ax^3+bx^4}}{bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] -a*atanh(sqrt(b)*x**2/sqrt(a*x**3 + b*x**4))/b**(3/2) + sqrt(a*x*
*3 + b*x**4)/(b*x)
```

Mathematica [A] time = 0.0415812, size = 75, normalized size = 1.34

$$\frac{\sqrt{b}x^2(a+bx)-ax^{3/2}\sqrt{a+bx}\log\left(\sqrt{b}\sqrt{a+bx}+b\sqrt{x}\right)}{b^{3/2}\sqrt{x^3(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^2/Sqrt[a*x^3 + b*x^4],x]
```

```
[Out] (Sqrt[b]*x^2*(a + b*x) - a*x^(3/2)*Sqrt[a + b*x]*Log[b*Sqrt[x] +
Sqrt[b]*Sqrt[a + b*x]])/(b^(3/2)*Sqrt[x^3*(a + b*x)])
```

Maple [A] time = 0.008, size = 78, normalized size = 1.4

$$\frac{x}{2}\sqrt{x\,(bx+a)}\left(2\,\sqrt{bx^2+ax}b^{3/2}-a\ln\left(\frac{1}{2}\left(2\,\sqrt{bx^2+ax}\sqrt{b}+2\,bx+a\right)\frac{1}{\sqrt{b}}\right)b\right)\frac{1}{\sqrt{bx^4+ax^3}}b^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2/(b*x^4+a*x^3)^(1/2),x)
```

```
[Out] 1/2*x*(x*(b*x+a))^(1/2)*(2*(b*x^2+a*x)^(1/2)*b^(3/2)-a*ln(1/2*(2*
(b*x^2+a*x)^(1/2)*b^(1/2)+2*b*x+a)/b^(1/2))*b)/(b*x^4+a*x^3)^(1/2
)/b^(5/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^4 + a*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.237094, size = 1, normalized size = 0.02

$$\left[\frac{a\sqrt{b}x\log\left(\frac{(2\,bx^2+ax)\sqrt{b}-2\,\sqrt{bx^4+ax^3}b}{x}\right)+2\,\sqrt{bx^4+ax^3}b}{2\,b^2x}, \frac{a\sqrt{-b}x\arctan\left(\frac{\sqrt{bx^4+ax^3}\sqrt{-b}}{bx^2}\right)+\sqrt{bx^4+ax^3}b}{b^2x}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^4 + a*x^3),x, algorithm="fricas")
```

```
[Out] [1/2*(a*sqrt(b)*x*log(((2*b*x^2 + a*x)*sqrt(b) - 2*sqrt(b*x^4 + a
*x^3)*b)/x) + 2*sqrt(b*x^4 + a*x^3)*b)/(b^2*x), (a*sqrt(-b)*x*arc
tan(sqrt(b*x^4 + a*x^3)*sqrt(-b)/(b*x^2)) + sqrt(b*x^4 + a*x^3)*b
)/(b^2*x)]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{x^3\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(x**3*(a + b*x)), x)
```

GIAC/XCAS [A] time = 0.236795, size = 55, normalized size = 0.98

$$\frac{\sqrt{b+\frac{a}{x}}x}{b}+\frac{a\arctan\left(\frac{\sqrt{b+\frac{a}{x}}}{\sqrt{-b}}\right)}{\sqrt{-b}b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x^2/sqrt(b*x^4 + a*x^3),x, algorithm="giac")
```

```
[Out] sqrt(b + a/x)*x/b + a*arctan(sqrt(b + a/x)/sqrt(-b))/(sqrt(-b)*b)
```

3.313 $\int \frac{x}{\sqrt{ax^3+bx^4}}\,dx$

Optimal. Leaf size=32

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{\sqrt{b}}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x^3 + b*x^4]])/Sqrt[b]
```

Rubi [A] time = 0.0635061, antiderivative size = 32, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[x/Sqrt[a*x^3 + b*x^4],x]

[Out] (2*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a*x^3 + b*x^4]])/Sqrt[b]
```

Rubi in Sympy [A] time = 6.6272, size = 29, normalized size = 0.91

$$\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{b}x^2}{\sqrt{ax^3+bx^4}}\right)}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x/(b*x**4+a*x**3)**(1/2),x)

[Out] 2*atanh(sqrt(b)*x**2/sqrt(a*x**3 + b*x**4))/sqrt(b)
```

Mathematica [A] time = 0.0220395, size = 58, normalized size = 1.81

$$\frac{2x^{3/2}\sqrt{a+bx}\log\left(\sqrt{b}\sqrt{a+bx}+b\sqrt{x}\right)}{\sqrt{b}\sqrt{x^3(a+bx)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x/Sqrt[a*x^3 + b*x^4],x]

[Out] (2*x^(3/2)*Sqrt[a + b*x]*Log[b*Sqrt[x] + Sqrt[b]*Sqrt[a + b*x]])/
(Sqrt[b]*Sqrt[x^3*(a + b*x)])
```

Maple [B] time = 0.006, size = 56, normalized size = 1.8

$$x\sqrt{x(bx+a)}\ln\left(\frac{1}{2}\left(2\sqrt{bx^2+ax}\sqrt{b}+2bx+a\right)\frac{1}{\sqrt{b}}\right)\frac{1}{\sqrt{bx^4+ax^3}}\frac{1}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x/(b*x^4+a*x^3)^(1/2),x)
```

```
[Out] 1/(b*x^4+a*x^3)^(1/2)*x*(x*(b*x+a))^(1/2)*ln(1/2*(2*(b*x^2+a*x)^(
1/2)*b^(1/2)+2*b*x+a)/b^(1/2))/b^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^4 + a*x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.229289, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(\frac{(2\,bx^2+ax)\sqrt{b}+2\,\sqrt{bx^4+ax^3}b}{x}\right)}{\sqrt{b}}, -\frac{2\,\sqrt{-b}\arctan\left(\frac{\sqrt{bx^4+ax^3}\sqrt{-b}}{bx^2}\right)}{b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^4 + a*x^3),x, algorithm="fricas")
```

```
[Out] [log(((2*b*x^2 + a*x)*sqrt(b) + 2*sqrt(b*x^4 + a*x^3)*b)/x)/sqrt(
b), -2*sqrt(-b)*arctan(sqrt(b*x^4 + a*x^3)*sqrt(-b)/(b*x^2))/b]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{x^3\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] Integral(x/sqrt(x**3*(a + b*x)), x)
```

GIAC/XCAS [A] time = 0.235048, size = 31, normalized size = 0.97

$$-\frac{2\,\arctan\left(\frac{\sqrt{b+\frac{a}{x}}}{\sqrt{-b}}\right)}{\sqrt{-b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x/sqrt(b*x^4 + a*x^3),x, algorithm="giac")
```

```
[Out] -2*arctan(sqrt(b + a/x)/sqrt(-b))/sqrt(-b)
```

3.314 $\int \frac{1}{\sqrt{ax^3+bx^4}}\,dx$

Optimal. Leaf size=23

$$-\frac{2\sqrt{ax^3+bx^4}}{ax^2}$$

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(a*x^2)
```

Rubi [A] time = 0.0150846, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067

$$-\frac{2\sqrt{ax^3+bx^4}}{ax^2}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[a*x^3 + b*x^4],x]

[Out] (-2*Sqrt[a*x^3 + b*x^4])/(a*x^2)
```

Rubi in Sympy [A] time = 1.40696, size = 20, normalized size = 0.87

$$-\frac{2\sqrt{ax^3+bx^4}}{ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**4+a*x**3)**(1/2),x)

[Out] -2*sqrt(a*x**3 + b*x**4)/(a*x**2)
```

Mathematica [A] time = 0.0176679, size = 21, normalized size = 0.91

$$-\frac{2\sqrt{x^3(a+bx)}}{ax^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[a*x^3 + b*x^4],x]

[Out] (-2*Sqrt[x^3*(a + b*x)])/(a*x^2)
```

Maple [A] time = 0.005, size = 25, normalized size = 1.1

$$-2\,\frac{x\,(bx+a)}{a\sqrt{bx^4+ax^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^4+a*x^3)^(1/2),x)

[Out] -2*x*(b*x+a)/a/(b*x^4+a*x^3)^(1/2)
```

Maxima [A] time = 1.42331, size = 20, normalized size = 0.87

$$-\frac{2\sqrt{bx+a}}{a\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^4 + a*x^3),x, algorithm="maxima")
```

```
[Out] -2*sqrt(b*x + a)/(a*sqrt(x))
```

Fricas [A] time = 0.218403, size = 28, normalized size = 1.22

$$-\frac{2\sqrt{bx^4+ax^3}}{ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^4 + a*x^3),x, algorithm="fricas")
```

```
[Out] -2*sqrt(b*x^4 + a*x^3)/(a*x^2)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax^3+bx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] Integral(1/sqrt(a*x**3 + b*x**4), x)
```

GIAC/XCAS [A] time = 0.232821, size = 36, normalized size = 1.57

$$\frac{2}{\left(\sqrt{b}x-\sqrt{bx^2+ax}\right)\operatorname{sign}\left(x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(b*x^4 + a*x^3),x, algorithm="giac")
```

```
[Out] 2/((sqrt(b)*x - sqrt(b*x^2 + a*x))*sign(x))
```

3.315 $\int \frac{1}{x\sqrt{ax^3+bx^4}}\,dx$

Optimal. Leaf size=52

$$\frac{4b\sqrt{ax^3+bx^4}}{3a^2x^2}-\frac{2\sqrt{ax^3+bx^4}}{3ax^3}$$

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(3*a*x^3) + (4*b*Sqrt[a*x^3 + b*x^4])/(3
*a^2*x^2)
```

Rubi [A] time = 0.0859974, antiderivative size = 52, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{4b\sqrt{ax^3+bx^4}}{3a^2x^2}-\frac{2\sqrt{ax^3+bx^4}}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x*Sqrt[a*x^3 + b*x^4]),x]
```

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(3*a*x^3) + (4*b*Sqrt[a*x^3 + b*x^4])/(3
*a^2*x^2)
```

Rubi in Sympy [A] time = 7.97208, size = 46, normalized size = 0.88

$$-\frac{2\sqrt{ax^3+bx^4}}{3ax^3}+\frac{4b\sqrt{ax^3+bx^4}}{3a^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**3 + b*x**4)/(3*a*x**3) + 4*b*sqrt(a*x**3 + b*x**4)/(
3*a**2*x**2)
```

Mathematica [A] time = 0.0270373, size = 29, normalized size = 0.56

$$-\frac{2(a-2bx)\sqrt{x^3(a+bx)}}{3a^2x^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x*Sqrt[a*x^3 + b*x^4]),x]
```

```
[Out] (-2*(a - 2*b*x)*Sqrt[x^3*(a + b*x)])/(3*a^2*x^3)
```

Maple [A] time = 0.006, size = 30, normalized size = 0.6

$$-\frac{(2\,bx+2\,a)(-2\,bx+a)}{3\,a^2}\frac{1}{\sqrt{bx^4+ax^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x/(b*x^4+a*x^3)^(1/2),x)
```

```
[Out] -2/3*(b*x+a)*(-2*b*x+a)/a^2/(b*x^4+a*x^3)^(1/2)
```

Maxima [A] time = 1.429, size = 42, normalized size = 0.81

$$\frac{2\left(\frac{3\sqrt{bx+a}b}{\sqrt{x}}-\frac{(bx+a)^{\frac{3}{2}}}{x^{\frac{3}{2}}}\right)}{3a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x),x, algorithm="maxima")
```

```
[Out] 2/3*(3*sqrt(b*x + a)*b/sqrt(x) - (b*x + a)^(3/2)/x^(3/2))/a^2
```

Fricas [A] time = 0.221948, size = 39, normalized size = 0.75

$$\frac{2\sqrt{bx^4+ax^3}(2\,bx-a)}{3\,a^2x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x),x, algorithm="fricas")
```

```
[Out] 2/3*sqrt(b*x^4 + a*x^3)*(2*b*x - a)/(a^2*x^3)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x\sqrt{x^3\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(x**3*(a + b*x))), x)
```

GIAC/XCAS [A] time = 0.234583, size = 46, normalized size = 0.88

$$-\frac{2\left(a^2\left(b+\frac{a}{x}\right)^{\frac{3}{2}}-3\,a^2\sqrt{b+\frac{a}{x}}b\right)}{3\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x),x, algorithm="giac")
```

```
[Out] -2/3*(a^2*(b + a/x)^(3/2) - 3*a^2*sqrt(b + a/x)*b)/a^4
```

3.316 $\int \frac{1}{x^2\sqrt{ax^3+bx^4}}\,dx$

Optimal. Leaf size=80

$$-\frac{16b^2\sqrt{ax^3+bx^4}}{15a^3x^2}+\frac{8b\sqrt{ax^3+bx^4}}{15a^2x^3}-\frac{2\sqrt{ax^3+bx^4}}{5ax^4}$$

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(5*a*x^4) + (8*b*Sqrt[a*x^3 + b*x^4])/(1
5*a^2*x^3) - (16*b^2*Sqrt[a*x^3 + b*x^4])/(15*a^3*x^2)
```

Rubi [A] time = 0.156459, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$-\frac{16b^2\sqrt{ax^3+bx^4}}{15a^3x^2}+\frac{8b\sqrt{ax^3+bx^4}}{15a^2x^3}-\frac{2\sqrt{ax^3+bx^4}}{5ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^2*Sqrt[a*x^3 + b*x^4]),x]
```

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(5*a*x^4) + (8*b*Sqrt[a*x^3 + b*x^4])/(1
5*a^2*x^3) - (16*b^2*Sqrt[a*x^3 + b*x^4])/(15*a^3*x^2)
```

Rubi in Sympy [A] time = 14.0659, size = 73, normalized size = 0.91

$$-\frac{2\sqrt{ax^3+bx^4}}{5ax^4}+\frac{8b\sqrt{ax^3+bx^4}}{15a^2x^3}-\frac{16b^2\sqrt{ax^3+bx^4}}{15a^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**2/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**3 + b*x**4)/(5*a*x**4) + 8*b*sqrt(a*x**3 + b*x**4)/(
15*a**2*x**3) - 16*b**2*sqrt(a*x**3 + b*x**4)/(15*a**3*x**2)
```

Mathematica [A] time = 0.030552, size = 42, normalized size = 0.52

$$-\frac{2\sqrt{x^3(a+bx)}\left(3a^2-4abx+8b^2x^2\right)}{15a^3x^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^2*Sqrt[a*x^3 + b*x^4]),x]
```

```
[Out] (-2*Sqrt[x^3*(a + b*x)]*(3*a^2 - 4*a*b*x + 8*b^2*x^2))/(15*a^3*x^
4)
```

Maple [A] time = 0.006, size = 46, normalized size = 0.6

$$-\frac{(2\,bx+2\,a)\left(8\,b^2x^2-4\,abx+3\,a^2\right)}{15\,xa^3}\frac{1}{\sqrt{bx^4+ax^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^2/(b*x^4+a*x^3)^(1/2),x)

[Out] -2/15*(b*x+a)*(8*b^2*x^2-4*a*b*x+3*a^2)/x/a^3/(b*x^4+a*x^3)^(1/2)
```

Maxima [A] time = 1.43855, size = 62, normalized size = 0.78

$$-\frac{2\left(\frac{15\sqrt{bx+a}b^2}{\sqrt{x}} - \frac{10\,(bx+a)^{\frac{3}{2}}b}{x^{\frac{3}{2}}} + \frac{3\,(bx+a)^{\frac{5}{2}}}{x^{\frac{5}{2}}}\right)}{15\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^2),x, algorithm="maxima")

[Out] -2/15*(15*sqrt(b*x + a)*b^2/sqrt(x) - 10*(b*x + a)^(3/2)*b/x^(3/2
) + 3*(b*x + a)^(5/2)/x^(5/2))/a^3
```

Fricas [A] time = 0.233186, size = 54, normalized size = 0.68

$$-\frac{2\sqrt{bx^4 + ax^3}\left(8\,b^2x^2 - 4\,abx + 3\,a^2\right)}{15\,a^3x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^2),x, algorithm="fricas")

[Out] -2/15*sqrt(b*x^4 + a*x^3)*(8*b^2*x^2 - 4*a*b*x + 3*a^2)/(a^3*x^4)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{x^3\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**2/(b*x**4+a*x**3)**(1/2),x)

[Out] Integral(1/(x**2*sqrt(x**3*(a + b*x))), x)
```

GIAC/XCAS [A] time = 0.236588, size = 70, normalized size = 0.88

$$-\frac{2\left(3\,a^{12}\left(b+\frac{a}{x}\right)^{\frac{5}{2}} - 10\,a^{12}\left(b+\frac{a}{x}\right)^{\frac{3}{2}}b + 15\,a^{12}\sqrt{b+\frac{a}{x}}b^2\right)}{15\,a^{15}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^2),x, algorithm="giac")

[Out] -2/15*(3*a^12*(b + a/x)^(5/2) - 10*a^12*(b + a/x)^(3/2)*b + 15*a^
12*sqrt(b + a/x)*b^2)/a^15
```

3.317 $\int \frac{1}{x^3\sqrt{ax^3+bx^4}}\,dx$

Optimal. Leaf size=108

$$\frac{32b^3\sqrt{ax^3+bx^4}}{35a^4x^2}-\frac{16b^2\sqrt{ax^3+bx^4}}{35a^3x^3}+\frac{12b\sqrt{ax^3+bx^4}}{35a^2x^4}-\frac{2\sqrt{ax^3+bx^4}}{7ax^5}$$

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(7*a*x^5) + (12*b*Sqrt[a*x^3 + b*x^4])/(
35*a^2*x^4) - (16*b^2*Sqrt[a*x^3 + b*x^4])/(35*a^3*x^3) + (32*b^3
*Sqrt[a*x^3 + b*x^4])/(35*a^4*x^2)
```

Rubi [A] time = 0.236629, antiderivative size = 108, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{32b^3\sqrt{ax^3+bx^4}}{35a^4x^2}-\frac{16b^2\sqrt{ax^3+bx^4}}{35a^3x^3}+\frac{12b\sqrt{ax^3+bx^4}}{35a^2x^4}-\frac{2\sqrt{ax^3+bx^4}}{7ax^5}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^3*Sqrt[a*x^3 + b*x^4]),x]
```

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(7*a*x^5) + (12*b*Sqrt[a*x^3 + b*x^4])/(
35*a^2*x^4) - (16*b^2*Sqrt[a*x^3 + b*x^4])/(35*a^3*x^3) + (32*b^3
*Sqrt[a*x^3 + b*x^4])/(35*a^4*x^2)
```

Rubi in Sympy [A] time = 20.5225, size = 100, normalized size = 0.93

$$-\frac{2\sqrt{ax^3+bx^4}}{7ax^5}+\frac{12b\sqrt{ax^3+bx^4}}{35a^2x^4}-\frac{16b^2\sqrt{ax^3+bx^4}}{35a^3x^3}+\frac{32b^3\sqrt{ax^3+bx^4}}{35a^4x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**3/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**3 + b*x**4)/(7*a*x**5) + 12*b*sqrt(a*x**3 + b*x**4)/
(35*a**2*x**4) - 16*b**2*sqrt(a*x**3 + b*x**4)/(35*a**3*x**3) + 3
2*b**3*sqrt(a*x**3 + b*x**4)/(35*a**4*x**2)
```

Mathematica [A] time = 0.042248, size = 53, normalized size = 0.49

$$\frac{2\sqrt{x^3(a+bx)}\left(-5a^3+6a^2bx-8ab^2x^2+16b^3x^3\right)}{35a^4x^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^3*Sqrt[a*x^3 + b*x^4]),x]
```

```
[Out] (2*Sqrt[x^3*(a + b*x)]*(-5*a^3 + 6*a^2*b*x - 8*a*b^2*x^2 + 16*b^3
*x^3))/(35*a^4*x^5)
```

Maple [A] time = 0.006, size = 57, normalized size = 0.5

$$-\frac{(2\,bx+2\,a)\left(-16\,b^3x^3+8\,ab^2x^2-6\,bxa^2+5\,a^3\right)}{35\,x^2a^4}\frac{1}{\sqrt{bx^4+ax^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^3/(b*x^4+a*x^3)^(1/2),x)
```

```
[Out] -2/35*(b*x+a)*(-16*b^3*x^3+8*a*b^2*x^2-6*a^2*b*x+5*a^3)/x^2/a^4/(
b*x^4+a*x^3)^(1/2)
```

Maxima [A] time = 1.42885, size = 82, normalized size = 0.76

$$\frac{2\left(\frac{35\sqrt{bx+a}b^3}{\sqrt{x}} - \frac{35(bx+a)^{\frac{3}{2}}b^2}{x^{\frac{3}{2}}} + \frac{21(bx+a)^{\frac{5}{2}}b}{x^{\frac{5}{2}}} - \frac{5(bx+a)^{\frac{7}{2}}}{x^{\frac{7}{2}}}\right)}{35\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^3),x, algorithm="maxima")
```

```
[Out] 2/35*(35*sqrt(b*x + a)*b^3/sqrt(x) - 35*(b*x + a)^(3/2)*b^2/x^(3/
2) + 21*(b*x + a)^(5/2)*b/x^(5/2) - 5*(b*x + a)^(7/2)/x^(7/2))/a^
4
```

Fricas [A] time = 0.227234, size = 69, normalized size = 0.64

$$\frac{2\left(16\,b^3x^3 - 8\,ab^2x^2 + 6\,a^2bx - 5\,a^3\right)\sqrt{bx^4 + ax^3}}{35\,a^4x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^3),x, algorithm="fricas")
```

```
[Out] 2/35*(16*b^3*x^3 - 8*a*b^2*x^2 + 6*a^2*b*x - 5*a^3)*sqrt(b*x^4 +
a*x^3)/(a^4*x^5)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^3\sqrt{x^3\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**3/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] Integral(1/(x**3*sqrt(x**3*(a + b*x))), x)
```

GIAC/XCAS [A] time = 0.235022, size = 93, normalized size = 0.86

$$-\frac{2\left(5\,a^{24}\left(b+\frac{a}{x}\right)^{\frac{7}{2}} - 21\,a^{24}\left(b+\frac{a}{x}\right)^{\frac{5}{2}}b + 35\,a^{24}\left(b+\frac{a}{x}\right)^{\frac{3}{2}}b^2 - 35\,a^{24}\sqrt{b+\frac{a}{x}}\,b^3\right)}{35\,a^{28}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^3),x, algorithm="giac")
```

```
[Out] -2/35*(5*a^24*(b + a/x)^(7/2) - 21*a^24*(b + a/x)^(5/2)*b + 35*a^
24*(b + a/x)^(3/2)*b^2 - 35*a^24*sqrt(b + a/x)*b^3)/a^28
```

3.318 $\int \frac{1}{x^4\sqrt{ax^3+bx^4}}\,dx$

Optimal. Leaf size=136

$$-\frac{256b^4\sqrt{ax^3+bx^4}}{315a^5x^2}+\frac{128b^3\sqrt{ax^3+bx^4}}{315a^4x^3}-\frac{32b^2\sqrt{ax^3+bx^4}}{105a^3x^4}+\frac{16b\sqrt{ax^3+bx^4}}{63a^2x^5}-\frac{2\sqrt{ax^3+bx^4}}{9ax^6}$$

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(9*a*x^6) + (16*b*Sqrt[a*x^3 + b*x^4])/(
63*a^2*x^5) - (32*b^2*Sqrt[a*x^3 + b*x^4])/(105*a^3*x^4) + (128*b
^3*Sqrt[a*x^3 + b*x^4])/(315*a^4*x^3) - (256*b^4*Sqrt[a*x^3 + b*x
^4])/(315*a^5*x^2)
```

Rubi [A] time = 0.316923, antiderivative size = 136, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$-\frac{256b^4\sqrt{ax^3+bx^4}}{315a^5x^2}+\frac{128b^3\sqrt{ax^3+bx^4}}{315a^4x^3}-\frac{32b^2\sqrt{ax^3+bx^4}}{105a^3x^4}+\frac{16b\sqrt{ax^3+bx^4}}{63a^2x^5}-\frac{2\sqrt{ax^3+bx^4}}{9ax^6}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(x^4*Sqrt[a*x^3 + b*x^4]),x]
```

```
[Out] (-2*Sqrt[a*x^3 + b*x^4])/(9*a*x^6) + (16*b*Sqrt[a*x^3 + b*x^4])/(
63*a^2*x^5) - (32*b^2*Sqrt[a*x^3 + b*x^4])/(105*a^3*x^4) + (128*b
^3*Sqrt[a*x^3 + b*x^4])/(315*a^4*x^3) - (256*b^4*Sqrt[a*x^3 + b*x
^4])/(315*a^5*x^2)
```

Rubi in Sympy [A] time = 27.912, size = 128, normalized size = 0.94

$$-\frac{2\sqrt{ax^3+bx^4}}{9ax^6}+\frac{16b\sqrt{ax^3+bx^4}}{63a^2x^5}-\frac{32b^2\sqrt{ax^3+bx^4}}{105a^3x^4}+\frac{128b^3\sqrt{ax^3+bx^4}}{315a^4x^3}-\frac{256b^4\sqrt{ax^3+bx^4}}{315a^5x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/x**4/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] -2*sqrt(a*x**3 + b*x**4)/(9*a*x**6) + 16*b*sqrt(a*x**3 + b*x**4)/
(63*a**2*x**5) - 32*b**2*sqrt(a*x**3 + b*x**4)/(105*a**3*x**4) +
128*b**3*sqrt(a*x**3 + b*x**4)/(315*a**4*x**3) - 256*b**4*sqrt(a*
x**3 + b*x**4)/(315*a**5*x**2)
```

Mathematica [A] time = 0.0443768, size = 64, normalized size = 0.47

$$-\frac{2\sqrt{x^3(a+bx)}\left(35a^4-40a^3bx+48a^2b^2x^2-64ab^3x^3+128b^4x^4\right)}{315a^5x^6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(x^4*Sqrt[a*x^3 + b*x^4]),x]
```

```
[Out] (-2*Sqrt[x^3*(a + b*x)]*(35*a^4 - 40*a^3*b*x + 48*a^2*b^2*x^2 - 6
4*a*b^3*x^3 + 128*b^4*x^4))/(315*a^5*x^6)
```

Maple [A] time = 0.007, size = 68, normalized size = 0.5

$$-\frac{(2\,bx+2\,a)\left(128\,b^4x^4-64\,ab^3x^3+48\,b^2x^2a^2-40\,xa^3b+35\,a^4\right)}{315\,x^3a^5}\frac{1}{\sqrt{bx^4+ax^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/x^4/(b*x^4+a*x^3)^(1/2),x)
```

```
[Out] -2/315*(b*x+a)*(128*b^4*x^4-64*a*b^3*x^3+48*a^2*b^2*x^2-40*a^3*b*
x+35*a^4)/x^3/a^5/(b*x^4+a*x^3)^(1/2)
```

Maxima [A] time = 1.41931, size = 103, normalized size = 0.76

$$-\frac{2\left(\frac{315\sqrt{bx+a}b^4}{\sqrt{x}}-\frac{420(bx+a)^{\frac{3}{2}}b^3}{x^{\frac{3}{2}}}+\frac{378(bx+a)^{\frac{5}{2}}b^2}{x^{\frac{5}{2}}}-\frac{180(bx+a)^{\frac{7}{2}}b}{x^{\frac{7}{2}}}+\frac{35(bx+a)^{\frac{9}{2}}}{x^{\frac{9}{2}}}\right)}{315\,a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^4),x, algorithm="maxima")
```

```
[Out] -2/315*(315*sqrt(b*x + a)*b^4/sqrt(x) - 420*(b*x + a)^(3/2)*b^3/x
^(3/2) + 378*(b*x + a)^(5/2)*b^2/x^(5/2) - 180*(b*x + a)^(7/2)*b/
x^(7/2) + 35*(b*x + a)^(9/2)/x^(9/2))/a^5
```

Fricas [A] time = 0.221085, size = 84, normalized size = 0.62

$$-\frac{2\left(128\,b^4x^4-64\,ab^3x^3+48\,a^2b^2x^2-40\,a^3bx+35\,a^4\right)\sqrt{bx^4+ax^3}}{315\,a^5x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^4),x, algorithm="fricas")
```

```
[Out] -2/315*(128*b^4*x^4 - 64*a*b^3*x^3 + 48*a^2*b^2*x^2 - 40*a^3*b*x
+ 35*a^4)*sqrt(b*x^4 + a*x^3)/(a^5*x^6)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^4\sqrt{x^3\,(a+bx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/x**4/(b*x**4+a*x**3)**(1/2),x)
```

```
[Out] Integral(1/(x**4*sqrt(x**3*(a + b*x))), x)
```

GIAC/XCAS [A] time = 0.235313, size = 116, normalized size = 0.85

$$-\frac{2\left(35\,a^{40}\left(b+\frac{a}{x}\right)^{\frac{9}{2}}-180\,a^{40}\left(b+\frac{a}{x}\right)^{\frac{7}{2}}b+378\,a^{40}\left(b+\frac{a}{x}\right)^{\frac{5}{2}}b^2-420\,a^{40}\left(b+\frac{a}{x}\right)^{\frac{3}{2}}b^3+315\,a^{40}\sqrt{b+\frac{a}{x}}b^4\right)}{315\,a^{45}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^4 + a*x^3)*x^4),x, algorithm="giac")
```

```
[Out] -2/315*(35*a^40*(b + a/x)^(9/2) - 180*a^40*(b + a/x)^(7/2)*b + 37
8*a^40*(b + a/x)^(5/2)*b^2 - 420*a^40*(b + a/x)^(3/2)*b^3 + 315*a
^40*sqrt(b + a/x)*b^4)/a^45
```

3.319 $\int \frac{1}{x^3+bx^5}\,dx$

Optimal. Leaf size=26

$$\frac{1}{2}b\log\left(bx^2+1\right)-b\log(x)-\frac{1}{2x^2}$$

```
[Out] -1/(2*x^2) - b*Log[x] + (b*Log[1 + b*x^2])/2
```

Rubi [A] time = 0.0429257, antiderivative size = 26, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$\frac{1}{2}b\log\left(bx^2+1\right)-b\log(x)-\frac{1}{2x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3 + b*x^5)^(-1),x]
```

```
[Out] -1/(2*x^2) - b*Log[x] + (b*Log[1 + b*x^2])/2
```

Rubi in Sympy [A] time = 6.33027, size = 26, normalized size = 1.

$$-\frac{b\log\left(x^2\right)}{2}+\frac{b\log\left(bx^2+1\right)}{2}-\frac{1}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**5+x**3),x)
```

```
[Out] -b*log(x**2)/2 + b*log(b*x**2 + 1)/2 - 1/(2*x**2)
```

Mathematica [A] time = 0.007542, size = 26, normalized size = 1.

$$\frac{1}{2}b\log\left(bx^2+1\right)-b\log(x)-\frac{1}{2x^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^3 + b*x^5)^(-1),x]
```

```
[Out] -1/(2*x^2) - b*Log[x] + (b*Log[1 + b*x^2])/2
```

Maple [A] time = 0.01, size = 23, normalized size = 0.9

$$-\frac{1}{2\,x^2}-b\ln(x)+\frac{b\ln\left(bx^2+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^5+x^3),x)
```

```
[Out] -1/2/x^2-b*ln(x)+1/2*b*ln(b*x^2+1)
```

Maxima [A] time = 1.3768, size = 30, normalized size = 1.15

$$\frac{1}{2}\,b\log\left(bx^2+1\right)-b\log\left(x\right)-\frac{1}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^5 + x^3),x, algorithm="maxima")
```

```
[Out] 1/2*b*log(b*x^2 + 1) - b*log(x) - 1/2/x^2
```

Fricas [A] time = 0.220021, size = 38, normalized size = 1.46

$$\frac{bx^2\log\left(bx^2+1\right)-2\,bx^2\log\left(x\right)-1}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^5 + x^3),x, algorithm="fricas")
```

```
[Out] 1/2*(b*x^2*log(b*x^2 + 1) - 2*b*x^2*log(x) - 1)/x^2
```

Sympy [A] time = 1.30984, size = 22, normalized size = 0.85

$$-b\log\left(x\right)+\frac{b\log\left(x^2+\frac{1}{b}\right)}{2}-\frac{1}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**5+x**3),x)
```

```
[Out] -b*log(x) + b*log(x**2 + 1/b)/2 - 1/(2*x**2)
```

GIAC/XCAS [A] time = 0.219025, size = 43, normalized size = 1.65

$$-\frac{1}{2}\,b\ln\left(x^2\right)+\frac{1}{2}\,b\ln\left(\left|bx^2+1\right|\right)+\frac{bx^2-1}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^5 + x^3),x, algorithm="giac")
```

```
[Out] -1/2*b*ln(x^2) + 1/2*b*ln(abs(b*x^2 + 1)) + 1/2*(b*x^2 - 1)/x^2
```

3.320 $\int \frac{1}{-x^3+bx^5}\,dx$

Optimal. Leaf size=27

$$\frac{1}{2}b\log\left(1-bx^2\right)-b\log(x)+\frac{1}{2x^2}$$

```
[Out] 1/(2*x^2) - b*Log[x] + (b*Log[1 - b*x^2])/2
```

Rubi [A] time = 0.0452162, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{1}{2}b\log\left(1-bx^2\right)-b\log(x)+\frac{1}{2x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(-x^3 + b*x^5)^(-1),x]
```

```
[Out] 1/(2*x^2) - b*Log[x] + (b*Log[1 - b*x^2])/2
```

Rubi in Sympy [A] time = 6.52057, size = 26, normalized size = 0.96

$$-\frac{b\log\left(x^2\right)}{2}+\frac{b\log\left(-bx^2+1\right)}{2}+\frac{1}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**5-x**3),x)
```

```
[Out] -b*log(x**2)/2 + b*log(-b*x**2 + 1)/2 + 1/(2*x**2)
```

Mathematica [A] time = 0.00814101, size = 27, normalized size = 1.

$$\frac{1}{2}b\log\left(1-bx^2\right)-b\log(x)+\frac{1}{2x^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(-x^3 + b*x^5)^(-1),x]
```

```
[Out] 1/(2*x^2) - b*Log[x] + (b*Log[1 - b*x^2])/2
```

Maple [A] time = 0.009, size = 23, normalized size = 0.9

$$\frac{1}{2\,x^2}-b\ln(x)+\frac{b\ln\left(bx^2-1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^5-x^3),x)
```

```
[Out] 1/2/x^2-b*ln(x)+1/2*b*ln(b*x^2-1)
```

Maxima [A] time = 1.37633, size = 30, normalized size = 1.11

$$\frac{1}{2}\,b\log\left(bx^2-1\right)-b\log\left(x\right)+\frac{1}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^5 - x^3),x, algorithm="maxima")
```

```
[Out] 1/2*b*log(b*x^2 - 1) - b*log(x) + 1/2/x^2
```

Fricas [A] time = 0.212011, size = 38, normalized size = 1.41

$$\frac{bx^2\log\left(bx^2-1\right)-2\,bx^2\log\left(x\right)+1}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^5 - x^3),x, algorithm="fricas")
```

```
[Out] 1/2*(b*x^2*log(b*x^2 - 1) - 2*b*x^2*log(x) + 1)/x^2
```

Sympy [A] time = 0.516603, size = 22, normalized size = 0.81

$$-b\log\left(x\right)+\frac{b\log\left(x^2-\frac{1}{b}\right)}{2}+\frac{1}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**5-x**3),x)
```

```
[Out] -b*log(x) + b*log(x**2 - 1/b)/2 + 1/(2*x**2)
```

GIAC/XCAS [A] time = 0.219165, size = 43, normalized size = 1.59

$$-\frac{1}{2}\,b\ln\left(x^2\right)+\frac{1}{2}\,b\ln\left(\left|bx^2-1\right|\right)+\frac{bx^2+1}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x^5 - x^3),x, algorithm="giac")
```

```
[Out] -1/2*b*ln(x^2) + 1/2*b*ln(abs(b*x^2 - 1)) + 1/2*(b*x^2 + 1)/x^2
```

3.321 $\int \frac{1}{ax+bx}\,dx$

Optimal. Leaf size=8

$$\frac{\log(x)}{a+b}$$

```
[Out] Log[x]/(a + b)
```

Rubi [A] time = 0.00988811, antiderivative size = 8, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$

$$\frac{\log(x)}{a+b}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x)^(-1),x]

[Out] Log[x]/(a + b)
```

Rubi in Sympy [A] time = 2.16215, size = 5, normalized size = 0.62

$$\frac{\log(x)}{a+b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x+b*x),x)

[Out] log(x)/(a + b)
```

Mathematica [A] time = 0.00384332, size = 14, normalized size = 1.75

$$\frac{\log(ax+bx)}{a+b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x)^(-1),x]

[Out] Log[a*x + b*x]/(a + b)
```

Maple [A] time = 0.001, size = 9, normalized size = 1.1

$$\frac{\ln(x)}{a+b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x+b*x),x)

[Out] ln(x)/(a+b)
```

Maxima [A] time = 1.3795, size = 19, normalized size = 2.38

$$\frac{\log(ax + bx)}{a + b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x),x, algorithm="maxima")
```

```
[Out] log(a*x + b*x)/(a + b)
```

Fricas [A] time = 0.212036, size = 11, normalized size = 1.38

$$\frac{\log(x)}{a + b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x),x, algorithm="fricas")
```

```
[Out] log(x)/(a + b)
```

Sympy [A] time = 0.090272, size = 5, normalized size = 0.62

$$\frac{\log(x)}{a + b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x+b*x),x)
```

```
[Out] log(x)/(a + b)
```

GIAC/XCAS [A] time = 0.217126, size = 20, normalized size = 2.5

$$\frac{\ln(|ax + bx|)}{a + b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x),x, algorithm="giac")
```

```
[Out] ln(abs(a*x + b*x))/(a + b)
```

3.322 $\int \frac{1}{(ax+bx)^2} \, dx$

Optimal. Leaf size=10

$$-\frac{1}{x(a+b)^2}$$

```
[Out] -(1/((a + b)^2*x))
```

Rubi [A] time = 0.0103761, antiderivative size = 10, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333

$$-\frac{1}{x(a+b)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x)^(-2),x]
```

```
[Out] -(1/((a + b)^2*x))
```

Rubi in Sympy [A] time = 2.26697, size = 8, normalized size = 0.8

$$-\frac{1}{x(a+b)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x+b*x)**2,x)
```

```
[Out] -1/(x*(a + b)**2)
```

Mathematica [A] time = 0.00447624, size = 10, normalized size = 1.

$$-\frac{1}{x(a+b)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x)^(-2),x]
```

```
[Out] -(1/((a + b)^2*x))
```

Maple [A] time = 0.002, size = 11, normalized size = 1.1

$$-\frac{1}{(a+b)^2 x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x+b*x)^2,x)
```

```
[Out] -1/(a+b)^2/x
```

Maxima [A] time = 1.37352, size = 22, normalized size = 2.2

$$-\frac{1}{(ax+bx)(a+b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x)^(-2),x, algorithm="maxima")
```

```
[Out] -1/((a*x + b*x)*(a + b))
```

Fricas [A] time = 0.205333, size = 24, normalized size = 2.4

$$-\frac{1}{(a^2+2\,ab+b^2)x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x)^(-2),x, algorithm="fricas")
```

```
[Out] -1/((a^2 + 2*a*b + b^2)*x)
```

Sympy [A] time = 0.113945, size = 15, normalized size = 1.5

$$-\frac{1}{x\,(a^2+2ab+b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x+b*x)**2,x)
```

```
[Out] -1/(x*(a**2 + 2*a*b + b**2))
```

GIAC/XCAS [A] time = 0.218333, size = 22, normalized size = 2.2

$$-\frac{1}{(ax+bx)(a+b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x)^(-2),x, algorithm="giac")
```

```
[Out] -1/((a*x + b*x)*(a + b))
```

3.323 $\int \frac{1}{(ax+bx)^3}\,dx$

Optimal. Leaf size=12

$$-\frac{1}{2x^2(a+b)^3}$$

```
[Out] -1/(2*(a + b)^3*x^2)
```

Rubi [A] time = 0.0103543, antiderivative size = 12, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$

$$-\frac{1}{2x^2(a+b)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x)^(-3),x]

[Out] -1/(2*(a + b)^3*x^2)
```

Rubi in Sympy [A] time = 2.31132, size = 12, normalized size = 1.

$$-\frac{1}{2x^2\,(a+b)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x+b*x)**3,x)

[Out] -1/(2*x**2*(a + b)**3)
```

Mathematica [A] time = 0.00494278, size = 12, normalized size = 1.

$$-\frac{1}{2x^2(a+b)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x)^(-3),x]

[Out] -1/(2*(a + b)^3*x^2)
```

Maple [A] time = 0.001, size = 11, normalized size = 0.9

$$-\frac{1}{2\,(a+b)^3\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x+b*x)^3,x)

[Out] -1/2/(a+b)^3/x^2
```

Maxima [A] time = 1.38279, size = 22, normalized size = 1.83

$$-\frac{1}{2\,(ax+bx)^2(a+b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x)^(-3),x, algorithm="maxima")
```

```
[Out] -1/2/((a*x + b*x)^2*(a + b))
```

Fricas [A] time = 0.203682, size = 35, normalized size = 2.92

$$-\frac{1}{2\,(a^3+3\,a^2b+3\,ab^2+b^3)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x)^(-3),x, algorithm="fricas")
```

```
[Out] -1/2/((a^3 + 3*a^2*b + 3*a*b^2 + b^3)*x^2)
```

Sympy [A] time = 0.126964, size = 27, normalized size = 2.25

$$-\frac{1}{2x^2\,(a^3+3a^2b+3ab^2+b^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x+b*x)**3,x)
```

```
[Out] -1/(2*x**2*(a**3 + 3*a**2*b + 3*a*b**2 + b**3))
```

GIAC/XCAS [A] time = 0.218701, size = 22, normalized size = 1.83

$$-\frac{1}{2\,(ax+bx)^2(a+b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x)^(-3),x, algorithm="giac")
```

```
[Out] -1/2/((a*x + b*x)^2*(a + b))
```

3.324 $\int \frac{1}{ax^2+bx^2}\,dx$

Optimal. Leaf size=10

$$-\frac{1}{x(a+b)}$$

[Out] -(1/((a + b)*x))

Rubi [A] time = 0.00727225, antiderivative size = 10, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$-\frac{1}{x(a+b)}$$

Antiderivative was successfully verified.

[In] Int[(a*x^2 + b*x^2)^(-1),x]

[Out] -(1/((a + b)*x))

Rubi in Sympy [A] time = 2.29567, size = 7, normalized size = 0.7

$$-\frac{1}{x\,(a+b)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] rubi_integrate(1/(a*x**2+b*x**2),x)

[Out] -1/(x*(a + b))

Mathematica [A] time = 0.00131545, size = 10, normalized size = 1.

$$-\frac{1}{x(a+b)}$$

Antiderivative was successfully verified.

[In] Integrate[(a*x^2 + b*x^2)^(-1),x]

[Out] -(1/((a + b)*x))

Maple [A] time = 0.001, size = 11, normalized size = 1.1

$$-\frac{1}{(a+b)\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(1/(a*x^2+b*x^2),x)

[Out] -1/(a+b)/x

Maxima [A] time = 1.39618, size = 14, normalized size = 1.4

$$-\frac{1}{(a+b)x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x^2 + b*x^2),x, algorithm="maxima")
```

```
[Out] -1/((a + b)*x)
```

Fricas [A] time = 0.200741, size = 14, normalized size = 1.4

$$-\frac{1}{(a+b)x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x^2 + b*x^2),x, algorithm="fricas")
```

```
[Out] -1/((a + b)*x)
```

Sympy [A] time = 0.095939, size = 7, normalized size = 0.7

$$-\frac{1}{x(a+b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**2+b*x**2),x)
```

```
[Out] -1/(x*(a + b))
```

GIAC/XCAS [A] time = 0.217472, size = 14, normalized size = 1.4

$$-\frac{1}{(a+b)x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x^2 + b*x^2),x, algorithm="giac")
```

```
[Out] -1/((a + b)*x)
```

3.325 $\int \frac{1}{ax^n+bx^n}\,dx$

Optimal. Leaf size=20

$$\frac{x^{1-n}}{(1-n)(a+b)}$$

```
[Out] x^(1 - n)/((a + b)*(1 - n))
```

Rubi [A] time = 0.019008, antiderivative size = 20, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.231$

$$\frac{x^{1-n}}{(1-n)(a+b)}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^n + b*x^n)^(-1),x]

[Out] x^(1 - n)/((a + b)*(1 - n))
```

Rubi in Sympy [A] time = 3.40945, size = 10, normalized size = 0.5

$$\frac{x^{-n+1}}{(a+b)(-n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x**n+b*x**n),x)

[Out] x**(-n + 1)/((a + b)*(-n + 1))
```

Mathematica [A] time = 0.00582209, size = 20, normalized size = 1.

$$\frac{x^{1-n}}{(1-n)(a+b)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^n + b*x^n)^(-1),x]

[Out] x^(1 - n)/((a + b)*(1 - n))
```

Maple [A] time = 0.003, size = 19, normalized size = 1.

$$-\frac{x}{(-1+n)\,x^n\,(a+b)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x^n+b*x^n),x)

[Out] -x/(-1+n)/(x^n)/(a+b)
```

Maxima [A] time = 1.53807, size = 28, normalized size = 1.4

$$-\frac{xx^{-n}}{a(n-1)+b(n-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x^n + b*x^n),x, algorithm="maxima")
```

```
[Out] -x*x^(-n)/(a*(n - 1) + b*(n - 1))
```

Fricas [A] time = 0.238138, size = 30, normalized size = 1.5

$$-\frac{x}{((a+b)n-a-b)x^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x^n + b*x^n),x, algorithm="fricas")
```

```
[Out] -x/(((a + b)*n - a - b)*x^n)
```

Sympy [A] time = 1.93952, size = 32, normalized size = 1.6

$$\begin{cases} -\frac{x}{anx^n-ax^n+bnx^n-bx^n} & \text{for } n \neq 1 \\ \frac{\log(x)}{a+b} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**n+b*x**n),x)
```

```
[Out] Piecewise((-x/(a*n*x**n - a*x**n + b*n*x**n - b*x**n), Ne(n, 1)),
 (log(x)/(a + b), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{ax^n+bx^n}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x^n + b*x^n),x, algorithm="giac")
```

```
[Out] integrate(1/(a*x^n + b*x^n), x)
```

3.326 $\int \frac{1}{(ax^n+bx^n)^2} \, dx$

Optimal. Leaf size=20

$$\frac{x^{1-2n}}{(1-2n)(a+b)^2}$$

```
[Out] x^(1 - 2*n)/((a + b)^2*(1 - 2*n))
```

Rubi [A] time = 0.0217089, antiderivative size = 20, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{x^{1-2n}}{(1-2n)(a+b)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a*x^n + b*x^n)^(-2),x]

[Out] x^(1 - 2*n)/((a + b)^2*(1 - 2*n))
```

Rubi in Sympy [A] time = 3.69257, size = 15, normalized size = 0.75

$$\frac{x^{-2n+1}}{(a+b)^2(-2n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/(a*x**n+b*x**n)**2,x)

[Out] x**(-2*n + 1)/((a + b)**2*(-2*n + 1))
```

Mathematica [A] time = 0.005337, size = 20, normalized size = 1.

$$\frac{x^{1-2n}}{(1-2n)(a+b)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*x^n + b*x^n)^(-2),x]

[Out] x^(1 - 2*n)/((a + b)^2*(1 - 2*n))
```

Maple [A] time = 0.003, size = 21, normalized size = 1.1

$$-\frac{x}{(-1+2n)(x^n)^2(a+b)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a*x^n+b*x^n)^2,x)

[Out] -x/(-1+2*n)/(x^n)^2/(a+b)^2
```

Maxima [A] time = 1.46628, size = 51, normalized size = 2.55

$$-\frac{xx^{-2\,n}}{a^{2}(2\,n-1)+2\,ab(2\,n-1)+b^{2}(2\,n-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^n + b*x^n)^(-2),x, algorithm="maxima")

[Out] -x*x^(-2*n)/(a^2*(2*n - 1) + 2*a*b*(2*n - 1) + b^2*(2*n - 1))
```

Fricas [A] time = 0.235885, size = 49, normalized size = 2.45

$$\frac{x}{(a^{2}+2\,ab+b^{2}-2\,(a^{2}+2\,ab+b^{2})n)x^{2\,n}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^n + b*x^n)^(-2),x, algorithm="fricas")

[Out] x/((a^2 + 2*a*b + b^2 - 2*(a^2 + 2*a*b + b^2)*n)*x^(2*n))
```

Sympy [A] time = 2.67464, size = 82, normalized size = 4.1

$$\begin{cases} -\frac{x}{2a^{2}nx^{2n}-a^{2}x^{2n}+4abnx^{2n}-2abx^{2n}+2b^{2}nx^{2n}-b^{2}x^{2n}} & \text{for } n\neq\frac{1}{2} \\ \frac{\log(x)}{a^{2}+2ab+b^{2}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**n+b*x**n)**2,x)

[Out] Piecewise((-x/(2*a**2*n*x**(2*n) - a**2*x**(2*n) + 4*a*b*n*x**(2*
n) - 2*a*b*x**(2*n) + 2*b**2*n*x**(2*n) - b**2*x**(2*n)), Ne(n, 1
/2)), (log(x)/(a**2 + 2*a*b + b**2), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(ax^{n}+bx^{n})^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^n + b*x^n)^(-2),x, algorithm="giac")

[Out] integrate((a*x^n + b*x^n)^(-2), x)
```

3.327 $\int \frac{1}{(ax^n+bx^n)^3}\,dx$

Optimal. Leaf size=20

$$\frac{x^{1-3n}}{(1-3n)(a+b)^3}$$

```
[Out] x^(1 - 3*n)/((a + b)^3*(1 - 3*n))
```

Rubi [A] time = 0.0268827, antiderivative size = 20, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$\frac{x^{1-3n}}{(1-3n)(a+b)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^n + b*x^n)^(-3),x]

[Out] x^(1 - 3*n)/((a + b)^3*(1 - 3*n))
```

Rubi in Sympy [A] time = 3.76444, size = 15, normalized size = 0.75

$$\frac{x^{-3n+1}}{(a+b)^3\,(-3n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x**n+b*x**n)**3,x)

[Out] x**(-3*n + 1)/((a + b)**3*(-3*n + 1))
```

Mathematica [A] time = 0.00545859, size = 20, normalized size = 1.

$$\frac{x^{1-3n}}{(1-3n)(a+b)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^n + b*x^n)^(-3),x]

[Out] x^(1 - 3*n)/((a + b)^3*(1 - 3*n))
```

Maple [A] time = 0.002, size = 21, normalized size = 1.1

$$-\frac{x}{(-1+3\,n)\,(x^n)^3\,(a+b)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x^n+b*x^n)^3,x)

[Out] -x/(-1+3*n)/(x^n)^3/(a+b)^3
```

Maxima [A] time = 1.38221, size = 69, normalized size = 3.45

$$-\frac{xx^{-3\,n}}{a^3(3\,n-1)+3\,a^2b(3\,n-1)+3\,ab^2(3\,n-1)+b^3(3\,n-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^n + b*x^n)^(-3),x, algorithm="maxima")
```

```
[Out] -x*x^(-3*n)/(a^3*(3*n - 1) + 3*a^2*b*(3*n - 1) + 3*a*b^2*(3*n - 1
) + b^3*(3*n - 1))
```

Fricas [A] time = 0.239557, size = 70, normalized size = 3.5

$$\frac{x}{(a^3+3\,a^2b+3\,ab^2+b^3-3\,(a^3+3\,a^2b+3\,ab^2+b^3)n)x^{3\,n}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^n + b*x^n)^(-3),x, algorithm="fricas")
```

```
[Out] x/((a^3 + 3*a^2*b + 3*a*b^2 + b^3 - 3*(a^3 + 3*a^2*b + 3*a*b^2 +
b^3)*n)*x^(3*n))
```

Sympy [A] time = 3.46824, size = 119, normalized size = 5.95

$$\begin{cases} -\frac{x}{3a^3nx^{3n}-a^3x^{3n}+9a^2bnx^{3n}-3a^2bx^{3n}+9ab^2nx^{3n}-3ab^2x^{3n}+3b^3nx^{3n}-b^3x^{3n}} & \text{for } n\neq\frac{1}{3} \\ \frac{\log(x)}{a^3+3a^2b+3ab^2+b^3} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**n+b*x**n)**3,x)
```

```
[Out] Piecewise((-x/(3*a**3*n*x**(3*n) - a**3*x**(3*n) + 9*a**2*b*n*x**
(3*n) - 3*a**2*b*x**(3*n) + 9*a*b**2*n*x**(3*n) - 3*a*b**2*x**(3*
n) + 3*b**3*n*x**(3*n) - b**3*x**(3*n)), Ne(n, 1/3)), (log(x)/(a*
*3 + 3*a**2*b + 3*a*b**2 + b**3), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(ax^n+bx^n)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^n + b*x^n)^(-3),x, algorithm="giac")
```

```
[Out] integrate((a*x^n + b*x^n)^(-3), x)
```

3.328 $\int \left(ax + bx^{14}\right)^{12} dx$

Optimal. Leaf size=16

$$\frac{\left(a+bx^{13}\right)^{13}}{169b}$$

```
[Out] (a + b*x^13)^13/(169*b)
```

Rubi [A] time = 0.0151643, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{\left(a+bx^{13}\right)^{13}}{169b}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^14)^12,x]
```

```
[Out] (a + b*x^13)^13/(169*b)
```

Rubi in Sympy [A] time = 2.54079, size = 10, normalized size = 0.62

$$\frac{\left(a+bx^{13}\right)^{13}}{169b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**14+a*x)**12,x)
```

```
[Out] (a + b*x**13)**13/(169*b)
```

Mathematica [B] time = 0.00685116, size = 160, normalized size = 10.

$$\frac{a^{12}x^{13}}{13}+\frac{6}{13}a^{11}bx^{26}+\frac{22}{13}a^{10}b^2x^{39}+\frac{55}{13}a^9b^3x^{52}+\frac{99}{13}a^8b^4x^{65}+\frac{132}{13}a^7b^5x^{78}+\frac{132}{13}a^6b^6x^{91}+\frac{99}{13}a^5b^7x^{104}+\frac{55}{13}a^4b^8x^{117}+\frac{22}{13}a^3b^9x^{130}+\frac{6}{13}a^2b^{10}x^{143}+\frac{1}{13}ab^{11}x^{156}+\frac{b^{12}x^{169}}{169}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^14)^12,x]
```

```
[Out] (a^12*x^13)/13 + (6*a^11*b*x^26)/13 + (22*a^10*b^2*x^39)/13 + (55
*a^9*b^3*x^52)/13 + (99*a^8*b^4*x^65)/13 + (132*a^7*b^5*x^78)/13
+ (132*a^6*b^6*x^91)/13 + (99*a^5*b^7*x^104)/13 + (55*a^4*b^8*x^1
17)/13 + (22*a^3*b^9*x^130)/13 + (6*a^2*b^10*x^143)/13 + (a*b^11*
x^156)/13 + (b^12*x^169)/169
```

Maple [B] time = 0.003, size = 135, normalized size = 8.4

$$\frac{b^{12}x^{169}}{169}+\frac{ab^{11}x^{156}}{13}+\frac{6\,a^2b^{10}x^{143}}{13}+\frac{22\,a^3b^9x^{130}}{13}+\frac{55\,b^8a^4x^{117}}{13}+\frac{99\,a^5b^7x^{104}}{13}+\frac{132\,a^6b^6x^{91}}{13}+\frac{132\,a^7b^5x^{78}}{13}+\frac{99\,a^8b^4x^{65}}{13}+\frac{55\,a^9b^3x^{52}}{13}+\frac{22\,a^{10}b^2x^{39}}{13}+\frac{6\,a^{11}bx^{26}}{13}+\frac{a^{12}x^{13}}{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^14+a*x)^12,x)
```

```
[Out] 1/169*b^12*x^169+1/13*a*b^11*x^156+6/13*a^2*b^10*x^143+22/13*a^3*
b^9*x^130+55/13*b^8*a^4*x^117+99/13*a^5*b^7*x^104+132/13*a^6*b^6*
x^91+132/13*a^7*b^5*x^78+99/13*a^8*b^4*x^65+55/13*a^9*b^3*x^52+22
/13*a^10*b^2*x^39+6/13*a^11*b*x^26+1/13*a^12*x^13
```

Maxima [A] time = 1.40371, size = 181, normalized size = 11.31

$$\frac{1}{169}b^{12}x^{169}+\frac{1}{13}ab^{11}x^{156}+\frac{6}{13}a^2b^{10}x^{143}+\frac{22}{13}a^3b^9x^{130}+\frac{55}{13}a^4b^8x^{117}+\frac{99}{13}a^5b^7x^{104}+\frac{132}{13}a^6b^6x^{91}+\frac{132}{13}a^7b^5x^{78}+\frac{99}{13}a^8b^4x^{65}+\frac{55}{13}a^9b^3x^{52}+\frac{22}{13}a^{10}b^2x^{39}+\frac{6}{13}a^{11}bx^{26}+\frac{1}{13}a^{12}x^{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^14 + a*x)^12,x, algorithm="maxima")
```

```
[Out] 1/169*b^12*x^169 + 1/13*a*b^11*x^156 + 6/13*a^2*b^10*x^143 + 22/1
3*a^3*b^9*x^130 + 55/13*a^4*b^8*x^117 + 99/13*a^5*b^7*x^104 + 132
/13*a^6*b^6*x^91 + 132/13*a^7*b^5*x^78 + 99/13*a^8*b^4*x^65 + 55/
13*a^9*b^3*x^52 + 22/13*a^10*b^2*x^39 + 6/13*a^11*b*x^26 + 1/13*a
^12*x^13
```

Fricas [A] time = 0.202416, size = 1, normalized size = 0.06

$$\frac{1}{169}x^{169}b^{12}+\frac{1}{13}x^{156}b^{11}a+\frac{6}{13}x^{143}b^{10}a^2+\frac{22}{13}x^{130}b^9a^3+\frac{55}{13}x^{117}b^8a^4+\frac{99}{13}x^{104}b^7a^5+\frac{132}{13}x^{91}b^6a^6+\frac{132}{13}x^{78}b^5a^7+\frac{99}{13}x^{65}b^4a^8+\frac{55}{13}x^{52}b^3a^9+\frac{22}{13}x^{39}b^2a^{10}+\frac{6}{13}x^{26}ba^{11}+\frac{1}{13}x^{13}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^14 + a*x)^12,x, algorithm="fricas")
```

```
[Out] 1/169*x^169*b^12 + 1/13*x^156*b^11*a + 6/13*x^143*b^10*a^2 + 22/1
3*x^130*b^9*a^3 + 55/13*x^117*b^8*a^4 + 99/13*x^104*b^7*a^5 + 132
/13*x^91*b^6*a^6 + 132/13*x^78*b^5*a^7 + 99/13*x^65*b^4*a^8 + 55/
13*x^52*b^3*a^9 + 22/13*x^39*b^2*a^10 + 6/13*x^26*b*a^11 + 1/13*x
^13*a^12
```

Sympy [A] time = 0.243438, size = 160, normalized size = 10.

$$\frac{a^{12}x^{13}}{13}+\frac{6a^{11}bx^{26}}{13}+\frac{22a^{10}b^2x^{39}}{13}+\frac{55a^9b^3x^{52}}{13}+\frac{99a^8b^4x^{65}}{13}+\frac{132a^7b^5x^{78}}{13}+\frac{132a^6b^6x^{91}}{13}+\frac{99a^5b^7x^{104}}{13}+\frac{55a^4b^8x^{117}}{13}+\frac{22a^3b^9x^{130}}{13}+\frac{6a^2b^{10}x^{143}}{13}+\frac{ab^{11}x^{156}}{13}+\frac{b^{12}x^{169}}{169}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**14+a*x)**12,x)
```

```
[Out] a**12*x**13/13 + 6*a**11*b*x**26/13 + 22*a**10*b**2*x**39/13 + 55
*a**9*b**3*x**52/13 + 99*a**8*b**4*x**65/13 + 132*a**7*b**5*x**78
/13 + 132*a**6*b**6*x**91/13 + 99*a**5*b**7*x**104/13 + 55*a**4*b
**8*x**117/13 + 22*a**3*b**9*x**130/13 + 6*a**2*b**10*x**143/13 +
 a*b**11*x**156/13 + b**12*x**169/169
```

GIAC/XCAS [A] time = 0.216945, size = 181, normalized size = 11.31

$$\frac{1}{169}\,b^{12}x^{169} + \frac{1}{13}\,ab^{11}x^{156} + \frac{6}{13}\,a^{2}b^{10}x^{143} + \frac{22}{13}\,a^{3}b^{9}x^{130} + \frac{55}{13}\,a^{4}b^{8}x^{117} + \frac{99}{13}\,a^{5}b^{7}x^{104} + \frac{132}{13}\,a^{6}b^{6}x^{91} + \frac{132}{13}\,a^{7}b^{5}x^{78} + \frac{99}{13}\,a^{8}b^{4}x^{65} + \frac{55}{13}\,a^{9}b^{3}x^{52} + \frac{22}{13}\,a^{10}b^{2}x^{39} + \frac{6}{13}\,a^{11}bx^{26} + \frac{1}{13}\,a^{12}x^{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^14 + a*x)^12,x, algorithm="giac")
```

```
[Out] 1/169*b^12*x^169 + 1/13*a*b^11*x^156 + 6/13*a^2*b^10*x^143 + 22/1
3*a^3*b^9*x^130 + 55/13*a^4*b^8*x^117 + 99/13*a^5*b^7*x^104 + 132
/13*a^6*b^6*x^91 + 132/13*a^7*b^5*x^78 + 99/13*a^8*b^4*x^65 + 55/
13*a^9*b^3*x^52 + 22/13*a^10*b^2*x^39 + 6/13*a^11*b*x^26 + 1/13*a
^12*x^13
```

3.329 $\int x^{12} \left(ax+bx^{26}\right)^{12}\, dx$

Optimal. Leaf size=21

$$\frac{\left(ax+bx^{26}\right)^{13}}{325bx^{13}}$$

```
[Out] (a*x + b*x^26)^13/(325*b*x^13)
```

Rubi [A] time = 0.0164289, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$

$$\frac{\left(ax+bx^{26}\right)^{13}}{325bx^{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^12*(a*x + b*x^26)^12,x]

[Out] (a*x + b*x^26)^13/(325*b*x^13)
```

Rubi in Sympy [A] time = 3.28874, size = 10, normalized size = 0.48

$$\frac{\left(a+bx^{25}\right)^{13}}{325b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**12*(b*x**26+a*x)**12,x)

[Out] (a + b*x**25)**13/(325*b)
```

Mathematica [B] time = 0.0116192, size = 160, normalized size = 7.62

$$\frac{a^{12}x^{25}}{25}+\frac{6}{25}a^{11}bx^{50}+\frac{22}{25}a^{10}b^2x^{75}+\frac{11}{5}a^9b^3x^{100}+\frac{99}{25}a^8b^4x^{125}+\frac{132}{25}a^7b^5x^{150}+\frac{132}{25}a^6b^6x^{175}+\frac{99}{25}a^5b^7x^{200}+\frac{11}{5}a^4b^8x^{225}+\frac{22}{25}a^3b^9x^{250}+\frac{6}{25}a^2b^{10}x^{275}+\frac{1}{25}ab^{11}x^{300}+\frac{b^{12}x^{325}}{325}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^12*(a*x + b*x^26)^12,x]

[Out] (a^12*x^25)/25 + (6*a^11*b*x^50)/25 + (22*a^10*b^2*x^75)/25 + (11
*a^9*b^3*x^100)/5 + (99*a^8*b^4*x^125)/25 + (132*a^7*b^5*x^150)/2
5 + (132*a^6*b^6*x^175)/25 + (99*a^5*b^7*x^200)/25 + (11*a^4*b^8*
x^225)/5 + (22*a^3*b^9*x^250)/25 + (6*a^2*b^10*x^275)/25 + (a*b^1
1*x^300)/25 + (b^12*x^325)/325
```

Maple [B] time = 0.001, size = 135, normalized size = 6.4

$$\frac{b^{12}x^{325}}{325}+\frac{ab^{11}x^{300}}{25}+\frac{6\,a^2b^{10}x^{275}}{25}+\frac{22\,a^3b^9x^{250}}{25}+\frac{11\,b^8a^4x^{225}}{5}+\frac{99\,a^5b^7x^{200}}{25}+\frac{132\,a^6b^6x^{175}}{25}+\frac{132\,a^7b^5x^{150}}{25}+\frac{99\,a^8b^4x^{125}}{25}+\frac{11\,a^9b^3x^{100}}{5}+\frac{22\,a^{10}b^2x^{75}}{25}+\frac{6\,a^{11}bx^{50}}{25}+\frac{a^{12}x^{25}}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^12*(b*x^26+a*x)^12,x)
```

```
[Out] 1/325*b^12*x^325+1/25*a*b^11*x^300+6/25*a^2*b^10*x^275+22/25*a^3*
b^9*x^250+11/5*b^8*a^4*x^225+99/25*a^5*b^7*x^200+132/25*a^6*b^6*x
^175+132/25*a^7*b^5*x^150+99/25*a^8*b^4*x^125+11/5*a^9*b^3*x^100+
22/25*a^10*b^2*x^75+6/25*a^11*b*x^50+1/25*a^12*x^25
```

Maxima [A] time = 1.41169, size = 181, normalized size = 8.62

$$\frac{1}{325}b^{12}x^{325}+\frac{1}{25}ab^{11}x^{300}+\frac{6}{25}a^2b^{10}x^{275}+\frac{22}{25}a^3b^9x^{250}+\frac{11}{5}a^4b^8x^{225}+\frac{99}{25}a^5b^7x^{200}+\frac{132}{25}a^6b^6x^{175}+\frac{132}{25}a^7b^5x^{150}+\frac{99}{25}a^8b^4x^{125}+\frac{11}{5}a^9b^3x^{100}+\frac{22}{25}a^{10}b^2x^{75}+\frac{6}{25}a^{11}bx^{50}+\frac{1}{25}a^{12}x^{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^26 + a*x)^12*x^12,x, algorithm="maxima")
```

```
[Out] 1/325*b^12*x^325 + 1/25*a*b^11*x^300 + 6/25*a^2*b^10*x^275 + 22/2
5*a^3*b^9*x^250 + 11/5*a^4*b^8*x^225 + 99/25*a^5*b^7*x^200 + 132/
25*a^6*b^6*x^175 + 132/25*a^7*b^5*x^150 + 99/25*a^8*b^4*x^125 + 1
1/5*a^9*b^3*x^100 + 22/25*a^10*b^2*x^75 + 6/25*a^11*b*x^50 + 1/25
*a^12*x^25
```

Fricas [A] time = 0.203807, size = 1, normalized size = 0.05

$$\frac{1}{325}x^{325}b^{12}+\frac{1}{25}x^{300}b^{11}a+\frac{6}{25}x^{275}b^{10}a^2+\frac{22}{25}x^{250}b^9a^3+\frac{11}{5}x^{225}b^8a^4+\frac{99}{25}x^{200}b^7a^5+\frac{132}{25}x^{175}b^6a^6+\frac{132}{25}x^{150}b^5a^7+\frac{99}{25}x^{125}b^4a^8+\frac{11}{5}x^{100}b^3a^9+\frac{22}{25}x^{75}b^2a^{10}+\frac{6}{25}x^{50}ba^{11}+\frac{1}{25}x^{25}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^26 + a*x)^12*x^12,x, algorithm="fricas")
```

```
[Out] 1/325*x^325*b^12 + 1/25*x^300*b^11*a + 6/25*x^275*b^10*a^2 + 22/2
5*x^250*b^9*a^3 + 11/5*x^225*b^8*a^4 + 99/25*x^200*b^7*a^5 + 132/
25*x^175*b^6*a^6 + 132/25*x^150*b^5*a^7 + 99/25*x^125*b^4*a^8 + 1
1/5*x^100*b^3*a^9 + 22/25*x^75*b^2*a^10 + 6/25*x^50*b*a^11 + 1/25
*x^25*a^12
```

Sympy [A] time = 0.272643, size = 160, normalized size = 7.62

$$\frac{a^{12}x^{25}}{25}+\frac{6a^{11}bx^{50}}{25}+\frac{22a^{10}b^2x^{75}}{25}+\frac{11a^9b^3x^{100}}{5}+\frac{99a^8b^4x^{125}}{25}+\frac{132a^7b^5x^{150}}{25}+\frac{132a^6b^6x^{175}}{25}+\frac{99a^5b^7x^{200}}{25}+\frac{11a^4b^8x^{225}}{5}+\frac{22a^3b^9x^{250}}{25}+\frac{6a^2b^{10}x^{275}}{25}+\frac{ab^{11}x^{300}}{25}+\frac{b^{12}x^{325}}{325}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**12*(b*x**26+a*x)**12,x)
```

```
[Out] a**12*x**25/25 + 6*a**11*b*x**50/25 + 22*a**10*b**2*x**75/25 + 11
*a**9*b**3*x**100/5 + 99*a**8*b**4*x**125/25 + 132*a**7*b**5*x**1
50/25 + 132*a**6*b**6*x**175/25 + 99*a**5*b**7*x**200/25 + 11*a**
4*b**8*x**225/5 + 22*a**3*b**9*x**250/25 + 6*a**2*b**10*x**275/25
 + a*b**11*x**300/25 + b**12*x**325/325
```

GIAC/XCAS [A] time = 0.217617, size = 181, normalized size = 8.62

$$\frac{1}{325}\,b^{12}x^{325} + \frac{1}{25}\,ab^{11}x^{300} + \frac{6}{25}\,a^{2}b^{10}x^{275} + \frac{22}{25}\,a^{3}b^{9}x^{250} + \frac{11}{5}\,a^{4}b^{8}x^{225} + \frac{99}{25}\,a^{5}b^{7}x^{200} + \frac{132}{25}\,a^{6}b^{6}x^{175} + \frac{132}{25}\,a^{7}b^{5}x^{150} + \frac{99}{25}\,a^{8}b^{4}x^{125} + \frac{11}{5}\,a^{9}b^{3}x^{100} + \frac{22}{25}\,a^{10}b^{2}x^{75} + \frac{6}{25}\,a^{11}bx^{50} + \frac{1}{25}\,a^{12}x^{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^26 + a*x)^12*x^12,x, algorithm="giac")
```

```
[Out] 1/325*b^12*x^325 + 1/25*a*b^11*x^300 + 6/25*a^2*b^10*x^275 + 22/2
5*a^3*b^9*x^250 + 11/5*a^4*b^8*x^225 + 99/25*a^5*b^7*x^200 + 132/
25*a^6*b^6*x^175 + 132/25*a^7*b^5*x^150 + 99/25*a^8*b^4*x^125 + 1
1/5*a^9*b^3*x^100 + 22/25*a^10*b^2*x^75 + 6/25*a^11*b*x^50 + 1/25
*a^12*x^25
```

3.330 $\int x^{24} \left(ax + bx^{38}\right)^{12} dx$

Optimal. Leaf size=21

$$\frac{\left(ax + bx^{38}\right)^{13}}{481bx^{13}}$$

```
[Out] (a*x + b*x^38)^13/(481*b*x^13)
```

Rubi [A] time = 0.0170669, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$

$$\frac{\left(ax + bx^{38}\right)^{13}}{481bx^{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^24*(a*x + b*x^38)^12,x]
```

```
[Out] (a*x + b*x^38)^13/(481*b*x^13)
```

Rubi in Sympy [A] time = 3.29201, size = 10, normalized size = 0.48

$$\frac{\left(a + bx^{37}\right)^{13}}{481b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**24*(b*x**38+a*x)**12,x)
```

```
[Out] (a + b*x**37)**13/(481*b)
```

Mathematica [B] time = 0.0129382, size = 160, normalized size = 7.62

$$\frac{a^{12}x^{37}}{37} + \frac{6}{37}a^{11}bx^{74} + \frac{22}{37}a^{10}b^2x^{111} + \frac{55}{37}a^9b^3x^{148} + \frac{99}{37}a^8b^4x^{185} + \frac{132}{37}a^7b^5x^{222} + \frac{132}{37}a^6b^6x^{259} + \frac{99}{37}a^5b^7x^{296} + \frac{55}{37}a^4b^8x^{333} + \frac{22}{37}a^3b^9x^{370} + \frac{6}{37}a^2b^{10}x^{407} + \frac{1}{37}ab^{11}x^{444} + \frac{b^{12}x^{481}}{481}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^24*(a*x + b*x^38)^12,x]
```

```
[Out] (a^12*x^37)/37 + (6*a^11*b*x^74)/37 + (22*a^10*b^2*x^111)/37 + (5
5*a^9*b^3*x^148)/37 + (99*a^8*b^4*x^185)/37 + (132*a^7*b^5*x^222)
/37 + (132*a^6*b^6*x^259)/37 + (99*a^5*b^7*x^296)/37 + (55*a^4*b^
8*x^333)/37 + (22*a^3*b^9*x^370)/37 + (6*a^2*b^10*x^407)/37 + (a*
b^11*x^444)/37 + (b^12*x^481)/481
```

Maple [B] time = 0.003, size = 135, normalized size = 6.4

$$\frac{b^{12}x^{481}}{481} + \frac{ab^{11}x^{444}}{37} + \frac{6\,a^2b^{10}x^{407}}{37} + \frac{22\,a^3b^9x^{370}}{37} + \frac{55\,b^8a^4x^{333}}{37} + \frac{99\,a^5b^7x^{296}}{37} + \frac{132\,a^6b^6x^{259}}{37} + \frac{132\,a^7b^5x^{222}}{37} + \frac{99\,a^8b^4x^{185}}{37} + \frac{55\,a^9b^3x^{148}}{37} + \frac{22\,a^{10}b^2x^{111}}{37} + \frac{6\,a^{11}bx^{74}}{37} + \frac{a^{12}x^{37}}{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^24*(b*x^38+a*x)^12,x)
```

```
[Out] 1/481*b^12*x^481+1/37*a*b^11*x^444+6/37*a^2*b^10*x^407+22/37*a^3*
b^9*x^370+55/37*b^8*a^4*x^333+99/37*a^5*b^7*x^296+132/37*a^6*b^6*
x^259+132/37*a^7*b^5*x^222+99/37*a^8*b^4*x^185+55/37*a^9*b^3*x^14
8+22/37*a^10*b^2*x^111+6/37*a^11*b*x^74+1/37*a^12*x^37
```

Maxima [A] time = 1.40892, size = 181, normalized size = 8.62

$$\frac{1}{481}\,b^{12}x^{481}+\frac{1}{37}\,ab^{11}x^{444}+\frac{6}{37}\,a^2b^{10}x^{407}+\frac{22}{37}\,a^3b^9x^{370}+\frac{55}{37}\,a^4b^8x^{333}+\frac{99}{37}\,a^5b^7x^{296}+\frac{132}{37}\,a^6b^6x^{259}+\frac{132}{37}\,a^7b^5x^{222}+\frac{99}{37}\,a^8b^4x^{185}+\frac{55}{37}\,a^9b^3x^{148}+\frac{22}{37}\,a^{10}b^2x^{111}+\frac{6}{37}\,a^{11}bx^{74}+\frac{1}{37}\,a^{12}x^{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^38 + a*x)^12*x^24,x, algorithm="maxima")
```

```
[Out] 1/481*b^12*x^481 + 1/37*a*b^11*x^444 + 6/37*a^2*b^10*x^407 + 22/3
7*a^3*b^9*x^370 + 55/37*a^4*b^8*x^333 + 99/37*a^5*b^7*x^296 + 132
/37*a^6*b^6*x^259 + 132/37*a^7*b^5*x^222 + 99/37*a^8*b^4*x^185 +
55/37*a^9*b^3*x^148 + 22/37*a^10*b^2*x^111 + 6/37*a^11*b*x^74 + 1
/37*a^12*x^37
```

Fricas [A] time = 0.193139, size = 1, normalized size = 0.05

$$\frac{1}{481}x^{481}b^{12}+\frac{1}{37}x^{444}b^{11}a+\frac{6}{37}x^{407}b^{10}a^2+\frac{22}{37}x^{370}b^9a^3+\frac{55}{37}x^{333}b^8a^4+\frac{99}{37}x^{296}b^7a^5+\frac{132}{37}x^{259}b^6a^6+\frac{132}{37}x^{222}b^5a^7+\frac{99}{37}x^{185}b^4a^8+\frac{55}{37}x^{148}b^3a^9+\frac{22}{37}x^{111}b^2a^{10}+\frac{6}{37}x^{74}ba^{11}+\frac{1}{37}x^{37}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^38 + a*x)^12*x^24,x, algorithm="fricas")
```

```
[Out] 1/481*x^481*b^12 + 1/37*x^444*b^11*a + 6/37*x^407*b^10*a^2 + 22/3
7*x^370*b^9*a^3 + 55/37*x^333*b^8*a^4 + 99/37*x^296*b^7*a^5 + 132
/37*x^259*b^6*a^6 + 132/37*x^222*b^5*a^7 + 99/37*x^185*b^4*a^8 +
55/37*x^148*b^3*a^9 + 22/37*x^111*b^2*a^10 + 6/37*x^74*b*a^11 + 1
/37*x^37*a^12
```

Sympy [A] time = 0.284469, size = 160, normalized size = 7.62

$$\frac{a^{12}x^{37}}{37}+\frac{6a^{11}bx^{74}}{37}+\frac{22a^{10}b^2x^{111}}{37}+\frac{55a^9b^3x^{148}}{37}+\frac{99a^8b^4x^{185}}{37}+\frac{132a^7b^5x^{222}}{37}+\frac{132a^6b^6x^{259}}{37}+\frac{99a^5b^7x^{296}}{37}+\frac{55a^4b^8x^{333}}{37}+\frac{22a^3b^9x^{370}}{37}+\frac{6a^2b^{10}x^{407}}{37}+\frac{ab^{11}x^{444}}{37}+\frac{b^{12}x^{481}}{481}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**24*(b*x**38+a*x)**12,x)
```

```
[Out] a**12*x**37/37 + 6*a**11*b*x**74/37 + 22*a**10*b**2*x**111/37 + 5
5*a**9*b**3*x**148/37 + 99*a**8*b**4*x**185/37 + 132*a**7*b**5*x*
*222/37 + 132*a**6*b**6*x**259/37 + 99*a**5*b**7*x**296/37 + 55*a
**4*b**8*x**333/37 + 22*a**3*b**9*x**370/37 + 6*a**2*b**10*x**407
/37 + a*b**11*x**444/37 + b**12*x**481/481
```

GIAC/XCAS [A] time = 0.219818, size = 181, normalized size = 8.62

$$\frac{1}{481}\,b^{12}x^{481} + \frac{1}{37}\,ab^{11}x^{444} + \frac{6}{37}\,a^{2}b^{10}x^{407} + \frac{22}{37}\,a^{3}b^{9}x^{370} + \frac{55}{37}\,a^{4}b^{8}x^{333} + \frac{99}{37}\,a^{5}b^{7}x^{296} + \frac{132}{37}\,a^{6}b^{6}x^{259} + \frac{132}{37}\,a^{7}b^{5}x^{222} + \frac{99}{37}\,a^{8}b^{4}x^{185} + \frac{55}{37}\,a^{9}b^{3}x^{148} + \frac{22}{37}\,a^{10}b^{2}x^{111} + \frac{6}{37}\,a^{11}bx^{74} + \frac{1}{37}\,a^{12}x^{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^38 + a*x)^12*x^24,x, algorithm="giac")
```

```
[Out] 1/481*b^12*x^481 + 1/37*a*b^11*x^444 + 6/37*a^2*b^10*x^407 + 22/3
7*a^3*b^9*x^370 + 55/37*a^4*b^8*x^333 + 99/37*a^5*b^7*x^296 + 132
/37*a^6*b^6*x^259 + 132/37*a^7*b^5*x^222 + 99/37*a^8*b^4*x^185 +
55/37*a^9*b^3*x^148 + 22/37*a^10*b^2*x^111 + 6/37*a^11*b*x^74 + 1
/37*a^12*x^37
```

3.331 $\int x^{12(-1+m)} \left(ax + bx^{2+12m}\right)^{12} dx$

Optimal. Leaf size=27

$$\frac{\left(a+bx^{12m+1}\right)^{13}}{13b(12m+1)}$$

```
[Out] (a + b*x^(1 + 12*m))^13/(13*b*(1 + 12*m))
```

Rubi [A] time = 0.03373, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$

$$\frac{\left(a+bx^{12m+1}\right)^{13}}{13b(12m+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(12*(-1 + m))*(a*x + b*x^(2 + 12*m))^12,x]
```

```
[Out] (a + b*x^(1 + 12*m))^13/(13*b*(1 + 12*m))
```

Rubi in Sympy [A] time = 82.6828, size = 248, normalized size = 9.19

$$\frac{a^{12}x^{12m+1}}{12m+1} + \frac{6a^{11}bx^{24m+2}}{12m+1} + \frac{22a^{10}b^2x^{36m+3}}{12m+1} + \frac{55a^9b^3x^{48m+4}}{12m+1} + \frac{99a^8b^4x^{60m+5}}{12m+1} + \frac{132a^7b^5x^{72m+6}}{12m+1} + \frac{132a^6b^6x^{84m+7}}{12m+1} + \frac{99a^5b^7x^{96m+8}}{12m+1} + \frac{55a^4b^8x^{108m+9}}{12m+1} + \frac{22a^3b^9x^{120m+10}}{12m+1} + \frac{6a^2b^{10}x^{132m+11}}{12m+1} + \frac{ab^{11}x^{144m+12}}{12m+1} + \frac{b^{12}x^{156m+13}}{13(12m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-12+12*m)*(a*x+b*x**(2+12*m))**12,x)
```

```
[Out] a**12*x**(12*m + 1)/(12*m + 1) + 6*a**11*b*x**(24*m + 2)/(12*m +
1) + 22*a**10*b**2*x**(36*m + 3)/(12*m + 1) + 55*a**9*b**3*x**(48
*m + 4)/(12*m + 1) + 99*a**8*b**4*x**(60*m + 5)/(12*m + 1) + 132*
a**7*b**5*x**(72*m + 6)/(12*m + 1) + 132*a**6*b**6*x**(84*m + 7)/
(12*m + 1) + 99*a**5*b**7*x**(96*m + 8)/(12*m + 1) + 55*a**4*b**8
*x**(108*m + 9)/(12*m + 1) + 22*a**3*b**9*x**(120*m + 10)/(12*m +
 1) + 6*a**2*b**10*x**(132*m + 11)/(12*m + 1) + a*b**11*x**(144*m
 + 12)/(12*m + 1) + b**12*x**(156*m + 13)/(13*(12*m + 1))
```

Mathematica [A] time = 0.0298832, size = 24, normalized size = 0.89

$$\frac{\left(a+bx^{12m+1}\right)^{13}}{156bm+13b}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(12*(-1 + m))*(a*x + b*x^(2 + 12*m))^12,x]
```

```
[Out] (a + b*x^(1 + 12*m))^13/(13*b + 156*b*m)
```

Maple [B] time = 0.107, size = 339, normalized size = 12.6

$$\frac{b^{12}\left(x^{2+12\,m}\right)^{13}}{(13+156\,m)\,x^{13}}+\frac{ab^{11}\left(x^{2+12\,m}\right)^{12}}{(1+12\,m)\,x^{12}}+6\,\frac{a^{2}b^{10}\left(x^{2+12\,m}\right)^{11}}{(1+12\,m)\,x^{11}}+22\,\frac{a^{3}b^{9}\left(x^{2+12\,m}\right)^{10}}{(1+12\,m)\,x^{10}}+55\,\frac{a^{4}b^{8}\left(x^{2+12\,m}\right)^{9}}{(1+12\,m)\,x^{9}}+99\,\frac{a^{5}b^{7}\left(x^{2+12\,m}\right)^{8}}{(1+12\,m)\,x^{8}}+132\,\frac{a^{6}b^{6}\left(x^{2+12\,m}\right)^{7}}{(1+12\,m)\,x^{7}}+132\,\frac{a^{7}b^{5}\left(x^{2+12\,m}\right)^{6}}{(1+12\,m)\,x^{6}}+99\,\frac{a^{8}b^{4}\left(x^{2+12\,m}\right)^{5}}{(1+12\,m)\,x^{5}}+55\,\frac{a^{9}b^{3}\left(x^{2+12\,m}\right)^{4}}{(1+12\,m)\,x^{4}}+22\,\frac{a^{10}b^{2}\left(x^{2+12\,m}\right)^{3}}{(1+12\,m)\,x^{3}}+6\,\frac{a^{11}b\left(x^{2+12\,m}\right)^{2}}{(1+12\,m)\,x^{2}}+\frac{a^{12}x^{2+12\,m}}{(1+12\,m)\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-12+12*m)*(a*x+b*x^(2+12*m))^12,x)
```

```
[Out] 1/13/(1+12*m)*b^12/x^13*(x^(2+12*m))^13+1/(1+12*m)*a*b^11/x^12*(x
^(2+12*m))^12+6/(1+12*m)*a^2*b^10/x^11*(x^(2+12*m))^11+22/(1+12*m
)*a^3*b^9/x^10*(x^(2+12*m))^10+55/(1+12*m)*a^4*b^8/x^9*(x^(2+12*m
))^9+99/(1+12*m)*a^5*b^7/x^8*(x^(2+12*m))^8+132/(1+12*m)*a^6*b^6/
x^7*(x^(2+12*m))^7+132/(1+12*m)*a^7*b^5/x^6*(x^(2+12*m))^6+99/(1+
12*m)*a^8*b^4/x^5*(x^(2+12*m))^5+55/(1+12*m)*a^9*b^3/x^4*(x^(2+12
*m))^4+22/(1+12*m)*a^10*b^2/x^3*(x^(2+12*m))^3+6/(1+12*m)*a^11*b/
x^2*(x^(2+12*m))^2+1/(1+12*m)*a^12/x*x^(2+12*m)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x + b*x^(12*m + 2))^12*x^(12*m - 12),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.240034, size = 312, normalized size = 11.56

$$13\,a^{12}x^{12}x^{12\,m+2}+78\,a^{11}bx^{11}x^{24\,m+4}+286\,a^{10}b^{2}x^{10}x^{36\,m+6}+715\,a^{9}b^{3}x^{9}x^{48\,m+8}+1287\,a^{8}b^{4}x^{8}x^{60\,m+10}+1716\,a^{7}b^{5}x^{7}x^{72\,m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x + b*x^(12*m + 2))^12*x^(12*m - 12),x, algorithm="fricas")
```

```
[Out] 1/13*(13*a^12*x^12*x^(12*m + 2) + 78*a^11*b*x^11*x^(24*m + 4) + 2
86*a^10*b^2*x^10*x^(36*m + 6) + 715*a^9*b^3*x^9*x^(48*m + 8) + 12
87*a^8*b^4*x^8*x^(60*m + 10) + 1716*a^7*b^5*x^7*x^(72*m + 12) + 1
716*a^6*b^6*x^6*x^(84*m + 14) + 1287*a^5*b^7*x^5*x^(96*m + 16) +
715*a^4*b^8*x^4*x^(108*m + 18) + 286*a^3*b^9*x^3*x^(120*m + 20) +
 78*a^2*b^10*x^2*x^(132*m + 22) + 13*a*b^11*x*x^(144*m + 24) + b^
12*x^(156*m + 26))/((12*m + 1)*x^13)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-12+12*m)*(a*x+b*x**(2+12*m))**12,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax + bx^{12\,m+2}\right)^{12} x^{12\,m-12}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x + b*x^(12*m + 2))^12*x^(12*m - 12),x, algorithm="giac")
```

```
[Out] integrate((a*x + b*x^(12*m + 2))^12*x^(12*m - 12), x)
```

3.332 $\int \left(ax+bx^{14}\right)^{12}\,dx$

Optimal. Leaf size=16

$$\frac{\left(a+bx^{13}\right)^{13}}{169b}$$

```
[Out] (a + b*x^13)^13/(169*b)
```

Rubi [A] time = 0.0108026, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{\left(a+bx^{13}\right)^{13}}{169b}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^14)^12,x]

[Out] (a + b*x^13)^13/(169*b)
```

Rubi in Sympy [A] time = 2.51458, size = 10, normalized size = 0.62

$$\frac{\left(a+bx^{13}\right)^{13}}{169b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**14+a*x)**12,x)

[Out] (a + b*x**13)**13/(169*b)
```

Mathematica [B] time = 0.00576129, size = 160, normalized size = 10.

$$\frac{a^{12}x^{13}}{13}+\frac{6}{13}a^{11}bx^{26}+\frac{22}{13}a^{10}b^2x^{39}+\frac{55}{13}a^9b^3x^{52}+\frac{99}{13}a^8b^4x^{65}+\frac{132}{13}a^7b^5x^{78}+\frac{132}{13}a^6b^6x^{91}+\frac{99}{13}a^5b^7x^{104}+\frac{55}{13}a^4b^8x^{117}+\frac{22}{13}a^3b^9x^{130}+\frac{6}{13}a^2b^{10}x^{143}+\frac{1}{13}ab^{11}x^{156}+\frac{b^{12}x^{169}}{169}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^14)^12,x]

[Out] (a^12*x^13)/13 + (6*a^11*b*x^26)/13 + (22*a^10*b^2*x^39)/13 + (55
*a^9*b^3*x^52)/13 + (99*a^8*b^4*x^65)/13 + (132*a^7*b^5*x^78)/13
+ (132*a^6*b^6*x^91)/13 + (99*a^5*b^7*x^104)/13 + (55*a^4*b^8*x^1
17)/13 + (22*a^3*b^9*x^130)/13 + (6*a^2*b^10*x^143)/13 + (a*b^11*
x^156)/13 + (b^12*x^169)/169
```

Maple [B] time = 0., size = 135, normalized size = 8.4

$$\frac{b^{12}x^{169}}{169}+\frac{ab^{11}x^{156}}{13}+\frac{6\,a^2b^{10}x^{143}}{13}+\frac{22\,a^3b^9x^{130}}{13}+\frac{55\,b^8a^4x^{117}}{13}+\frac{99\,a^5b^7x^{104}}{13}+\frac{132\,a^6b^6x^{91}}{13}+\frac{132\,a^7b^5x^{78}}{13}+\frac{99\,a^8b^4x^{65}}{13}+\frac{55\,a^9b^3x^{52}}{13}+\frac{22\,a^{10}b^2x^{39}}{13}+\frac{6\,a^{11}bx^{26}}{13}+\frac{a^{12}x^{13}}{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^14+a*x)^12,x)
```

```
[Out] 1/169*b^12*x^169+1/13*a*b^11*x^156+6/13*a^2*b^10*x^143+22/13*a^3*
b^9*x^130+55/13*b^8*a^4*x^117+99/13*a^5*b^7*x^104+132/13*a^6*b^6*
x^91+132/13*a^7*b^5*x^78+99/13*a^8*b^4*x^65+55/13*a^9*b^3*x^52+22
/13*a^10*b^2*x^39+6/13*a^11*b*x^26+1/13*a^12*x^13
```

Maxima [A] time = 1.40042, size = 181, normalized size = 11.31

$$\frac{1}{169}b^{12}x^{169}+\frac{1}{13}ab^{11}x^{156}+\frac{6}{13}a^2b^{10}x^{143}+\frac{22}{13}a^3b^9x^{130}+\frac{55}{13}a^4b^8x^{117}+\frac{99}{13}a^5b^7x^{104}+\frac{132}{13}a^6b^6x^{91}+\frac{132}{13}a^7b^5x^{78}+\frac{99}{13}a^8b^4x^{65}+\frac{55}{13}a^9b^3x^{52}+\frac{22}{13}a^{10}b^2x^{39}+\frac{6}{13}a^{11}bx^{26}+\frac{1}{13}a^{12}x^{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^14 + a*x)^12,x, algorithm="maxima")
```

```
[Out] 1/169*b^12*x^169 + 1/13*a*b^11*x^156 + 6/13*a^2*b^10*x^143 + 22/1
3*a^3*b^9*x^130 + 55/13*a^4*b^8*x^117 + 99/13*a^5*b^7*x^104 + 132
/13*a^6*b^6*x^91 + 132/13*a^7*b^5*x^78 + 99/13*a^8*b^4*x^65 + 55/
13*a^9*b^3*x^52 + 22/13*a^10*b^2*x^39 + 6/13*a^11*b*x^26 + 1/13*a
^12*x^13
```

Fricas [A] time = 0.207306, size = 1, normalized size = 0.06

$$\frac{1}{169}x^{169}b^{12}+\frac{1}{13}x^{156}b^{11}a+\frac{6}{13}x^{143}b^{10}a^2+\frac{22}{13}x^{130}b^9a^3+\frac{55}{13}x^{117}b^8a^4+\frac{99}{13}x^{104}b^7a^5+\frac{132}{13}x^{91}b^6a^6+\frac{132}{13}x^{78}b^5a^7+\frac{99}{13}x^{65}b^4a^8+\frac{55}{13}x^{52}b^3a^9+\frac{22}{13}x^{39}b^2a^{10}+\frac{6}{13}x^{26}ba^{11}+\frac{1}{13}x^{13}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^14 + a*x)^12,x, algorithm="fricas")
```

```
[Out] 1/169*x^169*b^12 + 1/13*x^156*b^11*a + 6/13*x^143*b^10*a^2 + 22/1
3*x^130*b^9*a^3 + 55/13*x^117*b^8*a^4 + 99/13*x^104*b^7*a^5 + 132
/13*x^91*b^6*a^6 + 132/13*x^78*b^5*a^7 + 99/13*x^65*b^4*a^8 + 55/
13*x^52*b^3*a^9 + 22/13*x^39*b^2*a^10 + 6/13*x^26*b*a^11 + 1/13*x
^13*a^12
```

Sympy [A] time = 0.247392, size = 160, normalized size = 10.

$$\frac{a^{12}x^{13}}{13}+\frac{6a^{11}bx^{26}}{13}+\frac{22a^{10}b^2x^{39}}{13}+\frac{55a^9b^3x^{52}}{13}+\frac{99a^8b^4x^{65}}{13}+\frac{132a^7b^5x^{78}}{13}+\frac{132a^6b^6x^{91}}{13}+\frac{99a^5b^7x^{104}}{13}+\frac{55a^4b^8x^{117}}{13}+\frac{22a^3b^9x^{130}}{13}+\frac{6a^2b^{10}x^{143}}{13}+\frac{ab^{11}x^{156}}{13}+\frac{b^{12}x^{169}}{169}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**14+a*x)**12,x)
```

```
[Out] a**12*x**13/13 + 6*a**11*b*x**26/13 + 22*a**10*b**2*x**39/13 + 55
*a**9*b**3*x**52/13 + 99*a**8*b**4*x**65/13 + 132*a**7*b**5*x**78
/13 + 132*a**6*b**6*x**91/13 + 99*a**5*b**7*x**104/13 + 55*a**4*b
**8*x**117/13 + 22*a**3*b**9*x**130/13 + 6*a**2*b**10*x**143/13 +
 a*b**11*x**156/13 + b**12*x**169/169
```

GIAC/XCAS [A] time = 0.217516, size = 181, normalized size = 11.31

$$\frac{1}{169}\,b^{12}x^{169}+\frac{1}{13}\,ab^{11}x^{156}+\frac{6}{13}\,a^2b^{10}x^{143}+\frac{22}{13}\,a^3b^9x^{130}+\frac{55}{13}\,a^4b^8x^{117}+\frac{99}{13}\,a^5b^7x^{104}+\frac{132}{13}\,a^6b^6x^{91}+\frac{132}{13}\,a^7b^5x^{78}+\frac{99}{13}\,a^8b^4x^{65}+\frac{55}{13}\,a^9b^3x^{52}+\frac{22}{13}\,a^{10}b^2x^{39}+\frac{6}{13}\,a^{11}bx^{26}+\frac{1}{13}\,a^{12}x^{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^14 + a*x)^12,x, algorithm="giac")
```

```
[Out] 1/169*b^12*x^169 + 1/13*a*b^11*x^156 + 6/13*a^2*b^10*x^143 + 22/1
3*a^3*b^9*x^130 + 55/13*a^4*b^8*x^117 + 99/13*a^5*b^7*x^104 + 132
/13*a^6*b^6*x^91 + 132/13*a^7*b^5*x^78 + 99/13*a^8*b^4*x^65 + 55/
13*a^9*b^3*x^52 + 22/13*a^10*b^2*x^39 + 6/13*a^11*b*x^26 + 1/13*a
^12*x^13
```

3.333 $\int \left(ax^2+bx^{27}\right)^{12} dx$

Optimal. Leaf size=16

$$\frac{\left(a+bx^{25}\right)^{13}}{325b}$$

```
[Out] (a + b*x^25)^13/(325*b)
```

Rubi [A] time = 0.0143144, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{\left(a+bx^{25}\right)^{13}}{325b}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^27)^12,x]
```

```
[Out] (a + b*x^25)^13/(325*b)
```

Rubi in Sympy [A] time = 2.59195, size = 10, normalized size = 0.62

$$\frac{\left(a+bx^{25}\right)^{13}}{325b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**27+a*x**2)**12,x)
```

```
[Out] (a + b*x**25)**13/(325*b)
```

Mathematica [B] time = 0.00806101, size = 160, normalized size = 10.

$$\frac{a^{12}x^{25}}{25}+\frac{6}{25}a^{11}bx^{50}+\frac{22}{25}a^{10}b^2x^{75}+\frac{11}{5}a^9b^3x^{100}+\frac{99}{25}a^8b^4x^{125}+\frac{132}{25}a^7b^5x^{150}+\frac{132}{25}a^6b^6x^{175}+\frac{99}{25}a^5b^7x^{200}+\frac{11}{5}a^4b^8x^{225}+\frac{22}{25}a^3b^9x^{250}+\frac{6}{25}a^2b^{10}x^{275}+\frac{1}{25}ab^{11}x^{300}+\frac{b^{12}x^{325}}{325}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^27)^12,x]
```

```
[Out] (a^12*x^25)/25 + (6*a^11*b*x^50)/25 + (22*a^10*b^2*x^75)/25 + (11
*a^9*b^3*x^100)/5 + (99*a^8*b^4*x^125)/25 + (132*a^7*b^5*x^150)/2
5 + (132*a^6*b^6*x^175)/25 + (99*a^5*b^7*x^200)/25 + (11*a^4*b^8*
x^225)/5 + (22*a^3*b^9*x^250)/25 + (6*a^2*b^10*x^275)/25 + (a*b^1
1*x^300)/25 + (b^12*x^325)/325
```

Maple [B] time = 0.004, size = 135, normalized size = 8.4

$$\frac{b^{12}x^{325}}{325}+\frac{ab^{11}x^{300}}{25}+\frac{6\,a^2b^{10}x^{275}}{25}+\frac{22\,a^3b^9x^{250}}{25}+\frac{11\,b^8a^4x^{225}}{5}+\frac{99\,a^5b^7x^{200}}{25}+\frac{132\,a^6b^6x^{175}}{25}+\frac{132\,a^7b^5x^{150}}{25}+\frac{99\,a^8b^4x^{125}}{25}+\frac{11\,a^9b^3x^{100}}{5}+\frac{22\,a^{10}b^2x^{75}}{25}+\frac{6\,a^{11}bx^{50}}{25}+\frac{a^{12}x^{25}}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^27+a*x^2)^12,x)
```

```
[Out] 1/325*b^12*x^325+1/25*a*b^11*x^300+6/25*a^2*b^10*x^275+22/25*a^3*
b^9*x^250+11/5*b^8*a^4*x^225+99/25*a^5*b^7*x^200+132/25*a^6*b^6*x
^175+132/25*a^7*b^5*x^150+99/25*a^8*b^4*x^125+11/5*a^9*b^3*x^100+
22/25*a^10*b^2*x^75+6/25*a^11*b*x^50+1/25*a^12*x^25
```

Maxima [A] time = 1.38749, size = 181, normalized size = 11.31

$$\frac{1}{325}\,b^{12}x^{325}+\frac{1}{25}\,ab^{11}x^{300}+\frac{6}{25}\,a^2b^{10}x^{275}+\frac{22}{25}\,a^3b^9x^{250}+\frac{11}{5}\,a^4b^8x^{225}+\frac{99}{25}\,a^5b^7x^{200}+\frac{132}{25}\,a^6b^6x^{175}+\frac{132}{25}\,a^7b^5x^{150}+\frac{99}{25}\,a^8b^4x^{125}+\frac{11}{5}\,a^9b^3x^{100}+\frac{22}{25}\,a^{10}b^2x^{75}+\frac{6}{25}\,a^{11}bx^{50}+\frac{1}{25}\,a^{12}x^{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^27 + a*x^2)^12,x, algorithm="maxima")
```

```
[Out] 1/325*b^12*x^325 + 1/25*a*b^11*x^300 + 6/25*a^2*b^10*x^275 + 22/2
5*a^3*b^9*x^250 + 11/5*a^4*b^8*x^225 + 99/25*a^5*b^7*x^200 + 132/
25*a^6*b^6*x^175 + 132/25*a^7*b^5*x^150 + 99/25*a^8*b^4*x^125 + 1
1/5*a^9*b^3*x^100 + 22/25*a^10*b^2*x^75 + 6/25*a^11*b*x^50 + 1/25
*a^12*x^25
```

Fricas [A] time = 0.194884, size = 1, normalized size = 0.06

$$\frac{1}{325}x^{325}b^{12}+\frac{1}{25}x^{300}b^{11}a+\frac{6}{25}x^{275}b^{10}a^2+\frac{22}{25}x^{250}b^9a^3+\frac{11}{5}x^{225}b^8a^4+\frac{99}{25}x^{200}b^7a^5+\frac{132}{25}x^{175}b^6a^6+\frac{132}{25}x^{150}b^5a^7+\frac{99}{25}x^{125}b^4a^8+\frac{11}{5}x^{100}b^3a^9+\frac{22}{25}x^{75}b^2a^{10}+\frac{6}{25}x^{50}ba^{11}+\frac{1}{25}x^{25}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^27 + a*x^2)^12,x, algorithm="fricas")
```

```
[Out] 1/325*x^325*b^12 + 1/25*x^300*b^11*a + 6/25*x^275*b^10*a^2 + 22/2
5*x^250*b^9*a^3 + 11/5*x^225*b^8*a^4 + 99/25*x^200*b^7*a^5 + 132/
25*x^175*b^6*a^6 + 132/25*x^150*b^5*a^7 + 99/25*x^125*b^4*a^8 + 1
1/5*x^100*b^3*a^9 + 22/25*x^75*b^2*a^10 + 6/25*x^50*b*a^11 + 1/25
*x^25*a^12
```

Sympy [A] time = 0.254004, size = 160, normalized size = 10.

$$\frac{a^{12}x^{25}}{25}+\frac{6a^{11}bx^{50}}{25}+\frac{22a^{10}b^2x^{75}}{25}+\frac{11a^9b^3x^{100}}{5}+\frac{99a^8b^4x^{125}}{25}+\frac{132a^7b^5x^{150}}{25}+\frac{132a^6b^6x^{175}}{25}+\frac{99a^5b^7x^{200}}{25}+\frac{11a^4b^8x^{225}}{5}+\frac{22a^3b^9x^{250}}{25}+\frac{6a^2b^{10}x^{275}}{25}+\frac{ab^{11}x^{300}}{25}+\frac{b^{12}x^{325}}{325}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**27+a*x**2)**12,x)
```

```
[Out] a**12*x**25/25 + 6*a**11*b*x**50/25 + 22*a**10*b**2*x**75/25 + 11
*a**9*b**3*x**100/5 + 99*a**8*b**4*x**125/25 + 132*a**7*b**5*x**1
50/25 + 132*a**6*b**6*x**175/25 + 99*a**5*b**7*x**200/25 + 11*a**
4*b**8*x**225/5 + 22*a**3*b**9*x**250/25 + 6*a**2*b**10*x**275/25
 + a*b**11*x**300/25 + b**12*x**325/325
```

GIAC/XCAS [A] time = 0.217297, size = 181, normalized size = 11.31

$$\frac{1}{325}\,b^{12}x^{325}+\frac{1}{25}\,ab^{11}x^{300}+\frac{6}{25}\,a^{2}b^{10}x^{275}+\frac{22}{25}\,a^{3}b^{9}x^{250}+\frac{11}{5}\,a^{4}b^{8}x^{225}+\frac{99}{25}\,a^{5}b^{7}x^{200}+\frac{132}{25}\,a^{6}b^{6}x^{175}+\frac{132}{25}\,a^{7}b^{5}x^{150}+\frac{99}{25}\,a^{8}b^{4}x^{125}+\frac{11}{5}\,a^{9}b^{3}x^{100}+\frac{22}{25}\,a^{10}b^{2}x^{75}+\frac{6}{25}\,a^{11}bx^{50}+\frac{1}{25}\,a^{12}x^{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^27 + a*x^2)^12,x, algorithm="giac")
```

```
[Out] 1/325*b^12*x^325 + 1/25*a*b^11*x^300 + 6/25*a^2*b^10*x^275 + 22/2
5*a^3*b^9*x^250 + 11/5*a^4*b^8*x^225 + 99/25*a^5*b^7*x^200 + 132/
25*a^6*b^6*x^175 + 132/25*a^7*b^5*x^150 + 99/25*a^8*b^4*x^125 + 1
1/5*a^9*b^3*x^100 + 22/25*a^10*b^2*x^75 + 6/25*a^11*b*x^50 + 1/25
*a^12*x^25
```

3.334 $\int \left(ax^3+bx^{40}\right)^{12} dx$

Optimal. Leaf size=16

$$\frac{(a+bx^{37})^{13}}{481b}$$

```
[Out] (a + b*x^37)^13/(481*b)
```

Rubi [A] time = 0.0149128, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{(a+bx^{37})^{13}}{481b}$$

Antiderivative was successfully verified.

```
[In] Int[(a*x^3 + b*x^40)^12,x]

[Out] (a + b*x^37)^13/(481*b)
```

Rubi in Sympy [A] time = 2.61749, size = 10, normalized size = 0.62

$$\frac{(a+bx^{37})^{13}}{481b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**40+a*x**3)**12,x)

[Out] (a + b*x**37)**13/(481*b)
```

Mathematica [B] time = 0.010385, size = 160, normalized size = 10.

$$\frac{a^{12}x^{37}}{37}+\frac{6}{37}a^{11}bx^{74}+\frac{22}{37}a^{10}b^2x^{111}+\frac{55}{37}a^9b^3x^{148}+\frac{99}{37}a^8b^4x^{185}+\frac{132}{37}a^7b^5x^{222}+\frac{132}{37}a^6b^6x^{259}+\frac{99}{37}a^5b^7x^{296}+\frac{55}{37}a^4b^8x^{333}+\frac{22}{37}a^3b^9x^{370}+\frac{6}{37}a^2b^{10}x^{407}+\frac{1}{37}ab^{11}x^{444}+\frac{b^{12}x^{481}}{481}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*x^3 + b*x^40)^12,x]

[Out] (a^12*x^37)/37 + (6*a^11*b*x^74)/37 + (22*a^10*b^2*x^111)/37 + (5
5*a^9*b^3*x^148)/37 + (99*a^8*b^4*x^185)/37 + (132*a^7*b^5*x^222)
/37 + (132*a^6*b^6*x^259)/37 + (99*a^5*b^7*x^296)/37 + (55*a^4*b^
8*x^333)/37 + (22*a^3*b^9*x^370)/37 + (6*a^2*b^10*x^407)/37 + (a*
b^11*x^444)/37 + (b^12*x^481)/481
```

Maple [B] time = 0.003, size = 135, normalized size = 8.4

$$\frac{b^{12}x^{481}}{481}+\frac{ab^{11}x^{444}}{37}+\frac{6\,a^2b^{10}x^{407}}{37}+\frac{22\,a^3b^9x^{370}}{37}+\frac{55\,b^8a^4x^{333}}{37}+\frac{99\,a^5b^7x^{296}}{37}+\frac{132\,a^6b^6x^{259}}{37}+\frac{132\,a^7b^5x^{222}}{37}+\frac{99\,a^8b^4x^{185}}{37}+\frac{55\,a^9b^3x^{148}}{37}+\frac{22\,a^{10}b^2x^{111}}{37}+\frac{6\,a^{11}bx^{74}}{37}+\frac{a^{12}x^{37}}{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^40+a*x^3)^12,x)
```

```
[Out] 1/481*b^12*x^481+1/37*a*b^11*x^444+6/37*a^2*b^10*x^407+22/37*a^3*
b^9*x^370+55/37*b^8*a^4*x^333+99/37*a^5*b^7*x^296+132/37*a^6*b^6*
x^259+132/37*a^7*b^5*x^222+99/37*a^8*b^4*x^185+55/37*a^9*b^3*x^14
8+22/37*a^10*b^2*x^111+6/37*a^11*b*x^74+1/37*a^12*x^37
```

Maxima [A] time = 1.3749, size = 181, normalized size = 11.31

$$\frac{1}{481}\,b^{12}x^{481}+\frac{1}{37}\,ab^{11}x^{444}+\frac{6}{37}\,a^{2}b^{10}x^{407}+\frac{22}{37}\,a^{3}b^{9}x^{370}+\frac{55}{37}\,a^{4}b^{8}x^{333}+\frac{99}{37}\,a^{5}b^{7}x^{296}+\frac{132}{37}\,a^{6}b^{6}x^{259}+\frac{132}{37}\,a^{7}b^{5}x^{222}+\frac{99}{37}\,a^{8}b^{4}x^{185}+\frac{55}{37}\,a^{9}b^{3}x^{148}+\frac{22}{37}\,a^{10}b^{2}x^{111}+\frac{6}{37}\,a^{11}bx^{74}+\frac{1}{37}\,a^{12}x^{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^40 + a*x^3)^12,x, algorithm="maxima")
```

```
[Out] 1/481*b^12*x^481 + 1/37*a*b^11*x^444 + 6/37*a^2*b^10*x^407 + 22/3
7*a^3*b^9*x^370 + 55/37*a^4*b^8*x^333 + 99/37*a^5*b^7*x^296 + 132
/37*a^6*b^6*x^259 + 132/37*a^7*b^5*x^222 + 99/37*a^8*b^4*x^185 +
55/37*a^9*b^3*x^148 + 22/37*a^10*b^2*x^111 + 6/37*a^11*b*x^74 + 1
/37*a^12*x^37
```

Fricas [A] time = 0.196226, size = 1, normalized size = 0.06

$$\frac{1}{481}x^{481}b^{12}+\frac{1}{37}x^{444}b^{11}a+\frac{6}{37}x^{407}b^{10}a^{2}+\frac{22}{37}x^{370}b^{9}a^{3}+\frac{55}{37}x^{333}b^{8}a^{4}+\frac{99}{37}x^{296}b^{7}a^{5}+\frac{132}{37}x^{259}b^{6}a^{6}+\frac{132}{37}x^{222}b^{5}a^{7}+\frac{99}{37}x^{185}b^{4}a^{8}+\frac{55}{37}x^{148}b^{3}a^{9}+\frac{22}{37}x^{111}b^{2}a^{10}+\frac{6}{37}x^{74}ba^{11}+\frac{1}{37}x^{37}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^40 + a*x^3)^12,x, algorithm="fricas")
```

```
[Out] 1/481*x^481*b^12 + 1/37*x^444*b^11*a + 6/37*x^407*b^10*a^2 + 22/3
7*x^370*b^9*a^3 + 55/37*x^333*b^8*a^4 + 99/37*x^296*b^7*a^5 + 132
/37*x^259*b^6*a^6 + 132/37*x^222*b^5*a^7 + 99/37*x^185*b^4*a^8 +
55/37*x^148*b^3*a^9 + 22/37*x^111*b^2*a^10 + 6/37*x^74*b*a^11 + 1
/37*x^37*a^12
```

Sympy [A] time = 0.264192, size = 160, normalized size = 10.

$$\frac{a^{12}x^{37}}{37}+\frac{6a^{11}bx^{74}}{37}+\frac{22a^{10}b^{2}x^{111}}{37}+\frac{55a^{9}b^{3}x^{148}}{37}+\frac{99a^{8}b^{4}x^{185}}{37}+\frac{132a^{7}b^{5}x^{222}}{37}+\frac{132a^{6}b^{6}x^{259}}{37}+\frac{99a^{5}b^{7}x^{296}}{37}+\frac{55a^{4}b^{8}x^{333}}{37}+\frac{22a^{3}b^{9}x^{370}}{37}+\frac{6a^{2}b^{10}x^{407}}{37}+\frac{ab^{11}x^{444}}{37}+\frac{b^{12}x^{481}}{481}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**40+a*x**3)**12,x)
```

```
[Out] a**12*x**37/37 + 6*a**11*b*x**74/37 + 22*a**10*b**2*x**111/37 + 5
5*a**9*b**3*x**148/37 + 99*a**8*b**4*x**185/37 + 132*a**7*b**5*x*
*222/37 + 132*a**6*b**6*x**259/37 + 99*a**5*b**7*x**296/37 + 55*a
**4*b**8*x**333/37 + 22*a**3*b**9*x**370/37 + 6*a**2*b**10*x**407
/37 + a*b**11*x**444/37 + b**12*x**481/481
```

GIAC/XCAS [A] time = 0.217303, size = 181, normalized size = 11.31

$$\frac{1}{481}\,b^{12}x^{481}+\frac{1}{37}\,ab^{11}x^{444}+\frac{6}{37}\,a^2b^{10}x^{407}+\frac{22}{37}\,a^3b^9x^{370}+\frac{55}{37}\,a^4b^8x^{333}+\frac{99}{37}\,a^5b^7x^{296}+\frac{132}{37}\,a^6b^6x^{259}+\frac{132}{37}\,a^7b^5x^{222}+\frac{99}{37}\,a^8b^4x^{185}+\frac{55}{37}\,a^9b^3x^{148}+\frac{22}{37}\,a^{10}b^2x^{111}+\frac{6}{37}\,a^{11}bx^{74}+\frac{1}{37}\,a^{12}x^{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^40 + a*x^3)^12,x, algorithm="giac")
```

```
[Out] 1/481*b^12*x^481 + 1/37*a*b^11*x^444 + 6/37*a^2*b^10*x^407 + 22/3
7*a^3*b^9*x^370 + 55/37*a^4*b^8*x^333 + 99/37*a^5*b^7*x^296 + 132
/37*a^6*b^6*x^259 + 132/37*a^7*b^5*x^222 + 99/37*a^8*b^4*x^185 +
55/37*a^9*b^3*x^148 + 22/37*a^10*b^2*x^111 + 6/37*a^11*b*x^74 + 1
/37*a^12*x^37
```

3.335 $\int \left(ax^m + bx^{1+13m}\right)^{12} dx$

Optimal. Leaf size=27

$$\frac{\left(a + bx^{12m+1}\right)^{13}}{13b(12m + 1)}$$

```
[Out] (a + b*x^(1 + 12*m))^13/(13*b*(1 + 12*m))
```

Rubi [A] time = 0.0240061, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$\frac{\left(a + bx^{12m+1}\right)^{13}}{13b(12m + 1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^m + b*x^(1 + 13*m))^12,x]
```

```
[Out] (a + b*x^(1 + 12*m))^13/(13*b*(1 + 12*m))
```

Rubi in Sympy [A] time = 3.57275, size = 19, normalized size = 0.7

$$\frac{\left(a + bx^{12m+1}\right)^{13}}{13b\,(12m + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**m+b*x**(1+13*m))**12,x)
```

```
[Out] (a + b*x**(12*m + 1))**13/(13*b*(12*m + 1))
```

Mathematica [B] time = 0.116297, size = 193, normalized size = 7.15

$$\frac{x^{12m+1}\left(13a^{12} + 78a^{11}bx^{12m+1} + 286a^{10}b^2x^{24m+2} + 715a^9b^3x^{36m+3} + 1287a^8b^4x^{48m+4} + 1716a^7b^5x^{60m+5} + 1716a^6b^6x^{72m+6} + \right.}{156m + 13}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^m + b*x^(1 + 13*m))^12,x]
```

```
[Out] (x^(1 + 12*m)*(13*a^12 + 78*a^11*b*x^(1 + 12*m) + 286*a^10*b^2*x^
(2 + 24*m) + 715*a^9*b^3*x^(3 + 36*m) + 1287*a^8*b^4*x^(4 + 48*m)
 + 1716*a^7*b^5*x^(5 + 60*m) + 1716*a^6*b^6*x^(6 + 72*m) + 1287*a
^5*b^7*x^(7 + 84*m) + 715*a^4*b^8*x^(8 + 96*m) + 286*a^3*b^9*x^(9
 + 108*m) + 78*a^2*b^10*x^(10 + 120*m) + 13*a*b^11*x^(11 + 132*m)
 + b^12*x^(12 + 144*m)))/(13 + 156*m)
```

Maple [B] time = 0.063, size = 287, normalized size = 10.6

$$\frac{b^{12}x^{13}\left(x^m\right)^{156}}{13 + 156\,m} + \frac{ab^{11}x^{12}\left(x^m\right)^{144}}{1 + 12\,m} + 6\,\frac{a^2b^{10}x^{11}\left(x^m\right)^{132}}{1 + 12\,m} + 22\,\frac{a^3b^9x^{10}\left(x^m\right)^{120}}{1 + 12\,m} + 55\,\frac{a^4b^8x^9\left(x^m\right)^{108}}{1 + 12\,m} + 99\,\frac{a^5b^7x^8\left(x^m\right)^{96}}{1 + 12\,m} + 132\,\frac{a^6b^6x^7\left(x^m\right)^{84}}{1 + 12\,m} + 132\,\frac{a^7b^5x^6\left(x^m\right)^{72}}{1 + 12\,m} + 99\,\frac{a^8b^4x^5\left(x^m\right)^{60}}{1 + 12\,m} + 55\,\frac{a^9b^3x^4\left(x^m\right)^{48}}{1 + 12\,m} + 22\,\frac{a^{10}b^2x^3\left(x^m\right)^{36}}{1 + 12\,m} + 6\,\frac{a^{11}bx^2\left(x^m\right)^{24}}{1 + 12\,m} + \frac{a^{12}x\left(x^m\right)^{12}}{1 + 12\,m}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x^m+b*x^(1+13*m))^12,x)
```

```
[Out] 1/13*b^12*x^13/(1+12*m)*(x^m)^156+a*b^11*x^12/(1+12*m)*(x^m)^144+
6*a^2*b^10*x^11/(1+12*m)*(x^m)^132+22*a^3*b^9*x^10/(1+12*m)*(x^m)
^120+55*a^4*b^8*x^9/(1+12*m)*(x^m)^108+99*a^5*b^7*x^8/(1+12*m)*(x
^m)^96+132*a^6*b^6*x^7/(1+12*m)*(x^m)^84+132*a^7*b^5*x^6/(1+12*m)
*(x^m)^72+99*a^8*b^4*x^5/(1+12*m)*(x^m)^60+55*a^9*b^3*x^4/(1+12*m
)*(x^m)^48+22*a^10*b^2*x^3/(1+12*m)*(x^m)^36+6*a^11*b*x^2/(1+12*m
)*(x^m)^24+a^12/(1+12*m)*x*(x^m)^12
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(13*m + 1) + a*x^m)^12,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.245305, size = 277, normalized size = 10.26

$$\frac{b^{12}x^{13}x^{156\,m} + 13\,ab^{11}x^{12}x^{144\,m} + 78\,a^{2}b^{10}x^{11}x^{132\,m} + 286\,a^{3}b^{9}x^{10}x^{120\,m} + 715\,a^{4}b^{8}x^{9}x^{108\,m} + 1287\,a^{5}b^{7}x^{8}x^{96\,m} + 1716\,a^{6}b^{6}}{13\,(12\,m}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(13*m + 1) + a*x^m)^12,x, algorithm="fricas")
```

```
[Out] 1/13*(b^12*x^13*x^(156*m) + 13*a*b^11*x^12*x^(144*m) + 78*a^2*b^1
0*x^11*x^(132*m) + 286*a^3*b^9*x^10*x^(120*m) + 715*a^4*b^8*x^9*x
^(108*m) + 1287*a^5*b^7*x^8*x^(96*m) + 1716*a^6*b^6*x^7*x^(84*m)
+ 1716*a^7*b^5*x^6*x^(72*m) + 1287*a^8*b^4*x^5*x^(60*m) + 715*a^9
*b^3*x^4*x^(48*m) + 286*a^10*b^2*x^3*x^(36*m) + 78*a^11*b*x^2*x^(
24*m) + 13*a^12*x*x^(12*m))/(12*m + 1)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x**m+b*x**(1+13*m))**12,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.244906, size = 294, normalized size = 10.89

$$\frac{b^{12}x^{13}e^{(156\,m\ln(x))} + 13\,ab^{11}x^{12}e^{(144\,m\ln(x))} + 78\,a^{2}b^{10}x^{11}e^{(132\,m\ln(x))} + 286\,a^{3}b^{9}x^{10}e^{(120\,m\ln(x))} + 715\,a^{4}b^{8}x^{9}e^{(108\,m\ln(x))} + 1287\,a}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(13*m + 1) + a*x^m)^12,x, algorithm="giac")
```

```
[Out] 1/13*(b^12*x^13*e^(156*m*ln(x)) + 13*a*b^11*x^12*e^(144*m*ln(x))
+ 78*a^2*b^10*x^11*e^(132*m*ln(x)) + 286*a^3*b^9*x^10*e^(120*m*ln
(x)) + 715*a^4*b^8*x^9*e^(108*m*ln(x)) + 1287*a^5*b^7*x^8*e^(96*m
*ln(x)) + 1716*a^6*b^6*x^7*e^(84*m*ln(x)) + 1716*a^7*b^5*x^6*e^(7
2*m*ln(x)) + 1287*a^8*b^4*x^5*e^(60*m*ln(x)) + 715*a^9*b^3*x^4*e^
(48*m*ln(x)) + 286*a^10*b^2*x^3*e^(36*m*ln(x)) + 78*a^11*b*x^2*e^
(24*m*ln(x)) + 13*a^12*x*e^(12*m*ln(x)))/(12*m + 1)
```

3.336 $\int \left(ax^m + bx^{1+6m}\right)^5 \, dx$

Optimal. Leaf size=27

$$\frac{\left(a + bx^{5m+1}\right)^6}{6b(5m + 1)}$$

```
[Out] (a + b*x^(1 + 5*m))^6/(6*b*(1 + 5*m))
```

Rubi [A] time = 0.0262613, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$\frac{\left(a + bx^{5m+1}\right)^6}{6b(5m + 1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^m + b*x^(1 + 6*m))^5,x]

[Out] (a + b*x^(1 + 5*m))^6/(6*b*(1 + 5*m))
```

Rubi in Sympy [A] time = 3.56607, size = 19, normalized size = 0.7

$$\frac{\left(a + bx^{5m+1}\right)^6}{6b\,(5m + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**m+b*x**(1+6*m))**5,x)

[Out] (a + b*x**(5*m + 1))**6/(6*b*(5*m + 1))
```

Mathematica [B] time = 0.0725136, size = 88, normalized size = 3.26

$$\frac{x^{5m+1}\left(6a^5 + 15a^4bx^{5m+1} + 20a^3b^2x^{10m+2} + 15a^2b^3x^{15m+3} + 6ab^4x^{20m+4} + b^5x^{25m+5}\right)}{30m + 6}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^m + b*x^(1 + 6*m))^5,x]

[Out] (x^(1 + 5*m)*(6*a^5 + 15*a^4*b*x^(1 + 5*m) + 20*a^3*b^2*x^(2 + 10
*m) + 15*a^2*b^3*x^(3 + 15*m) + 6*a*b^4*x^(4 + 20*m) + b^5*x^(5 +
 25*m)))/(6 + 30*m)
```

Maple [B] time = 0.035, size = 126, normalized size = 4.7

$$\frac{b^5x^6\,(x^m)^{30}}{6 + 30\,m} + \frac{ab^4x^5\,(x^m)^{25}}{1 + 5\,m} + \frac{5\,a^2b^3x^4\,(x^m)^{20}}{2 + 10\,m} + \frac{10\,a^3b^2x^3\,(x^m)^{15}}{3 + 15\,m} + \frac{5\,a^4bx^2\,(x^m)^{10}}{2 + 10\,m} + \frac{a^5x\,(x^m)^5}{1 + 5\,m}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x^m+b*x^(1+6*m))^5,x)
```

```
[Out] 1/6*b^5*x^6/(1+5*m)*(x^m)^30+a*b^4*x^5/(1+5*m)*(x^m)^25+5/2*a^2*b
^3*x^4/(1+5*m)*(x^m)^20+10/3*a^3*b^2*x^3/(1+5*m)*(x^m)^15+5/2*a^4
*b*x^2/(1+5*m)*(x^m)^10+a^5/(1+5*m)*x*(x^m)^5
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(6*m + 1) + a*x^m)^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.237145, size = 126, normalized size = 4.67

$$\frac{b^5x^6x^{30\,m} + 6\,ab^4x^5x^{25\,m} + 15\,a^2b^3x^4x^{20\,m} + 20\,a^3b^2x^3x^{15\,m} + 15\,a^4bx^2x^{10\,m} + 6\,a^5xx^{5\,m}}{6\,(5\,m + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(6*m + 1) + a*x^m)^5,x, algorithm="fricas")
```

```
[Out] 1/6*(b^5*x^6*x^(30*m) + 6*a*b^4*x^5*x^(25*m) + 15*a^2*b^3*x^4*x^(
20*m) + 20*a^3*b^2*x^3*x^(15*m) + 15*a^4*b*x^2*x^(10*m) + 6*a^5*x
*x^(5*m))/(5*m + 1)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x**m+b*x**(1+6*m))**5,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.224648, size = 134, normalized size = 4.96

$$\frac{b^5x^6e^{(30\,m\ln(x))} + 6\,ab^4x^5e^{(25\,m\ln(x))} + 15\,a^2b^3x^4e^{(20\,m\ln(x))} + 20\,a^3b^2x^3e^{(15\,m\ln(x))} + 15\,a^4bx^2e^{(10\,m\ln(x))} + 6\,a^5xe^{(5\,m\ln(x))}}{6\,(5\,m + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(6*m + 1) + a*x^m)^5,x, algorithm="giac")
```

```
[Out] 1/6*(b^5*x^6*e^(30*m*ln(x)) + 6*a*b^4*x^5*e^(25*m*ln(x)) + 15*a^2
*b^3*x^4*e^(20*m*ln(x)) + 20*a^3*b^2*x^3*e^(15*m*ln(x)) + 15*a^4*
b*x^2*e^(10*m*ln(x)) + 6*a^5*x*e^(5*m*ln(x)))/(5*m + 1)
```

3.337 $\int \frac{1}{(bx^{1-2m}+ax^m)^3} \, dx$

Optimal. Leaf size=27

$$-\frac{1}{2b(1-3m)\left(a+bx^{1-3m}\right)^2}$$

```
[Out] -1/(2*b*(1 - 3*m)*(a + b*x^(1 - 3*m))^2)
```

Rubi [A] time = 0.0359987, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$-\frac{1}{2b(1-3m)\left(a+bx^{1-3m}\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(b*x^(1 - 2*m) + a*x^m)^(-3),x]
```

```
[Out] -1/(2*b*(1 - 3*m)*(a + b*x^(1 - 3*m))^2)
```

Rubi in Sympy [A] time = 3.69084, size = 22, normalized size = 0.81

$$-\frac{1}{2b\left(a+bx^{-3m+1}\right)^2(-3m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b*x**(1-2*m)+a*x**m)**3,x)
```

```
[Out] -1/(2*b*(a + b*x**(-3*m + 1))**2*(-3*m + 1))
```

Mathematica [A] time = 0.0563836, size = 27, normalized size = 1.

$$\frac{1}{2b(3m-1)\left(a+bx^{1-3m}\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b*x^(1 - 2*m) + a*x^m)^(-3),x]
```

```
[Out] 1/(2*b*(-1 + 3*m)*(a + b*x^(1 - 3*m))^2)
```

Maple [A] time = 0.037, size = 39, normalized size = 1.4

$$-\frac{x\left(2\,a\,(x^m)^3+bx\right)}{(-2+6\,m)\,a^2\left(a\,(x^m)^3+bx\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b*x^(1-2*m)+a*x^m)^3,x)
```

```
[Out] -1/2*x*(2*a*(x^m)^3+b*x)/(-1+3*m)/a^2/(a*(x^m)^3+b*x)^2
```

Maxima [A] time = 1.38736, size = 89, normalized size = 3.3

$$-\frac{2\,axx^{3\,m} + bx^2}{2\,(2\,a^3b(3\,m-1)xx^{3\,m} + a^2b^2(3\,m-1)x^2 + a^4(3\,m-1)x^{6\,m})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^m + b*x^(-2*m + 1))^(-3),x, algorithm="maxima")
```

```
[Out] -1/2*(2*a*x*x^(3*m) + b*x^2)/(2*a^3*b*(3*m - 1)*x*x^(3*m) + a^2*b
^2*(3*m - 1)*x^2 + a^4*(3*m - 1)*x^(6*m))
```

Fricas [A] time = 0.231291, size = 111, normalized size = 4.11

$$-\frac{2\,axx^{3\,m} + bx^2}{2\,(2\,(3\,a^3bm - a^3b)xx^{3\,m} + (3\,a^2b^2m - a^2b^2)x^2 + (3\,a^4m - a^4)x^{6\,m})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^m + b*x^(-2*m + 1))^(-3),x, algorithm="fricas")
```

```
[Out] -1/2*(2*a*x*x^(3*m) + b*x^2)/(2*(3*a^3*b*m - a^3*b)*x*x^(3*m) + (
3*a^2*b^2*m - a^2*b^2)*x^2 + (3*a^4*m - a^4)*x^(6*m))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b*x**(1-2*m)+a*x**m)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(ax^m + bx^{-2\,m+1})^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^m + b*x^(-2*m + 1))^(-3),x, algorithm="giac")
```

```
[Out] integrate((a*x^m + b*x^(-2*m + 1))^(-3), x)
```

3.338 $\int \frac{1}{\frac{b}{x}+ax}\,dx$

Optimal. Leaf size=15

$$\frac{\log\left(ax^2+b\right)}{2a}$$

```
[Out] Log[b + a*x^2]/(2*a)
```

Rubi [A] time = 0.00984524, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{\log\left(ax^2+b\right)}{2a}$$

Antiderivative was successfully verified.

```
[In]  Int[(b/x + a*x)^(-1),x]
```

```
[Out] Log[b + a*x^2]/(2*a)
```

Rubi in Sympy [A] time = 2.48597, size = 10, normalized size = 0.67

$$\frac{\log\left(ax^2+b\right)}{2a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b/x+a*x),x)
```

```
[Out] log(a*x**2 + b)/(2*a)
```

Mathematica [A] time = 0.00362829, size = 15, normalized size = 1.

$$\frac{\log\left(ax^2+b\right)}{2a}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b/x + a*x)^(-1),x]
```

```
[Out] Log[b + a*x^2]/(2*a)
```

Maple [A] time = 0.001, size = 14, normalized size = 0.9

$$\frac{\ln\left(ax^2+b\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b/x+a*x),x)
```

```
[Out] 1/2*ln(a*x^2+b)/a
```

Maxima [A] time = 1.3831, size = 18, normalized size = 1.2

$$\frac{\log\left(ax^2+b\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x),x, algorithm="maxima")
```

```
[Out] 1/2*log(a*x^2 + b)/a
```

Fricas [A] time = 0.214143, size = 18, normalized size = 1.2

$$\frac{\log\left(ax^2+b\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x),x, algorithm="fricas")
```

```
[Out] 1/2*log(a*x^2 + b)/a
```

Sympy [A] time = 0.236194, size = 10, normalized size = 0.67

$$\frac{\log\left(ax^2+b\right)}{2a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b/x+a*x),x)
```

```
[Out] log(a*x**2 + b)/(2*a)
```

GIAC/XCAS [A] time = 0.216392, size = 19, normalized size = 1.27

$$\frac{\ln\left(\left|ax^2+b\right|\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x),x, algorithm="giac")
```

```
[Out] 1/2*ln(abs(a*x^2 + b))/a
```

3.339 $\int \frac{1}{\frac{b}{x^2}+ax}\,dx$

Optimal. Leaf size=15

$$\frac{\log\left(ax^3+b\right)}{3a}$$

```
[Out] Log[b + a*x^3]/(3*a)
```

Rubi [A] time = 0.0106084, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{\log\left(ax^3+b\right)}{3a}$$

Antiderivative was successfully verified.

```
[In]  Int[(b/x^2 + a*x)^(-1),x]
```

```
[Out] Log[b + a*x^3]/(3*a)
```

Rubi in Sympy [A] time = 2.53248, size = 10, normalized size = 0.67

$$\frac{\log\left(ax^3+b\right)}{3a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b/x**2+a*x),x)
```

```
[Out] log(a*x**3 + b)/(3*a)
```

Mathematica [A] time = 0.00615935, size = 15, normalized size = 1.

$$\frac{\log\left(ax^3+b\right)}{3a}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b/x^2 + a*x)^(-1),x]
```

```
[Out] Log[b + a*x^3]/(3*a)
```

Maple [A] time = 0.001, size = 14, normalized size = 0.9

$$\frac{\ln\left(ax^3+b\right)}{3\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b/x^2+a*x),x)
```

```
[Out] 1/3*ln(a*x^3+b)/a
```

Maxima [A] time = 1.38461, size = 18, normalized size = 1.2

$$\frac{\log(ax^3 + b)}{3a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x^2),x, algorithm="maxima")
```

```
[Out] 1/3*log(a*x^3 + b)/a
```

Fricas [A] time = 0.207672, size = 18, normalized size = 1.2

$$\frac{\log(ax^3 + b)}{3a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x^2),x, algorithm="fricas")
```

```
[Out] 1/3*log(a*x^3 + b)/a
```

Sympy [A] time = 0.305232, size = 10, normalized size = 0.67

$$\frac{\log(ax^3 + b)}{3a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b/x**2+a*x),x)
```

```
[Out] log(a*x**3 + b)/(3*a)
```

GIAC/XCAS [A] time = 0.218539, size = 19, normalized size = 1.27

$$\frac{\ln(|ax^3 + b|)}{3a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x^2),x, algorithm="giac")
```

```
[Out] 1/3*ln(abs(a*x^3 + b))/a
```

3.340 $\int \frac{1}{\frac{b}{x^3}+ax}\,dx$

Optimal. Leaf size=15

$$\frac{\log\left(ax^4+b\right)}{4a}$$

```
[Out] Log[b + a*x^4]/(4*a)
```

Rubi [A] time = 0.00945454, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{\log\left(ax^4+b\right)}{4a}$$

Antiderivative was successfully verified.

```
[In]  Int[(b/x^3 + a*x)^(-1),x]

[Out] Log[b + a*x^4]/(4*a)
```

Rubi in Sympy [A] time = 2.54026, size = 10, normalized size = 0.67

$$\frac{\log\left(ax^4+b\right)}{4a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b/x**3+a*x),x)

[Out] log(a*x**4 + b)/(4*a)
```

Mathematica [A] time = 0.00686364, size = 15, normalized size = 1.

$$\frac{\log\left(ax^4+b\right)}{4a}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b/x^3 + a*x)^(-1),x]

[Out] Log[b + a*x^4]/(4*a)
```

Maple [A] time = 0.001, size = 14, normalized size = 0.9

$$\frac{\ln\left(ax^4+b\right)}{4\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b/x^3+a*x),x)

[Out] 1/4*ln(a*x^4+b)/a
```

Maxima [A] time = 1.37943, size = 18, normalized size = 1.2

$$\frac{\log\left(ax^4 + b\right)}{4\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x^3),x, algorithm="maxima")
```

```
[Out] 1/4*log(a*x^4 + b)/a
```

Fricas [A] time = 0.209262, size = 18, normalized size = 1.2

$$\frac{\log\left(ax^4 + b\right)}{4\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x^3),x, algorithm="fricas")
```

```
[Out] 1/4*log(a*x^4 + b)/a
```

Sympy [A] time = 0.365069, size = 10, normalized size = 0.67

$$\frac{\log\left(ax^4 + b\right)}{4a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b/x**3+a*x),x)
```

```
[Out] log(a*x**4 + b)/(4*a)
```

GIAC/XCAS [A] time = 0.218496, size = 19, normalized size = 1.27

$$\frac{\ln\left(\left|ax^4 + b\right|\right)}{4\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b/x^3),x, algorithm="giac")
```

```
[Out] 1/4*ln(abs(a*x^4 + b))/a
```

3.341 $\int \frac{1}{\left(\frac{b}{x}+ax\right)^3} dx$

Optimal. Leaf size=19

$$\frac{x^4}{4b(ax^2+b)^2}$$

```
[Out] x^4/(4*b*(b + a*x^2)^2)
```

Rubi [A] time = 0.0171456, antiderivative size = 19, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{x^4}{4b(ax^2+b)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(b/x + a*x)^(-3),x]
```

```
[Out] x^4/(4*b*(b + a*x^2)^2)
```

Rubi in Sympy [A] time = 3.52927, size = 14, normalized size = 0.74

$$\frac{x^4}{4b(ax^2+b)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/(b/x+a*x)**3,x)
```

```
[Out] x**4/(4*b*(a*x**2 + b)**2)
```

Mathematica [A] time = 0.0146395, size = 24, normalized size = 1.26

$$-\frac{2ax^2+b}{4a^2(ax^2+b)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(b/x + a*x)^(-3),x]
```

```
[Out] -(b + 2*a*x^2)/(4*a^2*(b + a*x^2)^2)
```

Maple [A] time = 0.007, size = 31, normalized size = 1.6

$$-\frac{1}{(2ax^2+2b)a^2}+\frac{b}{4a^2(ax^2+b)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(b/x+a*x)^3,x)
```

```
[Out] -1/2/(a*x^2+b)/a^2+1/4*b/a^2/(a*x^2+b)^2
```

Maxima [A] time = 1.37528, size = 49, normalized size = 2.58

$$-\frac{2\,ax^2+b}{4\,(a^4x^4+2\,a^3bx^2+a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b/x)^(-3),x, algorithm="maxima")
```

```
[Out] -1/4*(2*a*x^2 + b)/(a^4*x^4 + 2*a^3*b*x^2 + a^2*b^2)
```

Fricas [A] time = 0.205972, size = 49, normalized size = 2.58

$$-\frac{2\,ax^2+b}{4\,(a^4x^4+2\,a^3bx^2+a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b/x)^(-3),x, algorithm="fricas")
```

```
[Out] -1/4*(2*a*x^2 + b)/(a^4*x^4 + 2*a^3*b*x^2 + a^2*b^2)
```

Sympy [A] time = 1.64192, size = 36, normalized size = 1.89

$$-\frac{2ax^2+b}{4a^4x^4+8a^3bx^2+4a^2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b/x+a*x)**3,x)
```

```
[Out] -(2*a*x**2 + b)/(4*a**4*x**4 + 8*a**3*b*x**2 + 4*a**2*b**2)
```

GIAC/XCAS [A] time = 0.21962, size = 30, normalized size = 1.58

$$-\frac{2\,ax^2+b}{4\,(ax^2+b)^2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b/x)^(-3),x, algorithm="giac")
```

```
[Out] -1/4*(2*a*x^2 + b)/((a*x^2 + b)^2*a^2)
```

3.342 $\int \frac{1}{\left(\frac{b}{x^3}+ax^2\right)^3} dx$

Optimal. Leaf size=19

$$\frac{x^{10}}{10b\left(ax^5+b\right)^2}$$

```
[Out] x^10/(10*b*(b + a*x^5)^2)
```

Rubi [A] time = 0.01887, antiderivative size = 19, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{x^{10}}{10b\left(ax^5+b\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(b/x^3 + a*x^2)^(-3),x]

[Out] x^10/(10*b*(b + a*x^5)^2)
```

Rubi in Sympy [A] time = 3.29841, size = 14, normalized size = 0.74

$$\frac{x^{10}}{10b\left(ax^5+b\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b/x**3+a*x**2)**3,x)

[Out] x**10/(10*b*(a*x**5 + b)**2)
```

Mathematica [A] time = 0.0136591, size = 24, normalized size = 1.26

$$-\frac{2ax^5+b}{10a^2\left(ax^5+b\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b/x^3 + a*x^2)^(-3),x]

[Out] -(b + 2*a*x^5)/(10*a^2*(b + a*x^5)^2)
```

Maple [A] time = 0.007, size = 31, normalized size = 1.6

$$-\frac{1}{\left(5\,ax^5+5\,b\right)a^2}+\frac{b}{10\,a^2\left(ax^5+b\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b/x^3+a*x^2)^3,x)
```

```
[Out] -1/5/(a*x^5+b)/a^2+1/10*b/a^2/(a*x^5+b)^2
```

Maxima [A] time = 1.37801, size = 49, normalized size = 2.58

$$-\frac{2\,ax^5+b}{10\,(a^4x^{10}+2\,a^3bx^5+a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^2 + b/x^3)^(-3),x, algorithm="maxima")

[Out] -1/10*(2*a*x^5 + b)/(a^4*x^10 + 2*a^3*b*x^5 + a^2*b^2)
```

Fricas [A] time = 0.209973, size = 49, normalized size = 2.58

$$-\frac{2\,ax^5+b}{10\,(a^4x^{10}+2\,a^3bx^5+a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^2 + b/x^3)^(-3),x, algorithm="fricas")

[Out] -1/10*(2*a*x^5 + b)/(a^4*x^10 + 2*a^3*b*x^5 + a^2*b^2)
```

Sympy [A] time = 18.9838, size = 36, normalized size = 1.89

$$-\frac{2ax^5+b}{10a^4x^{10}+20a^3bx^5+10a^2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b/x**3+a*x**2)**3,x)

[Out] -(2*a*x**5 + b)/(10*a**4*x**10 + 20*a**3*b*x**5 + 10*a**2*b**2)
```

GIAC/XCAS [A] time = 0.216092, size = 30, normalized size = 1.58

$$-\frac{2\,ax^5+b}{10\,(ax^5+b)^2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^2 + b/x^3)^(-3),x, algorithm="giac")

[Out] -1/10*(2*a*x^5 + b)/((a*x^5 + b)^2*a^2)
```

3.343 $\int \frac{1}{\left(\frac{b}{x^5}+ax^3\right)^3}\,dx$

Optimal. Leaf size=19

$$\frac{x^{16}}{16b\,(ax^8+b)^2}$$

```
[Out] x^16/(16*b*(b + a*x^8)^2)
```

Rubi [A] time = 0.017464, antiderivative size = 19, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154

$$\frac{x^{16}}{16b\,(ax^8+b)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(b/x^5 + a*x^3)^(-3),x]

[Out] x^16/(16*b*(b + a*x^8)^2)
```

Rubi in Sympy [A] time = 3.29014, size = 14, normalized size = 0.74

$$\frac{x^{16}}{16b\,(ax^8+b)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(b/x**5+a*x**3)**3,x)

[Out] x**16/(16*b*(a*x**8 + b)**2)
```

Mathematica [A] time = 0.0170535, size = 24, normalized size = 1.26

$$-\frac{2ax^8+b}{16a^2\,(ax^8+b)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(b/x^5 + a*x^3)^(-3),x]

[Out] -(b + 2*a*x^8)/(16*a^2*(b + a*x^8)^2)
```

Maple [A] time = 0.013, size = 31, normalized size = 1.6

$$-\frac{1}{(8\,ax^8+8\,b)\,a^2}+\frac{b}{16\,a^2\,(ax^8+b)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(b/x^5+a*x^3)^3,x)
```

```
[Out] -1/8/(a*x^8+b)/a^2+1/16*b/a^2/(a*x^8+b)^2
```

Maxima [A] time = 1.37092, size = 49, normalized size = 2.58

$$-\frac{2\,ax^8+b}{16\,(a^4x^{16}+2\,a^3bx^8+a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^3 + b/x^5)^(-3),x, algorithm="maxima")

[Out] -1/16*(2*a*x^8 + b)/(a^4*x^16 + 2*a^3*b*x^8 + a^2*b^2)
```

Fricas [A] time = 0.205732, size = 49, normalized size = 2.58

$$-\frac{2\,ax^8+b}{16\,(a^4x^{16}+2\,a^3bx^8+a^2b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^3 + b/x^5)^(-3),x, algorithm="fricas")

[Out] -1/16*(2*a*x^8 + b)/(a^4*x^16 + 2*a^3*b*x^8 + a^2*b^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(b/x**5+a*x**3)**3,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.215441, size = 30, normalized size = 1.58

$$-\frac{2\,ax^8+b}{16\,(ax^8+b)^2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^3 + b/x^5)^(-3),x, algorithm="giac")

[Out] -1/16*(2*a*x^8 + b)/((a*x^8 + b)^2*a^2)
```

3.344 $\int \left(\frac{a}{x}+bx\right)^2 dx$

Optimal. Leaf size=24

$$-\frac{a^2}{x}+2abx+\frac{b^2x^3}{3}$$

```
[Out] -(a^2/x) + 2*a*b*x + (b^2*x^3)/3
```

Rubi [A] time = 0.0290765, antiderivative size = 24, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{a^2}{x}+2abx+\frac{b^2x^3}{3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a/x + b*x)^2,x]

[Out] -(a^2/x) + 2*a*b*x + (b^2*x^3)/3
```

Rubi in Sympy [A] time = 5.74351, size = 19, normalized size = 0.79

$$-\frac{a^2}{x}+2abx+\frac{b^2x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a/x+b*x)**2,x)

[Out] -a**2/x + 2*a*b*x + b**2*x**3/3
```

Mathematica [A] time = 0.00196566, size = 24, normalized size = 1.

$$-\frac{a^2}{x}+2abx+\frac{b^2x^3}{3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a/x + b*x)^2,x]

[Out] -(a^2/x) + 2*a*b*x + (b^2*x^3)/3
```

Maple [A] time = 0.003, size = 23, normalized size = 1.

$$-\frac{a^2}{x}+2\,abx+\frac{b^2x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a/x+b*x)^2,x)

[Out] -a^2/x+2*a*b*x+1/3*b^2*x^3
```

Maxima [A] time = 1.36792, size = 30, normalized size = 1.25

$$\frac{1}{3}\,b^2x^3 + 2\,abx - \frac{a^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x + a/x)^2,x, algorithm="maxima")
```

```
[Out] 1/3*b^2*x^3 + 2*a*b*x - a^2/x
```

Fricas [A] time = 0.213412, size = 34, normalized size = 1.42

$$\frac{b^2x^4 + 6\,abx^2 - 3\,a^2}{3\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x + a/x)^2,x, algorithm="fricas")
```

```
[Out] 1/3*(b^2*x^4 + 6*a*b*x^2 - 3*a^2)/x
```

Sympy [A] time = 1.01392, size = 19, normalized size = 0.79

$$-\frac{a^2}{x} + 2abx + \frac{b^2x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a/x+b*x)**2,x)
```

```
[Out] -a**2/x + 2*a*b*x + b**2*x**3/3
```

GIAC/XCAS [A] time = 0.219116, size = 30, normalized size = 1.25

$$\frac{1}{3}\,b^2x^3 + 2\,abx - \frac{a^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x + a/x)^2,x, algorithm="giac")
```

```
[Out] 1/3*b^2*x^3 + 2*a*b*x - a^2/x
```

3.345 $\int \left(\frac{a}{x}+bx\right)^3\,dx$

Optimal. Leaf size=40

$$-\frac{a^3}{2x^2}+3a^2b\log(x)+\frac{3}{2}ab^2x^2+\frac{b^3x^4}{4}$$

```
[Out] -a^3/(2*x^2) + (3*a*b^2*x^2)/2 + (b^3*x^4)/4 + 3*a^2*b*Log[x]
```

Rubi [A] time = 0.0589127, antiderivative size = 40, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273

$$-\frac{a^3}{2x^2}+3a^2b\log(x)+\frac{3}{2}ab^2x^2+\frac{b^3x^4}{4}$$

Antiderivative was successfully verified.

```
[In] Int[(a/x + b*x)^3,x]

[Out] -a^3/(2*x^2) + (3*a*b^2*x^2)/2 + (b^3*x^4)/4 + 3*a^2*b*Log[x]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^3}{2x^2}+\frac{3a^2b\log\left(x^2\right)}{2}+\frac{3ab^2x^2}{2}+\frac{b^3\int^{x^2}x\,dx}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a/x+b*x)**3,x)

[Out] -a**3/(2*x**2) + 3*a**2*b*log(x**2)/2 + 3*a*b**2*x**2/2 + b**3*In
tegral(x, (x, x**2))/2
```

Mathematica [A] time = 0.0109767, size = 40, normalized size = 1.

$$-\frac{a^3}{2x^2}+3a^2b\log(x)+\frac{3}{2}ab^2x^2+\frac{b^3x^4}{4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a/x + b*x)^3,x]

[Out] -a^3/(2*x^2) + (3*a*b^2*x^2)/2 + (b^3*x^4)/4 + 3*a^2*b*Log[x]
```

Maple [A] time = 0.009, size = 35, normalized size = 0.9

$$-\frac{a^3}{2\,x^2}+\frac{3\,ab^2x^2}{2}+\frac{b^3x^4}{4}+3\,a^2b\ln(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a/x+b*x)^3,x)
```

```
[Out] -1/2*a^3/x^2+3/2*a*b^2*x^2+1/4*b^3*x^4+3*a^2*b*ln(x)
```

Maxima [A] time = 1.39367, size = 46, normalized size = 1.15

$$\frac{1}{4}b^3x^4 + \frac{3}{2}ab^2x^2 + 3a^2b\log(x) - \frac{a^3}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x + a/x)^3,x, algorithm="maxima")
```

```
[Out] 1/4*b^3*x^4 + 3/2*a*b^2*x^2 + 3*a^2*b*log(x) - 1/2*a^3/x^2
```

Fricas [A] time = 0.220705, size = 51, normalized size = 1.27

$$\frac{b^3x^6 + 6ab^2x^4 + 12a^2bx^2\log(x) - 2a^3}{4x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x + a/x)^3,x, algorithm="fricas")
```

```
[Out] 1/4*(b^3*x^6 + 6*a*b^2*x^4 + 12*a^2*b*x^2*log(x) - 2*a^3)/x^2
```

Sympy [A] time = 1.17231, size = 37, normalized size = 0.92

$$-\frac{a^3}{2x^2} + 3a^2b\log(x) + \frac{3ab^2x^2}{2} + \frac{b^3x^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a/x+b*x)**3,x)
```

```
[Out] -a**3/(2*x**2) + 3*a**2*b*log(x) + 3*a*b**2*x**2/2 + b**3*x**4/4
```

GIAC/XCAS [A] time = 0.220201, size = 62, normalized size = 1.55

$$\frac{1}{4}b^3x^4 + \frac{3}{2}ab^2x^2 + \frac{3}{2}a^2b\ln\left(x^2\right) - \frac{3a^2bx^2 + a^3}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x + a/x)^3,x, algorithm="giac")
```

```
[Out] 1/4*b^3*x^4 + 3/2*a*b^2*x^2 + 3/2*a^2*b*ln(x^2) - 1/2*(3*a^2*b*x^
2 + a^3)/x^2
```

3.346 $\int \left(\frac{a}{x}+bx\right)^4 dx$

Optimal. Leaf size=50

$$-\frac{a^4}{3x^3}-\frac{4a^3b}{x}+6a^2b^2x+\frac{4}{3}ab^3x^3+\frac{b^4x^5}{5}$$

```
[Out] -a^4/(3*x^3) - (4*a^3*b)/x + 6*a^2*b^2*x + (4*a*b^3*x^3)/3 + (b^4
*x^5)/5
```

Rubi [A] time = 0.0546313, antiderivative size = 50, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{a^4}{3x^3}-\frac{4a^3b}{x}+6a^2b^2x+\frac{4}{3}ab^3x^3+\frac{b^4x^5}{5}$$

Antiderivative was successfully verified.

```
[In] Int[(a/x + b*x)^4,x]
```

```
[Out] -a^4/(3*x^3) - (4*a^3*b)/x + 6*a^2*b^2*x + (4*a*b^3*x^3)/3 + (b^4
*x^5)/5
```

Rubi in Sympy [A] time = 9.3441, size = 46, normalized size = 0.92

$$-\frac{a^4}{3x^3}-\frac{4a^3b}{x}+6a^2b^2x+\frac{4ab^3x^3}{3}+\frac{b^4x^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((a/x+b*x)**4,x)
```

```
[Out] -a**4/(3*x**3) - 4*a**3*b/x + 6*a**2*b**2*x + 4*a*b**3*x**3/3 + b
**4*x**5/5
```

Mathematica [A] time = 0.00945294, size = 50, normalized size = 1.

$$-\frac{a^4}{3x^3}-\frac{4a^3b}{x}+6a^2b^2x+\frac{4}{3}ab^3x^3+\frac{b^4x^5}{5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a/x + b*x)^4,x]
```

```
[Out] -a^4/(3*x^3) - (4*a^3*b)/x + 6*a^2*b^2*x + (4*a*b^3*x^3)/3 + (b^4
*x^5)/5
```

Maple [A] time = 0.008, size = 45, normalized size = 0.9

$$-\frac{a^4}{3\,x^3}-4\,\frac{a^3b}{x}+6\,a^2b^2x+\frac{4\,ab^3x^3}{3}+\frac{b^4x^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a/x+b*x)^4,x)
```

```
[Out] -1/3*a^4/x^3-4*a^3*b/x+6*a^2*b^2*x+4/3*a*b^3*x^3+1/5*b^4*x^5
```

Maxima [A] time = 1.37328, size = 59, normalized size = 1.18

$$\frac{1}{5}b^4x^5 + \frac{4}{3}ab^3x^3 + 6a^2b^2x - \frac{4a^3b}{x} - \frac{a^4}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x + a/x)^4,x, algorithm="maxima")
```

```
[Out] 1/5*b^4*x^5 + 4/3*a*b^3*x^3 + 6*a^2*b^2*x - 4*a^3*b/x - 1/3*a^4/x
^3
```

Fricas [A] time = 0.211296, size = 65, normalized size = 1.3

$$\frac{3b^4x^8 + 20ab^3x^6 + 90a^2b^2x^4 - 60a^3bx^2 - 5a^4}{15x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x + a/x)^4,x, algorithm="fricas")
```

```
[Out] 1/15*(3*b^4*x^8 + 20*a*b^3*x^6 + 90*a^2*b^2*x^4 - 60*a^3*b*x^2 -
5*a^4)/x^3
```

Sympy [A] time = 1.22904, size = 48, normalized size = 0.96

$$6a^2b^2x + \frac{4ab^3x^3}{3} + \frac{b^4x^5}{5} - \frac{a^4 + 12a^3bx^2}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a/x+b*x)**4,x)
```

```
[Out] 6*a**2*b**2*x + 4*a*b**3*x**3/3 + b**4*x**5/5 - (a**4 + 12*a**3*b
*x**2)/(3*x**3)
```

GIAC/XCAS [A] time = 0.214975, size = 61, normalized size = 1.22

$$\frac{1}{5}b^4x^5 + \frac{4}{3}ab^3x^3 + 6a^2b^2x - \frac{12a^3bx^2 + a^4}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x + a/x)^4,x, algorithm="giac")
```

```
[Out] 1/5*b^4*x^5 + 4/3*a*b^3*x^3 + 6*a^2*b^2*x - 1/3*(12*a^3*b*x^2 + a
^4)/x^3
```

3.347 $\int \frac{1}{\frac{1}{x^2}+x^3}\,dx$

Optimal. Leaf size=185

$$-\frac{1}{20}\left(1+\sqrt{5}\right)\log\left(x^2-\frac{1}{2}\left(1-\sqrt{5}\right)x+1\right)-\frac{1}{20}\left(1-\sqrt{5}\right)\log\left(x^2-\frac{1}{2}\left(1+\sqrt{5}\right)x+1\right)+\frac{1}{5}\log(x+1)-\frac{1}{5}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}\tan^{-1}\left(2\sqrt{\frac{2}{5+\sqrt{5}}}x+\sqrt{\frac{1}{5}\left(5-2\sqrt{5}\right)}\right)-\frac{1}{5}\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}\tan^{-1}\left(\sqrt{\frac{1}{5}\left(5+2\sqrt{5}\right)}-\sqrt{\frac{2}{5}\left(5+\sqrt{5}\right)}x\right)$$

```
[Out] -(Sqrt[(5 - Sqrt[5])/2]*ArcTan[Sqrt[(5 - 2*Sqrt[5])/5] + 2*Sqrt[2
/(5 + Sqrt[5])]*x])/5 - (Sqrt[(5 + Sqrt[5])/2]*ArcTan[Sqrt[(5 + 2
*Sqrt[5])/5] - Sqrt[(2*(5 + Sqrt[5]))/5]*x])/5 + Log[1 + x]/5 - (
(1 + Sqrt[5])*Log[1 - ((1 - Sqrt[5])*x)/2 + x^2])/20 - ((1 - Sqrt
[5])*Log[1 - ((1 + Sqrt[5])*x)/2 + x^2])/20
```

Rubi [A] time = 0.652386, antiderivative size = 185, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.778

$$-\frac{1}{20}\left(1+\sqrt{5}\right)\log\left(x^2-\frac{1}{2}\left(1-\sqrt{5}\right)x+1\right)-\frac{1}{20}\left(1-\sqrt{5}\right)\log\left(x^2-\frac{1}{2}\left(1+\sqrt{5}\right)x+1\right)+\frac{1}{5}\log(x+1)-\frac{1}{5}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}\tan^{-1}\left(2\sqrt{\frac{2}{5+\sqrt{5}}}x+\sqrt{\frac{1}{5}\left(5-2\sqrt{5}\right)}\right)-\frac{1}{5}\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}\tan^{-1}\left(\sqrt{\frac{1}{5}\left(5+2\sqrt{5}\right)}-\sqrt{\frac{2}{5}\left(5+\sqrt{5}\right)}x\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(-2) + x^3)^(-1),x]
```

```
[Out] -(Sqrt[(5 - Sqrt[5])/2]*ArcTan[Sqrt[(5 - 2*Sqrt[5])/5] + 2*Sqrt[2
/(5 + Sqrt[5])]*x])/5 - (Sqrt[(5 + Sqrt[5])/2]*ArcTan[Sqrt[(5 + 2
*Sqrt[5])/5] - Sqrt[(2*(5 + Sqrt[5]))/5]*x])/5 + Log[1 + x]/5 - (
(1 + Sqrt[5])*Log[1 - ((1 - Sqrt[5])*x)/2 + x^2])/20 - ((1 - Sqrt
[5])*Log[1 - ((1 + Sqrt[5])*x)/2 + x^2])/20
```

Rubi in Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(1/x**2+x**3),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.237227, size = 144, normalized size = 0.78

$$\frac{1}{20}\left(-\left(1+\sqrt{5}\right)\log\left(x^2+\frac{1}{2}\left(\sqrt{5}-1\right)x+1\right)+\left(\sqrt{5}-1\right)\log\left(x^2-\frac{1}{2}\left(1+\sqrt{5}\right)x+1\right)+4\log(x+1)-2\sqrt{2\left(5+\sqrt{5}\right)}\tan^{-1}\left(\frac{-4x+\sqrt{5}+1}{\sqrt{10-2\sqrt{5}}}\right)-2\sqrt{10-2\sqrt{5}}\tan^{-1}\left(\frac{4x+\sqrt{5}-1}{\sqrt{2\left(5+\sqrt{5}\right)}}\right)\right)$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(x^(-2) + x^3)^(-1),x]
```

```
[Out] (-2*Sqrt[2*(5 + Sqrt[5])]*ArcTan[(1 + Sqrt[5] - 4*x)/Sqrt[10 - 2*
Sqrt[5]]] - 2*Sqrt[10 - 2*Sqrt[5]]*ArcTan[(-1 + Sqrt[5] + 4*x)/Sq
rt[2*(5 + Sqrt[5])]] + 4*Log[1 + x] - (1 + Sqrt[5])*Log[1 + ((-1
+ Sqrt[5])*x)/2 + x^2] + (-1 + Sqrt[5])*Log[1 - ((1 + Sqrt[5])*x)
/2 + x^2])/20
```

Maple [A] time = 0.029, size = 156, normalized size = 0.8

$$\frac{\ln(1+x)}{5}-\frac{\sqrt{5}\ln\left(x\sqrt{5}+2x^2-x+2\right)}{20}-\frac{\ln\left(x\sqrt{5}+2x^2-x+2\right)}{20}-\frac{2\sqrt{5}}{5\sqrt{10+2\sqrt{5}}}\arctan\left(\frac{\sqrt{5}+4x-1}{\sqrt{10+2\sqrt{5}}}\right)+\frac{\sqrt{5}\ln\left(-x\sqrt{5}+2x^2-x+2\right)}{20}-\frac{\ln\left(-x\sqrt{5}+2x^2-x+2\right)}{20}+\frac{2\sqrt{5}}{5\sqrt{10-2\sqrt{5}}}\arctan\left(\frac{-\sqrt{5}+4x-1}{\sqrt{10-2\sqrt{5}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(1/x^2+x^3),x)
```

```
[Out] 1/5*ln(1+x)-1/20*5^(1/2)*ln(x*5^(1/2)+2*x^2-x+2)-1/20*ln(x*5^(1/2
)+2*x^2-x+2)-2/5/(10+2*5^(1/2))^(1/2)*arctan((5^(1/2)+4*x-1)/(10+
2*5^(1/2))^(1/2))*5^(1/2)+1/20*5^(1/2)*ln(-x*5^(1/2)+2*x^2-x+2)-1
/20*ln(-x*5^(1/2)+2*x^2-x+2)+2/5/(10-2*5^(1/2))^(1/2)*arctan((-5^
(1/2)+4*x-1)/(10-2*5^(1/2))^(1/2))*5^(1/2)
```

Maxima [A] time = 1.58137, size = 166, normalized size = 0.9

$$-\frac{2\sqrt{5}\arctan\left(\frac{4x+\sqrt{5}-1}{\sqrt{2\sqrt{5}+10}}\right)}{5\sqrt{2\sqrt{5}+10}}+\frac{2\sqrt{5}\arctan\left(\frac{4x-\sqrt{5}-1}{\sqrt{-2\sqrt{5}+10}}\right)}{5\sqrt{-2\sqrt{5}+10}}+\frac{\log\left(2x^2-x\left(\sqrt{5}+1\right)+2\right)}{5\sqrt{5}+5}-\frac{\log\left(2x^2+x\left(\sqrt{5}-1\right)+2\right)}{5\left(\sqrt{5}-1\right)}+\frac{1}{5}\log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x^3 + 1/x^2),x, algorithm="maxima")
```

```
[Out] -2/5*sqrt(5)*arctan((4*x + sqrt(5) - 1)/sqrt(2*sqrt(5) + 10))/sqr
t(2*sqrt(5) + 10) + 2/5*sqrt(5)*arctan((4*x - sqrt(5) - 1)/sqrt(-
2*sqrt(5) + 10))/sqrt(-2*sqrt(5) + 10) + log(2*x^2 - x*(sqrt(5) +
```

```
 1) + 2)/((5*sqrt(5)) + 5) - 1/5*log(2*x^2 + x*(sqrt(5) - 1) + 2)
/(sqrt(5) - 1) + 1/5*log(x + 1)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x^3 + 1/x^2),x, algorithm="fricas")
```

```
[Out] Exception raised: NotImplementedError
```

Sympy [A] time = 4.13208, size = 36, normalized size = 0.19

$$\frac{\log{(x+1)}}{5} + \operatorname{RootSum}{\left(625t^4 + 125t^3 + 25t^2 + 5t + 1, \left(t \mapsto t\log{\left(25t^2 + x\right)}\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(1/x**2+x**3),x)
```

```
[Out] log(x + 1)/5 + RootSum(625*_t**4 + 125*_t**3 + 25*_t**2 + 5*_t +
1, Lambda(_t, _t*log(25*_t**2 + x)))
```

GIAC/XCAS [A] time = 0.225488, size = 151, normalized size = 0.82

$$\frac{1}{20}\left(\sqrt{5}-1\right)\ln\left(x^2-\frac{1}{2}x\left(\sqrt{5}+1\right)+1\right)-\frac{1}{20}\left(\sqrt{5}+1\right)\ln\left(x^2+\frac{1}{2}x\left(\sqrt{5}-1\right)+1\right)$$
$$-\frac{1}{10}\sqrt{-2\sqrt{5}+10}\arctan\left(\frac{4x+\sqrt{5}-1}{\sqrt{2\sqrt{5}+10}}\right)+\frac{1}{10}\sqrt{2\sqrt{5}+10}\arctan\left(\frac{4x-\sqrt{5}-1}{\sqrt{-2\sqrt{5}+10}}\right)+\frac{1}{5}\ln\left(|x+1|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x^3 + 1/x^2),x, algorithm="giac")
```

```
[Out] 1/20*(sqrt(5) - 1)*ln(x^2 - 1/2*x*(sqrt(5) + 1) + 1) - 1/20*(sqrt
(5) + 1)*ln(x^2 + 1/2*x*(sqrt(5) - 1) + 1) - 1/10*sqrt(-2*sqrt(5)
 + 10)*arctan((4*x + sqrt(5) - 1)/sqrt(2*sqrt(5) + 10)) + 1/10*sq
rt(2*sqrt(5) + 10)*arctan((4*x - sqrt(5) - 1)/sqrt(-2*sqrt(5) + 1
0)) + 1/5*ln(abs(x + 1))
```

3.348 $\int x^p \left(ax^n + bx^{1+13n+p}\right)^{12} dx$

Optimal. Leaf size=29

$$\frac{\left(a + bx^{12n+p+1}\right)^{13}}{13b(12n + p + 1)}$$

```
[Out] (a + b*x^(1 + 12*n + p))^13/(13*b*(1 + 12*n + p))
```

Rubi [A] time = 0.0378409, antiderivative size = 29, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091

$$\frac{\left(a + bx^{12n+p+1}\right)^{13}}{13b(12n + p + 1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^p*(a*x^n + b*x^(1 + 13*n + p))^12,x]

[Out] (a + b*x^(1 + 12*n + p))^13/(13*b*(1 + 12*n + p))
```

Rubi in Sympy [A] time = 4.73202, size = 22, normalized size = 0.76

$$\frac{\left(a + bx^{12n+p+1}\right)^{13}}{13b\left(12n + p + 1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**p*(a*x**n+b*x**(1+13*n+p))**12,x)

[Out] (a + b*x**(12*n + p + 1))**13/(13*b*(12*n + p + 1))
```

Mathematica [B] time = 0.327041, size = 232, normalized size = 8.

$$\frac{x^{12n+p+1}\left(13a^{12} + 78a^{11}bx^{12n+p+1} + 286a^{10}b^2x^{24n+2p+2} + 715a^9b^3x^{36n+3p+3} + 1287a^8b^4x^{48n+4p+4} + 1716a^7b^5x^{60n+5p+5} + 1716\right.}{1}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^p*(a*x^n + b*x^(1 + 13*n + p))^12,x]

[Out] (x^(1 + 12*n + p)*(13*a^12 + 78*a^11*b*x^(1 + 12*n + p) + 286*a^3
*b^9*x^(9*(1 + 12*n + p)) + 78*a^2*b^10*x^(10*(1 + 12*n + p)) + 1
3*a*b^11*x^(11*(1 + 12*n + p)) + b^12*x^(12*(1 + 12*n + p)) + 286
*a^10*b^2*x^(2 + 24*n + 2*p) + 715*a^9*b^3*x^(3 + 36*n + 3*p) + 1
287*a^8*b^4*x^(4 + 48*n + 4*p) + 1716*a^7*b^5*x^(5 + 60*n + 5*p)
+ 1716*a^6*b^6*x^(6 + 72*n + 6*p) + 1287*a^5*b^7*x^(7 + 84*n + 7*
p) + 715*a^4*b^8*x^(8 + 96*n + 8*p)))/(13*(1 + 12*n + p))
```

Maple [B] time = 0.257, size = 363, normalized size = 12.5

$$\frac{b^{12}x^{13}\left(x^{n}\right)^{156}\left(x^{p}\right)^{13}}{13+156n+13p}+\frac{ab^{11}x^{12}\left(x^{n}\right)^{144}\left(x^{p}\right)^{12}}{1+12n+p}+6\frac{a^{2}b^{10}x^{11}\left(x^{n}\right)^{132}\left(x^{p}\right)^{11}}{1+12n+p}+22\frac{a^{3}b^{9}x^{10}\left(x^{n}\right)^{120}\left(x^{p}\right)^{10}}{1+12n+p}+55\frac{a^{4}b^{8}x^{9}\left(x^{n}\right)^{108}\left(x^{p}\right)^{9}}{1+12n+p}+99\frac{a^{5}b^{7}x^{8}\left(x^{n}\right)^{96}\left(x^{p}\right)^{8}}{1+12n+p}+132\frac{a^{6}b^{6}x^{7}\left(x^{n}\right)^{84}\left(x^{p}\right)^{7}}{1+12n+p}+132\frac{a^{7}b^{5}x^{6}\left(x^{n}\right)^{72}\left(x^{p}\right)^{6}}{1+12n+p}+99\frac{a^{8}b^{4}x^{5}\left(x^{n}\right)^{60}\left(x^{p}\right)^{5}}{1+12n+p}+55\frac{a^{9}b^{3}x^{4}\left(x^{n}\right)^{48}\left(x^{p}\right)^{4}}{1+12n+p}+22\frac{a^{10}b^{2}x^{3}\left(x^{n}\right)^{36}\left(x^{p}\right)^{3}}{1+12n+p}+6\frac{a^{11}bx^{2}\left(x^{n}\right)^{24}\left(x^{p}\right)^{2}}{1+12n+p}+\frac{a^{12}x\left(x^{n}\right)^{12}x^{p}}{1+12n+p}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^p*(a*x^n+b*x^(1+13*n+p))^12,x)
```

```
[Out] 1/13*b^12*x^13*(x^n)^156/(1+12*n+p)*(x^p)^13+a*b^11*x^12*(x^n)^14
4/(1+12*n+p)*(x^p)^12+6*a^2*b^10*x^11*(x^n)^132/(1+12*n+p)*(x^p)^
11+22*a^3*b^9*x^10*(x^n)^120/(1+12*n+p)*(x^p)^10+55*a^4*b^8*x^9*(
x^n)^108/(1+12*n+p)*(x^p)^9+99*a^5*b^7*x^8*(x^n)^96/(1+12*n+p)*(x
^p)^8+132*a^6*b^6*x^7*(x^n)^84/(1+12*n+p)*(x^p)^7+132*a^7*b^5*x^6
*(x^n)^72/(1+12*n+p)*(x^p)^6+99*a^8*b^4*x^5*(x^n)^60/(1+12*n+p)*(
x^p)^5+55*a^9*b^3*x^4*(x^n)^48/(1+12*n+p)*(x^p)^4+22*a^10*b^2*x^3
*(x^n)^36/(1+12*n+p)*(x^p)^3+6*a^11*b*x^2*(x^n)^24/(1+12*n+p)*(x^
p)^2+a^12/(1+12*n+p)*x*(x^n)^12*x^p
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(13*n + p + 1) + a*x^n)^12*x^p,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.25195, size = 401, normalized size = 13.83

$$\frac{78\,a^{2}b^{10}x^{2\,n}x^{143\,n+11\,p+11}+286\,a^{3}b^{9}x^{3\,n}x^{130\,n+10\,p+10}+715\,a^{4}b^{8}x^{4\,n}x^{117\,n+9\,p+9}+1287\,a^{5}b^{7}x^{5\,n}x^{104\,n+8\,p+8}+1716\,a^{6}b^{6}x^{6\,n}x^{91}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(13*n + p + 1) + a*x^n)^12*x^p,x, algorithm="fricas")
```

```
[Out] 1/13*(78*a^2*b^10*x^(2*n)*x^(143*n + 11*p + 11) + 286*a^3*b^9*x^(
3*n)*x^(130*n + 10*p + 10) + 715*a^4*b^8*x^(4*n)*x^(117*n + 9*p +
 9) + 1287*a^5*b^7*x^(5*n)*x^(104*n + 8*p + 8) + 1716*a^6*b^6*x^(
6*n)*x^(91*n + 7*p + 7) + 1716*a^7*b^5*x^(7*n)*x^(78*n + 6*p + 6)
 + 1287*a^8*b^4*x^(8*n)*x^(65*n + 5*p + 5) + 715*a^9*b^3*x^(9*n)*
x^(52*n + 4*p + 4) + 286*a^10*b^2*x^(10*n)*x^(39*n + 3*p + 3) + 7
8*a^11*b*x^(11*n)*x^(26*n + 2*p + 2) + 13*a^12*x^(12*n)*x^(13*n +
 p + 1) + 13*a*b^11*x^(156*n + 12*p + 12)*x^n + b^12*x^(169*n + 1
3*p + 13))/((12*n + p + 1)*x^(13*n))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**p*(a*x**n+b*x**(1+13*n+p))**12,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.922125, size = 400, normalized size = 13.79

$$\frac{b^{12}x^{13}e^{(156\,n\ln(x)+13\,p\ln(x))} + 13\,ab^{11}x^{12}e^{(144\,n\ln(x)+12\,p\ln(x))} + 78\,a^2b^{10}x^{11}e^{(132\,n\ln(x)+11\,p\ln(x))} + 286\,a^3b^9x^{10}e^{(120\,n\ln(x)+10\,p\ln(x))} + \cdots}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(13*n + p + 1) + a*x^n)^12*x^p,x, algorithm="giac")
```

```
[Out] 1/13*(b^12*x^13*e^(156*n*ln(x) + 13*p*ln(x)) + 13*a*b^11*x^12*e^(
144*n*ln(x) + 12*p*ln(x)) + 78*a^2*b^10*x^11*e^(132*n*ln(x) + 11*
p*ln(x)) + 286*a^3*b^9*x^10*e^(120*n*ln(x) + 10*p*ln(x)) + 715*a^
4*b^8*x^9*e^(108*n*ln(x) + 9*p*ln(x)) + 1287*a^5*b^7*x^8*e^(96*n*
ln(x) + 8*p*ln(x)) + 1716*a^6*b^6*x^7*e^(84*n*ln(x) + 7*p*ln(x))
+ 1716*a^7*b^5*x^6*e^(72*n*ln(x) + 6*p*ln(x)) + 1287*a^8*b^4*x^5*
e^(60*n*ln(x) + 5*p*ln(x)) + 715*a^9*b^3*x^4*e^(48*n*ln(x) + 4*p*
ln(x)) + 286*a^10*b^2*x^3*e^(36*n*ln(x) + 3*p*ln(x)) + 78*a^11*b*
x^2*e^(24*n*ln(x) + 2*p*ln(x)) + 13*a^12*x*e^(12*n*ln(x) + p*ln(x
)))/(12*n + p + 1)
```

3.349 $\int x^{12} \left(a + bx^{13}\right)^{12} \, dx$

Optimal. Leaf size=16

$$\frac{\left(a + bx^{13}\right)^{13}}{169b}$$

```
[Out] (a + b*x^13)^13/(169*b)
```

Rubi [A] time = 0.01117, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$

$$\frac{\left(a + bx^{13}\right)^{13}}{169b}$$

Antiderivative was successfully verified.

```
[In] Int[x^12*(a + b*x^13)^12,x]

[Out] (a + b*x^13)^13/(169*b)
```

Rubi in Sympy [A] time = 2.12092, size = 10, normalized size = 0.62

$$\frac{\left(a + bx^{13}\right)^{13}}{169b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**12*(b*x**13+a)**12,x)

[Out] (a + b*x**13)**13/(169*b)
```

Mathematica [B] time = 0.00819892, size = 160, normalized size = 10.

$$\frac{a^{12}x^{13}}{13} + \frac{6}{13}a^{11}bx^{26} + \frac{22}{13}a^{10}b^2x^{39} + \frac{55}{13}a^9b^3x^{52} + \frac{99}{13}a^8b^4x^{65} + \frac{132}{13}a^7b^5x^{78} + \frac{132}{13}a^6b^6x^{91} + \frac{99}{13}a^5b^7x^{104} + \frac{55}{13}a^4b^8x^{117} + \frac{22}{13}a^3b^9x^{130} + \frac{6}{13}a^2b^{10}x^{143} + \frac{1}{13}ab^{11}x^{156} + \frac{b^{12}x^{169}}{169}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^12*(a + b*x^13)^12,x]

[Out] (a^12*x^13)/13 + (6*a^11*b*x^26)/13 + (22*a^10*b^2*x^39)/13 + (55
*a^9*b^3*x^52)/13 + (99*a^8*b^4*x^65)/13 + (132*a^7*b^5*x^78)/13
+ (132*a^6*b^6*x^91)/13 + (99*a^5*b^7*x^104)/13 + (55*a^4*b^8*x^1
17)/13 + (22*a^3*b^9*x^130)/13 + (6*a^2*b^10*x^143)/13 + (a*b^11*
x^156)/13 + (b^12*x^169)/169
```

Maple [B] time = 0.002, size = 135, normalized size = 8.4

$$\frac{b^{12}x^{169}}{169} + \frac{ab^{11}x^{156}}{13} + \frac{6\,a^2b^{10}x^{143}}{13} + \frac{22\,a^3b^9x^{130}}{13} + \frac{55\,b^8a^4x^{117}}{13} + \frac{99\,a^5b^7x^{104}}{13} + \frac{132\,a^6b^6x^{91}}{13} + \frac{132\,a^7b^5x^{78}}{13} + \frac{99\,a^8b^4x^{65}}{13} + \frac{55\,a^9b^3x^{52}}{13} + \frac{22\,a^{10}b^2x^{39}}{13} + \frac{6\,a^{11}bx^{26}}{13} + \frac{a^{12}x^{13}}{13}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^12*(b*x^13+a)^12,x)
```

```
[Out] 1/169*b^12*x^169+1/13*a*b^11*x^156+6/13*a^2*b^10*x^143+22/13*a^3*
b^9*x^130+55/13*b^8*a^4*x^117+99/13*a^5*b^7*x^104+132/13*a^6*b^6*
x^91+132/13*a^7*b^5*x^78+99/13*a^8*b^4*x^65+55/13*a^9*b^3*x^52+22
/13*a^10*b^2*x^39+6/13*a^11*b*x^26+1/13*a^12*x^13
```

Maxima [A] time = 1.37876, size = 19, normalized size = 1.19

$$\frac{\left(bx^{13}+a\right)^{13}}{169\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^13 + a)^12*x^12,x, algorithm="maxima")
```

```
[Out] 1/169*(b*x^13 + a)^13/b
```

Fricas [A] time = 0.19355, size = 1, normalized size = 0.06

$$\frac{1}{169}x^{169}b^{12}+\frac{1}{13}x^{156}b^{11}a+\frac{6}{13}x^{143}b^{10}a^2+\frac{22}{13}x^{130}b^9a^3+\frac{55}{13}x^{117}b^8a^4+\frac{99}{13}x^{104}b^7a^5+\frac{132}{13}x^{91}b^6a^6+\frac{132}{13}x^{78}b^5a^7+\frac{99}{13}x^{65}b^4a^8+\frac{55}{13}x^{52}b^3a^9+\frac{22}{13}x^{39}b^2a^{10}+\frac{6}{13}x^{26}ba^{11}+\frac{1}{13}x^{13}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^13 + a)^12*x^12,x, algorithm="fricas")
```

```
[Out] 1/169*x^169*b^12 + 1/13*x^156*b^11*a + 6/13*x^143*b^10*a^2 + 22/1
3*x^130*b^9*a^3 + 55/13*x^117*b^8*a^4 + 99/13*x^104*b^7*a^5 + 132
/13*x^91*b^6*a^6 + 132/13*x^78*b^5*a^7 + 99/13*x^65*b^4*a^8 + 55/
13*x^52*b^3*a^9 + 22/13*x^39*b^2*a^10 + 6/13*x^26*b*a^11 + 1/13*x
^13*a^12
```

Sympy [A] time = 0.218928, size = 160, normalized size = 10.

$$\frac{a^{12}x^{13}}{13}+\frac{6a^{11}bx^{26}}{13}+\frac{22a^{10}b^2x^{39}}{13}+\frac{55a^9b^3x^{52}}{13}+\frac{99a^8b^4x^{65}}{13}+\frac{132a^7b^5x^{78}}{13}+\frac{132a^6b^6x^{91}}{13}+\frac{99a^5b^7x^{104}}{13}+\frac{55a^4b^8x^{117}}{13}+\frac{22a^3b^9x^{130}}{13}+\frac{6a^2b^{10}x^{143}}{13}+\frac{ab^{11}x^{156}}{13}+\frac{b^{12}x^{169}}{169}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**12*(b*x**13+a)**12,x)
```

```
[Out] a**12*x**13/13 + 6*a**11*b*x**26/13 + 22*a**10*b**2*x**39/13 + 55
*a**9*b**3*x**52/13 + 99*a**8*b**4*x**65/13 + 132*a**7*b**5*x**78
/13 + 132*a**6*b**6*x**91/13 + 99*a**5*b**7*x**104/13 + 55*a**4*b
**8*x**117/13 + 22*a**3*b**9*x**130/13 + 6*a**2*b**10*x**143/13 +
 a*b**11*x**156/13 + b**12*x**169/169
```

GIAC/XCAS [A] time = 0.217658, size = 19, normalized size = 1.19

$$\frac{\left(bx^{13}+a\right)^{13}}{169\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^13 + a)^12*x^12,x, algorithm="giac")
```

```
[Out] 1/169*(b*x^13 + a)^13/b
```

3.350 $\int x^{12} \left(ax + bx^{26}\right)^{12} dx$

Optimal. Leaf size=21

$$\frac{\left(ax + bx^{26}\right)^{13}}{325bx^{13}}$$

```
[Out] (a*x + b*x^26)^13/(325*b*x^13)
```

Rubi [A] time = 0.0126825, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$

$$\frac{\left(ax + bx^{26}\right)^{13}}{325bx^{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^12*(a*x + b*x^26)^12,x]
```

```
[Out] (a*x + b*x^26)^13/(325*b*x^13)
```

Rubi in Sympy [A] time = 3.30218, size = 10, normalized size = 0.48

$$\frac{\left(a + bx^{25}\right)^{13}}{325b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**12*(b*x**26+a*x)**12,x)
```

```
[Out] (a + b*x**25)**13/(325*b)
```

Mathematica [B] time = 0.0110714, size = 160, normalized size = 7.62

$$\frac{a^{12}x^{25}}{25} + \frac{6}{25}a^{11}bx^{50} + \frac{22}{25}a^{10}b^2x^{75} + \frac{11}{5}a^9b^3x^{100} + \frac{99}{25}a^8b^4x^{125} + \frac{132}{25}a^7b^5x^{150} + \frac{132}{25}a^6b^6x^{175} + \frac{99}{25}a^5b^7x^{200} + \frac{11}{5}a^4b^8x^{225} + \frac{22}{25}a^3b^9x^{250} + \frac{6}{25}a^2b^{10}x^{275} + \frac{1}{25}ab^{11}x^{300} + \frac{b^{12}x^{325}}{325}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^12*(a*x + b*x^26)^12,x]
```

```
[Out] (a^12*x^25)/25 + (6*a^11*b*x^50)/25 + (22*a^10*b^2*x^75)/25 + (11
*a^9*b^3*x^100)/5 + (99*a^8*b^4*x^125)/25 + (132*a^7*b^5*x^150)/2
5 + (132*a^6*b^6*x^175)/25 + (99*a^5*b^7*x^200)/25 + (11*a^4*b^8*
x^225)/5 + (22*a^3*b^9*x^250)/25 + (6*a^2*b^10*x^275)/25 + (a*b^1
1*x^300)/25 + (b^12*x^325)/325
```

Maple [B] time = 0., size = 135, normalized size = 6.4

$$\frac{b^{12}x^{325}}{325} + \frac{ab^{11}x^{300}}{25} + \frac{6\,a^2b^{10}x^{275}}{25} + \frac{22\,a^3b^9x^{250}}{25} + \frac{11\,b^8a^4x^{225}}{5} + \frac{99\,a^5b^7x^{200}}{25} + \frac{132\,a^6b^6x^{175}}{25} + \frac{132\,a^7b^5x^{150}}{25} + \frac{99\,a^8b^4x^{125}}{25} + \frac{11\,a^9b^3x^{100}}{5} + \frac{22\,a^{10}b^2x^{75}}{25} + \frac{6\,a^{11}bx^{50}}{25} + \frac{a^{12}x^{25}}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^12*(b*x^26+a*x)^12,x)
```

```
[Out] 1/325*b^12*x^325+1/25*a*b^11*x^300+6/25*a^2*b^10*x^275+22/25*a^3*
b^9*x^250+11/5*b^8*a^4*x^225+99/25*a^5*b^7*x^200+132/25*a^6*b^6*x
^175+132/25*a^7*b^5*x^150+99/25*a^8*b^4*x^125+11/5*a^9*b^3*x^100+
22/25*a^10*b^2*x^75+6/25*a^11*b*x^50+1/25*a^12*x^25
```

Maxima [A] time = 1.37521, size = 181, normalized size = 8.62

$$\frac{1}{325}\,b^{12}x^{325} + \frac{1}{25}\,ab^{11}x^{300} + \frac{6}{25}\,a^2b^{10}x^{275} + \frac{22}{25}\,a^3b^9x^{250} + \frac{11}{5}\,a^4b^8x^{225} + \frac{99}{25}\,a^5b^7x^{200} + \frac{132}{25}\,a^6b^6x^{175} + \frac{132}{25}\,a^7b^5x^{150} + \frac{99}{25}\,a^8b^4x^{125} + \frac{11}{5}\,a^9b^3x^{100} + \frac{22}{25}\,a^{10}b^2x^{75} + \frac{6}{25}\,a^{11}bx^{50} + \frac{1}{25}\,a^{12}x^{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x^26 + a*x)^12*x^12,x, algorithm="maxima")
```

```
[Out] 1/325*b^12*x^325 + 1/25*a*b^11*x^300 + 6/25*a^2*b^10*x^275 + 22/2
5*a^3*b^9*x^250 + 11/5*a^4*b^8*x^225 + 99/25*a^5*b^7*x^200 + 132/
25*a^6*b^6*x^175 + 132/25*a^7*b^5*x^150 + 99/25*a^8*b^4*x^125 + 1
1/5*a^9*b^3*x^100 + 22/25*a^10*b^2*x^75 + 6/25*a^11*b*x^50 + 1/25
*a^12*x^25
```

Fricas [A] time = 0.1922, size = 1, normalized size = 0.05

$$\frac{1}{325}x^{325}b^{12} + \frac{1}{25}x^{300}b^{11}a + \frac{6}{25}x^{275}b^{10}a^2 + \frac{22}{25}x^{250}b^9a^3 + \frac{11}{5}x^{225}b^8a^4 + \frac{99}{25}x^{200}b^7a^5 + \frac{132}{25}x^{175}b^6a^6 + \frac{132}{25}x^{150}b^5a^7 + \frac{99}{25}x^{125}b^4a^8 + \frac{11}{5}x^{100}b^3a^9 + \frac{22}{25}x^{75}b^2a^{10} + \frac{6}{25}x^{50}ba^{11} + \frac{1}{25}x^{25}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x^26 + a*x)^12*x^12,x, algorithm="fricas")
```

```
[Out] 1/325*x^325*b^12 + 1/25*x^300*b^11*a + 6/25*x^275*b^10*a^2 + 22/2
5*x^250*b^9*a^3 + 11/5*x^225*b^8*a^4 + 99/25*x^200*b^7*a^5 + 132/
25*x^175*b^6*a^6 + 132/25*x^150*b^5*a^7 + 99/25*x^125*b^4*a^8 + 1
1/5*x^100*b^3*a^9 + 22/25*x^75*b^2*a^10 + 6/25*x^50*b*a^11 + 1/25
*x^25*a^12
```

Sympy [A] time = 0.271573, size = 160, normalized size = 7.62

$$\frac{a^{12}x^{25}}{25} + \frac{6a^{11}bx^{50}}{25} + \frac{22a^{10}b^2x^{75}}{25} + \frac{11a^9b^3x^{100}}{5} + \frac{99a^8b^4x^{125}}{25} + \frac{132a^7b^5x^{150}}{25} + \frac{132a^6b^6x^{175}}{25} + \frac{99a^5b^7x^{200}}{25} + \frac{11a^4b^8x^{225}}{5} + \frac{22a^3b^9x^{250}}{25} + \frac{6a^2b^{10}x^{275}}{25} + \frac{ab^{11}x^{300}}{25} + \frac{b^{12}x^{325}}{325}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**12*(b*x**26+a*x)**12,x)
```

```
[Out] a**12*x**25/25 + 6*a**11*b*x**50/25 + 22*a**10*b**2*x**75/25 + 11
*a**9*b**3*x**100/5 + 99*a**8*b**4*x**125/25 + 132*a**7*b**5*x**1
50/25 + 132*a**6*b**6*x**175/25 + 99*a**5*b**7*x**200/25 + 11*a**
4*b**8*x**225/5 + 22*a**3*b**9*x**250/25 + 6*a**2*b**10*x**275/25
 + a*b**11*x**300/25 + b**12*x**325/325
```

GIAC/XCAS [A] time = 0.220236, size = 181, normalized size = 8.62

$$\frac{1}{325}\,b^{12}x^{325}+\frac{1}{25}\,ab^{11}x^{300}+\frac{6}{25}\,a^{2}b^{10}x^{275}+\frac{22}{25}\,a^{3}b^{9}x^{250}+\frac{11}{5}\,a^{4}b^{8}x^{225}+\frac{99}{25}\,a^{5}b^{7}x^{200}+\frac{132}{25}\,a^{6}b^{6}x^{175}+\frac{132}{25}\,a^{7}b^{5}x^{150}+\frac{99}{25}\,a^{8}b^{4}x^{125}+\frac{11}{5}\,a^{9}b^{3}x^{100}+\frac{22}{25}\,a^{10}b^{2}x^{75}+\frac{6}{25}\,a^{11}bx^{50}+\frac{1}{25}\,a^{12}x^{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^26 + a*x)^12*x^12,x, algorithm="giac")
```

```
[Out] 1/325*b^12*x^325 + 1/25*a*b^11*x^300 + 6/25*a^2*b^10*x^275 + 22/2
5*a^3*b^9*x^250 + 11/5*a^4*b^8*x^225 + 99/25*a^5*b^7*x^200 + 132/
25*a^6*b^6*x^175 + 132/25*a^7*b^5*x^150 + 99/25*a^8*b^4*x^125 + 1
1/5*a^9*b^3*x^100 + 22/25*a^10*b^2*x^75 + 6/25*a^11*b*x^50 + 1/25
*a^12*x^25
```

3.351 $\int x^{12} \left(ax^2+bx^{39}\right)^{12} dx$

Optimal. Leaf size=23

$$\frac{\left(ax^2+bx^{39}\right)^{13}}{481bx^{26}}$$

```
[Out] (a*x^2 + b*x^39)^13/(481*b*x^26)
```

Rubi [A] time = 0.0185888, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059

$$\frac{\left(ax^2+bx^{39}\right)^{13}}{481bx^{26}}$$

Antiderivative was successfully verified.

```
[In] Int[x^12*(a*x^2 + b*x^39)^12,x]

[Out] (a*x^2 + b*x^39)^13/(481*b*x^26)
```

Rubi in Sympy [A] time = 3.50444, size = 10, normalized size = 0.43

$$\frac{\left(a+bx^{37}\right)^{13}}{481b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**12*(b*x**39+a*x**2)**12,x)

[Out] (a + b*x**37)**13/(481*b)
```

Mathematica [B] time = 0.0130595, size = 160, normalized size = 6.96

$$\frac{a^{12}x^{37}}{37}+\frac{6}{37}a^{11}bx^{74}+\frac{22}{37}a^{10}b^2x^{111}+\frac{55}{37}a^9b^3x^{148}+\frac{99}{37}a^8b^4x^{185}+\frac{132}{37}a^7b^5x^{222}+\frac{132}{37}a^6b^6x^{259}+\frac{99}{37}a^5b^7x^{296}+\frac{55}{37}a^4b^8x^{333}+\frac{22}{37}a^3b^9x^{370}+\frac{6}{37}a^2b^{10}x^{407}+\frac{1}{37}ab^{11}x^{444}+\frac{b^{12}x^{481}}{481}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^12*(a*x^2 + b*x^39)^12,x]

[Out] (a^12*x^37)/37 + (6*a^11*b*x^74)/37 + (22*a^10*b^2*x^111)/37 + (5
5*a^9*b^3*x^148)/37 + (99*a^8*b^4*x^185)/37 + (132*a^7*b^5*x^222)
/37 + (132*a^6*b^6*x^259)/37 + (99*a^5*b^7*x^296)/37 + (55*a^4*b^
8*x^333)/37 + (22*a^3*b^9*x^370)/37 + (6*a^2*b^10*x^407)/37 + (a*
b^11*x^444)/37 + (b^12*x^481)/481
```

Maple [B] time = 0.004, size = 135, normalized size = 5.9

$$\frac{b^{12}x^{481}}{481}+\frac{ab^{11}x^{444}}{37}+\frac{6\,a^2b^{10}x^{407}}{37}+\frac{22\,a^3b^9x^{370}}{37}+\frac{55\,b^8a^4x^{333}}{37}+\frac{99\,a^5b^7x^{296}}{37}+\frac{132\,a^6b^6x^{259}}{37}+\frac{132\,a^7b^5x^{222}}{37}+\frac{99\,a^8b^4x^{185}}{37}+\frac{55\,a^9b^3x^{148}}{37}+\frac{22\,a^{10}b^2x^{111}}{37}+\frac{6\,a^{11}bx^{74}}{37}+\frac{a^{12}x^{37}}{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^12*(b*x^39+a*x^2)^12,x)
```

```
[Out] 1/481*b^12*x^481+1/37*a*b^11*x^444+6/37*a^2*b^10*x^407+22/37*a^3*
b^9*x^370+55/37*b^8*a^4*x^333+99/37*a^5*b^7*x^296+132/37*a^6*b^6*
x^259+132/37*a^7*b^5*x^222+99/37*a^8*b^4*x^185+55/37*a^9*b^3*x^14
8+22/37*a^10*b^2*x^111+6/37*a^11*b*x^74+1/37*a^12*x^37
```

Maxima [A] time = 1.37852, size = 181, normalized size = 7.87

$$\frac{1}{481}\,b^{12}x^{481}+\frac{1}{37}\,ab^{11}x^{444}+\frac{6}{37}\,a^{2}b^{10}x^{407}+\frac{22}{37}\,a^{3}b^{9}x^{370}+\frac{55}{37}\,a^{4}b^{8}x^{333}+\frac{99}{37}\,a^{5}b^{7}x^{296}+\frac{132}{37}\,a^{6}b^{6}x^{259}+\frac{132}{37}\,a^{7}b^{5}x^{222}+\frac{99}{37}\,a^{8}b^{4}x^{185}+\frac{55}{37}\,a^{9}b^{3}x^{148}+\frac{22}{37}\,a^{10}b^{2}x^{111}+\frac{6}{37}\,a^{11}bx^{74}+\frac{1}{37}\,a^{12}x^{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^39 + a*x^2)^12*x^12,x, algorithm="maxima")
```

```
[Out] 1/481*b^12*x^481 + 1/37*a*b^11*x^444 + 6/37*a^2*b^10*x^407 + 22/3
7*a^3*b^9*x^370 + 55/37*a^4*b^8*x^333 + 99/37*a^5*b^7*x^296 + 132
/37*a^6*b^6*x^259 + 132/37*a^7*b^5*x^222 + 99/37*a^8*b^4*x^185 +
55/37*a^9*b^3*x^148 + 22/37*a^10*b^2*x^111 + 6/37*a^11*b*x^74 + 1
/37*a^12*x^37
```

Fricas [A] time = 0.199018, size = 1, normalized size = 0.04

$$\frac{1}{481}x^{481}b^{12}+\frac{1}{37}x^{444}b^{11}a+\frac{6}{37}x^{407}b^{10}a^{2}+\frac{22}{37}x^{370}b^{9}a^{3}+\frac{55}{37}x^{333}b^{8}a^{4}+\frac{99}{37}x^{296}b^{7}a^{5}+\frac{132}{37}x^{259}b^{6}a^{6}+\frac{132}{37}x^{222}b^{5}a^{7}+\frac{99}{37}x^{185}b^{4}a^{8}+\frac{55}{37}x^{148}b^{3}a^{9}+\frac{22}{37}x^{111}b^{2}a^{10}+\frac{6}{37}x^{74}ba^{11}+\frac{1}{37}x^{37}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^39 + a*x^2)^12*x^12,x, algorithm="fricas")
```

```
[Out] 1/481*x^481*b^12 + 1/37*x^444*b^11*a + 6/37*x^407*b^10*a^2 + 22/3
7*x^370*b^9*a^3 + 55/37*x^333*b^8*a^4 + 99/37*x^296*b^7*a^5 + 132
/37*x^259*b^6*a^6 + 132/37*x^222*b^5*a^7 + 99/37*x^185*b^4*a^8 +
55/37*x^148*b^3*a^9 + 22/37*x^111*b^2*a^10 + 6/37*x^74*b*a^11 + 1
/37*x^37*a^12
```

Sympy [A] time = 0.287439, size = 160, normalized size = 6.96

$$\frac{a^{12}x^{37}}{37}+\frac{6a^{11}bx^{74}}{37}+\frac{22a^{10}b^{2}x^{111}}{37}+\frac{55a^{9}b^{3}x^{148}}{37}+\frac{99a^{8}b^{4}x^{185}}{37}+\frac{132a^{7}b^{5}x^{222}}{37}+\frac{132a^{6}b^{6}x^{259}}{37}+\frac{99a^{5}b^{7}x^{296}}{37}+\frac{55a^{4}b^{8}x^{333}}{37}+\frac{22a^{3}b^{9}x^{370}}{37}+\frac{6a^{2}b^{10}x^{407}}{37}+\frac{ab^{11}x^{444}}{37}+\frac{b^{12}x^{481}}{481}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**12*(b*x**39+a*x**2)**12,x)
```

```
[Out] a**12*x**37/37 + 6*a**11*b*x**74/37 + 22*a**10*b**2*x**111/37 + 5
5*a**9*b**3*x**148/37 + 99*a**8*b**4*x**185/37 + 132*a**7*b**5*x*
*222/37 + 132*a**6*b**6*x**259/37 + 99*a**5*b**7*x**296/37 + 55*a
**4*b**8*x**333/37 + 22*a**3*b**9*x**370/37 + 6*a**2*b**10*x**407
/37 + a*b**11*x**444/37 + b**12*x**481/481
```

GIAC/XCAS [A] time = 0.218071, size = 181, normalized size = 7.87

$$\frac{1}{481}b^{12}x^{481}+\frac{1}{37}ab^{11}x^{444}+\frac{6}{37}a^2b^{10}x^{407}+\frac{22}{37}a^3b^9x^{370}+\frac{55}{37}a^4b^8x^{333}+\frac{99}{37}a^5b^7x^{296}+\frac{132}{37}a^6b^6x^{259}+\frac{132}{37}a^7b^5x^{222}+\frac{99}{37}a^8b^4x^{185}+\frac{55}{37}a^9b^3x^{148}+\frac{22}{37}a^{10}b^2x^{111}+\frac{6}{37}a^{11}bx^{74}+\frac{1}{37}a^{12}x^{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^39 + a*x^2)^12*x^12,x, algorithm="giac")
```

```
[Out] 1/481*b^12*x^481 + 1/37*a*b^11*x^444 + 6/37*a^2*b^10*x^407 + 22/3
7*a^3*b^9*x^370 + 55/37*a^4*b^8*x^333 + 99/37*a^5*b^7*x^296 + 132
/37*a^6*b^6*x^259 + 132/37*a^7*b^5*x^222 + 99/37*a^8*b^4*x^185 +
55/37*a^9*b^3*x^148 + 22/37*a^10*b^2*x^111 + 6/37*a^11*b*x^74 + 1
/37*a^12*x^37
```

3.352 $\int x^{24}\left(a+bx^{25}\right)^{12}\,dx$

Optimal. Leaf size=16

$$\frac{\left(a+bx^{25}\right)^{13}}{325b}$$

```
[Out] (a + b*x^25)^13/(325*b)
```

Rubi [A] time = 0.0110481, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{\left(a+bx^{25}\right)^{13}}{325b}$$

Antiderivative was successfully verified.

```
[In] Int[x^24*(a + b*x^25)^12,x]
```

```
[Out] (a + b*x^25)^13/(325*b)
```

Rubi in Sympy [A] time = 2.12218, size = 10, normalized size = 0.62

$$\frac{\left(a+bx^{25}\right)^{13}}{325b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**24*(b*x**25+a)**12,x)
```

```
[Out] (a + b*x**25)**13/(325*b)
```

Mathematica [B] time = 0.00725849, size = 160, normalized size = 10.

$$\frac{a^{12}x^{25}}{25}+\frac{6}{25}a^{11}bx^{50}+\frac{22}{25}a^{10}b^2x^{75}+\frac{11}{5}a^9b^3x^{100}+\frac{99}{25}a^8b^4x^{125}+\frac{132}{25}a^7b^5x^{150}+\frac{132}{25}a^6b^6x^{175}+\frac{99}{25}a^5b^7x^{200}+\frac{11}{5}a^4b^8x^{225}+\frac{22}{25}a^3b^9x^{250}+\frac{6}{25}a^2b^{10}x^{275}+\frac{1}{25}ab^{11}x^{300}+\frac{b^{12}x^{325}}{325}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^24*(a + b*x^25)^12,x]
```

```
[Out] (a^12*x^25)/25 + (6*a^11*b*x^50)/25 + (22*a^10*b^2*x^75)/25 + (11
*a^9*b^3*x^100)/5 + (99*a^8*b^4*x^125)/25 + (132*a^7*b^5*x^150)/2
5 + (132*a^6*b^6*x^175)/25 + (99*a^5*b^7*x^200)/25 + (11*a^4*b^8*
x^225)/5 + (22*a^3*b^9*x^250)/25 + (6*a^2*b^10*x^275)/25 + (a*b^1
1*x^300)/25 + (b^12*x^325)/325
```

Maple [B] time = 0.003, size = 135, normalized size = 8.4

$$\frac{b^{12}x^{325}}{325}+\frac{ab^{11}x^{300}}{25}+\frac{6\,a^2b^{10}x^{275}}{25}+\frac{22\,a^3b^9x^{250}}{25}+\frac{11\,b^8a^4x^{225}}{5}+\frac{99\,a^5b^7x^{200}}{25}+\frac{132\,a^6b^6x^{175}}{25}+\frac{132\,a^7b^5x^{150}}{25}+\frac{99\,a^8b^4x^{125}}{25}+\frac{11\,a^9b^3x^{100}}{5}+\frac{22\,a^{10}b^2x^{75}}{25}+\frac{6\,a^{11}bx^{50}}{25}+\frac{a^{12}x^{25}}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^24*(b*x^25+a)^12,x)
```

```
[Out] 1/325*b^12*x^325+1/25*a*b^11*x^300+6/25*a^2*b^10*x^275+22/25*a^3*
b^9*x^250+11/5*b^8*a^4*x^225+99/25*a^5*b^7*x^200+132/25*a^6*b^6*x
^175+132/25*a^7*b^5*x^150+99/25*a^8*b^4*x^125+11/5*a^9*b^3*x^100+
22/25*a^10*b^2*x^75+6/25*a^11*b*x^50+1/25*a^12*x^25
```

Maxima [A] time = 1.38094, size = 19, normalized size = 1.19

$$\frac{\left(bx^{25}+a\right)^{13}}{325\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x^25 + a)^12*x^24,x, algorithm="maxima")
```

```
[Out] 1/325*(b*x^25 + a)^13/b
```

Fricas [A] time = 0.199255, size = 1, normalized size = 0.06

$$\frac{1}{325}x^{325}b^{12}+\frac{1}{25}x^{300}b^{11}a+\frac{6}{25}x^{275}b^{10}a^2+\frac{22}{25}x^{250}b^9a^3+\frac{11}{5}x^{225}b^8a^4+\frac{99}{25}x^{200}b^7a^5+\frac{132}{25}x^{175}b^6a^6+\frac{132}{25}x^{150}b^5a^7+\frac{99}{25}x^{125}b^4a^8+\frac{11}{5}x^{100}b^3a^9+\frac{22}{25}x^{75}b^2a^{10}+\frac{6}{25}x^{50}ba^{11}+\frac{1}{25}x^{25}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x^25 + a)^12*x^24,x, algorithm="fricas")
```

```
[Out] 1/325*x^325*b^12 + 1/25*x^300*b^11*a + 6/25*x^275*b^10*a^2 + 22/2
5*x^250*b^9*a^3 + 11/5*x^225*b^8*a^4 + 99/25*x^200*b^7*a^5 + 132/
25*x^175*b^6*a^6 + 132/25*x^150*b^5*a^7 + 99/25*x^125*b^4*a^8 + 1
1/5*x^100*b^3*a^9 + 22/25*x^75*b^2*a^10 + 6/25*x^50*b*a^11 + 1/25
*x^25*a^12
```

Sympy [A] time = 0.223979, size = 160, normalized size = 10.

$$\frac{a^{12}x^{25}}{25}+\frac{6a^{11}bx^{50}}{25}+\frac{22a^{10}b^2x^{75}}{25}+\frac{11a^9b^3x^{100}}{5}+\frac{99a^8b^4x^{125}}{25}+\frac{132a^7b^5x^{150}}{25}+\frac{132a^6b^6x^{175}}{25}+\frac{99a^5b^7x^{200}}{25}+\frac{11a^4b^8x^{225}}{5}+\frac{22a^3b^9x^{250}}{25}+\frac{6a^2b^{10}x^{275}}{25}+\frac{ab^{11}x^{300}}{25}+\frac{b^{12}x^{325}}{325}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**24*(b*x**25+a)**12,x)
```

```
[Out] a**12*x**25/25 + 6*a**11*b*x**50/25 + 22*a**10*b**2*x**75/25 + 11
*a**9*b**3*x**100/5 + 99*a**8*b**4*x**125/25 + 132*a**7*b**5*x**1
50/25 + 132*a**6*b**6*x**175/25 + 99*a**5*b**7*x**200/25 + 11*a**
4*b**8*x**225/5 + 22*a**3*b**9*x**250/25 + 6*a**2*b**10*x**275/25
 + a*b**11*x**300/25 + b**12*x**325/325
```

GIAC/XCAS [A] time = 0.217776, size = 19, normalized size = 1.19

$$\frac{\left(bx^{25}+a\right)^{13}}{325\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^25 + a)^12*x^24,x, algorithm="giac")
```

```
[Out] 1/325*(b*x^25 + a)^13/b
```

3.353 $\int x^{24} \left(ax + bx^{38}\right)^{12} \, dx$

Optimal. Leaf size=21

$$\frac{\left(ax + bx^{38}\right)^{13}}{481bx^{13}}$$

```
[Out] (a*x + b*x^38)^13/(481*b*x^13)
```

Rubi [A] time = 0.0123021, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067

$$\frac{\left(ax + bx^{38}\right)^{13}}{481bx^{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[x^24*(a*x + b*x^38)^12,x]
```

```
[Out] (a*x + b*x^38)^13/(481*b*x^13)
```

Rubi in Sympy [A] time = 3.29027, size = 10, normalized size = 0.48

$$\frac{\left(a + bx^{37}\right)^{13}}{481b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**24*(b*x**38+a*x)**12,x)
```

```
[Out] (a + b*x**37)**13/(481*b)
```

Mathematica [B] time = 0.0103694, size = 160, normalized size = 7.62

$$\frac{a^{12}x^{37}}{37} + \frac{6}{37}a^{11}bx^{74} + \frac{22}{37}a^{10}b^2x^{111} + \frac{55}{37}a^9b^3x^{148} + \frac{99}{37}a^8b^4x^{185} + \frac{132}{37}a^7b^5x^{222} + \frac{132}{37}a^6b^6x^{259} + \frac{99}{37}a^5b^7x^{296} + \frac{55}{37}a^4b^8x^{333} + \frac{22}{37}a^3b^9x^{370} + \frac{6}{37}a^2b^{10}x^{407} + \frac{1}{37}ab^{11}x^{444} + \frac{b^{12}x^{481}}{481}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^24*(a*x + b*x^38)^12,x]
```

```
[Out] (a^12*x^37)/37 + (6*a^11*b*x^74)/37 + (22*a^10*b^2*x^111)/37 + (5
5*a^9*b^3*x^148)/37 + (99*a^8*b^4*x^185)/37 + (132*a^7*b^5*x^222)
/37 + (132*a^6*b^6*x^259)/37 + (99*a^5*b^7*x^296)/37 + (55*a^4*b^
8*x^333)/37 + (22*a^3*b^9*x^370)/37 + (6*a^2*b^10*x^407)/37 + (a*
b^11*x^444)/37 + (b^12*x^481)/481
```

Maple [B] time = 0., size = 135, normalized size = 6.4

$$\frac{b^{12}x^{481}}{481} + \frac{ab^{11}x^{444}}{37} + \frac{6\,a^2b^{10}x^{407}}{37} + \frac{22\,a^3b^9x^{370}}{37} + \frac{55\,b^8a^4x^{333}}{37} + \frac{99\,a^5b^7x^{296}}{37} + \frac{132\,a^6b^6x^{259}}{37} + \frac{132\,a^7b^5x^{222}}{37} + \frac{99\,a^8b^4x^{185}}{37} + \frac{55\,a^9b^3x^{148}}{37} + \frac{22\,a^{10}b^2x^{111}}{37} + \frac{6\,a^{11}bx^{74}}{37} + \frac{a^{12}x^{37}}{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^24*(b*x^38+a*x)^12,x)
```

```
[Out] 1/481*b^12*x^481+1/37*a*b^11*x^444+6/37*a^2*b^10*x^407+22/37*a^3*
b^9*x^370+55/37*b^8*a^4*x^333+99/37*a^5*b^7*x^296+132/37*a^6*b^6*
x^259+132/37*a^7*b^5*x^222+99/37*a^8*b^4*x^185+55/37*a^9*b^3*x^14
8+22/37*a^10*b^2*x^111+6/37*a^11*b*x^74+1/37*a^12*x^37
```

Maxima [A] time = 1.3749, size = 181, normalized size = 8.62

$$\frac{1}{481}\,b^{12}x^{481}+\frac{1}{37}\,ab^{11}x^{444}+\frac{6}{37}\,a^{2}b^{10}x^{407}+\frac{22}{37}\,a^{3}b^{9}x^{370}+\frac{55}{37}\,a^{4}b^{8}x^{333}+\frac{99}{37}\,a^{5}b^{7}x^{296}+\frac{132}{37}\,a^{6}b^{6}x^{259}+\frac{132}{37}\,a^{7}b^{5}x^{222}+\frac{99}{37}\,a^{8}b^{4}x^{185}+\frac{55}{37}\,a^{9}b^{3}x^{148}+\frac{22}{37}\,a^{10}b^{2}x^{111}+\frac{6}{37}\,a^{11}bx^{74}+\frac{1}{37}\,a^{12}x^{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^38 + a*x)^12*x^24,x, algorithm="maxima")
```

```
[Out] 1/481*b^12*x^481 + 1/37*a*b^11*x^444 + 6/37*a^2*b^10*x^407 + 22/3
7*a^3*b^9*x^370 + 55/37*a^4*b^8*x^333 + 99/37*a^5*b^7*x^296 + 132
/37*a^6*b^6*x^259 + 132/37*a^7*b^5*x^222 + 99/37*a^8*b^4*x^185 +
55/37*a^9*b^3*x^148 + 22/37*a^10*b^2*x^111 + 6/37*a^11*b*x^74 + 1
/37*a^12*x^37
```

Fricas [A] time = 0.199328, size = 1, normalized size = 0.05

$$\frac{1}{481}x^{481}b^{12}+\frac{1}{37}x^{444}b^{11}a+\frac{6}{37}x^{407}b^{10}a^{2}+\frac{22}{37}x^{370}b^{9}a^{3}+\frac{55}{37}x^{333}b^{8}a^{4}+\frac{99}{37}x^{296}b^{7}a^{5}+\frac{132}{37}x^{259}b^{6}a^{6}+\frac{132}{37}x^{222}b^{5}a^{7}+\frac{99}{37}x^{185}b^{4}a^{8}+\frac{55}{37}x^{148}b^{3}a^{9}+\frac{22}{37}x^{111}b^{2}a^{10}+\frac{6}{37}x^{74}ba^{11}+\frac{1}{37}x^{37}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^38 + a*x)^12*x^24,x, algorithm="fricas")
```

```
[Out] 1/481*x^481*b^12 + 1/37*x^444*b^11*a + 6/37*x^407*b^10*a^2 + 22/3
7*x^370*b^9*a^3 + 55/37*x^333*b^8*a^4 + 99/37*x^296*b^7*a^5 + 132
/37*x^259*b^6*a^6 + 132/37*x^222*b^5*a^7 + 99/37*x^185*b^4*a^8 +
55/37*x^148*b^3*a^9 + 22/37*x^111*b^2*a^10 + 6/37*x^74*b*a^11 + 1
/37*x^37*a^12
```

Sympy [A] time = 0.287666, size = 160, normalized size = 7.62

$$\frac{a^{12}x^{37}}{37}+\frac{6a^{11}bx^{74}}{37}+\frac{22a^{10}b^{2}x^{111}}{37}+\frac{55a^{9}b^{3}x^{148}}{37}+\frac{99a^{8}b^{4}x^{185}}{37}+\frac{132a^{7}b^{5}x^{222}}{37}+\frac{132a^{6}b^{6}x^{259}}{37}+\frac{99a^{5}b^{7}x^{296}}{37}+\frac{55a^{4}b^{8}x^{333}}{37}+\frac{22a^{3}b^{9}x^{370}}{37}+\frac{6a^{2}b^{10}x^{407}}{37}+\frac{ab^{11}x^{444}}{37}+\frac{b^{12}x^{481}}{481}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**24*(b*x**38+a*x)**12,x)
```

```
[Out] a**12*x**37/37 + 6*a**11*b*x**74/37 + 22*a**10*b**2*x**111/37 + 5
5*a**9*b**3*x**148/37 + 99*a**8*b**4*x**185/37 + 132*a**7*b**5*x*
*222/37 + 132*a**6*b**6*x**259/37 + 99*a**5*b**7*x**296/37 + 55*a
**4*b**8*x**333/37 + 22*a**3*b**9*x**370/37 + 6*a**2*b**10*x**407
/37 + a*b**11*x**444/37 + b**12*x**481/481
```

GIAC/XCAS [A] time = 0.221089, size = 181, normalized size = 8.62

$$\frac{1}{481}\,b^{12}x^{481}+\frac{1}{37}\,ab^{11}x^{444}+\frac{6}{37}\,a^{2}b^{10}x^{407}+\frac{22}{37}\,a^{3}b^{9}x^{370}+\frac{55}{37}\,a^{4}b^{8}x^{333}+\frac{99}{37}\,a^{5}b^{7}x^{296}+\frac{132}{37}\,a^{6}b^{6}x^{259}+\frac{132}{37}\,a^{7}b^{5}x^{222}+\frac{99}{37}\,a^{8}b^{4}x^{185}+\frac{55}{37}\,a^{9}b^{3}x^{148}+\frac{22}{37}\,a^{10}b^{2}x^{111}+\frac{6}{37}\,a^{11}bx^{74}+\frac{1}{37}\,a^{12}x^{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^38 + a*x)^12*x^24,x, algorithm="giac")
```

```
[Out] 1/481*b^12*x^481 + 1/37*a*b^11*x^444 + 6/37*a^2*b^10*x^407 + 22/3
7*a^3*b^9*x^370 + 55/37*a^4*b^8*x^333 + 99/37*a^5*b^7*x^296 + 132
/37*a^6*b^6*x^259 + 132/37*a^7*b^5*x^222 + 99/37*a^8*b^4*x^185 +
55/37*a^9*b^3*x^148 + 22/37*a^10*b^2*x^111 + 6/37*a^11*b*x^74 + 1
/37*a^12*x^37
```

3.354 $\int x^{36} \left(a+b x^{37}\right)^{12} \, dx$

Optimal. Leaf size=16

$$\frac{\left(a+b x^{37}\right)^{13}}{481 b}$$

```
[Out] (a + b*x^37)^13/(481*b)
```

Rubi [A] time = 0.0136156, antiderivative size = 16, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077

$$\frac{\left(a+b x^{37}\right)^{13}}{481 b}$$

Antiderivative was successfully verified.

```
[In]  Int[x^36*(a + b*x^37)^12,x]

[Out] (a + b*x^37)^13/(481*b)
```

Rubi in Sympy [A] time = 2.12093, size = 10, normalized size = 0.62

$$\frac{\left(a+b x^{37}\right)^{13}}{481 b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**36*(b*x**37+a)**12,x)

[Out] (a + b*x**37)**13/(481*b)
```

Mathematica [B] time = 0.0090232, size = 160, normalized size = 10.

$$\frac{a^{12} x^{37}}{37}+\frac{6}{37} a^{11} b x^{74}+\frac{22}{37} a^{10} b^2 x^{111}+\frac{55}{37} a^9 b^3 x^{148}+\frac{99}{37} a^8 b^4 x^{185}+\frac{132}{37} a^7 b^5 x^{222}+\frac{132}{37} a^6 b^6 x^{259}+\frac{99}{37} a^5 b^7 x^{296}+\frac{55}{37} a^4 b^8 x^{333}+\frac{22}{37} a^3 b^9 x^{370}+\frac{6}{37} a^2 b^{10} x^{407}+\frac{1}{37} a b^{11} x^{444}+\frac{b^{12} x^{481}}{481}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^36*(a + b*x^37)^12,x]

[Out] (a^12*x^37)/37 + (6*a^11*b*x^74)/37 + (22*a^10*b^2*x^111)/37 + (5
5*a^9*b^3*x^148)/37 + (99*a^8*b^4*x^185)/37 + (132*a^7*b^5*x^222)
/37 + (132*a^6*b^6*x^259)/37 + (99*a^5*b^7*x^296)/37 + (55*a^4*b^
8*x^333)/37 + (22*a^3*b^9*x^370)/37 + (6*a^2*b^10*x^407)/37 + (a*
b^11*x^444)/37 + (b^12*x^481)/481
```

Maple [B] time = 0.001, size = 135, normalized size = 8.4

$$\frac{b^{12} x^{481}}{481}+\frac{a b^{11} x^{444}}{37}+\frac{6 a^2 b^{10} x^{407}}{37}+\frac{22 a^3 b^9 x^{370}}{37}+\frac{55 b^8 a^4 x^{333}}{37}+\frac{99 a^5 b^7 x^{296}}{37}+\frac{132 a^6 b^6 x^{259}}{37}+\frac{132 a^7 b^5 x^{222}}{37}+\frac{99 a^8 b^4 x^{185}}{37}+\frac{55 a^9 b^3 x^{148}}{37}+\frac{22 a^{10} b^2 x^{111}}{37}+\frac{6 a^{11} b x^{74}}{37}+\frac{a^{12} x^{37}}{37}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(x^36*(b*x^37+a)^12,x)
```

```
[Out] 1/481*b^12*x^481+1/37*a*b^11*x^444+6/37*a^2*b^10*x^407+22/37*a^3*
b^9*x^370+55/37*b^8*a^4*x^333+99/37*a^5*b^7*x^296+132/37*a^6*b^6*
x^259+132/37*a^7*b^5*x^222+99/37*a^8*b^4*x^185+55/37*a^9*b^3*x^14
8+22/37*a^10*b^2*x^111+6/37*a^11*b*x^74+1/37*a^12*x^37
```

Maxima [A] time = 1.3753, size = 19, normalized size = 1.19

$$\frac{\left(bx^{37} + a\right)^{13}}{481\, b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x^37 + a)^12*x^36,x, algorithm="maxima")
```

```
[Out] 1/481*(b*x^37 + a)^13/b
```

Fricas [A] time = 0.195028, size = 1, normalized size = 0.06

$$\frac{1}{481}x^{481}b^{12} + \frac{1}{37}x^{444}b^{11}a + \frac{6}{37}x^{407}b^{10}a^2 + \frac{22}{37}x^{370}b^9a^3 + \frac{55}{37}x^{333}b^8a^4 + \frac{99}{37}x^{296}b^7a^5 + \frac{132}{37}x^{259}b^6a^6 + \frac{132}{37}x^{222}b^5a^7 + \frac{99}{37}x^{185}b^4a^8 + \frac{55}{37}x^{148}b^3a^9 + \frac{22}{37}x^{111}b^2a^{10} + \frac{6}{37}x^{74}ba^{11} + \frac{1}{37}x^{37}a^{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate((b*x^37 + a)^12*x^36,x, algorithm="fricas")
```

```
[Out] 1/481*x^481*b^12 + 1/37*x^444*b^11*a + 6/37*x^407*b^10*a^2 + 22/3
7*x^370*b^9*a^3 + 55/37*x^333*b^8*a^4 + 99/37*x^296*b^7*a^5 + 132
/37*x^259*b^6*a^6 + 132/37*x^222*b^5*a^7 + 99/37*x^185*b^4*a^8 +
55/37*x^148*b^3*a^9 + 22/37*x^111*b^2*a^10 + 6/37*x^74*b*a^11 + 1
/37*x^37*a^12
```

Sympy [A] time = 0.240704, size = 160, normalized size = 10.

$$\frac{a^{12}x^{37}}{37} + \frac{6a^{11}bx^{74}}{37} + \frac{22a^{10}b^2x^{111}}{37} + \frac{55a^9b^3x^{148}}{37} + \frac{99a^8b^4x^{185}}{37} + \frac{132a^7b^5x^{222}}{37} + \frac{132a^6b^6x^{259}}{37} + \frac{99a^5b^7x^{296}}{37} + \frac{55a^4b^8x^{333}}{37} + \frac{22a^3b^9x^{370}}{37} + \frac{6a^2b^{10}x^{407}}{37} + \frac{ab^{11}x^{444}}{37} + \frac{b^{12}x^{481}}{481}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(x**36*(b*x**37+a)**12,x)
```

```
[Out] a**12*x**37/37 + 6*a**11*b*x**74/37 + 22*a**10*b**2*x**111/37 + 5
5*a**9*b**3*x**148/37 + 99*a**8*b**4*x**185/37 + 132*a**7*b**5*x*
*222/37 + 132*a**6*b**6*x**259/37 + 99*a**5*b**7*x**296/37 + 55*a
**4*b**8*x**333/37 + 22*a**3*b**9*x**370/37 + 6*a**2*b**10*x**407
/37 + a*b**11*x**444/37 + b**12*x**481/481
```

GIAC/XCAS [A] time = 0.218338, size = 19, normalized size = 1.19

$$\frac{\left(bx^{37} + a\right)^{13}}{481\, b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^37 + a)^12*x^36,x, algorithm="giac")
```

```
[Out] 1/481*(b*x^37 + a)^13/b
```

3.355 $\int \frac{1}{ax+bx^n} \, dx$

Optimal. Leaf size=23

$$\frac{\log \left(ax^{1-n}+b\right)}{a(1-n)}$$

```
[Out] Log[b + a*x^(1 - n)]/(a*(1 - n))
```

Rubi [A] time = 0.0295978, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{\log \left(ax^{1-n}+b\right)}{a(1-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^n)^(-1),x]

[Out] Log[b + a*x^(1 - n)]/(a*(1 - n))
```

Rubi in Sympy [A] time = 3.40921, size = 14, normalized size = 0.61

$$\frac{\log \left(ax^{-n+1}+b\right)}{a\left(-n+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x+b*x**n),x)

[Out] log(a*x**(-n + 1) + b)/(a*(-n + 1))
```

Mathematica [A] time = 0.0257836, size = 26, normalized size = 1.13

$$\frac{n\log(x)-\log\left(ax+bx^n\right)}{a(n-1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^n)^(-1),x]

[Out] (n*Log[x] - Log[a*x + b*x^n])/(a*(-1 + n))
```

Maple [A] time = 0.016, size = 36, normalized size = 1.6

$$\frac{n\ln\left(x\right)}{a\left(-1+n\right)}-\frac{\ln\left(ax+be^{n\ln(x)}\right)}{a\left(-1+n\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x+b*x^n),x)
```

```
[Out] n/a/(-1+n)*ln(x)-1/a/(-1+n)*ln(a*x+b*exp(n*ln(x)))
```

Maxima [A] time = 1.37839, size = 50, normalized size = 2.17

$$\frac{n \log(x)}{a(n-1)} - \frac{\log\left(\frac{ax+bx^n}{b}\right)}{a(n-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^n),x, algorithm="maxima")
```

```
[Out] n*log(x)/(a*(n - 1)) - log((a*x + b*x^n)/b)/(a*(n - 1))
```

Fricas [A] time = 0.240729, size = 36, normalized size = 1.57

$$\frac{n \log(x) - \log(ax+bx^n)}{an-a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^n),x, algorithm="fricas")
```

```
[Out] (n*log(x) - log(a*x + b*x^n))/(a*n - a)
```

Sympy [A] time = 2.04241, size = 48, normalized size = 2.09

$$\begin{cases} \frac{\log(x)}{b} & \text{for } a = 0 \wedge n = 1 \\ -\frac{x}{b(nx^n - x^n)} & \text{for } a = 0 \\ \frac{\log(x)}{a+b} & \text{for } n = 1 \\ \frac{n\log(x)}{an-a} - \frac{\log\left(x + \frac{bx^n}{a}\right)}{an-a} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x+b*x**n),x)
```

```
[Out] Piecewise((log(x)/b, Eq(a, 0) & Eq(n, 1)), (-x/(b*(n*x**n - x**n)
), Eq(a, 0)), (log(x)/(a + b), Eq(n, 1)), (n*log(x)/(a*n - a) - l
og(x + b*x**n/a)/(a*n - a), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{ax+bx^n}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^n),x, algorithm="giac")
```

```
[Out] integrate(1/(a*x + b*x^n), x)
```

3.356 $\int \frac{1}{ax+bx^{1+n}}\,dx$

Optimal. Leaf size=23

$$\frac{\log(x)}{a}-\frac{\log(a+bx^n)}{an}$$

```
[Out] Log[x]/a - Log[a + b*x^n]/(a*n)
```

Rubi [A] time = 0.0350525, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385

$$\frac{\log(x)}{a}-\frac{\log(a+bx^n)}{an}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^(1 + n))^(-1),x]

[Out] Log[x]/a - Log[a + b*x^n]/(a*n)
```

Rubi in Sympy [A] time = 7.07436, size = 19, normalized size = 0.83

$$\frac{\log(x^n)}{an}-\frac{\log(a+bx^n)}{an}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x+b*x**(1+n)),x)

[Out] log(x**n)/(a*n) - log(a + b*x**n)/(a*n)
```

Mathematica [A] time = 0.0150715, size = 22, normalized size = 0.96

$$\frac{n\log(x)-\log(a+bx^n)}{an}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^(1 + n))^(-1),x]

[Out] (n*Log[x] - Log[a + b*x^n])/(a*n)
```

Maple [A] time = 0.019, size = 39, normalized size = 1.7

$$\frac{\ln(x)}{an}+\frac{\ln(x)}{a}-\frac{\ln\left(ax+be^{(1+n)\ln(x)}\right)}{an}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x+b*x^(1+n)),x)

[Out] 1/a/n*ln(x)+ln(x)/a-1/a/n*ln(a*x+b*exp((1+n)*ln(x)))
```

Maxima [A] time = 1.3774, size = 36, normalized size = 1.57

$$\frac{\log(x)}{a} - \frac{\log\left(\frac{bx^n+a}{b}\right)}{an}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^(n + 1)),x, algorithm="maxima")
```

```
[Out] log(x)/a - log((b*x^n + a)/b)/(a*n)
```

Fricas [A] time = 0.240313, size = 38, normalized size = 1.65

$$\frac{(n+1)\log(x) - \log\left(ax + bx^{n+1}\right)}{an}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^(n + 1)),x, algorithm="fricas")
```

```
[Out] ((n + 1)*log(x) - log(a*x + b*x^(n + 1)))/(a*n)
```

Sympy [A] time = 5.43167, size = 41, normalized size = 1.78

$$\begin{cases} \tilde{\infty}\log(x) & \text{for } a = 0 \wedge b = 0 \wedge n = 0 \\ \frac{\log(x)}{a+b} & \text{for } n = 0 \\ -\frac{x^{-n}}{bn} & \text{for } a = 0 \\ \frac{\log(x)}{a} & \text{for } b = 0 \\ \frac{\log(x)}{a} - \frac{\log\left(\frac{a}{b}+x^n\right)}{an} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x+b*x**(1+n)),x)
```

```
[Out] Piecewise((zoo*log(x), Eq(a, 0) & Eq(b, 0) & Eq(n, 0)), (log(x)/(
a + b), Eq(n, 0)), (-x**(-n)/(b*n), Eq(a, 0)), (log(x)/a, Eq(b, 0
)), (log(x)/a - log(a/b + x**n)/(a*n), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{ax + bx^{n+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^(n + 1)),x, algorithm="giac")
```

```
[Out] integrate(1/(a*x + b*x^(n + 1)), x)
```

3.357 $\int \frac{1}{ax+bx^{1-n}}\,dx$

Optimal. Leaf size=15

$$\frac{\log(ax^n+b)}{an}$$

```
[Out] Log[b + a*x^n]/(a*n)
```

Rubi [A] time = 0.0200165, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{\log(ax^n+b)}{an}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^(1 - n))^(-1),x]

[Out] Log[b + a*x^n]/(a*n)
```

Rubi in Sympy [A] time = 2.99698, size = 10, normalized size = 0.67

$$\frac{\log(ax^n+b)}{an}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x+b*x**(1-n)),x)

[Out] log(a*x**n + b)/(a*n)
```

Mathematica [A] time = 0.00693275, size = 15, normalized size = 1.

$$\frac{\log(ax^n+b)}{an}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^(1 - n))^(-1),x]

[Out] Log[b + a*x^n]/(a*n)
```

Maple [B] time = 0.018, size = 41, normalized size = 2.7

$$-\frac{\ln(x)}{an}+\frac{\ln(x)}{a}+\frac{\ln\left(ax+b\mathrm{e}^{(1-n)\ln(x)}\right)}{an}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x+b*x^(1-n)),x)

[Out] -1/a/n*ln(x)+ln(x)/a+1/a/n*ln(a*x+b*exp((1-n)*ln(x)))
```

Maxima [A] time = 1.38654, size = 26, normalized size = 1.73

$$\frac{\log\left(\frac{ax^n+b}{a}\right)}{an}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^(-n + 1)),x, algorithm="maxima")
```

```
[Out] log((a*x^n + b)/a)/(a*n)
```

Fricas [A] time = 0.237165, size = 38, normalized size = 2.53

$$\frac{(n-1)\log(x) + \log\left(ax + bx^{-n+1}\right)}{an}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^(-n + 1)),x, algorithm="fricas")
```

```
[Out] ((n - 1)*log(x) + log(a*x + b*x^(-n + 1)))/(a*n)
```

Sympy [A] time = 5.52288, size = 39, normalized size = 2.6

$$\begin{cases} \tilde{\infty}\log(x) & \text{for } a = 0 \wedge b = 0 \wedge n = 0 \\ \frac{\log(x)}{a+b} & \text{for } n = 0 \\ \frac{x^n}{bn} & \text{for } a = 0 \\ \frac{\log(x)}{a} & \text{for } b = 0 \\ \frac{\log(x)}{a} + \frac{\log\left(\frac{a}{b}+x^{-n}\right)}{an} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x+b*x**(1-n)),x)
```

```
[Out] Piecewise((zoo*log(x), Eq(a, 0) & Eq(b, 0) & Eq(n, 0)), (log(x)/(
a + b), Eq(n, 0)), (x**n/(b*n), Eq(a, 0)), (log(x)/a, Eq(b, 0)),
(log(x)/a + log(a/b + x**(-n))/(a*n), True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{ax + bx^{-n+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x + b*x^(-n + 1)),x, algorithm="giac")
```

```
[Out] integrate(1/(a*x + b*x^(-n + 1)), x)
```

3.358 $\int \frac{1}{2x+3x^{1+n}}\,dx$

Optimal. Leaf size=22

$$\frac{\log(x)}{2} - \frac{\log(3x^n+2)}{2n}$$

```
[Out] Log[x]/2 - Log[2 + 3*x^n]/(2*n)
```

Rubi [A] time = 0.0260473, antiderivative size = 22, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385

$$\frac{\log(x)}{2} - \frac{\log(3x^n+2)}{2n}$$

Antiderivative was successfully verified.

```
[In]  Int[(2*x + 3*x^(1 + n))^(-1),x]

[Out] Log[x]/2 - Log[2 + 3*x^n]/(2*n)
```

Rubi in Sympy [A] time = 5.13649, size = 19, normalized size = 0.86

$$\frac{\log(x^n)}{2n} - \frac{\log(3x^n+2)}{2n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(2*x+3*x**(1+n)),x)

[Out] log(x**n)/(2*n) - log(3*x**n + 2)/(2*n)
```

Mathematica [A] time = 0.0119581, size = 22, normalized size = 1.

$$\frac{n\log(x) - \log(3x^n+2)}{2n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2*x + 3*x^(1 + n))^(-1),x]

[Out] (n*Log[x] - Log[2 + 3*x^n])/(2*n)
```

Maple [A] time = 0.019, size = 32, normalized size = 1.5

$$\frac{\ln(x)}{2\,n} + \frac{\ln(x)}{2} - \frac{\ln\left(2\,x + 3\,e^{(1+n)\ln(x)}\right)}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(2*x+3*x^(1+n)),x)

[Out] 1/2/n*ln(x)+1/2*ln(x)-1/2/n*ln(2*x+3*exp((1+n)*ln(x)))
```

Maxima [A] time = 1.37611, size = 22, normalized size = 1.

$$-\frac{\log\left(x^n+\frac{2}{3}\right)}{2\,n}+\frac{1}{2}\,\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(3*x^(n + 1) + 2*x),x, algorithm="maxima")

[Out] -1/2*log(x^n + 2/3)/n + 1/2*log(x)
```

Fricas [A] time = 0.235839, size = 35, normalized size = 1.59

$$\frac{(n+1)\log\left(x\right)-\log\left(3\,x^{n+1}+2\,x\right)}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(3*x^(n + 1) + 2*x),x, algorithm="fricas")

[Out] 1/2*((n + 1)*log(x) - log(3*x^(n + 1) + 2*x))/n
```

Sympy [A] time = 4.99145, size = 20, normalized size = 0.91

$$\begin{cases}\frac{\log\left(x\right)}{2}-\frac{\log\left(x^n+\frac{2}{3}\right)}{2n} & \text{for } n\neq 0\\ \frac{\log\left(x\right)}{5} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(2*x+3*x**(1+n)),x)

[Out] Piecewise((log(x)/2 - log(x**n + 2/3)/(2*n), Ne(n, 0)), (log(x)/5
, True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{3\,x^{n+1}+2\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(3*x^(n + 1) + 2*x),x, algorithm="giac")

[Out] integrate(1/(3*x^(n + 1) + 2*x), x)
```

3.359 $\int \frac{1}{2x+3x^{1-n}}\,dx$

Optimal. Leaf size=15

$$\frac{\log(2x^n+3)}{2n}$$

```
[Out] Log[3 + 2*x^n]/(2*n)
```

Rubi [A] time = 0.0153048, antiderivative size = 15, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.133$

$$\frac{\log(2x^n+3)}{2n}$$

Antiderivative was successfully verified.

```
[In]  Int[(2*x + 3*x^(1 - n))^(-1),x]

[Out] Log[3 + 2*x^n]/(2*n)
```

Rubi in Sympy [A] time = 2.72339, size = 10, normalized size = 0.67

$$\frac{\log(2x^n+3)}{2n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(2*x+3*x**(1-n)),x)

[Out] log(2*x**n + 3)/(2*n)
```

Mathematica [A] time = 0.00513285, size = 15, normalized size = 1.

$$\frac{\log(2x^n+3)}{2n}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2*x + 3*x^(1 - n))^(-1),x]

[Out] Log[3 + 2*x^n]/(2*n)
```

Maple [B] time = 0.016, size = 34, normalized size = 2.3

$$-\frac{\ln(x)}{2\,n}+\frac{\ln(x)}{2}+\frac{\ln\left(2\,x+3\,e^{(1-n)\ln(x)}\right)}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(2*x+3*x^(1-n)),x)

[Out] -1/2/n*ln(x)+1/2*ln(x)+1/2/n*ln(2*x+3*exp((1-n)*ln(x)))
```

Maxima [A] time = 1.37878, size = 15, normalized size = 1.

$$\frac{\log\left(x^n + \frac{3}{2}\right)}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(3*x^(-n + 1) + 2*x),x, algorithm="maxima")
```

```
[Out] 1/2*log(x^n + 3/2)/n
```

Fricas [A] time = 0.23396, size = 35, normalized size = 2.33

$$\frac{(n-1)\log\left(x\right) + \log\left(3\,x^{-n+1} + 2\,x\right)}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(3*x^(-n + 1) + 2*x),x, algorithm="fricas")
```

```
[Out] 1/2*((n - 1)*log(x) + log(3*x^(-n + 1) + 2*x))/n
```

Sympy [A] time = 5.03032, size = 22, normalized size = 1.47

$$\begin{cases} \frac{\log\left(x\right)}{2} + \frac{\log\left(\frac{2}{3} + x^{-n}\right)}{2n} & \text{for}\: n \neq 0 \\ \frac{\log\left(x\right)}{5} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(2*x+3*x**(1-n)),x)
```

```
[Out] Piecewise((log(x)/2 + log(2/3 + x**(-n))/(2*n), Ne(n, 0)), (log(x
)/5, True))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{3\,x^{-n+1} + 2\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(3*x^(-n + 1) + 2*x),x, algorithm="giac")
```

```
[Out] integrate(1/(3*x^(-n + 1) + 2*x), x)
```

3.360 $\int \frac{1}{-\sqrt{x}+x}\,dx$

Optimal. Leaf size=12

$$2\log\left(1-\sqrt{x}\right)$$

```
[Out] 2*Log[1 - Sqrt[x]]
```

Rubi [A] time = 0.0103588, antiderivative size = 12, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$2\log\left(1-\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(-Sqrt[x] + x)^(-1),x]
```

```
[Out] 2*Log[1 - Sqrt[x]]
```

Rubi in Sympy [A] time = 1.94399, size = 8, normalized size = 0.67

$$2\log\left(-\sqrt{x}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/(x-x**(1/2)),x)
```

```
[Out] 2*log(-sqrt(x) + 1)
```

Mathematica [A] time = 0.00661213, size = 12, normalized size = 1.

$$2\log\left(1-\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(-Sqrt[x] + x)^(-1),x]
```

```
[Out] 2*Log[1 - Sqrt[x]]
```

Maple [A] time = 0.006, size = 12, normalized size = 1.

$$\ln(-1+x)-2\,\mathrm{Artanh}\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x-x^(1/2)),x)
```

```
[Out] ln(-1+x)-2*arctanh(x^(1/2))
```

Maxima [A] time = 1.37828, size = 11, normalized size = 0.92

$$2\log\left(\sqrt{x}-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x - sqrt(x)),x, algorithm="maxima")
```

```
[Out] 2*log(sqrt(x) - 1)
```

Fricas [A] time = 0.222104, size = 11, normalized size = 0.92

$$2\log\left(\sqrt{x}-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x - sqrt(x)),x, algorithm="fricas")
```

```
[Out] 2*log(sqrt(x) - 1)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{-\sqrt{x}+x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x-x**(1/2)),x)
```

```
[Out] Integral(1/(-sqrt(x) + x), x)
```

GIAC/XCAS [A] time = 0.220904, size = 12, normalized size = 1.

$$2\ln\left(\left|\sqrt{x}-1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x - sqrt(x)),x, algorithm="giac")
```

```
[Out] 2*ln(abs(sqrt(x) - 1))
```

3.361 $\int \frac{1}{-x^{3/5}+x}\,dx$

Optimal. Leaf size=14

$$\frac{5}{2}\log\left(1-x^{2/5}\right)$$

```
[Out] (5*Log[1 - x^(2/5)])/2
```

Rubi [A] time = 0.0121645, antiderivative size = 14, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{5}{2}\log\left(1-x^{2/5}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(-x^(3/5) + x)^(-1),x]

[Out] (5*Log[1 - x^(2/5)])/2
```

Rubi in Sympy [A] time = 1.96755, size = 10, normalized size = 0.71

$$\frac{5\log\left(-x^{\frac{2}{5}}+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/(-x**(3/5)+x),x)

[Out] 5*log(-x**(2/5) + 1)/2
```

Mathematica [A] time = 0.00716218, size = 14, normalized size = 1.

$$\frac{5}{2}\log\left(1-x^{2/5}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(-x^(3/5) + x)^(-1),x]

[Out] (5*Log[1 - x^(2/5)])/2
```

Maple [B] time = 0.072, size = 116, normalized size = 8.3

$$\frac{\ln(1+x)}{2}+2\ln\left(\sqrt[5]{x}-1\right)-\frac{1}{2}\ln\left(\sqrt[5]{x}\sqrt{5}+2x^{2/5}+\sqrt[5]{x}+2\right)+\frac{\ln(-1+x)}{2}$$
$$-\frac{1}{2}\ln\left(-\sqrt[5]{x}\sqrt{5}+2x^{2/5}+\sqrt[5]{x}+2\right)-\frac{1}{2}\ln\left(\sqrt[5]{x}\sqrt{5}+2x^{2/5}-\sqrt[5]{x}+2\right)$$
$$+2\ln\left(1+\sqrt[5]{x}\right)-\frac{1}{2}\ln\left(-\sqrt[5]{x}\sqrt{5}+2x^{2/5}-\sqrt[5]{x}+2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(-x^(3/5)+x),x)
```

```
[Out] 1/2*ln(1+x)+2*ln(x^(1/5)-1)-1/2*ln(x^(1/5)*5^(1/2)+2*x^(2/5)+x^(1
/5)+2)+1/2*ln(-1+x)-1/2*ln(-x^(1/5)*5^(1/2)+2*x^(2/5)+x^(1/5)+2)-
1/2*ln(x^(1/5)*5^(1/2)+2*x^(2/5)-x^(1/5)+2)+2*ln(1+x^(1/5))-1/2*l
n(-x^(1/5)*5^(1/2)+2*x^(2/5)-x^(1/5)+2)
```

Maxima [A] time = 1.36627, size = 23, normalized size = 1.64

$$\frac{5}{2}\log\left(x^{\frac{1}{5}}+1\right)+\frac{5}{2}\log\left(x^{\frac{1}{5}}-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x - x^(3/5)),x, algorithm="maxima")
```

```
[Out] 5/2*log(x^(1/5) + 1) + 5/2*log(x^(1/5) - 1)
```

Fricas [A] time = 0.219574, size = 11, normalized size = 0.79

$$\frac{5}{2}\log\left(x^{\frac{2}{5}}-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x - x^(3/5)),x, algorithm="fricas")
```

```
[Out] 5/2*log(x^(2/5) - 1)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{-x^{\frac{3}{5}}+x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(-x**(3/5)+x),x)
```

```
[Out] Integral(1/(-x**(3/5) + x), x)
```

GIAC/XCAS [A] time = 0.237828, size = 24, normalized size = 1.71

$$\frac{5}{2}\ln\left(x^{\frac{1}{5}}+1\right)+\frac{5}{2}\ln\left(\left|x^{\frac{1}{5}}-1\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x - x^(3/5)),x, algorithm="giac")
```

```
[Out] 5/2*ln(x^(1/5) + 1) + 5/2*ln(abs(x^(1/5) - 1))
```

3.362 $\int \frac{1}{\frac{1}{\sqrt[3]{x}}+x} \, dx$

Optimal. Leaf size=12

$$\frac{3}{4} \log \left(x^{4/3}+1\right)$$

[Out] (3*Log[1 + x^(4/3)])/4

Rubi [A] time = 0.0103678, antiderivative size = 12, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$\frac{3}{4} \log \left(x^{4/3}+1\right)$$

Antiderivative was successfully verified.

[In] Int[(x^(-1/3) + x)^(-1),x]

[Out] (3*Log[1 + x^(4/3)])/4

Rubi in Sympy [A] time = 1.88069, size = 10, normalized size = 0.83

$$\frac{3 \log \left(x^{\frac{4}{3}}+1\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] rubi_integrate(1/(1/x**(1/3)+x),x)

[Out] 3*log(x**(4/3) + 1)/4

Mathematica [A] time = 0.00597696, size = 12, normalized size = 1.

$$\frac{3}{4} \log \left(x^{4/3}+1\right)$$

Antiderivative was successfully verified.

[In] Integrate[(x^(-1/3) + x)^(-1),x]

[Out] (3*Log[1 + x^(4/3)])/4

Maple [A] time = 0.003, size = 9, normalized size = 0.8

$$\frac{3}{4} \ln \left(1+x^{\frac{4}{3}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(1/(1/x^(1/3)+x),x)

[Out] 3/4*ln(1+x^(4/3))

Maxima [A] time = 1.53507, size = 11, normalized size = 0.92

$$\frac{3}{4}\log\left(x^{\frac{4}{3}}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x + 1/x^(1/3)),x, algorithm="maxima")
```

```
[Out] 3/4*log(x^(4/3) + 1)
```

Fricas [A] time = 0.224116, size = 11, normalized size = 0.92

$$\frac{3}{4}\log\left(x^{\frac{4}{3}}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x + 1/x^(1/3)),x, algorithm="fricas")
```

```
[Out] 3/4*log(x^(4/3) + 1)
```

Sympy [A] time = 1.1228, size = 10, normalized size = 0.83

$$\frac{3\log\left(x^{\frac{4}{3}}+1\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(1/x**(1/3)+x),x)
```

```
[Out] 3*log(x**(4/3) + 1)/4
```

GIAC/XCAS [A] time = 0.219999, size = 43, normalized size = 3.58

$$\frac{3}{4}\ln\left(\sqrt{2}x^{\frac{1}{3}}+x^{\frac{2}{3}}+1\right)+\frac{3}{4}\ln\left(-\sqrt{2}x^{\frac{1}{3}}+x^{\frac{2}{3}}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x + 1/x^(1/3)),x, algorithm="giac")
```

```
[Out] 3/4*ln(sqrt(2)*x^(1/3) + x^(2/3) + 1) + 3/4*ln(-sqrt(2)*x^(1/3) +
 x^(2/3) + 1)
```

3.363 $\int \frac{1}{x+x^{\sqrt{2}}} \, dx$

Optimal. Leaf size=24

$$\log(x) - \left(1+\sqrt{2}\right)\log\left(x^{\sqrt{2}-1}+1\right)$$

```
[Out] Log[x] - (1 + Sqrt[2])*Log[1 + x^(-1 + Sqrt[2])]
```

Rubi [A] time = 0.0409661, antiderivative size = 24, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.454

$$\log(x) - \left(1+\sqrt{2}\right)\log\left(x^{\sqrt{2}-1}+1\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(x + x^Sqrt[2])^(-1),x]
```

```
[Out] Log[x] - (1 + Sqrt[2])*Log[1 + x^(-1 + Sqrt[2])]
```

Rubi in Sympy [A] time = 4.17138, size = 34, normalized size = 1.42

$$-\frac{\log\left(x^{-1+\sqrt{2}}\right)}{-\sqrt{2}+1} + \frac{\log\left(x^{-1+\sqrt{2}}+1\right)}{-\sqrt{2}+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x+x**(2**(1/2))),x)
```

```
[Out] -log(x**(-1 + sqrt(2)))/(-sqrt(2) + 1) + log(x**(-1 + sqrt(2)) +
1)/(-sqrt(2) + 1)
```

Mathematica [A] time = 0.0435218, size = 29, normalized size = 1.21

$$\left(1+\sqrt{2}\right)\left(\sqrt{2}\log(x) - \log\left(x^{\sqrt{2}}+x\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x + x^Sqrt[2])^(-1),x]
```

```
[Out] (1 + Sqrt[2])*(Sqrt[2]*Log[x] - Log[x + x^Sqrt[2]])
```

Maple [A] time = 0.04, size = 39, normalized size = 1.6

$$\sqrt{2}\ln(x) + 2\ln(x) - \ln\left(x+e^{\sqrt{2}\ln(x)}\right)\sqrt{2} - \ln\left(x+e^{\sqrt{2}\ln(x)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x+x^(2^(1/2))),x)
```

```
[Out] 2^(1/2)*ln(x)+2*ln(x)-ln(x+exp(2^(1/2)*ln(x)))*2^(1/2)-ln(x+exp(2
^(1/2)*ln(x)))
```

Maxima [A] time = 1.53598, size = 42, normalized size = 1.75

$$\frac{\sqrt{2}\log\left(x\right)}{\sqrt{2}-1}-\frac{\log\left(x+x^{\left(\sqrt{2}\right)}\right)}{\sqrt{2}-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x + x^sqrt(2)),x, algorithm="maxima")
```

```
[Out] sqrt(2)*log(x)/(sqrt(2) - 1) - log(x + x^sqrt(2))/(sqrt(2) - 1)
```

Fricas [A] time = 0.246099, size = 34, normalized size = 1.42

$$\frac{\sqrt{2}\log\left(x+x^{\left(\sqrt{2}\right)}\right)-2\,\log\left(x\right)}{\sqrt{2}-2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x + x^sqrt(2)),x, algorithm="fricas")
```

```
[Out] (sqrt(2)*log(x + x^sqrt(2)) - 2*log(x))/(sqrt(2) - 2)
```

Sympy [A] time = 1.76364, size = 71, normalized size = 2.96

$$\frac{\sqrt{2}\log\left(x\right)}{-3+2\sqrt{2}}-\frac{2\log\left(x\right)}{-3+2\sqrt{2}}+\frac{\sqrt{2}\log\left(x+x^{\sqrt{2}}\right)}{-3+2\sqrt{2}}-\frac{\log\left(x+x^{\sqrt{2}}\right)}{-3+2\sqrt{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x+x**(2**(1/2))),x)
```

```
[Out] sqrt(2)*log(x)/(-3 + 2*sqrt(2)) - 2*log(x)/(-3 + 2*sqrt(2)) + sqr
t(2)*log(x + x**(sqrt(2)))/(-3 + 2*sqrt(2)) - log(x + x**(sqrt(2)
))/(-3 + 2*sqrt(2))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{x+x^{\left(\sqrt{2}\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x + x^sqrt(2)),x, algorithm="giac")
```

```
[Out] integrate(1/(x + x^sqrt(2)), x)
```

3.364 $\int x^{-1-\frac{j}{2}}\sqrt{ax^j+bx^n}\,dx$

Optimal. Leaf size=75

$$\frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{j-n}-\frac{2x^{-j/2}\sqrt{ax^j+bx^n}}{j-n}$$

```
[Out] (-2*Sqrt[a*x^j + b*x^n])/((j - n)*x^(j/2)) + (2*Sqrt[a]*ArcTanh[(
Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(j - n)
```

Rubi [A] time = 0.193491, antiderivative size = 75, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.12

$$\frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{j-n}-\frac{2x^{-j/2}\sqrt{ax^j+bx^n}}{j-n}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 - j/2)*Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (-2*Sqrt[a*x^j + b*x^n])/((j - n)*x^(j/2)) + (2*Sqrt[a]*ArcTanh[(
Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(j - n)
```

Rubi in Sympy [A] time = 17.3824, size = 58, normalized size = 0.77

$$\frac{2\sqrt{a}\,\mathrm{atanh}\left(\frac{\sqrt{a}x^{\frac{j}{2}}}{\sqrt{ax^j+bx^n}}\right)}{j-n}-\frac{2x^{-\frac{j}{2}}\sqrt{ax^j+bx^n}}{j-n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1-1/2*j)*(a*x**j+b*x**n)**(1/2),x)
```

```
[Out] 2*sqrt(a)*atanh(sqrt(a)*x**(j/2)/sqrt(a*x**j + b*x**n))/(j - n) -
 2*x**(-j/2)*sqrt(a*x**j + b*x**n)/(j - n)
```

Mathematica [A] time = 0.257418, size = 104, normalized size = 1.39

$$-\frac{2x^{-j/2}\left(-\sqrt{a}\sqrt{b}x^{\frac{j+n}{2}}\sqrt{\frac{ax^{j-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{j-n}{2}}}{\sqrt{b}}\right)+ax^j+bx^n\right)}{(j-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 - j/2)*Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (-2*(a*x^j + b*x^n - Sqrt[a]*Sqrt[b]*x^((j + n)/2)*Sqrt[1 + (a*x^
(j - n))/b]*ArcSinh[(Sqrt[a]*x^((j - n)/2))/Sqrt[b]]))/((j - n)*x
^(j/2)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.191, size = 0, normalized size = 0.

$$\int x^{-1-\frac{j}{2}}\sqrt{ax^j+bx^n}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1-1/2*j)*(a*x^j+b*x^n)^(1/2),x)
```

```
[Out] int(x^(-1-1/2*j)*(a*x^j+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax^j + bx^n} x^{-\frac{1}{2}j-1} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*x^(-1/2*j - 1),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x^j + b*x^n)*x^(-1/2*j - 1), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*x^(-1/2*j - 1),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1-1/2*j)*(a*x**j+b*x**n)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax^j + bx^n} x^{-\frac{1}{2}j-1} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*x^(-1/2*j - 1),x, algorithm="giac")
```

```
[Out] integrate(sqrt(a*x^j + b*x^n)*x^(-1/2*j - 1), x)
```

3.365 $\int (cx)^{-1-\frac{j}{2}}\sqrt{ax^j+bx^n}\,dx$

Optimal. Leaf size=99

$$\frac{2\sqrt{a}x^{j/2}(cx)^{-j/2}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{c(j-n)}-\frac{2(cx)^{-j/2}\sqrt{ax^j+bx^n}}{c(j-n)}$$

```
[Out] (-2*Sqrt[a*x^j + b*x^n])/(c*(j - n)*(c*x)^(j/2)) + (2*Sqrt[a]*x^(
j/2)*ArcTanh[(Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(c*(j - n)*(
c*x)^(j/2))
```

Rubi [A] time = 0.264335, antiderivative size = 99, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{2\sqrt{a}x^{j/2}(cx)^{-j/2}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{c(j-n)}-\frac{2(cx)^{-j/2}\sqrt{ax^j+bx^n}}{c(j-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^(-1 - j/2)*Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (-2*Sqrt[a*x^j + b*x^n])/(c*(j - n)*(c*x)^(j/2)) + (2*Sqrt[a]*x^(
j/2)*ArcTanh[(Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(c*(j - n)*(
c*x)^(j/2))
```

Rubi in Sympy [A] time = 26.2271, size = 75, normalized size = 0.76

$$\frac{2\sqrt{a}x^{\frac{j}{2}}(cx)^{-\frac{j}{2}}\operatorname{atanh}\left(\frac{\sqrt{a}x^{\frac{j}{2}}}{\sqrt{ax^j+bx^n}}\right)}{c(j-n)}-\frac{2(cx)^{-\frac{j}{2}}\sqrt{ax^j+bx^n}}{c(j-n)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(-1-1/2*j)*(a*x**j+b*x**n)**(1/2),x)
```

```
[Out] 2*sqrt(a)*x**(j/2)*(c*x)**(-j/2)*atanh(sqrt(a)*x**(j/2)/sqrt(a*x*
*j + b*x**n))/(c*(j - n)) - 2*(c*x)**(-j/2)*sqrt(a*x**j + b*x**n)
/(c*(j - n))
```

Mathematica [A] time = 0.0982943, size = 109, normalized size = 1.1

$$-\frac{2(cx)^{-j/2}\left(-\sqrt{a}\sqrt{b}x^{\frac{j+n}{2}}\sqrt{\frac{ax^{j-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{j-n}{2}}}{\sqrt{b}}\right)+ax^j+bx^n\right)}{c(j-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^(-1 - j/2)*Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (-2*(a*x^j + b*x^n - Sqrt[a]*Sqrt[b]*x^((j + n)/2)*Sqrt[1 + (a*x^
(j - n))/b]*ArcSinh[(Sqrt[a]*x^((j - n)/2))/Sqrt[b]]))/(c*(j - n)
*(c*x)^(j/2)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.412, size = 0, normalized size = 0.

$$\int (cx)^{-1-\frac{j}{2}} \sqrt{a x^j + b x^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(-1-1/2*j)*(a*x^j+b*x^n)^(1/2),x)

[Out] int((c*x)^(-1-1/2*j)*(a*x^j+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{a x^j + b x^n}\, (cx)^{-\frac{1}{2}j-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*(c*x)^(-1/2*j - 1),x, algorithm="maxima")

[Out] integrate(sqrt(a*x^j + b*x^n)*(c*x)^(-1/2*j - 1), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*(c*x)^(-1/2*j - 1),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(-1-1/2*j)*(a*x**j+b*x**n)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{a x^j + b x^n}\, (cx)^{-\frac{1}{2}j-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*(c*x)^(-1/2*j - 1),x, algorithm="giac")

[Out] integrate(sqrt(a*x^j + b*x^n)*(c*x)^(-1/2*j - 1), x)
```

3.366 $\int \frac{\sqrt{ax^3+bx^n}}{(cx)^{5/2}}\,dx$

Optimal. Leaf size=91

$$\frac{2\sqrt{a}\sqrt{cx}\tanh^{-1}\left(\frac{\sqrt{a}x^{3/2}}{\sqrt{ax^3+bx^n}}\right)}{c^3(3-n)\sqrt{x}}-\frac{2\sqrt{ax^3+bx^n}}{c(3-n)(cx)^{3/2}}$$

```
[Out] (-2*Sqrt[a*x^3 + b*x^n])/(c*(3 - n)*(c*x)^(3/2)) + (2*Sqrt[a]*Sqr
t[c*x]*ArcTanh[(Sqrt[a]*x^(3/2))/Sqrt[a*x^3 + b*x^n]])/(c^3*(3 -
n)*Sqrt[x])
```

Rubi [A] time = 0.258849, antiderivative size = 91, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$\frac{2\sqrt{a}\sqrt{cx}\tanh^{-1}\left(\frac{\sqrt{a}x^{3/2}}{\sqrt{ax^3+bx^n}}\right)}{c^3(3-n)\sqrt{x}}-\frac{2\sqrt{ax^3+bx^n}}{c(3-n)(cx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^3 + b*x^n]/(c*x)^(5/2),x]
```

```
[Out] (-2*Sqrt[a*x^3 + b*x^n])/(c*(3 - n)*(c*x)^(3/2)) + (2*Sqrt[a]*Sqr
t[c*x]*ArcTanh[(Sqrt[a]*x^(3/2))/Sqrt[a*x^3 + b*x^n]])/(c^3*(3 -
n)*Sqrt[x])
```

Rubi in Sympy [A] time = 24.1645, size = 76, normalized size = 0.84

$$\frac{2\sqrt{a}\sqrt{cx}\,\mathrm{atanh}\left(\frac{\sqrt{a}x^{\frac{3}{2}}}{\sqrt{ax^3+bx^n}}\right)}{c^3\sqrt{x}\,(-n+3)}-\frac{2\sqrt{ax^3+bx^n}}{c\,(cx)^{\frac{3}{2}}\,(-n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**3+b*x**n)**(1/2)/(c*x)**(5/2),x)
```

```
[Out] 2*sqrt(a)*sqrt(c*x)*atanh(sqrt(a)*x**(3/2)/sqrt(a*x**3 + b*x**n))
/(c**3*sqrt(x)*(-n + 3)) - 2*sqrt(a*x**3 + b*x**n)/(c*(c*x)**(3/2
)*(-n + 3))
```

Mathematica [A] time = 0.278467, size = 103, normalized size = 1.13

$$\frac{2x\left(-\sqrt{a}\sqrt{b}x^{\frac{n+3}{2}}\sqrt{\frac{ax^{3-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{3}{2}-\frac{n}{2}}}{\sqrt{b}}\right)+ax^3+bx^n\right)}{(n-3)(cx)^{5/2}\sqrt{ax^3+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^3 + b*x^n]/(c*x)^(5/2),x]
```

```
[Out] (2*x*(a*x^3 + b*x^n - Sqrt[a]*Sqrt[b]*x^((3 + n)/2)*Sqrt[1 + (a*x
^(3 - n))/b]*ArcSinh[(Sqrt[a]*x^(3/2 - n/2))/Sqrt[b]]))/((-3 + n)
*(c*x)^(5/2)*Sqrt[a*x^3 + b*x^n])
```

Maple [F] time = 0.076, size = 0, normalized size = 0.

$$\int 1\sqrt{a x^{3}+b x^{n}}\, \left(c x \right)^{-\frac{5}{2}}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x^3+b*x^n)^(1/2)/(c*x)^(5/2),x)

[Out] int((a*x^3+b*x^n)^(1/2)/(c*x)^(5/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax^3 + bx^n}}{(cx)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^3 + b*x^n)/(c*x)^(5/2),x, algorithm="maxima")

[Out] integrate(sqrt(a*x^3 + b*x^n)/(c*x)^(5/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^3 + b*x^n)/(c*x)^(5/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x**3+b*x**n)**(1/2)/(c*x)**(5/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax^3 + bx^n}}{(cx)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^3 + b*x^n)/(c*x)^(5/2),x, algorithm="giac")

[Out] integrate(sqrt(a*x^3 + b*x^n)/(c*x)^(5/2), x)
```

3.367 $\int \frac{\sqrt{ax^2+bx^n}}{c^2x^2}\,dx$

Optimal. Leaf size=71

$$\frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{c^2(2-n)}-\frac{2\sqrt{ax^2+bx^n}}{c^2(2-n)x}$$

```
[Out] (-2*Sqrt[a*x^2 + b*x^n])/(c^2*(2 - n)*x) + (2*Sqrt[a]*ArcTanh[(Sq
rt[a]*x)/Sqrt[a*x^2 + b*x^n]])/(c^2*(2 - n))
```

Rubi [A] time = 0.136302, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{c^2(2-n)}-\frac{2\sqrt{ax^2+bx^n}}{c^2(2-n)x}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^2 + b*x^n]/(c^2*x^2),x]
```

```
[Out] (-2*Sqrt[a*x^2 + b*x^n])/(c^2*(2 - n)*x) + (2*Sqrt[a]*ArcTanh[(Sq
rt[a]*x)/Sqrt[a*x^2 + b*x^n]])/(c^2*(2 - n))
```

Rubi in Sympy [A] time = 13.7776, size = 58, normalized size = 0.82

$$\frac{2\sqrt{a}\,\mathrm{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{c^2\left(-n+2\right)}-\frac{2\sqrt{ax^2+bx^n}}{c^2x\left(-n+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**2+b*x**n)**(1/2)/c**2/x**2,x)
```

```
[Out] 2*sqrt(a)*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**n))/(c**2*(-n + 2))
- 2*sqrt(a*x**2 + b*x**n)/(c**2*x*(-n + 2))
```

Mathematica [A] time = 0.180297, size = 99, normalized size = 1.39

$$\frac{2\left(-\sqrt{a}\sqrt{b}x^{\frac{n}{2}+1}\sqrt{\frac{ax^{2-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{1-\frac{n}{2}}}{\sqrt{b}}\right)+ax^2+bx^n\right)}{c^2(n-2)x\sqrt{ax^2+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^2 + b*x^n]/(c^2*x^2),x]
```

```
[Out] (2*(a*x^2 + b*x^n - Sqrt[a]*Sqrt[b]*x^(1 + n/2)*Sqrt[1 + (a*x^(2
- n))/b]*ArcSinh[(Sqrt[a]*x^(1 - n/2))/Sqrt[b]]))/(c^2*(-2 + n)*x
*Sqrt[a*x^2 + b*x^n])
```

Maple [F] time = 0.088, size = 0, normalized size = 0.

$$\int \frac{1}{c^2x^2}\sqrt{ax^2+bx^n}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x^2+b*x^n)^(1/2)/c^2/x^2,x)
```

```
[Out] int((a*x^2+b*x^n)^(1/2)/c^2/x^2,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{\sqrt{ax^2+bx^n}}{x^2}\,dx}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^2 + b*x^n)/(c^2*x^2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x^2 + b*x^n)/x^2, x)/c^2
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^2 + b*x^n)/(c^2*x^2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{\sqrt{ax^2+bx^n}}{x^2}\,dx}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x**2+b*x**n)**(1/2)/c**2/x**2,x)
```

```
[Out] Integral(sqrt(a*x**2 + b*x**n)/x**2, x)/c**2
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax^2+bx^n}}{c^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^2 + b*x^n)/(c^2*x^2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(a*x^2 + b*x^n)/(c^2*x^2), x)
```

3.368 $\int \frac{\sqrt{ax+bx^n}}{(cx)^{3/2}}\,dx$

Optimal. Leaf size=87

$$\frac{2\sqrt{a}\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{c(1-n)\sqrt{cx}}-\frac{2\sqrt{ax+bx^n}}{c(1-n)\sqrt{cx}}$$

```
[Out] (-2*Sqrt[a*x + b*x^n])/(c*(1 - n)*Sqrt[c*x]) + (2*Sqrt[a]*Sqrt[x]
*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^n]])/(c*(1 - n)*Sqrt[c*
x])
```

Rubi [A] time = 0.234596, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.19

$$\frac{2\sqrt{a}\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{c(1-n)\sqrt{cx}}-\frac{2\sqrt{ax+bx^n}}{c(1-n)\sqrt{cx}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x + b*x^n]/(c*x)^(3/2),x]
```

```
[Out] (-2*Sqrt[a*x + b*x^n])/(c*(1 - n)*Sqrt[c*x]) + (2*Sqrt[a]*Sqrt[x]
*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^n]])/(c*(1 - n)*Sqrt[c*
x])
```

Rubi in Sympy [A] time = 23.6288, size = 73, normalized size = 0.84

$$\frac{2\sqrt{a}\sqrt{cx}\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{c^2\sqrt{x}\,(-n+1)}-\frac{2\sqrt{ax+bx^n}}{c\sqrt{cx}\,(-n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x+b*x**n)**(1/2)/(c*x)**(3/2),x)
```

```
[Out] 2*sqrt(a)*sqrt(c*x)*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*x**n))/(c*
*2*sqrt(x)*(-n + 1)) - 2*sqrt(a*x + b*x**n)/(c*sqrt(c*x)*(-n + 1)
)
```

Mathematica [A] time = 0.250894, size = 100, normalized size = 1.15

$$\frac{x\left(-2\sqrt{a}\sqrt{b}x^{\frac{n+1}{2}}\sqrt{\frac{ax^{1-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{1}{2}-\frac{n}{2}}}{\sqrt{b}}\right)+2ax+2bx^n\right)}{(n-1)(cx)^{3/2}\sqrt{ax+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x + b*x^n]/(c*x)^(3/2),x]
```

```
[Out] (x*(2*a*x + 2*b*x^n - 2*Sqrt[a]*Sqrt[b]*x^((1 + n)/2)*Sqrt[1 + (a
*x^(1 - n))/b]*ArcSinh[(Sqrt[a]*x^(1/2 - n/2))/Sqrt[b]]))/((-1 +
n)*(c*x)^(3/2)*Sqrt[a*x + b*x^n])
```

Maple [F] time = 0.07, size = 0, normalized size = 0.

$$\int 1\sqrt{ax+bx^n}\,(cx)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x+b*x^n)^(1/2)/(c*x)^(3/2),x)
```

```
[Out] int((a*x+b*x^n)^(1/2)/(c*x)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax+bx^n}}{(cx)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^n)/(c*x)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(a*x + b*x^n)/(c*x)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^n)/(c*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax+bx^n}}{(cx)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x+b*x**n)**(1/2)/(c*x)**(3/2),x)
```

```
[Out] Integral(sqrt(a*x + b*x**n)/(c*x)**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{ax+bx^n}}{(cx)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x + b*x^n)/(c*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(a*x + b*x^n)/(c*x)^(3/2), x)
```

3.369 $\int \frac{\sqrt{a+bx^n}}{cx} \, dx$

Optimal. Leaf size=51

$$\frac{2\sqrt{a+bx^n}}{cn} - \frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{cn}$$

```
[Out] (2*Sqrt[a + b*x^n])/(c*n) - (2*Sqrt[a]*ArcTanh[Sqrt[a + b*x^n]/Sq
rt[a]])/(c*n)
```

Rubi [A] time = 0.0764388, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.278

$$\frac{2\sqrt{a+bx^n}}{cn} - \frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{cn}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a + b*x^n]/(c*x),x]
```

```
[Out] (2*Sqrt[a + b*x^n])/(c*n) - (2*Sqrt[a]*ArcTanh[Sqrt[a + b*x^n]/Sq
rt[a]])/(c*n)
```

Rubi in Sympy [A] time = 9.40493, size = 41, normalized size = 0.8

$$-\frac{2\sqrt{a}\operatorname{atanh}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{cn} + \frac{2\sqrt{a+bx^n}}{cn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b*x**n)**(1/2)/c/x,x)
```

```
[Out] -2*sqrt(a)*atanh(sqrt(a + b*x**n)/sqrt(a))/(c*n) + 2*sqrt(a + b*x
**n)/(c*n)
```

Mathematica [A] time = 0.0347111, size = 45, normalized size = 0.88

$$\frac{2\left(\sqrt{a+bx^n} - \sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)\right)}{cn}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a + b*x^n]/(c*x),x]
```

```
[Out] (2*(Sqrt[a + b*x^n] - Sqrt[a]*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]]))/
(c*n)
```

Maple [A] time = 0.001, size = 39, normalized size = 0.8

$$\frac{1}{cn}\left(2\sqrt{a+bx^n} - 2\sqrt{a}Artanh\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b*x^n)^(1/2)/c/x,x)
```

```
[Out] 1/c/n*(2*(a+b*x^n)^(1/2)-2*a^(1/2)*arctanh((a+b*x^n)^(1/2)/a^(1/2
)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a)/(c*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.241772, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{a}\log\left(\frac{bx^n-2\sqrt{bx^n+a}\sqrt{a}+2a}{x^n}\right)+2\sqrt{bx^n+a}}{cn}, -\frac{2\left(\sqrt{-a}\arctan\left(\frac{\sqrt{bx^n+a}}{\sqrt{-a}}\right)-\sqrt{bx^n+a}\right)}{cn}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a)/(c*x),x, algorithm="fricas")
```

```
[Out] [(sqrt(a)*log((b*x^n - 2*sqrt(b*x^n + a)*sqrt(a) + 2*a)/x^n) + 2*
sqrt(b*x^n + a))/(c*n), -2*(sqrt(-a)*arctan(sqrt(b*x^n + a)/sqrt(
-a)) - sqrt(b*x^n + a))/(c*n)]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b*x**n)**(1/2)/c/x,x)
```

```
[Out] Exception raised: TypeError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^n+a}}{cx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a)/(c*x),x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x^n + a)/(c*x), x)
```

3.370 $\int \frac{\sqrt{\frac{a}{x}+bx^n}}{\sqrt{cx}}\,dx$

Optimal. Leaf size=84

$$\frac{2\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}{c(n+1)}-\frac{2\sqrt{a}\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{(n+1)\sqrt{cx}}$$

```
[Out] (2*Sqrt[c*x]*Sqrt[a/x + b*x^n])/(c*(1 + n)) - (2*Sqrt[a]*Sqrt[x]*
ArcTanh[Sqrt[a]/(Sqrt[x]*Sqrt[a/x + b*x^n])])/((1 + n)*Sqrt[c*x])
```

Rubi [A] time = 0.285059, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$\frac{2\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}{c(n+1)}-\frac{2\sqrt{a}\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{(n+1)\sqrt{cx}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a/x + b*x^n]/Sqrt[c*x],x]
```

```
[Out] (2*Sqrt[c*x]*Sqrt[a/x + b*x^n])/(c*(1 + n)) - (2*Sqrt[a]*Sqrt[x]*
ArcTanh[Sqrt[a]/(Sqrt[x]*Sqrt[a/x + b*x^n])])/((1 + n)*Sqrt[c*x])
```

Rubi in Sympy [A] time = 23.6758, size = 71, normalized size = 0.85

$$-\frac{2\sqrt{a}\sqrt{cx}\,\mathrm{atanh}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{c\sqrt{x}\,(n+1)}+\frac{2\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}{c\,(n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a/x+b*x**n)**(1/2)/(c*x)**(1/2),x)
```

```
[Out] -2*sqrt(a)*sqrt(c*x)*atanh(sqrt(a)/(sqrt(x)*sqrt(a/x + b*x**n)))/
(c*sqrt(x)*(n + 1)) + 2*sqrt(c*x)*sqrt(a/x + b*x**n)/(c*(n + 1))
```

Mathematica [A] time = 0.160284, size = 102, normalized size = 1.21

$$\frac{2x\sqrt{\frac{a}{x}+bx^n}\left(\sqrt{a+bx^{n+1}}-\sqrt{a}\log\left(\sqrt{a}\sqrt{a+bx^{n+1}}+a\right)+\sqrt{a}\log\left(x^{\frac{n+1}{2}}\right)\right)}{(n+1)\sqrt{cx}\sqrt{a+bx^{n+1}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a/x + b*x^n]/Sqrt[c*x],x]
```

```
[Out] (2*x*Sqrt[a/x + b*x^n]*(Sqrt[a + b*x^(1 + n)] + Sqrt[a]*Log[x^((1
 + n)/2)] - Sqrt[a]*Log[a + Sqrt[a]*Sqrt[a + b*x^(1 + n)]]))/((1
+ n)*Sqrt[c*x]*Sqrt[a + b*x^(1 + n)])
```

Maple [F] time = 0.084, size = 0, normalized size = 0.

$$\int 1\sqrt{\frac{a}{x}+bx^n}\frac{1}{\sqrt{cx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a/x+b*x^n)^(1/2)/(c*x)^(1/2),x)

[Out] int((a/x+b*x^n)^(1/2)/(c*x)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^n + \frac{a}{x}}}{\sqrt{cx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x)/sqrt(c*x),x, algorithm="maxima")

[Out] integrate(sqrt(b*x^n + a/x)/sqrt(c*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x)/sqrt(c*x),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{\frac{a}{x} + bx^n}}{\sqrt{cx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a/x+b*x**n)**(1/2)/(c*x)**(1/2),x)

[Out] Integral(sqrt(a/x + b*x**n)/sqrt(c*x), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{bx^n + \frac{a}{x}}}{\sqrt{cx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x)/sqrt(c*x),x, algorithm="giac")

[Out] integrate(sqrt(b*x^n + a/x)/sqrt(c*x), x)
```

3.371 $\int \sqrt{\frac{a}{x^2}+bx^n}\,dx$

Optimal. Leaf size=61

$$\frac{2x\sqrt{\frac{a}{x^2}+bx^n}}{n+2}-\frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{n+2}$$

```
[Out] (2*x*Sqrt[a/x^2 + b*x^n])/(2 + n) - (2*Sqrt[a]*ArcTanh[Sqrt[a]/(x
*Sqrt[a/x^2 + b*x^n])])/(2 + n)
```

Rubi [A] time = 0.146122, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{2x\sqrt{\frac{a}{x^2}+bx^n}}{n+2}-\frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{n+2}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a/x^2 + b*x^n],x]
```

```
[Out] (2*x*Sqrt[a/x^2 + b*x^n])/(2 + n) - (2*Sqrt[a]*ArcTanh[Sqrt[a]/(x
*Sqrt[a/x^2 + b*x^n])])/(2 + n)
```

Rubi in Sympy [A] time = 10.6509, size = 51, normalized size = 0.84

$$-\frac{2\sqrt{a}\,\mathrm{atanh}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{n+2}+\frac{2x\sqrt{\frac{a}{x^2}+bx^n}}{n+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a/x**2+b*x**n)**(1/2),x)
```

```
[Out] -2*sqrt(a)*atanh(sqrt(a)/(x*sqrt(a/x**2 + b*x**n)))/(n + 2) + 2*x
*sqrt(a/x**2 + b*x**n)/(n + 2)
```

Mathematica [A] time = 0.147797, size = 95, normalized size = 1.56

$$\frac{2x\sqrt{\frac{a}{x^2}+bx^n}\left(\sqrt{a+bx^{n+2}}-\sqrt{a}\log\left(\sqrt{a}\sqrt{a+bx^{n+2}}+a\right)+\sqrt{a}\log\left(x^{\frac{n}{2}+1}\right)\right)}{(n+2)\sqrt{a+bx^{n+2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a/x^2 + b*x^n],x]
```

```
[Out] (2*x*Sqrt[a/x^2 + b*x^n]*(Sqrt[a + b*x^(2 + n)] + Sqrt[a]*Log[x^(
1 + n/2)] - Sqrt[a]*Log[a + Sqrt[a]*Sqrt[a + b*x^(2 + n)]]))/((2
+ n)*Sqrt[a + b*x^(2 + n)])
```

Maple [F] time = 0.067, size = 0, normalized size = 0.

$$\int \sqrt{\frac{a}{x^2} + b x^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a/x^2+b*x^n)^(1/2),x)

[Out] int((a/x^2+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{b x^n + \frac{a}{x^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x^2),x, algorithm="maxima")

[Out] integrate(sqrt(b*x^n + a/x^2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x^2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\frac{a}{x^2} + b x^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a/x**2+b*x**n)**(1/2),x)

[Out] Integral(sqrt(a/x**2 + b*x**n), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{b x^n + \frac{a}{x^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x^2),x, algorithm="giac")

[Out] integrate(sqrt(b*x^n + a/x^2), x)
```

3.372 $\int \sqrt{cx}\sqrt{\frac{a}{x^3}+bx^n}\,dx$

Optimal. Leaf size=85

$$\frac{2(cx)^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}{c(n+3)}-\frac{2\sqrt{a}c\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{x^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{(n+3)\sqrt{cx}}$$

```
[Out] (2*(c*x)^(3/2)*Sqrt[a/x^3 + b*x^n])/(c*(3 + n)) - (2*Sqrt[a]*c*Sq
rt[x]*ArcTanh[Sqrt[a]/(x^(3/2)*Sqrt[a/x^3 + b*x^n])])/((3 + n)*Sq
rt[c*x])
```

Rubi [A] time = 0.328368, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$\frac{2(cx)^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}{c(n+3)}-\frac{2\sqrt{a}c\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{x^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{(n+3)\sqrt{cx}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c*x]*Sqrt[a/x^3 + b*x^n],x]
```

```
[Out] (2*(c*x)^(3/2)*Sqrt[a/x^3 + b*x^n])/(c*(3 + n)) - (2*Sqrt[a]*c*Sq
rt[x]*ArcTanh[Sqrt[a]/(x^(3/2)*Sqrt[a/x^3 + b*x^n])])/((3 + n)*Sq
rt[c*x])
```

Rubi in Sympy [A] time = 23.6595, size = 73, normalized size = 0.86

$$-\frac{2\sqrt{a}\sqrt{cx}\,\operatorname{atanh}\left(\frac{\sqrt{a}}{x^{\frac{3}{2}}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{\sqrt{x}\,(n+3)}+\frac{2\,(cx)^{\frac{3}{2}}\sqrt{\frac{a}{x^3}+bx^n}}{c\,(n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(1/2)*(a/x**3+b*x**n)**(1/2),x)
```

```
[Out] -2*sqrt(a)*sqrt(c*x)*atanh(sqrt(a)/(x**(3/2)*sqrt(a/x**3 + b*x**n
)))/(sqrt(x)*(n + 3)) + 2*(c*x)**(3/2)*sqrt(a/x**3 + b*x**n)/(c*(
n + 3))
```

Mathematica [A] time = 0.153404, size = 102, normalized size = 1.2

$$\frac{2x\sqrt{cx}\sqrt{\frac{a}{x^3}+bx^n}\left(\sqrt{a+bx^{n+3}}-\sqrt{a}\log\left(\sqrt{a}\sqrt{a+bx^{n+3}}+a\right)+\sqrt{a}\log\left(x^{\frac{n+3}{2}}\right)\right)}{(n+3)\sqrt{a+bx^{n+3}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[c*x]*Sqrt[a/x^3 + b*x^n],x]
```

```
[Out] (2*x*Sqrt[c*x]*Sqrt[a/x^3 + b*x^n]*(Sqrt[a + b*x^(3 + n)] + Sqrt[
a]*Log[x^((3 + n)/2)] - Sqrt[a]*Log[a + Sqrt[a]*Sqrt[a + b*x^(3 +
 n)]]))/((3 + n)*Sqrt[a + b*x^(3 + n)])
```

Maple [F] time = 0.08, size = 0, normalized size = 0.

$$\int \sqrt{cx}\sqrt{\frac{a}{x^3}+bx^n}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(1/2)*(a/x^3+b*x^n)^(1/2),x)

[Out] int((c*x)^(1/2)*(a/x^3+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx^n+\frac{a}{x^3}}\sqrt{cx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x^3)*sqrt(c*x),x, algorithm="maxima")

[Out] integrate(sqrt(b*x^n + a/x^3)*sqrt(c*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x^3)*sqrt(c*x),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(1/2)*(a/x**3+b*x**n)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx^n+\frac{a}{x^3}}\sqrt{cx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^n + a/x^3)*sqrt(c*x),x, algorithm="giac")

[Out] integrate(sqrt(b*x^n + a/x^3)*sqrt(c*x), x)
```

3.373 $\int (cx)^{-1-\frac{3j}{2}} \left(ax^j + bx^n\right)^{3/2} dx$

Optimal. Leaf size=141

$$\frac{2a^{3/2}x^{3j/2}(cx)^{-3j/2}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{c(j-n)} - \frac{2(cx)^{-3j/2}\left(ax^j+bx^n\right)^{3/2}}{3c(j-n)} - \frac{2ax^j(cx)^{-3j/2}\sqrt{ax^j+bx^n}}{c(j-n)}$$

```
[Out] (-2*a*x^j*Sqrt[a*x^j + b*x^n])/(c*(j - n)*(c*x)^((3*j)/2)) - (2*(
a*x^j + b*x^n)^(3/2))/(3*c*(j - n)*(c*x)^((3*j)/2)) + (2*a^(3/2)*
x^((3*j)/2)*ArcTanh[(Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(c*(j
 - n)*(c*x)^((3*j)/2))
```

Rubi [A] time = 0.381502, antiderivative size = 141, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$

$$\frac{2a^{3/2}x^{3j/2}(cx)^{-3j/2}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{c(j-n)} - \frac{2(cx)^{-3j/2}\left(ax^j+bx^n\right)^{3/2}}{3c(j-n)} - \frac{2ax^j(cx)^{-3j/2}\sqrt{ax^j+bx^n}}{c(j-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^(-1 - (3*j)/2)*(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (-2*a*x^j*Sqrt[a*x^j + b*x^n])/(c*(j - n)*(c*x)^((3*j)/2)) - (2*(
a*x^j + b*x^n)^(3/2))/(3*c*(j - n)*(c*x)^((3*j)/2)) + (2*a^(3/2)*
x^((3*j)/2)*ArcTanh[(Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(c*(j
 - n)*(c*x)^((3*j)/2))
```

Rubi in Sympy [A] time = 35.5241, size = 116, normalized size = 0.82

$$\frac{2a^{\frac{3}{2}}x^{\frac{3j}{2}}\left(cx\right)^{-\frac{3j}{2}}\operatorname{atanh}\left(\frac{\sqrt{a}x^{\frac{j}{2}}}{\sqrt{ax^j+bx^n}}\right)}{c\left(j-n\right)} - \frac{2ax^j\left(cx\right)^{-\frac{3j}{2}}\sqrt{ax^j+bx^n}}{c\left(j-n\right)} - \frac{2\left(cx\right)^{-\frac{3j}{2}}\left(ax^j+bx^n\right)^{\frac{3}{2}}}{3c\left(j-n\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(-1-3/2*j)*(a*x**j+b*x**n)**(3/2),x)
```

```
[Out] 2*a**(3/2)*x**(3*j/2)*(c*x)**(-3*j/2)*atanh(sqrt(a)*x**(j/2)/sqrt
(a*x**j + b*x**n))/(c*(j - n)) - 2*a*x**j*(c*x)**(-3*j/2)*sqrt(a*
x**j + b*x**n)/(c*(j - n)) - 2*(c*x)**(-3*j/2)*(a*x**j + b*x**n)*
*(3/2)/(3*c*(j - n))
```

Mathematica [A] time = 0.302857, size = 131, normalized size = 0.93

$$-\frac{2(cx)^{-3j/2}\left(-3a^{3/2}\sqrt{b}x^{\frac{1}{2}(3j+n)}\sqrt{\frac{ax^{j-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{j-n}{2}}}{\sqrt{b}}\right)+4a^2x^{2j}+5abx^{j+n}+b^2x^{2n}\right)}{3c(j-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^(-1 - (3*j)/2)*(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (-2*(4*a^2*x^(2*j) + b^2*x^(2*n) + 5*a*b*x^(j + n) - 3*a^(3/2)*Sq
rt[b]*x^((3*j + n)/2)*Sqrt[1 + (a*x^(j - n))/b]*ArcSinh[(Sqrt[a]*
x^((j - n)/2))/Sqrt[b]]))/(3*c*(j - n)*(c*x)^((3*j)/2)*Sqrt[a*x^j
```

```
+ b*x^n])
```

Maple [F] time = 0.451, size = 0, normalized size = 0.

$$\int (cx)^{-1-\frac{3j}{2}} \left(ax^j + bx^n\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(-1-3/2*j)*(a*x^j+b*x^n)^(3/2),x)

[Out] int((c*x)^(-1-3/2*j)*(a*x^j+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax^j + bx^n\right)^{\frac{3}{2}} (cx)^{-\frac{3}{2}j-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^j + b*x^n)^(3/2)*(c*x)^(-3/2*j - 1),x, algorithm="maxima")

[Out] integrate((a*x^j + b*x^n)^(3/2)*(c*x)^(-3/2*j - 1), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^j + b*x^n)^(3/2)*(c*x)^(-3/2*j - 1),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(-1-3/2*j)*(a*x**j+b*x**n)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax^j + bx^n\right)^{\frac{3}{2}} (cx)^{-\frac{3}{2}j-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^j + b*x^n)^(3/2)*(c*x)^(-3/2*j - 1),x, algorithm="giac")

[Out] integrate((a*x^j + b*x^n)^(3/2)*(c*x)^(-3/2*j - 1), x)
```

3.374 $\int \frac{(ax^3+bx^n)^{3/2}}{(cx)^{11/2}}\,dx$

Optimal. Leaf size=128

$$\frac{2a^{3/2}\sqrt{cx}\tanh^{-1}\left(\frac{\sqrt{a}x^{3/2}}{\sqrt{ax^3+bx^n}}\right)}{c^6(3-n)\sqrt{x}}-\frac{2a\sqrt{ax^3+bx^n}}{c^4(3-n)(cx)^{3/2}}-\frac{2\left(ax^3+bx^n\right)^{3/2}}{3c(3-n)(cx)^{9/2}}$$

```
[Out] (-2*a*Sqrt[a*x^3 + b*x^n])/(c^4*(3 - n)*(c*x)^(3/2)) - (2*(a*x^3
+ b*x^n)^(3/2))/(3*c*(3 - n)*(c*x)^(9/2)) + (2*a^(3/2)*Sqrt[c*x]*
ArcTanh[(Sqrt[a]*x^(3/2))/Sqrt[a*x^3 + b*x^n]])/(c^6*(3 - n)*Sqrt
[x])
```

Rubi [A] time = 0.336378, antiderivative size = 128, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$\frac{2a^{3/2}\sqrt{cx}\tanh^{-1}\left(\frac{\sqrt{a}x^{3/2}}{\sqrt{ax^3+bx^n}}\right)}{c^6(3-n)\sqrt{x}}-\frac{2a\sqrt{ax^3+bx^n}}{c^4(3-n)(cx)^{3/2}}-\frac{2\left(ax^3+bx^n\right)^{3/2}}{3c(3-n)(cx)^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^3 + b*x^n)^(3/2)/(c*x)^(11/2),x]
```

```
[Out] (-2*a*Sqrt[a*x^3 + b*x^n])/(c^4*(3 - n)*(c*x)^(3/2)) - (2*(a*x^3
+ b*x^n)^(3/2))/(3*c*(3 - n)*(c*x)^(9/2)) + (2*a^(3/2)*Sqrt[c*x]*
ArcTanh[(Sqrt[a]*x^(3/2))/Sqrt[a*x^3 + b*x^n]])/(c^6*(3 - n)*Sqrt
[x])
```

Rubi in Sympy [A] time = 33.2162, size = 109, normalized size = 0.85

$$\frac{2a^{\frac{3}{2}}\sqrt{cx}\,\text{atanh}\left(\frac{\sqrt{a}x^{\frac{3}{2}}}{\sqrt{ax^3+bx^n}}\right)}{c^6\sqrt{x}\,(-n+3)}-\frac{2a\sqrt{ax^3+bx^n}}{c^4\,(cx)^{\frac{3}{2}}\,(-n+3)}-\frac{2\left(ax^3+bx^n\right)^{\frac{3}{2}}}{3c\,(cx)^{\frac{9}{2}}\,(-n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**3+b*x**n)**(3/2)/(c*x)**(11/2),x)
```

```
[Out] 2*a**(3/2)*sqrt(c*x)*atanh(sqrt(a)*x**(3/2)/sqrt(a*x**3 + b*x**n)
)/(c**6*sqrt(x)*(-n + 3)) - 2*a*sqrt(a*x**3 + b*x**n)/(c**4*(c*x)
**(3/2)*(-n + 3)) - 2*(a*x**3 + b*x**n)**(3/2)/(3*c*(c*x)**(9/2)*
(-n + 3))
```

Mathematica [A] time = 0.365984, size = 126, normalized size = 0.98

$$\frac{2\sqrt{cx}\left(-3a^{3/2}\sqrt{b}x^{\frac{n+9}{2}}\sqrt{\frac{ax^{3-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{3}{2}-\frac{n}{2}}}{\sqrt{b}}\right)+4a^2x^6+5abx^{n+3}+b^2x^{2n}\right)}{3c^6(n-3)x^5\sqrt{ax^3+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^3 + b*x^n)^(3/2)/(c*x)^(11/2),x]
```

```
[Out] (2*Sqrt[c*x]*(4*a^2*x^6 + b^2*x^(2*n) + 5*a*b*x^(3 + n) - 3*a^(3/
2)*Sqrt[b]*x^((9 + n)/2)*Sqrt[1 + (a*x^(3 - n))/b]*ArcSinh[(Sqrt[
```

```
a]*x^(3/2 - n/2))/Sqrt[b]]))/(3*c^6*(-3 + n)*x^5*Sqrt[a*x^3 + b*x
^n])
```

Maple [F] time = 0.056, size = 0, normalized size = 0.

$$\int 1 \left(a x^3+b x^n\right)^{\frac{3}{2}} (cx)^{-\frac{11}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*x^3+b*x^n)^(3/2)/(c*x)^(11/2),x)

[Out] int((a*x^3+b*x^n)^(3/2)/(c*x)^(11/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a x^3+b x^n\right)^{\frac{3}{2}}}{(cx)^{\frac{11}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^3 + b*x^n)^(3/2)/(c*x)^(11/2),x, algorithm="maxima")

[Out] integrate((a*x^3 + b*x^n)^(3/2)/(c*x)^(11/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^3 + b*x^n)^(3/2)/(c*x)^(11/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x**3+b*x**n)**(3/2)/(c*x)**(11/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a x^3+b x^n\right)^{\frac{3}{2}}}{(cx)^{\frac{11}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^3 + b*x^n)^(3/2)/(c*x)^(11/2),x, algorithm="giac")

[Out] integrate((a*x^3 + b*x^n)^(3/2)/(c*x)^(11/2), x)
```

3.375 $\int \frac{(ax^2+bx^n)^{3/2}}{c^4x^4}\,dx$

Optimal. Leaf size=104

$$\frac{2a^{3/2}\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{c^4(2-n)}-\frac{2a\sqrt{ax^2+bx^n}}{c^4(2-n)x}-\frac{2\left(ax^2+bx^n\right)^{3/2}}{3c^4(2-n)x^3}$$

```
[Out] (-2*a*Sqrt[a*x^2 + b*x^n])/(c^4*(2 - n)*x) - (2*(a*x^2 + b*x^n)^(
3/2))/(3*c^4*(2 - n)*x^3) + (2*a^(3/2)*ArcTanh[(Sqrt[a]*x)/Sqrt[a
*x^2 + b*x^n]])/(c^4*(2 - n))
```

Rubi [A] time = 0.224533, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{2a^{3/2}\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{c^4(2-n)}-\frac{2a\sqrt{ax^2+bx^n}}{c^4(2-n)x}-\frac{2\left(ax^2+bx^n\right)^{3/2}}{3c^4(2-n)x^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^2 + b*x^n)^(3/2)/(c^4*x^4),x]
```


```
[Out] (-2*a*Sqrt[a*x^2 + b*x^n])/(c^4*(2 - n)*x) - (2*(a*x^2 + b*x^n)^(
3/2))/(3*c^4*(2 - n)*x^3) + (2*a^(3/2)*ArcTanh[(Sqrt[a]*x)/Sqrt[a
*x^2 + b*x^n]])/(c^4*(2 - n))
```

Rubi in Sympy [A] time = 22.5031, size = 87, normalized size = 0.84

$$\frac{2a^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{c^4\left(-n+2\right)}-\frac{2a\sqrt{ax^2+bx^n}}{c^4x\left(-n+2\right)}-\frac{2\left(ax^2+bx^n\right)^{\frac{3}{2}}}{3c^4x^3\left(-n+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**2+b*x**n)**(3/2)/c**4/x**4,x)
```

```
[Out] 2*a**(3/2)*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**n))/(c**4*(-n + 2))
 - 2*a*sqrt(a*x**2 + b*x**n)/(c**4*x*(-n + 2)) - 2*(a*x**2 + b*x*
*n)**(3/2)/(3*c**4*x**3*(-n + 2))
```

Mathematica [A] time = 0.188749, size = 117, normalized size = 1.12

$$\frac{2\left(-3a^{3/2}\sqrt{b}x^{\frac{n}{2}+3}\sqrt{\frac{ax^{2-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{1-\frac{n}{2}}}{\sqrt{b}}\right)+4a^2x^4+5abx^{n+2}+b^2x^{2n}\right)}{3c^4(n-2)x^3\sqrt{ax^2+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^2 + b*x^n)^(3/2)/(c^4*x^4),x]
```

```
[Out] (2*(4*a^2*x^4 + b^2*x^(2*n) + 5*a*b*x^(2 + n) - 3*a^(3/2)*Sqrt[b]
*x^(3 + n/2)*Sqrt[1 + (a*x^(2 - n))/b]*ArcSinh[(Sqrt[a]*x^(1 - n/
2))/Sqrt[b]]))/(3*c^4*(-2 + n)*x^3*Sqrt[a*x^2 + b*x^n])
```

Maple [F] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{1}{c^4 x^4} \left(a x^2 + b x^n\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x^2+b*x^n)^(3/2)/c^4/x^4,x)

[Out] int((a*x^2+b*x^n)^(3/2)/c^4/x^4,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{\left(a x^2 + b x^n\right)^{\frac{3}{2}}}{x^4}\, dx}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^2 + b*x^n)^(3/2)/(c^4*x^4),x, algorithm="maxima")

[Out] integrate((a*x^2 + b*x^n)^(3/2)/x^4, x)/c^4
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^2 + b*x^n)^(3/2)/(c^4*x^4),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{a\sqrt{a x^2 + b x^n}}{x^2}\, dx + \int \frac{b x^n \sqrt{a x^2 + b x^n}}{x^4}\, dx}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x**2+b*x**n)**(3/2)/c**4/x**4,x)

[Out] (Integral(a*sqrt(a*x**2 + b*x**n)/x**2, x) + Integral(b*x**n*sqrt
(a*x**2 + b*x**n)/x**4, x))/c**4
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(a x^2 + b x^n\right)^{\frac{3}{2}}}{c^4 x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^2 + b*x^n)^(3/2)/(c^4*x^4),x, algorithm="giac")

[Out] integrate((a*x^2 + b*x^n)^(3/2)/(c^4*x^4), x)
```

3.376 $\int \frac{(ax+bx^n)^{3/2}}{(cx)^{5/2}} \, dx$

Optimal. Leaf size=122

$$\frac{2a^{3/2}\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{c^2(1-n)\sqrt{cx}}-\frac{2a\sqrt{ax+bx^n}}{c^2(1-n)\sqrt{cx}}-\frac{2\left(ax+bx^n\right)^{3/2}}{3c(1-n)(cx)^{3/2}}$$

```
[Out] (-2*a*Sqrt[a*x + b*x^n])/(c^2*(1 - n)*Sqrt[c*x]) - (2*(a*x + b*x^
n)^(3/2))/(3*c*(1 - n)*(c*x)^(3/2)) + (2*a^(3/2)*Sqrt[x]*ArcTanh[
(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^n]])/(c^2*(1 - n)*Sqrt[c*x])
```

Rubi [A] time = 0.303265, antiderivative size = 122, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.19

$$\frac{2a^{3/2}\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{c^2(1-n)\sqrt{cx}}-\frac{2a\sqrt{ax+bx^n}}{c^2(1-n)\sqrt{cx}}-\frac{2\left(ax+bx^n\right)^{3/2}}{3c(1-n)(cx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x + b*x^n)^(3/2)/(c*x)^(5/2),x]
```

```
[Out] (-2*a*Sqrt[a*x + b*x^n])/(c^2*(1 - n)*Sqrt[c*x]) - (2*(a*x + b*x^
n)^(3/2))/(3*c*(1 - n)*(c*x)^(3/2)) + (2*a^(3/2)*Sqrt[x]*ArcTanh[
(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^n]])/(c^2*(1 - n)*Sqrt[c*x])
```

Rubi in Sympy [A] time = 32.6313, size = 104, normalized size = 0.85

$$\frac{2a^{\frac{3}{2}}\sqrt{cx}\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{c^3\sqrt{x}\left(-n+1\right)}-\frac{2a\sqrt{ax+bx^n}}{c^2\sqrt{cx}\left(-n+1\right)}-\frac{2\left(ax+bx^n\right)^{\frac{3}{2}}}{3c\left(cx\right)^{\frac{3}{2}}\left(-n+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x+b*x**n)**(3/2)/(c*x)**(5/2),x)
```

```
[Out] 2*a**(3/2)*sqrt(c*x)*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*x**n))/(c
**3*sqrt(x)*(-n + 1)) - 2*a*sqrt(a*x + b*x**n)/(c**2*sqrt(c*x)*(-
n + 1)) - 2*(a*x + b*x**n)**(3/2)/(3*c*(c*x)**(3/2)*(-n + 1))
```

Mathematica [A] time = 0.326149, size = 120, normalized size = 0.98

$$\frac{x\left(-6a^{3/2}\sqrt{b}x^{\frac{n+3}{2}}\sqrt{\frac{ax^{1-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{1}{2}-\frac{n}{2}}}{\sqrt{b}}\right)+8a^2x^2+10abx^{n+1}+2b^2x^{2n}\right)}{3(n-1)(cx)^{5/2}\sqrt{ax+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x + b*x^n)^(3/2)/(c*x)^(5/2),x]
```

```
[Out] (x*(8*a^2*x^2 + 2*b^2*x^(2*n) + 10*a*b*x^(1 + n) - 6*a^(3/2)*Sqrt
[b]*x^((3 + n)/2)*Sqrt[1 + (a*x^(1 - n))/b]*ArcSinh[(Sqrt[a]*x^(1
/2 - n/2))/Sqrt[b]]))/(3*(-1 + n)*(c*x)^(5/2)*Sqrt[a*x + b*x^n])
```

Maple [F] time = 0.054, size = 0, normalized size = 0.

$$\int 1\left(ax+bx^n\right)^{\frac{3}{2}}\left(cx\right)^{-\frac{5}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x+b*x^n)^(3/2)/(c*x)^(5/2),x)

[Out] int((a*x+b*x^n)^(3/2)/(c*x)^(5/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax+bx^n\right)^{\frac{3}{2}}}{\left(cx\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^n)^(3/2)/(c*x)^(5/2),x, algorithm="maxima")

[Out] integrate((a*x + b*x^n)^(3/2)/(c*x)^(5/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^n)^(3/2)/(c*x)^(5/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x+b*x**n)**(3/2)/(c*x)**(5/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(ax+bx^n\right)^{\frac{3}{2}}}{\left(cx\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x + b*x^n)^(3/2)/(c*x)^(5/2),x, algorithm="giac")

[Out] integrate((a*x + b*x^n)^(3/2)/(c*x)^(5/2), x)
```

3.377 $\int \frac{(a+bx^n)^{3/2}}{cx}\,dx$

Optimal. Leaf size=73

$$-\frac{2a^{3/2}\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{cn}+\frac{2a\sqrt{a+bx^n}}{cn}+\frac{2\,(a+bx^n)^{3/2}}{3cn}$$

```
[Out] (2*a*Sqrt[a + b*x^n])/(c*n) + (2*(a + b*x^n)^(3/2))/(3*c*n) - (2*
a^(3/2)*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]])/(c*n)
```

Rubi [A] time = 0.100312, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.278$

$$-\frac{2a^{3/2}\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{cn}+\frac{2a\sqrt{a+bx^n}}{cn}+\frac{2\,(a+bx^n)^{3/2}}{3cn}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x^n)^(3/2)/(c*x),x]
```

```
[Out] (2*a*Sqrt[a + b*x^n])/(c*n) + (2*(a + b*x^n)^(3/2))/(3*c*n) - (2*
a^(3/2)*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]])/(c*n)
```

Rubi in Sympy [A] time = 12.2016, size = 60, normalized size = 0.82

$$-\frac{2a^{\frac{3}{2}}\operatorname{atanh}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{cn}+\frac{2a\sqrt{a+bx^n}}{cn}+\frac{2\,(a+bx^n)^{\frac{3}{2}}}{3cn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a+b*x**n)**(3/2)/c/x,x)
```

```
[Out] -2*a**(3/2)*atanh(sqrt(a + b*x**n)/sqrt(a))/(c*n) + 2*a*sqrt(a +
b*x**n)/(c*n) + 2*(a + b*x**n)**(3/2)/(3*c*n)
```

Mathematica [A] time = 0.0665277, size = 58, normalized size = 0.79

$$\frac{2\sqrt{a+bx^n}\,(4a+bx^n)-6a^{3/2}\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{3cn}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b*x^n)^(3/2)/(c*x),x]
```

```
[Out] (2*Sqrt[a + b*x^n]*(4*a + b*x^n) - 6*a^(3/2)*ArcTanh[Sqrt[a + b*x
^n]/Sqrt[a]])/(3*c*n)
```

Maple [A] time = 0.002, size = 51, normalized size = 0.7

$$\frac{1}{cn}\left(\frac{2}{3}(a+bx^n)^{\frac{3}{2}}+2\,a\sqrt{a+bx^n}-2\,a^{3/2}Artanh\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a+b*x^n)^(3/2)/c/x,x)
```

```
[Out] 1/c/n*(2/3*(a+b*x^n)^(3/2)+2*a*(a+b*x^n)^(1/2)-2*a^(3/2)*arctanh(
(a+b*x^n)^(1/2)/a^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^(3/2)/(c*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.241377, size = 1, normalized size = 0.01

$$\left[\frac{3\,a^{\frac{3}{2}}\log\left(\frac{bx^n-2\,\sqrt{bx^n+a}\sqrt{a}+2\,a}{x^n}\right)+2\,(bx^n+4\,a)\sqrt{bx^n+a}}{3\,cn},\right.$$
$$\left.-\frac{2\left(3\,\sqrt{-a}a\arctan\left(\frac{\sqrt{bx^n+a}}{\sqrt{-a}}\right)-(bx^n+4\,a)\sqrt{bx^n+a}\right)}{3\,cn}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^(3/2)/(c*x),x, algorithm="fricas")
```

```
[Out] [1/3*(3*a^(3/2)*log((b*x^n - 2*sqrt(b*x^n + a)*sqrt(a) + 2*a)/x^n
) + 2*(b*x^n + 4*a)*sqrt(b*x^n + a))/(c*n), -2/3*(3*sqrt(-a)*a*ar
ctan(sqrt(b*x^n + a)/sqrt(-a)) - (b*x^n + 4*a)*sqrt(b*x^n + a))/(
c*n)]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a+b*x**n)**(3/2)/c/x,x)
```

```
[Out] Exception raised: TypeError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{(bx^n+a)^{\frac{3}{2}}}{cx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a)^(3/2)/(c*x),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a)^(3/2)/(c*x), x)
```

3.378 $\int \sqrt{cx}\left(\frac{a}{x}+bx^n\right)^{3/2}\,dx$

Optimal. Leaf size=117

$$-\frac{2a^{3/2}c\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{(n+1)\sqrt{cx}}+\frac{2a\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}{n+1}+\frac{2(cx)^{3/2}\left(\frac{a}{x}+bx^n\right)^{3/2}}{3c(n+1)}$$

```
[Out] (2*a*Sqrt[c*x]*Sqrt[a/x + b*x^n])/(1 + n) + (2*(c*x)^(3/2)*(a/x +
 b*x^n)^(3/2))/(3*c*(1 + n)) - (2*a^(3/2)*c*Sqrt[x]*ArcTanh[Sqrt[
a]/(Sqrt[x]*Sqrt[a/x + b*x^n])])/((1 + n)*Sqrt[c*x])
```

Rubi [A] time = 0.357314, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$-\frac{2a^{3/2}c\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{(n+1)\sqrt{cx}}+\frac{2a\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}{n+1}+\frac{2(cx)^{3/2}\left(\frac{a}{x}+bx^n\right)^{3/2}}{3c(n+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c*x]*(a/x + b*x^n)^(3/2),x]
```

```
[Out] (2*a*Sqrt[c*x]*Sqrt[a/x + b*x^n])/(1 + n) + (2*(c*x)^(3/2)*(a/x +
 b*x^n)^(3/2))/(3*c*(1 + n)) - (2*a^(3/2)*c*Sqrt[x]*ArcTanh[Sqrt[
a]/(Sqrt[x]*Sqrt[a/x + b*x^n])])/((1 + n)*Sqrt[c*x])
```

Rubi in Sympy [A] time = 31.9468, size = 97, normalized size = 0.83

$$-\frac{2a^{\frac{3}{2}}\sqrt{cx}\operatorname{atanh}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{\sqrt{x}\,(n+1)}+\frac{2a\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}{n+1}+\frac{2\,(cx)^{\frac{3}{2}}\left(\frac{a}{x}+bx^n\right)^{\frac{3}{2}}}{3c\,(n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(1/2)*(a/x+b*x**n)**(3/2),x)
```

```
[Out] -2*a**(3/2)*sqrt(c*x)*atanh(sqrt(a)/(sqrt(x)*sqrt(a/x + b*x**n)))
/(sqrt(x)*(n + 1)) + 2*a*sqrt(c*x)*sqrt(a/x + b*x**n)/(n + 1) + 2
*(c*x)**(3/2)*(a/x + b*x**n)**(3/2)/(3*c*(n + 1))
```

Mathematica [A] time = 0.407489, size = 0, normalized size = 0.

$$\int \sqrt{cx}\left(\frac{a}{x}+bx^n\right)^{3/2}\,dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[Sqrt[c*x]*(a/x + b*x^n)^(3/2),x]
```

```
[Out] Integrate[Sqrt[c*x]*(a/x + b*x^n)^(3/2), x]
```

Maple [F] time = 0.056, size = 0, normalized size = 0.

$$\int \sqrt{cx}\left(\frac{a}{x}+bx^n\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(1/2)*(a/x+b*x^n)^(3/2),x)

[Out] int((c*x)^(1/2)*(a/x+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^n + \frac{a}{x}\right)^{\frac{3}{2}} \sqrt{cx}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x)^(3/2)*sqrt(c*x),x, algorithm="maxima")

[Out] integrate((b*x^n + a/x)^(3/2)*sqrt(c*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x)^(3/2)*sqrt(c*x),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(1/2)*(a/x+b*x**n)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^n + \frac{a}{x}\right)^{\frac{3}{2}} \sqrt{cx}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x)^(3/2)*sqrt(c*x),x, algorithm="giac")

[Out] integrate((b*x^n + a/x)^(3/2)*sqrt(c*x), x)
```

3.379 $\int c^2x^2\left(\frac{a}{x^2}+bx^n\right)^{3/2}\,dx$

Optimal. Leaf size=98

$$-\frac{2a^{3/2}c^2\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{n+2}+\frac{2ac^2x\sqrt{\frac{a}{x^2}+bx^n}}{n+2}+\frac{2c^2x^3\left(\frac{a}{x^2}+bx^n\right)^{3/2}}{3(n+2)}$$

```
[Out] (2*a*c^2*x*Sqrt[a/x^2 + b*x^n])/(2 + n) + (2*c^2*x^3*(a/x^2 + b*x
^n)^(3/2))/(3*(2 + n)) - (2*a^(3/2)*c^2*ArcTanh[Sqrt[a]/(x*Sqrt[a
/x^2 + b*x^n])])/(2 + n)
```

Rubi [A] time = 0.268372, antiderivative size = 98, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$-\frac{2a^{3/2}c^2\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{n+2}+\frac{2ac^2x\sqrt{\frac{a}{x^2}+bx^n}}{n+2}+\frac{2c^2x^3\left(\frac{a}{x^2}+bx^n\right)^{3/2}}{3(n+2)}$$

Antiderivative was successfully verified.

```
[In]  Int[c^2*x^2*(a/x^2 + b*x^n)^(3/2),x]
```

```
[Out] (2*a*c^2*x*Sqrt[a/x^2 + b*x^n])/(2 + n) + (2*c^2*x^3*(a/x^2 + b*x
^n)^(3/2))/(3*(2 + n)) - (2*a^(3/2)*c^2*ArcTanh[Sqrt[a]/(x*Sqrt[a
/x^2 + b*x^n])])/(2 + n)
```

Rubi in Sympy [A] time = 21.755, size = 87, normalized size = 0.89

$$-\frac{2a^{\frac{3}{2}}c^2\operatorname{atanh}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{n+2}+\frac{2ac^2x\sqrt{\frac{a}{x^2}+bx^n}}{n+2}+\frac{2c^2x^3\left(\frac{a}{x^2}+bx^n\right)^{\frac{3}{2}}}{3\,(n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(c**2*x**2*(a/x**2+b*x**n)**(3/2),x)
```

```
[Out] -2*a**(3/2)*c**2*atanh(sqrt(a)/(x*sqrt(a/x**2 + b*x**n)))/(n + 2)
 + 2*a*c**2*x*sqrt(a/x**2 + b*x**n)/(n + 2) + 2*c**2*x**3*(a/x**2
 + b*x**n)**(3/2)/(3*(n + 2))
```

Mathematica [A] time = 0.225331, size = 113, normalized size = 1.15

$$\frac{2c^2x\sqrt{\frac{a}{x^2}+bx^n}\left(-3a^{3/2}\log\left(\sqrt{a}\sqrt{a+bx^{n+2}}+a\right)+3a^{3/2}\log\left(x^{\frac{n+2}{2}}\right)+\sqrt{a+bx^{n+2}}\left(4a+bx^{n+2}\right)\right)}{3(n+2)\sqrt{a+bx^{n+2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[c^2*x^2*(a/x^2 + b*x^n)^(3/2),x]
```

```
[Out] (2*c^2*x*Sqrt[a/x^2 + b*x^n]*(Sqrt[a + b*x^(2 + n)]*(4*a + b*x^(2
 + n)) + 3*a^(3/2)*Log[x^((2 + n)/2)] - 3*a^(3/2)*Log[a + Sqrt[a]
*Sqrt[a + b*x^(2 + n)]]))/(3*(2 + n)*Sqrt[a + b*x^(2 + n)])
```

Maple [F] time = 0.052, size = 0, normalized size = 0.

$$\int c^{2} x^{2} \left(\frac{a}{x^{2}}+b x^{n}\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(c^2*x^2*(a/x^2+b*x^n)^(3/2),x)

[Out] int(c^2*x^2*(a/x^2+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$c^{2} \int \left(b x^{n}+\frac{a}{x^{2}}\right)^{\frac{3}{2}} x^{2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^2)^(3/2)*c^2*x^2,x, algorithm="maxima")

[Out] c^2*integrate((b*x^n + a/x^2)^(3/2)*x^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^2)^(3/2)*c^2*x^2,x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$c^{2} \left(\int a \sqrt{\frac{a}{x^{2}}+b x^{n}}\, dx+\int b x^{2} x^{n} \sqrt{\frac{a}{x^{2}}+b x^{n}}\, dx\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(c**2*x**2*(a/x**2+b*x**n)**(3/2),x)

[Out] c**2*(Integral(a*sqrt(a/x**2 + b*x**n), x) + Integral(b*x**2*x**n
*sqrt(a/x**2 + b*x**n), x))
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(b x^{n}+\frac{a}{x^{2}}\right)^{\frac{3}{2}} c^{2} x^{2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^2)^(3/2)*c^2*x^2,x, algorithm="giac")

[Out] integrate((b*x^n + a/x^2)^(3/2)*c^2*x^2, x)
```

3.380 $\int (cx)^{7/2} \left(\frac{a}{x^3}+bx^n\right)^{3/2} dx$

Optimal. Leaf size=122

$$-\frac{2a^{3/2}c^4\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{x^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{(n+3)\sqrt{cx}}+\frac{2ac^2(cx)^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}{n+3}+\frac{2(cx)^{9/2}\left(\frac{a}{x^3}+bx^n\right)^{3/2}}{3c(n+3)}$$

```
[Out] (2*a*c^2*(c*x)^(3/2)*Sqrt[a/x^3 + b*x^n])/(3 + n) + (2*(c*x)^(9/2
)*(a/x^3 + b*x^n)^(3/2))/(3*c*(3 + n)) - (2*a^(3/2)*c^4*Sqrt[x]*A
rcTanh[Sqrt[a]/(x^(3/2)*Sqrt[a/x^3 + b*x^n])])/((3 + n)*Sqrt[c*x]
)
```

Rubi [A] time = 0.42938, antiderivative size = 122, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$-\frac{2a^{3/2}c^4\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{x^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{(n+3)\sqrt{cx}}+\frac{2ac^2(cx)^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}{n+3}+\frac{2(cx)^{9/2}\left(\frac{a}{x^3}+bx^n\right)^{3/2}}{3c(n+3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^(7/2)*(a/x^3 + b*x^n)^(3/2),x]
```

```
[Out] (2*a*c^2*(c*x)^(3/2)*Sqrt[a/x^3 + b*x^n])/(3 + n) + (2*(c*x)^(9/2
)*(a/x^3 + b*x^n)^(3/2))/(3*c*(3 + n)) - (2*a^(3/2)*c^4*Sqrt[x]*A
rcTanh[Sqrt[a]/(x^(3/2)*Sqrt[a/x^3 + b*x^n])])/((3 + n)*Sqrt[c*x]
)
```

Rubi in Sympy [A] time = 33.1237, size = 109, normalized size = 0.89

$$-\frac{2a^{\frac{3}{2}}c^3\sqrt{cx}\,\operatorname{atanh}\left(\frac{\sqrt{a}}{x^{\frac{3}{2}}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{\sqrt{x}\,(n+3)}+\frac{2ac^2\,(cx)^{\frac{3}{2}}\,\sqrt{\frac{a}{x^3}+bx^n}}{n+3}+\frac{2\,(cx)^{\frac{9}{2}}\left(\frac{a}{x^3}+bx^n\right)^{\frac{3}{2}}}{3c\,(n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(7/2)*(a/x**3+b*x**n)**(3/2),x)
```

```
[Out] -2*a**(3/2)*c**3*sqrt(c*x)*atanh(sqrt(a)/(x**(3/2)*sqrt(a/x**3 +
b*x**n)))/(sqrt(x)*(n + 3)) + 2*a*c**2*(c*x)**(3/2)*sqrt(a/x**3 +
 b*x**n)/(n + 3) + 2*(c*x)**(9/2)*(a/x**3 + b*x**n)**(3/2)/(3*c*(
n + 3))
```

Mathematica [A] time = 0.432136, size = 0, normalized size = 0.

$$\int (cx)^{7/2}\left(\frac{a}{x^3}+bx^n\right)^{3/2} dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[(c*x)^(7/2)*(a/x^3 + b*x^n)^(3/2),x]
```

```
[Out] Integrate[(c*x)^(7/2)*(a/x^3 + b*x^n)^(3/2), x]
```

Maple [F] time = 0.058, size = 0, normalized size = 0.

$$\int (cx)^{\frac{7}{2}} \left(\frac{a}{x^3} + bx^n\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(7/2)*(a/x^3+b*x^n)^(3/2),x)
```

```
[Out] int((c*x)^(7/2)*(a/x^3+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^n + \frac{a}{x^3}\right)^{\frac{3}{2}} (cx)^{\frac{7}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^3)^(3/2)*(c*x)^(7/2),x, algorithm="maxima")
```

```
[Out] integrate((b*x^n + a/x^3)^(3/2)*(c*x)^(7/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^3)^(3/2)*(c*x)^(7/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(7/2)*(a/x**3+b*x**n)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^n + \frac{a}{x^3}\right)^{\frac{3}{2}} (cx)^{\frac{7}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^3)^(3/2)*(c*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a/x^3)^(3/2)*(c*x)^(7/2), x)
```

3.381 $\int c^5x^5\left(\frac{a}{x^4}+bx^n\right)^{3/2}dx$

Optimal. Leaf size=100

$$-\frac{2a^{3/2}c^5\tanh^{-1}\left(\frac{\sqrt{a}}{x^2\sqrt{\frac{a}{x^4}+bx^n}}\right)}{n+4}+\frac{2c^5x^6\left(\frac{a}{x^4}+bx^n\right)^{3/2}}{3(n+4)}+\frac{2ac^5x^2\sqrt{\frac{a}{x^4}+bx^n}}{n+4}$$

```
[Out] (2*a*c^5*x^2*Sqrt[a/x^4 + b*x^n])/(4 + n) + (2*c^5*x^6*(a/x^4 + b
*x^n)^(3/2))/(3*(4 + n)) - (2*a^(3/2)*c^5*ArcTanh[Sqrt[a]/(x^2*Sq
rt[a/x^4 + b*x^n])])/(4 + n)
```

Rubi [A] time = 0.325684, antiderivative size = 100, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{2a^{3/2}c^5\tanh^{-1}\left(\frac{\sqrt{a}}{x^2\sqrt{\frac{a}{x^4}+bx^n}}\right)}{n+4}+\frac{2c^5x^6\left(\frac{a}{x^4}+bx^n\right)^{3/2}}{3(n+4)}+\frac{2ac^5x^2\sqrt{\frac{a}{x^4}+bx^n}}{n+4}$$

Antiderivative was successfully verified.

```
[In]  Int[c^5*x^5*(a/x^4 + b*x^n)^(3/2),x]
```

```
[Out] (2*a*c^5*x^2*Sqrt[a/x^4 + b*x^n])/(4 + n) + (2*c^5*x^6*(a/x^4 + b
*x^n)^(3/2))/(3*(4 + n)) - (2*a^(3/2)*c^5*ArcTanh[Sqrt[a]/(x^2*Sq
rt[a/x^4 + b*x^n])])/(4 + n)
```

Rubi in Sympy [A] time = 26.0652, size = 90, normalized size = 0.9

$$-\frac{2a^{\frac{3}{2}}c^5\operatorname{atanh}\left(\frac{\sqrt{a}}{x^2\sqrt{\frac{a}{x^4}+bx^n}}\right)}{n+4}+\frac{2ac^5x^2\sqrt{\frac{a}{x^4}+bx^n}}{n+4}+\frac{2c^5x^6\left(\frac{a}{x^4}+bx^n\right)^{\frac{3}{2}}}{3\,(n+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(c**5*x**5*(a/x**4+b*x**n)**(3/2),x)
```

```
[Out] -2*a**(3/2)*c**5*atanh(sqrt(a)/(x**2*sqrt(a/x**4 + b*x**n)))/(n +
 4) + 2*a*c**5*x**2*sqrt(a/x**4 + b*x**n)/(n + 4) + 2*c**5*x**6*(
a/x**4 + b*x**n)**(3/2)/(3*(n + 4))
```

Mathematica [A] time = 0.230669, size = 115, normalized size = 1.15

$$\frac{2c^5x^2\sqrt{\frac{a}{x^4}+bx^n}\left(-3a^{3/2}\log\left(\sqrt{a}\sqrt{a+bx^{n+4}}+a\right)+3a^{3/2}\log\left(x^{\frac{n+4}{2}}\right)+\sqrt{a+bx^{n+4}}\left(4a+bx^{n+4}\right)\right)}{3(n+4)\sqrt{a+bx^{n+4}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[c^5*x^5*(a/x^4 + b*x^n)^(3/2),x]
```

```
[Out] (2*c^5*x^2*Sqrt[a/x^4 + b*x^n]*(Sqrt[a + b*x^(4 + n)]*(4*a + b*x^
(4 + n)) + 3*a^(3/2)*Log[x^((4 + n)/2)] - 3*a^(3/2)*Log[a + Sqrt[
a]*Sqrt[a + b*x^(4 + n)]]))/(3*(4 + n)*Sqrt[a + b*x^(4 + n)])
```

Maple [F] time = 0.069, size = 0, normalized size = 0.

$$\int c^{5}x^{5}\left(\frac{a}{x^{4}}+bx^{n}\right)^{\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(c^5*x^5*(a/x^4+b*x^n)^(3/2),x)
```

```
[Out] int(c^5*x^5*(a/x^4+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$c^{5}\int\left(bx^{n}+\frac{a}{x^{4}}\right)^{\frac{3}{2}}x^{5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^4)^(3/2)*c^5*x^5,x, algorithm="maxima")
```

```
[Out] c^5*integrate((b*x^n + a/x^4)^(3/2)*x^5, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^4)^(3/2)*c^5*x^5,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(c**5*x**5*(a/x**4+b*x**n)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\left(bx^{n}+\frac{a}{x^{4}}\right)^{\frac{3}{2}}c^{5}x^{5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a/x^4)^(3/2)*c^5*x^5,x, algorithm="giac")
```

```
[Out] integrate((b*x^n + a/x^4)^(3/2)*c^5*x^5, x)
```

3.382 $\int \sqrt{\frac{a+bx}{x^2}}\,dx$

Optimal. Leaf size=51

$$2x\sqrt{\frac{a}{x^2}+\frac{b}{x}}-2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+\frac{b}{x}}}\right)$$

```
[Out] 2*Sqrt[a/x^2 + b/x]*x - 2*Sqrt[a]*ArcTanh[Sqrt[a]/(Sqrt[a/x^2 + b
/x]*x)]
```

Rubi [A] time = 0.125978, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385

$$2x\sqrt{\frac{a}{x^2}+\frac{b}{x}}-2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+\frac{b}{x}}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(a + b*x)/x^2],x]
```

```
[Out] 2*Sqrt[a/x^2 + b/x]*x - 2*Sqrt[a]*ArcTanh[Sqrt[a]/(Sqrt[a/x^2 + b
/x]*x)]
```

Rubi in Sympy [A] time = 8.51486, size = 41, normalized size = 0.8

$$-2\sqrt{a}\,\text{atanh}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+\frac{b}{x}}}\right)+2x\sqrt{\frac{a}{x^2}+\frac{b}{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((b*x+a)/x**2)**(1/2),x)
```

```
[Out] -2*sqrt(a)*atanh(sqrt(a)/(x*sqrt(a/x**2 + b/x))) + 2*x*sqrt(a/x**
2 + b/x)
```

Mathematica [A] time = 0.0456024, size = 58, normalized size = 1.14

$$\frac{2x\sqrt{\frac{a+bx}{x^2}}\left(\sqrt{a+bx}-\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a+bx}}{\sqrt{a}}\right)\right)}{\sqrt{a+bx}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(a + b*x)/x^2],x]
```

```
[Out] (2*x*Sqrt[(a + b*x)/x^2]*(Sqrt[a + b*x] - Sqrt[a]*ArcTanh[Sqrt[a
+ b*x]/Sqrt[a]]))/Sqrt[a + b*x]
```

Maple [A] time = 0.01, size = 47, normalized size = 0.9

$$2\,\frac{x}{\sqrt{bx+a}}\sqrt{\frac{bx+a}{x^2}}\left(-\sqrt{a}\mathit{Artanh}\left(\frac{\sqrt{bx+a}}{\sqrt{a}}\right)+\sqrt{bx+a}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(((b*x+a)/x^2)^(1/2),x)
```

```
[Out] 2*((b*x+a)/x^2)^(1/2)*x*(-a^(1/2)*arctanh((b*x+a)^(1/2)/a^(1/2))+
(b*x+a)^(1/2))/(b*x+a)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x + a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.23282, size = 1, normalized size = 0.02

$$\left[2\,x\sqrt{\frac{bx+a}{x^2}}+\sqrt{a}\log\left(\frac{bx-2\,\sqrt{a}x\sqrt{\frac{bx+a}{x^2}}+2\,a}{x}\right), 2\,x\sqrt{\frac{bx+a}{x^2}}-2\,\sqrt{-a}\arctan\left(\frac{x\sqrt{\frac{bx+a}{x^2}}}{\sqrt{-a}}\right)\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x + a)/x^2),x, algorithm="fricas")
```

```
[Out] [2*x*sqrt((b*x + a)/x^2) + sqrt(a)*log((b*x - 2*sqrt(a)*x*sqrt((b
*x + a)/x^2) + 2*a)/x), 2*x*sqrt((b*x + a)/x^2) - 2*sqrt(-a)*arct
an(x*sqrt((b*x + a)/x^2)/sqrt(-a))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\frac{a+bx}{x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x+a)/x**2)**(1/2),x)
```

```
[Out] Integral(sqrt((a + b*x)/x**2), x)
```

GIAC/XCAS [A] time = 0.222044, size = 88, normalized size = 1.73

$$2\left(\frac{a\arctan\left(\frac{\sqrt{bx+a}}{\sqrt{-a}}\right)}{\sqrt{-a}}+\sqrt{bx+a}\right)\mathrm{sign}\left(x\right)-\frac{2\left(a\arctan\left(\frac{\sqrt{a}}{\sqrt{-a}}\right)+\sqrt{-a}\sqrt{a}\right)\mathrm{sign}\left(x\right)}{\sqrt{-a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x + a)/x^2),x, algorithm="giac")
```

```
[Out] 2*(a*arctan(sqrt(b*x + a)/sqrt(-a))/sqrt(-a) + sqrt(b*x + a))*sig
n(x) - 2*(a*arctan(sqrt(a)/sqrt(-a)) + sqrt(-a)*sqrt(a))*sign(x)/
sqrt(-a)
```

3.383 $\int \sqrt{\frac{a+bx^2}{x^2}}\,dx$

Optimal. Leaf size=42

$$x\sqrt{\frac{a}{x^2}+b}-\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+b}}\right)$$

```
[Out] Sqrt[b + a/x^2]*x - Sqrt[a]*ArcTanh[Sqrt[a]/(Sqrt[b + a/x^2]*x)]
```

Rubi [A] time = 0.0618879, antiderivative size = 42, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333

$$x\sqrt{\frac{a}{x^2}+b}-\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+b}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(a + b*x^2)/x^2],x]

[Out] Sqrt[b + a/x^2]*x - Sqrt[a]*ArcTanh[Sqrt[a]/(Sqrt[b + a/x^2]*x)]
```

Rubi in Sympy [A] time = 4.93287, size = 34, normalized size = 0.81

$$-\sqrt{a}\,\text{atanh}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+b}}\right)+x\sqrt{\frac{a}{x^2}+b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((b*x**2+a)/x**2)**(1/2),x)

[Out] -sqrt(a)*atanh(sqrt(a)/(x*sqrt(a/x**2 + b))) + x*sqrt(a/x**2 + b)
```

Mathematica [A] time = 0.0469191, size = 71, normalized size = 1.69

$$\frac{x\sqrt{\frac{a}{x^2}+b}\left(\sqrt{a+bx^2}-\sqrt{a}\log\left(\sqrt{a}\sqrt{a+bx^2}+a\right)+\sqrt{a}\log(x)\right)}{\sqrt{a+bx^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(a + b*x^2)/x^2],x]

[Out] (Sqrt[b + a/x^2]*x*(Sqrt[a + b*x^2] + Sqrt[a]*Log[x] - Sqrt[a]*Lo
g[a + Sqrt[a]*Sqrt[a + b*x^2]]))/Sqrt[a + b*x^2]
```

Maple [A] time = 0.01, size = 61, normalized size = 1.5

$$x\sqrt{\frac{bx^2+a}{x^2}}\left(\sqrt{bx^2+a}-\sqrt{a}\ln\left(2\,\frac{\sqrt{a}\sqrt{bx^2+a}+a}{x}\right)\right)\frac{1}{\sqrt{bx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(((b*x^2+a)/x^2)^(1/2),x)
```

```
[Out] ((b*x^2+a)/x^2)^(1/2)*x/(b*x^2+a)^(1/2)*((b*x^2+a)^(1/2)-a^(1/2)*
ln(2*(a^(1/2)*(b*x^2+a)^(1/2)+a)/x))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^2 + a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.251397, size = 1, normalized size = 0.02

$$\left[x\sqrt{\frac{bx^2+a}{x^2}}+\frac{1}{2}\sqrt{a}\log\left(-\frac{bx^2-2\sqrt{a}x\sqrt{\frac{bx^2+a}{x^2}}+2a}{x^2}\right), x\sqrt{\frac{bx^2+a}{x^2}}-\sqrt{-a}\arctan\left(\frac{a}{\sqrt{-a}x\sqrt{\frac{bx^2+a}{x^2}}}\right)\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^2 + a)/x^2),x, algorithm="fricas")
```

```
[Out] [x*sqrt((b*x^2 + a)/x^2) + 1/2*sqrt(a)*log(-(b*x^2 - 2*sqrt(a)*x*
sqrt((b*x^2 + a)/x^2) + 2*a)/x^2), x*sqrt((b*x^2 + a)/x^2) - sqrt
(-a)*arctan(a/(sqrt(-a)*x*sqrt((b*x^2 + a)/x^2)))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x**2+a)/x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222623, size = 92, normalized size = 2.19

$$\left(\frac{a\arctan\left(\frac{\sqrt{bx^2+a}}{\sqrt{-a}}\right)}{\sqrt{-a}}+\sqrt{bx^2+a}\right)\mathrm{sign}(x)-\frac{\left(a\arctan\left(\frac{\sqrt{a}}{\sqrt{-a}}\right)+\sqrt{-a}\sqrt{a}\right)\mathrm{sign}(x)}{\sqrt{-a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^2 + a)/x^2),x, algorithm="giac")
```

```
[Out] (a*arctan(sqrt(b*x^2 + a)/sqrt(-a))/sqrt(-a) + sqrt(b*x^2 + a))*s
ign(x) - (a*arctan(sqrt(a)/sqrt(-a)) + sqrt(-a)*sqrt(a))*sign(x)/
sqrt(-a)
```

3.384 $\int \sqrt{\frac{a+bx^3}{x^2}}\,dx$

Optimal. Leaf size=51

$$\frac{2}{3}x\sqrt{\frac{a}{x^2}+bx}-\frac{2}{3}\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx}}\right)$$

```
[Out] (2*x*Sqrt[a/x^2 + b*x])/3 - (2*Sqrt[a]*ArcTanh[Sqrt[a]/(x*Sqrt[a/
x^2 + b*x])])/3
```

Rubi [A] time = 0.112344, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.267

$$\frac{2}{3}x\sqrt{\frac{a}{x^2}+bx}-\frac{2}{3}\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(a + b*x^3)/x^2],x]
```

```
[Out] (2*x*Sqrt[a/x^2 + b*x])/3 - (2*Sqrt[a]*ArcTanh[Sqrt[a]/(x*Sqrt[a/
x^2 + b*x])])/3
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\frac{a+bx^3}{x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((b*x**3+a)/x**2)**(1/2),x)
```

```
[Out] Integral(sqrt((a + b*x**3)/x**2), x)
```

Mathematica [A] time = 0.0830906, size = 66, normalized size = 1.29

$$\frac{2}{3}x\sqrt{\frac{a}{x^2}+bx}-\frac{2x\sqrt{\frac{a}{x^2}+bx}\tanh^{-1}\left(\sqrt{\frac{bx^3}{a}+1}\right)}{3\sqrt{\frac{bx^3}{a}+1}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(a + b*x^3)/x^2],x]
```

```
[Out] (2*x*Sqrt[a/x^2 + b*x])/3 - (2*x*Sqrt[a/x^2 + b*x]*ArcTanh[Sqrt[1
 + (b*x^3)/a]])/(3*Sqrt[1 + (b*x^3)/a])
```

Maple [A] time = 0.011, size = 55, normalized size = 1.1

$$\frac{2x}{3}\sqrt{\frac{bx^3+a}{x^2}}\left(-\sqrt{a}Artanh\left(1\sqrt{bx^3+a}\frac{1}{\sqrt{a}}\right)+\sqrt{bx^3+a}\right)\frac{1}{\sqrt{bx^3+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int(((b*x^3+a)/x^2)^(1/2),x)
```

```
[Out] 2/3*((b*x^3+a)/x^2)^(1/2)*x*(-a^(1/2)*arctanh((b*x^3+a)^(1/2)/a^(
1/2))+(b*x^3+a)^(1/2))/(b*x^3+a)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt((b*x^3 + a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238227, size = 1, normalized size = 0.02

$$\left[\frac{2}{3}\,x\sqrt{\frac{bx^{3}+a}{x^{2}}}+\frac{1}{3}\,\sqrt{a}\log\left(\frac{bx^{3}-2\,\sqrt{a}x\sqrt{\frac{bx^{3}+a}{x^{2}}}+2\,a}{x^{3}}\right),\frac{2}{3}\,x\sqrt{\frac{bx^{3}+a}{x^{2}}}-\frac{2}{3}\,\sqrt{-a}\arctan\left(\frac{x\sqrt{\frac{bx^{3}+a}{x^{2}}}}{\sqrt{-a}}\right)\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt((b*x^3 + a)/x^2),x, algorithm="fricas")
```

```
[Out] [2/3*x*sqrt((b*x^3 + a)/x^2) + 1/3*sqrt(a)*log((b*x^3 - 2*sqrt(a)
*x*sqrt((b*x^3 + a)/x^2) + 2*a)/x^3), 2/3*x*sqrt((b*x^3 + a)/x^2)
 - 2/3*sqrt(-a)*arctan(x*sqrt((b*x^3 + a)/x^2)/sqrt(-a))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(((b*x**3+a)/x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222289, size = 93, normalized size = 1.82

$$\frac{2}{3}\left(\frac{a\arctan\left(\frac{\sqrt{bx^{3}+a}}{\sqrt{-a}}\right)}{\sqrt{-a}}+\sqrt{bx^{3}+a}\right)\operatorname{sign}(x)-\frac{2\left(a\arctan\left(\frac{\sqrt{a}}{\sqrt{-a}}\right)+\sqrt{-a}\sqrt{a}\right)\operatorname{sign}(x)}{3\,\sqrt{-a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   integrate(sqrt((b*x^3 + a)/x^2),x, algorithm="giac")
```

```
[Out] 2/3*(a*arctan(sqrt(b*x^3 + a)/sqrt(-a))/sqrt(-a) + sqrt(b*x^3 + a
))*sign(x) - 2/3*(a*arctan(sqrt(a)/sqrt(-a)) + sqrt(-a)*sqrt(a))*
sign(x)/sqrt(-a)
```

3.385 $\int \sqrt{\frac{a+bx^n}{x^2}}\,dx$

Optimal. Leaf size=61

$$\frac{2x\sqrt{\frac{a}{x^2}+bx^{n-2}}}{n}-\frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^{n-2}}}\right)}{n}$$

```
[Out] (2*x*Sqrt[a/x^2 + b*x^(-2 + n)])/n - (2*Sqrt[a]*ArcTanh[Sqrt[a]/(
x*Sqrt[a/x^2 + b*x^(-2 + n)])])/n
```

Rubi [A] time = 0.138083, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.267

$$\frac{2x\sqrt{\frac{a}{x^2}+bx^{n-2}}}{n}-\frac{2\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^{n-2}}}\right)}{n}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(a + b*x^n)/x^2],x]
```

```
[Out] (2*x*Sqrt[a/x^2 + b*x^(-2 + n)])/n - (2*Sqrt[a]*ArcTanh[Sqrt[a]/(
x*Sqrt[a/x^2 + b*x^(-2 + n)])])/n
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\frac{a+bx^n}{x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((a+b*x**n)/x**2)**(1/2),x)
```

```
[Out] Integral(sqrt((a + b*x**n)/x**2), x)
```

Mathematica [A] time = 0.0586529, size = 69, normalized size = 1.13

$$\frac{2x\sqrt{\frac{a+bx^n}{x^2}}\left(\sqrt{a+bx^n}-\sqrt{a}\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)\right)}{n\sqrt{a+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(a + b*x^n)/x^2],x]
```

```
[Out] (2*x*Sqrt[(a + b*x^n)/x^2]*(Sqrt[a + b*x^n] - Sqrt[a]*ArcTanh[Sqr
t[a + b*x^n]/Sqrt[a]]))/(n*Sqrt[a + b*x^n])
```

Maple [A] time = 0.055, size = 74, normalized size = 1.2

$$2\,\frac{x}{n}\sqrt{\frac{a+be^{n\ln(x)}}{x^2}}-2\,\frac{\sqrt{a}x}{n\sqrt{a+be^{n\ln(x)}}}\mathit{Artanh}\left(\frac{\sqrt{a+be^{n\ln(x)}}}{\sqrt{a}}\right)\sqrt{\frac{a+be^{n\ln(x)}}{x^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(((a+b*x^n)/x^2)^(1/2),x)
```

```
[Out] 2/n*((a+b*exp(n*ln(x)))/x^2)^(1/2)*x-2*a^(1/2)/n*arctanh((a+b*exp
(n*ln(x)))^(1/2)/a^(1/2))*((a+b*exp(n*ln(x)))/x^2)^(1/2)/(a+b*exp
(n*ln(x)))^(1/2)*x
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n + a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.24474, size = 1, normalized size = 0.02

$$\left[\frac{2\,x\sqrt{\frac{bx^n+a}{x^2}}+\sqrt{a}\log\left(\frac{bx^n-2\,\sqrt{a}x\sqrt{\frac{bx^n+a}{x^2}}+2\,a}{x^n}\right)}{n},\ \frac{2\left(x\sqrt{\frac{bx^n+a}{x^2}}-\sqrt{-a}\arctan\left(\frac{x\sqrt{\frac{bx^n+a}{x^2}}}{\sqrt{-a}}\right)\right)}{n}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n + a)/x^2),x, algorithm="fricas")
```

```
[Out] [(2*x*sqrt((b*x^n + a)/x^2) + sqrt(a)*log((b*x^n - 2*sqrt(a)*x*sq
rt((b*x^n + a)/x^2) + 2*a)/x^n))/n, 2*(x*sqrt((b*x^n + a)/x^2) -
sqrt(-a)*arctan(x*sqrt((b*x^n + a)/x^2)/sqrt(-a)))/n]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((a+b*x**n)/x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\frac{bx^n + a}{x^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n + a)/x^2),x, algorithm="giac")
```

```
[Out] integrate(sqrt((b*x^n + a)/x^2), x)
```

3.386 $\int \sqrt{\frac{-a+bx}{x^2}}\,dx$

Optimal. Leaf size=53

$$2x\sqrt{\frac{b}{x}-\frac{a}{x^2}}+2\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{b}{x}-\frac{a}{x^2}}}\right)$$

```
[Out] 2*Sqrt[-(a/x^2) + b/x]*x + 2*Sqrt[a]*ArcTan[Sqrt[a]/(Sqrt[-(a/x^2
) + b/x]*x)]
```

Rubi [A] time = 0.136955, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333

$$2x\sqrt{\frac{b}{x}-\frac{a}{x^2}}+2\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{b}{x}-\frac{a}{x^2}}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(-a + b*x)/x^2],x]
```

```
[Out] 2*Sqrt[-(a/x^2) + b/x]*x + 2*Sqrt[a]*ArcTan[Sqrt[a]/(Sqrt[-(a/x^2
) + b/x]*x)]
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\frac{-a+bx}{x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((b*x-a)/x**2)**(1/2),x)
```

```
[Out] Integral(sqrt((-a + b*x)/x**2), x)
```

Mathematica [A] time = 0.0509919, size = 66, normalized size = 1.25

$$\frac{2x\sqrt{\frac{bx-a}{x^2}}\left(\sqrt{bx-a}-\sqrt{a}\tan^{-1}\left(\frac{\sqrt{bx-a}}{\sqrt{a}}\right)\right)}{\sqrt{bx-a}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(-a + b*x)/x^2],x]
```

```
[Out] (2*x*Sqrt[(-a + b*x)/x^2]*(Sqrt[-a + b*x] - Sqrt[a]*ArcTan[Sqrt[-
a + b*x]/Sqrt[a]]))/Sqrt[-a + b*x]
```

Maple [A] time = 0.016, size = 56, normalized size = 1.1

$$-2\frac{x}{\sqrt{bx-a}}\sqrt{\frac{bx-a}{x^2}}\left(\sqrt{a}\arctan\left(\frac{\sqrt{bx-a}}{\sqrt{a}}\right)-\sqrt{bx-a}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(((b*x-a)/x^2)^(1/2),x)
```

```
[Out] -2*((b*x-a)/x^2)^(1/2)*x*(a^(1/2)*arctan((b*x-a)^(1/2)/a^(1/2))-(
b*x-a)^(1/2))/(b*x-a)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x - a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.238713, size = 1, normalized size = 0.02

$$\left[2\,x\sqrt{\frac{bx-a}{x^2}}+\sqrt{-a}\log\left(\frac{bx-2\,\sqrt{-a}x\sqrt{\frac{bx-a}{x^2}}-2\,a}{x}\right),2\,x\sqrt{\frac{bx-a}{x^2}}-2\,\sqrt{a}\arctan\left(\frac{x\sqrt{\frac{bx-a}{x^2}}}{\sqrt{a}}\right)\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x - a)/x^2),x, algorithm="fricas")
```

```
[Out] [2*x*sqrt((b*x - a)/x^2) + sqrt(-a)*log((b*x - 2*sqrt(-a)*x*sqrt(
(b*x - a)/x^2) - 2*a)/x), 2*x*sqrt((b*x - a)/x^2) - 2*sqrt(a)*arc
tan(x*sqrt((b*x - a)/x^2)/sqrt(a))]
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{\frac{-a+bx}{x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x-a)/x**2)**(1/2),x)
```

```
[Out] Integral(sqrt((-a + b*x)/x**2), x)
```

GIAC/XCAS [A] time = 0.220157, size = 82, normalized size = 1.55

$$-2\left(\sqrt{a}\arctan\left(\frac{\sqrt{bx-a}}{\sqrt{a}}\right)-\sqrt{bx-a}\right)\operatorname{sign}(x)+2\left(\sqrt{a}\arctan\left(\frac{\sqrt{-a}}{\sqrt{a}}\right)-\sqrt{-a}\right)\operatorname{sign}(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x - a)/x^2),x, algorithm="giac")
```

```
[Out] -2*(sqrt(a)*arctan(sqrt(b*x - a)/sqrt(a)) - sqrt(b*x - a))*sign(x
) + 2*(sqrt(a)*arctan(sqrt(-a)/sqrt(a)) - sqrt(-a))*sign(x)
```

3.387 $\int \sqrt{\frac{-a+bx^2}{x^2}}\,dx$

Optimal. Leaf size=43

$$x\sqrt{b-\frac{a}{x^2}}+\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{x\sqrt{b-\frac{a}{x^2}}}\right)$$

```
[Out] Sqrt[b - a/x^2]*x + Sqrt[a]*ArcTan[Sqrt[a]/(Sqrt[b - a/x^2]*x)]
```

Rubi [A] time = 0.0625333, antiderivative size = 43, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294

$$x\sqrt{b-\frac{a}{x^2}}+\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{x\sqrt{b-\frac{a}{x^2}}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(-a + b*x^2)/x^2],x]

[Out] Sqrt[b - a/x^2]*x + Sqrt[a]*ArcTan[Sqrt[a]/(Sqrt[b - a/x^2]*x)]
```

Rubi in Sympy [A] time = 5.09326, size = 34, normalized size = 0.79

$$\sqrt{a}\,\mathrm{atan}\left(\frac{\sqrt{a}}{x\sqrt{-\frac{a}{x^2}+b}}\right)+x\sqrt{-\frac{a}{x^2}+b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((b*x**2-a)/x**2)**(1/2),x)

[Out] sqrt(a)*atan(sqrt(a)/(x*sqrt(-a/x**2 + b))) + x*sqrt(-a/x**2 + b)
```

Mathematica [A] time = 0.067733, size = 67, normalized size = 1.56

$$\frac{x\sqrt{b-\frac{a}{x^2}}\left(\sqrt{bx^2-a}+\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{\sqrt{bx^2-a}}\right)\right)}{\sqrt{bx^2-a}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(-a + b*x^2)/x^2],x]

[Out] (Sqrt[b - a/x^2]*x*(Sqrt[-a + b*x^2] + Sqrt[a]*ArcTan[Sqrt[a]/Sqr
t[-a + b*x^2]]))/Sqrt[-a + b*x^2]
```

Maple [B] time = 0.011, size = 81, normalized size = 1.9

$$x\sqrt{\frac{bx^2-a}{x^2}}\left(\sqrt{-a}\sqrt{bx^2-a}+a\ln\left(2\,\frac{\sqrt{-a}\sqrt{bx^2-a}-a}{x}\right)\right)\frac{1}{\sqrt{-a}}\frac{1}{\sqrt{bx^2-a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(((b*x^2-a)/x^2)^(1/2),x)
```

```
[Out] ((b*x^2-a)/x^2)^(1/2)*x*((-a)^(1/2)*(b*x^2-a)^(1/2)+a*ln(2*((-a)^
(1/2)*(b*x^2-a)^(1/2)-a)/x))/(-a)^(1/2)/(b*x^2-a)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^2 - a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.243506, size = 1, normalized size = 0.02

$$\left[x\sqrt{\frac{bx^2-a}{x^2}}+\frac{1}{2}\sqrt{-a}\log\left(-\frac{bx^2-2\sqrt{-a}x\sqrt{\frac{bx^2-a}{x^2}}-2a}{x^2}\right), x\sqrt{\frac{bx^2-a}{x^2}}+\sqrt{a}\arctan\left(\frac{\sqrt{a}}{x\sqrt{\frac{bx^2-a}{x^2}}}\right)\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^2 - a)/x^2),x, algorithm="fricas")
```

```
[Out] [x*sqrt((b*x^2 - a)/x^2) + 1/2*sqrt(-a)*log(-(b*x^2 - 2*sqrt(-a)*
x*sqrt((b*x^2 - a)/x^2) - 2*a)/x^2), x*sqrt((b*x^2 - a)/x^2) + sq
rt(a)*arctan(sqrt(a)/(x*sqrt((b*x^2 - a)/x^2)))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x**2-a)/x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.221326, size = 86, normalized size = 2.

$$-\left(\sqrt{a}\arctan\left(\frac{\sqrt{bx^2-a}}{\sqrt{a}}\right)-\sqrt{bx^2-a}\right)\operatorname{sign}(x)+\left(\sqrt{a}\arctan\left(\frac{\sqrt{-a}}{\sqrt{a}}\right)-\sqrt{-a}\right)\operatorname{sign}(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^2 - a)/x^2),x, algorithm="giac")
```

```
[Out] -(sqrt(a)*arctan(sqrt(b*x^2 - a)/sqrt(a)) - sqrt(b*x^2 - a))*sign
(x) + (sqrt(a)*arctan(sqrt(-a)/sqrt(a)) - sqrt(-a))*sign(x)
```

3.388 $\int \sqrt{\frac{-a+bx^3}{x^2}}\,dx$

Optimal. Leaf size=53

$$\frac{2}{3}x\sqrt{bx-\frac{a}{x^2}}+\frac{2}{3}\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{x\sqrt{bx-\frac{a}{x^2}}}\right)$$

```
[Out] (2*x*Sqrt[-(a/x^2) + b*x])/3 + (2*Sqrt[a]*ArcTan[Sqrt[a]/(x*Sqrt[
-(a/x^2) + b*x])])/3
```

Rubi [A] time = 0.119749, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$\frac{2}{3}x\sqrt{bx-\frac{a}{x^2}}+\frac{2}{3}\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{x\sqrt{bx-\frac{a}{x^2}}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(-a + b*x^3)/x^2],x]
```

```
[Out] (2*x*Sqrt[-(a/x^2) + b*x])/3 + (2*Sqrt[a]*ArcTan[Sqrt[a]/(x*Sqrt[
-(a/x^2) + b*x])])/3
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\frac{-a+bx^3}{x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((b*x**3-a)/x**2)**(1/2),x)
```

```
[Out] Integral(sqrt((-a + b*x**3)/x**2), x)
```

Mathematica [A] time = 0.0929416, size = 70, normalized size = 1.32

$$\frac{2}{3}x\sqrt{bx-\frac{a}{x^2}}-\frac{2x\sqrt{bx-\frac{a}{x^2}}\tanh^{-1}\left(\sqrt{1-\frac{bx^3}{a}}\right)}{3\sqrt{1-\frac{bx^3}{a}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(-a + b*x^3)/x^2],x]
```

```
[Out] (2*x*Sqrt[-(a/x^2) + b*x])/3 - (2*x*Sqrt[-(a/x^2) + b*x]*ArcTanh[
Sqrt[1 - (b*x^3)/a]])/(3*Sqrt[1 - (b*x^3)/a])
```

Maple [A] time = 0.034, size = 73, normalized size = 1.4

$$\frac{2x}{3}\sqrt{\frac{bx^3-a}{x^2}}\left(\sqrt{bx^3-a}\sqrt{-a}+a\mathit{Artanh}\left(1\sqrt{bx^3-a}\frac{1}{\sqrt{-a}}\right)\right)\frac{1}{\sqrt{bx^3-a}}\frac{1}{\sqrt{-a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(((b*x^3-a)/x^2)^(1/2),x)
```

```
[Out] 2/3*((b*x^3-a)/x^2)^(1/2)*x*((b*x^3-a)^(1/2)*(-a)^(1/2)+a*arctanh
((b*x^3-a)^(1/2)/(-a)^(1/2)))/(b*x^3-a)^(1/2)/(-a)^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 - a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.22992, size = 1, normalized size = 0.02

$$\left[\frac{2}{3}\,x\sqrt{\frac{bx^3-a}{x^2}}+\frac{1}{3}\,\sqrt{-a}\log\left(\frac{bx^3-2\,\sqrt{-a}x\sqrt{\frac{bx^3-a}{x^2}}-2\,a}{x^3}\right),\frac{2}{3}\,x\sqrt{\frac{bx^3-a}{x^2}}-\frac{2}{3}\,\sqrt{a}\arctan\left(\frac{x\sqrt{\frac{bx^3-a}{x^2}}}{\sqrt{a}}\right)\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 - a)/x^2),x, algorithm="fricas")
```

```
[Out] [2/3*x*sqrt((b*x^3 - a)/x^2) + 1/3*sqrt(-a)*log((b*x^3 - 2*sqrt(-
a)*x*sqrt((b*x^3 - a)/x^2) - 2*a)/x^3), 2/3*x*sqrt((b*x^3 - a)/x^
2) - 2/3*sqrt(a)*arctan(x*sqrt((b*x^3 - a)/x^2)/sqrt(a))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x**3-a)/x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223384, size = 88, normalized size = 1.66

$$-\frac{2}{3}\left(\sqrt{a}\arctan\left(\frac{\sqrt{bx^3-a}}{\sqrt{a}}\right)-\sqrt{bx^3-a}\right)\operatorname{sign}(x)+\frac{2}{3}\left(\sqrt{a}\arctan\left(\frac{\sqrt{-a}}{\sqrt{a}}\right)-\sqrt{-a}\right)\operatorname{sign}(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 - a)/x^2),x, algorithm="giac")
```

```
[Out] -2/3*(sqrt(a)*arctan(sqrt(b*x^3 - a)/sqrt(a)) - sqrt(b*x^3 - a))*
sign(x) + 2/3*(sqrt(a)*arctan(sqrt(-a)/sqrt(a)) - sqrt(-a))*sign(
x)
```

3.389 $\int \sqrt{\frac{-a+bx^n}{x^2}}\,dx$

Optimal. Leaf size=63

$$\frac{2x\sqrt{bx^{n-2}-\frac{a}{x^2}}}{n}+\frac{2\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{x\sqrt{bx^{n-2}-\frac{a}{x^2}}}\right)}{n}$$

```
[Out] (2*x*Sqrt[-(a/x^2) + b*x^(-2 + n)])/n + (2*Sqrt[a]*ArcTan[Sqrt[a]
/(x*Sqrt[-(a/x^2) + b*x^(-2 + n)])])/n
```

Rubi [A] time = 0.142246, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235

$$\frac{2x\sqrt{bx^{n-2}-\frac{a}{x^2}}}{n}+\frac{2\sqrt{a}\tan^{-1}\left(\frac{\sqrt{a}}{x\sqrt{bx^{n-2}-\frac{a}{x^2}}}\right)}{n}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(-a + b*x^n)/x^2],x]
```

```
[Out] (2*x*Sqrt[-(a/x^2) + b*x^(-2 + n)])/n + (2*Sqrt[a]*ArcTan[Sqrt[a]
/(x*Sqrt[-(a/x^2) + b*x^(-2 + n)])])/n
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{\frac{-a+bx^n}{x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((-a+b*x**n)/x**2)**(1/2),x)
```

```
[Out] Integral(sqrt((-a + b*x**n)/x**2), x)
```

Mathematica [A] time = 0.0651508, size = 77, normalized size = 1.22

$$\frac{2x\sqrt{\frac{bx^n-a}{x^2}}\left(\sqrt{bx^n-a}-\sqrt{a}\tan^{-1}\left(\frac{\sqrt{bx^n-a}}{\sqrt{a}}\right)\right)}{n\sqrt{bx^n-a}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(-a + b*x^n)/x^2],x]
```

```
[Out] (2*x*Sqrt[(-a + b*x^n)/x^2]*(Sqrt[-a + b*x^n] - Sqrt[a]*ArcTan[Sq
rt[-a + b*x^n]/Sqrt[a]]))/(n*Sqrt[-a + b*x^n])
```

Maple [A] time = 0.067, size = 105, normalized size = 1.7

$$-2\frac{\left(a-be^{n\ln(x)}\right)x}{n\left(be^{n\ln(x)}-a\right)}\sqrt{\frac{be^{n\ln(x)}-a}{x^2}}-2\frac{\sqrt{a}x}{n\sqrt{be^{n\ln(x)}-a}}\arctan\left(\frac{\sqrt{be^{n\ln(x)}-a}}{\sqrt{a}}\right)\sqrt{\frac{be^{n\ln(x)}-a}{x^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(((b*x^n-a)/x^2)^(1/2),x)
```

```
[Out] -2*(a-b*exp(n*ln(x)))/n/(b*exp(n*ln(x))-a)*((b*exp(n*ln(x))-a)/x^
2)^(1/2)*x-2*a^(1/2)/n*arctan((b*exp(n*ln(x))-a)^(1/2)/a^(1/2))*(
(b*exp(n*ln(x))-a)/x^2)^(1/2)/(b*exp(n*ln(x))-a)^(1/2)*x
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n - a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.245611, size = 1, normalized size = 0.02

$$\left[\frac{2\,x\sqrt{\frac{bx^n-a}{x^2}}+\sqrt{-a}\log\left(\frac{bx^n-2\,\sqrt{-a}x\sqrt{\frac{bx^n-a}{x^2}}-2\,a}{x^n}\right)}{n},\ \frac{2\left(x\sqrt{\frac{bx^n-a}{x^2}}-\sqrt{a}\arctan\left(\frac{x\sqrt{\frac{bx^n-a}{x^2}}}{\sqrt{a}}\right)\right)}{n}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n - a)/x^2),x, algorithm="fricas")
```

```
[Out] [(2*x*sqrt((b*x^n - a)/x^2) + sqrt(-a)*log((b*x^n - 2*sqrt(-a)*x*
sqrt((b*x^n - a)/x^2) - 2*a)/x^n))/n, 2*(x*sqrt((b*x^n - a)/x^2)
- sqrt(a)*arctan(x*sqrt((b*x^n - a)/x^2)/sqrt(a)))/n]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((-a+b*x**n)/x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\frac{bx^n-a}{x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n - a)/x^2),x, algorithm="giac")
```

```
[Out] integrate(sqrt((b*x^n - a)/x^2), x)
```

3.390 $\int \frac{(cx)^{-1+\frac{j}{2}}}{\sqrt{ax^j+bx^n}}\,dx$

Optimal. Leaf size=62

$$\frac{2x^{-j/2}(cx)^{j/2}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{\sqrt{a}c(j-n)}$$

```
[Out] (2*(c*x)^(j/2)*ArcTanh[(Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(S
qrt[a]*c*(j - n)*x^(j/2))
```

Rubi [A] time = 0.187209, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$\frac{2x^{-j/2}(cx)^{j/2}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{\sqrt{a}c(j-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^(-1 + j/2)/Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*(c*x)^(j/2)*ArcTanh[(Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(S
qrt[a]*c*(j - n)*x^(j/2))
```

Rubi in Sympy [A] time = 16.8545, size = 48, normalized size = 0.77

$$\frac{2x^{-\frac{j}{2}}(cx)^{\frac{j}{2}}\operatorname{atanh}\left(\frac{\sqrt{a}x^{\frac{j}{2}}}{\sqrt{ax^j+bx^n}}\right)}{\sqrt{a}c\,(j-n)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(-1+1/2*j)/(a*x**j+b*x**n)**(1/2),x)
```

```
[Out] 2*x**(-j/2)*(c*x)**(j/2)*atanh(sqrt(a)*x**(j/2)/sqrt(a*x**j + b*x
**n))/(sqrt(a)*c*(j - n))
```

Mathematica [A] time = 0.1581, size = 98, normalized size = 1.58

$$\frac{2\sqrt{b}(cx)^{j/2}x^{\frac{n-j}{2}}\sqrt{\frac{ax^{j-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{j-n}{2}}}{\sqrt{b}}\right)}{\sqrt{a}c(j-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^(-1 + j/2)/Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*Sqrt[b]*x^((-j + n)/2)*(c*x)^(j/2)*Sqrt[1 + (a*x^(j - n))/b]*A
rcSinh[(Sqrt[a]*x^((j - n)/2))/Sqrt[b]])/(Sqrt[a]*c*(j - n)*Sqrt[
a*x^j + b*x^n])
```

Maple [F] time = 0.114, size = 0, normalized size = 0.

$$\int 1\,(cx)^{-1+\frac{j}{2}}\frac{1}{\sqrt{ax^j+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(-1+1/2*j)/(a*x^j+b*x^n)^(1/2),x)

[Out] int((c*x)^(-1+1/2*j)/(a*x^j+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^{\frac{1}{2}j-1}}{\sqrt{ax^j + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(1/2*j - 1)/sqrt(a*x^j + b*x^n),x, algorithm="maxima")

[Out] integrate((c*x)^(1/2*j - 1)/sqrt(a*x^j + b*x^n), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(1/2*j - 1)/sqrt(a*x^j + b*x^n),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^{\frac{j}{2}-1}}{\sqrt{ax^j + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(-1+1/2*j)/(a*x**j+b*x**n)**(1/2),x)

[Out] Integral((c*x)**(j/2 - 1)/sqrt(a*x**j + b*x**n), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^{\frac{1}{2}j-1}}{\sqrt{ax^j + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(1/2*j - 1)/sqrt(a*x^j + b*x^n),x, algorithm="giac")

[Out] integrate((c*x)^(1/2*j - 1)/sqrt(a*x^j + b*x^n), x)
```

3.391 $\int \frac{\sqrt{cx}}{\sqrt{ax^3+bx^n}}\,dx$

Optimal. Leaf size=53

$$\frac{2\sqrt{cx}\tanh^{-1}\left(\frac{\sqrt{a}x^{3/2}}{\sqrt{ax^3+bx^n}}\right)}{\sqrt{a}(3-n)\sqrt{x}}$$

```
[Out] (2*Sqrt[c*x]*ArcTanh[(Sqrt[a]*x^(3/2))/Sqrt[a*x^3 + b*x^n]])/(Sqr
t[a]*(3 - n)*Sqrt[x])
```

Rubi [A] time = 0.170285, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.13

$$\frac{2\sqrt{cx}\tanh^{-1}\left(\frac{\sqrt{a}x^{3/2}}{\sqrt{ax^3+bx^n}}\right)}{\sqrt{a}(3-n)\sqrt{x}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[c*x]/Sqrt[a*x^3 + b*x^n],x]
```

```
[Out] (2*Sqrt[c*x]*ArcTanh[(Sqrt[a]*x^(3/2))/Sqrt[a*x^3 + b*x^n]])/(Sqr
t[a]*(3 - n)*Sqrt[x])
```

Rubi in Sympy [A] time = 15.3019, size = 46, normalized size = 0.87

$$\frac{2\sqrt{cx}\,\operatorname{atanh}\left(\frac{\sqrt{a}x^{\frac{3}{2}}}{\sqrt{ax^3+bx^n}}\right)}{\sqrt{a}\sqrt{x}\,(-n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(1/2)/(a*x**3+b*x**n)**(1/2),x)
```

```
[Out] 2*sqrt(c*x)*atanh(sqrt(a)*x**(3/2)/sqrt(a*x**3 + b*x**n))/(sqrt(a
)*sqrt(x)*(-n + 3))
```

Mathematica [A] time = 0.162442, size = 89, normalized size = 1.68

$$-\frac{2\sqrt{b}\sqrt{cx}x^{\frac{n-1}{2}}\sqrt{\frac{ax^{3-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{3}{2}-\frac{n}{2}}}{\sqrt{b}}\right)}{\sqrt{a}(n-3)\sqrt{ax^3+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[c*x]/Sqrt[a*x^3 + b*x^n],x]
```

```
[Out] (-2*Sqrt[b]*x^((-1 + n)/2)*Sqrt[c*x]*Sqrt[1 + (a*x^(3 - n))/b]*Ar
cSinh[(Sqrt[a]*x^(3/2 - n/2))/Sqrt[b]])/(Sqrt[a]*(-3 + n)*Sqrt[a*
x^3 + b*x^n])
```

Maple [F] time = 0.064, size = 0, normalized size = 0.

$$\int 1\sqrt{cx}\frac{1}{\sqrt{ax^3+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(1/2)/(a*x^3+b*x^n)^(1/2),x)

[Out] int((c*x)^(1/2)/(a*x^3+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{cx}}{\sqrt{ax^3+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x)/sqrt(a*x^3 + b*x^n),x, algorithm="maxima")

[Out] integrate(sqrt(c*x)/sqrt(a*x^3 + b*x^n), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x)/sqrt(a*x^3 + b*x^n),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{cx}}{\sqrt{ax^3+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(1/2)/(a*x**3+b*x**n)**(1/2),x)

[Out] Integral(sqrt(c*x)/sqrt(a*x**3 + b*x**n), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{cx}}{\sqrt{ax^3+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x)/sqrt(a*x^3 + b*x^n),x, algorithm="giac")

[Out] integrate(sqrt(c*x)/sqrt(a*x^3 + b*x^n), x)
```

3.392 $\int \frac{1}{\sqrt{ax^2+bx^n}}\,dx$

Optimal. Leaf size=37

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{\sqrt{a}(2-n)}$$

```
[Out] (2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^n]])/(Sqrt[a]*(2 - n))
```

Rubi [A] time = 0.033683, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.133$

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{\sqrt{a}(2-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[a*x^2 + b*x^n],x]

[Out] (2*ArcTanh[(Sqrt[a]*x)/Sqrt[a*x^2 + b*x^n]])/(Sqrt[a]*(2 - n))
```

Rubi in Sympy [A] time = 3.16503, size = 31, normalized size = 0.84

$$\frac{2\,\text{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{\sqrt{a}\,(-n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x**2+b*x**n)**(1/2),x)

[Out] 2*atanh(sqrt(a)*x/sqrt(a*x**2 + b*x**n))/(sqrt(a)*(-n + 2))
```

Mathematica [B] time = 0.101691, size = 78, normalized size = 2.11

$$-\frac{2\sqrt{b}x^{n/2}\sqrt{\frac{ax^{2-n}}{b}+1}\,\sinh^{-1}\left(\frac{\sqrt{a}x^{1-\frac{n}{2}}}{\sqrt{b}}\right)}{\sqrt{a}(n-2)\sqrt{ax^2+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[a*x^2 + b*x^n],x]

[Out] (-2*Sqrt[b]*x^(n/2)*Sqrt[1 + (a*x^(2 - n))/b]*ArcSinh[(Sqrt[a]*x^
(1 - n/2))/Sqrt[b]])/(Sqrt[a]*(-2 + n)*Sqrt[a*x^2 + b*x^n])
```

Maple [F] time = 0.044, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax^2+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x^2+b*x^n)^(1/2),x)

[Out] int(1/(a*x^2+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax^2 + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x^2 + b*x^n),x, algorithm="maxima")

[Out] integrate(1/sqrt(a*x^2 + b*x^n), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x^2 + b*x^n),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax^2 + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**2+b*x**n)**(1/2),x)

[Out] Integral(1/sqrt(a*x**2 + b*x**n), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax^2 + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x^2 + b*x^n),x, algorithm="giac")

[Out] integrate(1/sqrt(a*x^2 + b*x^n), x)
```

3.393 $\int \frac{1}{\sqrt{cx}\sqrt{ax+bx^n}}\,dx$

Optimal. Leaf size=51

$$\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{\sqrt{a}(1-n)\sqrt{cx}}$$

```
[Out] (2*Sqrt[x]*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^n]])/(Sqrt[a]
*(1 - n)*Sqrt[c*x])
```

Rubi [A] time = 0.148136, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{\sqrt{a}(1-n)\sqrt{cx}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(Sqrt[c*x]*Sqrt[a*x + b*x^n]),x]
```

```
[Out] (2*Sqrt[x]*ArcTanh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^n]])/(Sqrt[a]
*(1 - n)*Sqrt[c*x])
```

Rubi in Sympy [A] time = 15.6798, size = 46, normalized size = 0.9

$$\frac{2\sqrt{cx}\,\text{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{\sqrt{ac}\sqrt{x}\,(-n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(c*x)**(1/2)/(a*x+b*x**n)**(1/2),x)
```

```
[Out] 2*sqrt(c*x)*atanh(sqrt(a)*sqrt(x)/sqrt(a*x + b*x**n))/(sqrt(a)*c*
sqrt(x)*(-n + 1))
```

Mathematica [A] time = 0.139286, size = 87, normalized size = 1.71

$$-\frac{2\sqrt{b}x^{\frac{n+1}{2}}\sqrt{\frac{ax^{1-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{1}{2}-\frac{n}{2}}}{\sqrt{b}}\right)}{\sqrt{a}(n-1)\sqrt{cx}\sqrt{ax+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(Sqrt[c*x]*Sqrt[a*x + b*x^n]),x]
```

```
[Out] (-2*Sqrt[b]*x^((1 + n)/2)*Sqrt[1 + (a*x^(1 - n))/b]*ArcSinh[(Sqrt
[a]*x^(1/2 - n/2))/Sqrt[b]])/(Sqrt[a]*(-1 + n)*Sqrt[c*x]*Sqrt[a*x
 + b*x^n])
```

Maple [F] time = 0.061, size = 0, normalized size = 0.

$$\int 1\frac{1}{\sqrt{cx}}\frac{1}{\sqrt{ax+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(c*x)^(1/2)/(a*x+b*x^n)^(1/2),x)
```

```
[Out] int(1/(c*x)^(1/2)/(a*x+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax+bx^n}\sqrt{cx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^n)*sqrt(c*x)),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(a*x + b*x^n)*sqrt(c*x)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^n)*sqrt(c*x)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{cx}\sqrt{ax+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(c*x)**(1/2)/(a*x+b*x**n)**(1/2),x)
```

```
[Out] Integral(1/(sqrt(c*x)*sqrt(a*x + b*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{ax+bx^n}\sqrt{cx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(a*x + b*x^n)*sqrt(c*x)),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(a*x + b*x^n)*sqrt(c*x)), x)
```

3.394 $\int \frac{1}{cx\sqrt{a+bx^n}}\,dx$

Optimal. Leaf size=31

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{\sqrt{a}cn}$$

```
[Out] (-2*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]])/(Sqrt[a]*c*n)
```

Rubi [A] time = 0.0544201, antiderivative size = 31, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{\sqrt{a}cn}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(c*x*Sqrt[a + b*x^n]),x]

[Out] (-2*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]])/(Sqrt[a]*c*n)
```

Rubi in Sympy [A] time = 6.76791, size = 27, normalized size = 0.87

$$-\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{\sqrt{a}cn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/c/x/(a+b*x**n)**(1/2),x)

[Out] -2*atanh(sqrt(a + b*x**n)/sqrt(a))/(sqrt(a)*c*n)
```

Mathematica [A] time = 0.0291236, size = 31, normalized size = 1.

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{\sqrt{a}cn}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(c*x*Sqrt[a + b*x^n]),x]

[Out] (-2*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]])/(Sqrt[a]*c*n)
```

Maple [A] time = 0.002, size = 26, normalized size = 0.8

$$-2\,\frac{1}{cn\sqrt{a}}\mathit{Artanh}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/c/x/(a+b*x^n)^(1/2),x)

[Out] -2*arctanh((a+b*x^n)^(1/2)/a^(1/2))/c/n/a^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a)*c*x),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.250516, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(\frac{\sqrt{a}bx^n-2\sqrt{bx^n+a}a+2a^{\frac{3}{2}}}{x^n}\right)}{\sqrt{a}cn}, \frac{2\arctan\left(\frac{a}{\sqrt{bx^n+a}\sqrt{-a}}\right)}{\sqrt{-a}cn}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a)*c*x),x, algorithm="fricas")

[Out] [log((sqrt(a)*b*x^n - 2*sqrt(b*x^n + a)*a + 2*a^(3/2))/x^n)/(sqrt
(a)*c*n), 2*arctan(a/(sqrt(b*x^n + a)*sqrt(-a)))/(sqrt(-a)*c*n)]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/c/x/(a+b*x**n)**(1/2),x)

[Out] Exception raised: TypeError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^n + a}cx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a)*c*x),x, algorithm="giac")

[Out] integrate(1/(sqrt(b*x^n + a)*c*x), x)
```

3.395 $\int \frac{1}{(cx)^{3/2}\sqrt{\frac{a}{x}+bx^n}}\,dx$

Optimal. Leaf size=54

$$-\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{\sqrt{a}c(n+1)\sqrt{cx}}$$

```
[Out] (-2*Sqrt[x]*ArcTanh[Sqrt[a]/(Sqrt[x]*Sqrt[a/x + b*x^n])])/(Sqrt[a
]*c*(1 + n)*Sqrt[c*x])
```

Rubi [A] time = 0.186412, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.13

$$-\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{\sqrt{a}c(n+1)\sqrt{cx}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((c*x)^(3/2)*Sqrt[a/x + b*x^n]),x]
```

```
[Out] (-2*Sqrt[x]*ArcTanh[Sqrt[a]/(Sqrt[x]*Sqrt[a/x + b*x^n])])/(Sqrt[a
]*c*(1 + n)*Sqrt[c*x])
```

Rubi in Sympy [A] time = 15.734, size = 49, normalized size = 0.91

$$-\frac{2\sqrt{cx}\,\operatorname{atanh}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{\sqrt{a}c^2\sqrt{x}\,(n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(c*x)**(3/2)/(a/x+b*x**n)**(1/2),x)
```

```
[Out] -2*sqrt(c*x)*atanh(sqrt(a)/(sqrt(x)*sqrt(a/x + b*x**n)))/(sqrt(a)
*c**2*sqrt(x)*(n + 1))
```

Mathematica [A] time = 0.149559, size = 83, normalized size = 1.54

$$\frac{2x\sqrt{a+bx^{n+1}}\left(\log\left(x^{\frac{n+1}{2}}\right)-\log\left(\sqrt{a}\sqrt{a+bx^{n+1}}+a\right)\right)}{\sqrt{a}(n+1)(cx)^{3/2}\sqrt{\frac{a}{x}+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/((c*x)^(3/2)*Sqrt[a/x + b*x^n]),x]
```

```
[Out] (2*x*Sqrt[a + b*x^(1 + n)]*(Log[x^((1 + n)/2)] - Log[a + Sqrt[a]*
Sqrt[a + b*x^(1 + n)]]))/(Sqrt[a]*(1 + n)*(c*x)^(3/2)*Sqrt[a/x +
b*x^n])
```

Maple [F] time = 0.06, size = 0, normalized size = 0.

$$\int 1\,(cx)^{-\frac{3}{2}}\frac{1}{\sqrt{\frac{a}{x}+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(c*x)^(3/2)/(a/x+b*x^n)^(1/2),x)

[Out] int(1/(c*x)^(3/2)/(a/x+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^n + \frac{a}{x}}\,(cx)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x)*(c*x)^(3/2)),x, algorithm="maxima")

[Out] integrate(1/(sqrt(b*x^n + a/x)*(c*x)^(3/2)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x)*(c*x)^(3/2)),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(c*x)**(3/2)/(a/x+b*x**n)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^n + \frac{a}{x}}\,(cx)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x)*(c*x)^(3/2)),x, algorithm="giac")

[Out] integrate(1/(sqrt(b*x^n + a/x)*(c*x)^(3/2)), x)
```

3.396 $\int \frac{1}{c^2x^2\sqrt{\frac{a}{x^2}+bx^n}}\,dx$

Optimal. Leaf size=40

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{\sqrt{a}c^2(n+2)}$$

```
[Out] (-2*ArcTanh[Sqrt[a]/(x*Sqrt[a/x^2 + b*x^n])])/(Sqrt[a]*c^2*(2 + n
))
```

Rubi [A] time = 0.128473, antiderivative size = 40, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{\sqrt{a}c^2(n+2)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(c^2*x^2*Sqrt[a/x^2 + b*x^n]),x]
```

```
[Out] (-2*ArcTanh[Sqrt[a]/(x*Sqrt[a/x^2 + b*x^n])])/(Sqrt[a]*c^2*(2 + n
))
```

Rubi in Sympy [A] time = 10.8593, size = 36, normalized size = 0.9

$$-\frac{2\operatorname{atanh}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{\sqrt{a}c^2\,(n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/c**2/x**2/(a/x**2+b*x**n)**(1/2),x)
```

```
[Out] -2*atanh(sqrt(a)/(x*sqrt(a/x**2 + b*x**n)))/(sqrt(a)*c**2*(n + 2)
)
```

Mathematica [B] time = 0.144637, size = 81, normalized size = 2.02

$$\frac{2\sqrt{a+bx^{n+2}}\left(\log\left(x^{\frac{n+2}{2}}\right)-\log\left(\sqrt{a}\sqrt{a+bx^{n+2}}+a\right)\right)}{\sqrt{a}c^2(n+2)x\sqrt{\frac{a}{x^2}+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(c^2*x^2*Sqrt[a/x^2 + b*x^n]),x]
```

```
[Out] (2*Sqrt[a + b*x^(2 + n)]*(Log[x^((2 + n)/2)] - Log[a + Sqrt[a]*Sq
rt[a + b*x^(2 + n)]]))/(Sqrt[a]*c^2*(2 + n)*x*Sqrt[a/x^2 + b*x^n]
)
```

Maple [F] time = 0.052, size = 0, normalized size = 0.

$$\int \frac{1}{c^2x^2}\frac{1}{\sqrt{\frac{a}{x^2}+bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/c^2/x^2/(a/x^2+b*x^n)^(1/2),x)
```

```
[Out] int(1/c^2/x^2/(a/x^2+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{1}{\sqrt{bx^n+\frac{a}{x^2}}\,x^2}\,dx}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x^2)*c^2*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*x^n + a/x^2)*x^2), x)/c^2
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x^2)*c^2*x^2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{1}{x^2\sqrt{\frac{a}{x^2}+bx^n}}\,dx}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/c**2/x**2/(a/x**2+b*x**n)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(a/x**2 + b*x**n)), x)/c**2
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{bx^n+\frac{a}{x^2}}\,c^2x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x^2)*c^2*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*x^n + a/x^2)*c^2*x^2), x)
```

3.397 $\int \frac{1}{(cx)^{5/2}\sqrt{\frac{a}{x^3}+bx^n}}\,dx$

Optimal. Leaf size=54

$$-\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{x^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{\sqrt{a}c^2(n+3)\sqrt{cx}}$$

```
[Out] (-2*Sqrt[x]*ArcTanh[Sqrt[a]/(x^(3/2)*Sqrt[a/x^3 + b*x^n])])/(Sqrt
[a]*c^2*(3 + n)*Sqrt[c*x])
```

Rubi [A] time = 0.210333, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.13

$$-\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{x^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{\sqrt{a}c^2(n+3)\sqrt{cx}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((c*x)^(5/2)*Sqrt[a/x^3 + b*x^n]),x]
```

```
[Out] (-2*Sqrt[x]*ArcTanh[Sqrt[a]/(x^(3/2)*Sqrt[a/x^3 + b*x^n])])/(Sqrt
[a]*c^2*(3 + n)*Sqrt[c*x])
```

Rubi in Sympy [A] time = 15.9454, size = 51, normalized size = 0.94

$$-\frac{2\sqrt{cx}\,\mathrm{atanh}\left(\frac{\sqrt{a}}{x^{\frac{3}{2}}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{\sqrt{a}c^3\sqrt{x}\,(n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(c*x)**(5/2)/(a/x**3+b*x**n)**(1/2),x)
```

```
[Out] -2*sqrt(c*x)*atanh(sqrt(a)/(x**(3/2)*sqrt(a/x**3 + b*x**n)))/(sqr
t(a)*c**3*sqrt(x)*(n + 3))
```

Mathematica [A] time = 0.176505, size = 83, normalized size = 1.54

$$\frac{2x\sqrt{a+bx^{n+3}}\left(\log\left(x^{\frac{n+3}{2}}\right)-\log\left(\sqrt{a}\sqrt{a+bx^{n+3}}+a\right)\right)}{\sqrt{a}(n+3)(cx)^{5/2}\sqrt{\frac{a}{x^3}+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/((c*x)^(5/2)*Sqrt[a/x^3 + b*x^n]),x]
```

```
[Out] (2*x*Sqrt[a + b*x^(3 + n)]*(Log[x^((3 + n)/2)] - Log[a + Sqrt[a]*
Sqrt[a + b*x^(3 + n)]]))/(Sqrt[a]*(3 + n)*(c*x)^(5/2)*Sqrt[a/x^3
+ b*x^n])
```

Maple [F] time = 0.061, size = 0, normalized size = 0.

$$\int 1\left(cx\right)^{-\frac{5}{2}} \frac{1}{\sqrt{\frac{a}{x^{3}}+b x^{n}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(c*x)^(5/2)/(a/x^3+b*x^n)^(1/2),x)

[Out] int(1/(c*x)^(5/2)/(a/x^3+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b x^{n}+\frac{a}{x^{3}}}\left(cx\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x^3)*(c*x)^(5/2)),x, algorithm="maxima")

[Out] integrate(1/(sqrt(b*x^n + a/x^3)*(c*x)^(5/2)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x^3)*(c*x)^(5/2)),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(c*x)**(5/2)/(a/x**3+b*x**n)**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b x^{n}+\frac{a}{x^{3}}}\left(cx\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(sqrt(b*x^n + a/x^3)*(c*x)^(5/2)),x, algorithm="giac")

[Out] integrate(1/(sqrt(b*x^n + a/x^3)*(c*x)^(5/2)), x)
```

3.398 $\int \frac{(cx)^{-1+\frac{3j}{2}}}{(ax^j+bx^n)^{3/2}}\,dx$

Optimal. Leaf size=107

$$\frac{2x^{-3j/2}(cx)^{3j/2}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{a^{3/2}c(j-n)}-\frac{2x^{-j}(cx)^{3j/2}}{ac(j-n)\sqrt{ax^j+bx^n}}$$

```
[Out] (-2*(c*x)^((3*j)/2))/(a*c*(j - n)*x^j*Sqrt[a*x^j + b*x^n]) + (2*(
c*x)^((3*j)/2)*ArcTanh[(Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(a
^(3/2)*c*(j - n)*x^((3*j)/2))
```

Rubi [A] time = 0.296455, antiderivative size = 107, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{2x^{-3j/2}(cx)^{3j/2}\tanh^{-1}\left(\frac{\sqrt{a}x^{j/2}}{\sqrt{ax^j+bx^n}}\right)}{a^{3/2}c(j-n)}-\frac{2x^{-j}(cx)^{3j/2}}{ac(j-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^(-1 + (3*j)/2)/(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (-2*(c*x)^((3*j)/2))/(a*c*(j - n)*x^j*Sqrt[a*x^j + b*x^n]) + (2*(
c*x)^((3*j)/2)*ArcTanh[(Sqrt[a]*x^(j/2))/Sqrt[a*x^j + b*x^n]])/(a
^(3/2)*c*(j - n)*x^((3*j)/2))
```

Rubi in Sympy [A] time = 26.8575, size = 85, normalized size = 0.79

$$-\frac{2x^{-j}\left(cx\right)^{\frac{3j}{2}}}{ac\left(j-n\right)\sqrt{ax^j+bx^n}}+\frac{2x^{-\frac{3j}{2}}\left(cx\right)^{\frac{3j}{2}}\operatorname{atanh}\left(\frac{\sqrt{a}x^{\frac{j}{2}}}{\sqrt{ax^j+bx^n}}\right)}{a^{\frac{3}{2}}c\left(j-n\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(-1+3/2*j)/(a*x**j+b*x**n)**(3/2),x)
```

```
[Out] -2*x**(-j)*(c*x)**(3*j/2)/(a*c*(j - n)*sqrt(a*x**j + b*x**n)) + 2
*x**(-3*j/2)*(c*x)**(3*j/2)*atanh(sqrt(a)*x**(j/2)/sqrt(a*x**j +
b*x**n))/(a**(3/2)*c*(j - n))
```

Mathematica [A] time = 0.203206, size = 117, normalized size = 1.09

$$-\frac{2x^{-3j/2}(cx)^{3j/2}\left(\sqrt{a}x^{j/2}-\sqrt{b}x^{n/2}\sqrt{\frac{ax^{j-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{j-n}{2}}}{\sqrt{b}}\right)\right)}{a^{3/2}c(j-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^(-1 + (3*j)/2)/(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (-2*(c*x)^((3*j)/2)*(Sqrt[a]*x^(j/2) - Sqrt[b]*x^(n/2)*Sqrt[1 + (
a*x^(j - n))/b]*ArcSinh[(Sqrt[a]*x^((j - n)/2))/Sqrt[b]]))/(a^(3/
2)*c*(j - n)*x^((3*j)/2)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.111, size = 0, normalized size = 0.

$$\int 1\,(cx)^{-1+\frac{3j}{2}}\left(ax^{j}+bx^{n}\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(-1+3/2*j)/(a*x^j+b*x^n)^(3/2),x)

[Out] int((c*x)^(-1+3/2*j)/(a*x^j+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^{\frac{3}{2}j-1}}{(ax^{j}+bx^{n})^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(3/2*j - 1)/(a*x^j + b*x^n)^(3/2),x, algorithm="maxima")

[Out] integrate((c*x)^(3/2*j - 1)/(a*x^j + b*x^n)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(3/2*j - 1)/(a*x^j + b*x^n)^(3/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(-1+3/2*j)/(a*x**j+b*x**n)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^{\frac{3}{2}j-1}}{(ax^{j}+bx^{n})^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(3/2*j - 1)/(a*x^j + b*x^n)^(3/2),x, algorithm="giac")

[Out] integrate((c*x)^(3/2*j - 1)/(a*x^j + b*x^n)^(3/2), x)
```

3.399 $\int \frac{(cx)^{7/2}}{(ax^3+bx^n)^{3/2}}\,dx$

Optimal. Leaf size=94

$$\frac{2c^3\sqrt{cx}\tanh^{-1}\left(\frac{\sqrt{a}x^{3/2}}{\sqrt{ax^3+bx^n}}\right)}{a^{3/2}(3-n)\sqrt{x}}-\frac{2c^2(cx)^{3/2}}{a(3-n)\sqrt{ax^3+bx^n}}$$

```
[Out] (-2*c^2*(c*x)^(3/2))/(a*(3 - n)*Sqrt[a*x^3 + b*x^n]) + (2*c^3*Sqr
t[c*x]*ArcTanh[(Sqrt[a]*x^(3/2))/Sqrt[a*x^3 + b*x^n]])/(a^(3/2)*(
3 - n)*Sqrt[x])
```

Rubi [A] time = 0.266789, antiderivative size = 94, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$\frac{2c^3\sqrt{cx}\tanh^{-1}\left(\frac{\sqrt{a}x^{3/2}}{\sqrt{ax^3+bx^n}}\right)}{a^{3/2}(3-n)\sqrt{x}}-\frac{2c^2(cx)^{3/2}}{a(3-n)\sqrt{ax^3+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^(7/2)/(a*x^3 + b*x^n)^(3/2),x]
```

```
[Out] (-2*c^2*(c*x)^(3/2))/(a*(3 - n)*Sqrt[a*x^3 + b*x^n]) + (2*c^3*Sqr
t[c*x]*ArcTanh[(Sqrt[a]*x^(3/2))/Sqrt[a*x^3 + b*x^n]])/(a^(3/2)*(
3 - n)*Sqrt[x])
```

Rubi in Sympy [A] time = 24.9549, size = 80, normalized size = 0.85

$$-\frac{2c^2\,(cx)^{\frac{3}{2}}}{a\,(-n+3)\,\sqrt{ax^3+bx^n}}+\frac{2c^3\sqrt{cx}\,\operatorname{atanh}\left(\frac{\sqrt{a}x^{\frac{3}{2}}}{\sqrt{ax^3+bx^n}}\right)}{a^{\frac{3}{2}}\sqrt{x}\,(-n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**(7/2)/(a*x**3+b*x**n)**(3/2),x)
```

```
[Out] -2*c**2*(c*x)**(3/2)/(a*(-n + 3)*sqrt(a*x**3 + b*x**n)) + 2*c**3*
sqrt(c*x)*atanh(sqrt(a)*x**(3/2)/sqrt(a*x**3 + b*x**n))/(a**(3/2)
*sqrt(x)*(-n + 3))
```

Mathematica [A] time = 0.185135, size = 109, normalized size = 1.16

$$\frac{2c^3\sqrt{cx}\left(\sqrt{a}x^{3/2}-\sqrt{b}x^{n/2}\sqrt{\frac{ax^{3-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{3}{2}-\frac{n}{2}}}{\sqrt{b}}\right)\right)}{a^{3/2}(n-3)\sqrt{x}\sqrt{ax^3+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^(7/2)/(a*x^3 + b*x^n)^(3/2),x]
```

```
[Out] (2*c^3*Sqrt[c*x]*(Sqrt[a]*x^(3/2) - Sqrt[b]*x^(n/2)*Sqrt[1 + (a*x
^(3 - n))/b]*ArcSinh[(Sqrt[a]*x^(3/2 - n/2))/Sqrt[b]]))/(a^(3/2)*
(-3 + n)*Sqrt[x]*Sqrt[a*x^3 + b*x^n])
```

Maple [F] time = 0.052, size = 0, normalized size = 0.

$$\int 1\,(cx)^{\frac{7}{2}}\left(ax^3+bx^n\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(7/2)/(a*x^3+b*x^n)^(3/2),x)

[Out] int((c*x)^(7/2)/(a*x^3+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^{\frac{7}{2}}}{(ax^3+bx^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(7/2)/(a*x^3 + b*x^n)^(3/2),x, algorithm="maxima")

[Out] integrate((c*x)^(7/2)/(a*x^3 + b*x^n)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(7/2)/(a*x^3 + b*x^n)^(3/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(7/2)/(a*x**3+b*x**n)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^{\frac{7}{2}}}{(ax^3+bx^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^(7/2)/(a*x^3 + b*x^n)^(3/2),x, algorithm="giac")

[Out] integrate((c*x)^(7/2)/(a*x^3 + b*x^n)^(3/2), x)
```

3.400 $\int \frac{c^2x^2}{(ax^2+bx^n)^{3/2}}\,dx$

Optimal. Leaf size=72

$$\frac{2c^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{a^{3/2}(2-n)}-\frac{2c^2x}{a(2-n)\sqrt{ax^2+bx^n}}$$

```
[Out] (-2*c^2*x)/(a*(2 - n)*Sqrt[a*x^2 + b*x^n]) + (2*c^2*ArcTanh[(Sqrt
[a]*x)/Sqrt[a*x^2 + b*x^n]])/(a^(3/2)*(2 - n))
```

Rubi [A] time = 0.156995, antiderivative size = 72, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{2c^2\tanh^{-1}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{a^{3/2}(2-n)}-\frac{2c^2x}{a(2-n)\sqrt{ax^2+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c^2*x^2)/(a*x^2 + b*x^n)^(3/2),x]
```

```
[Out] (-2*c^2*x)/(a*(2 - n)*Sqrt[a*x^2 + b*x^n]) + (2*c^2*ArcTanh[(Sqrt
[a]*x)/Sqrt[a*x^2 + b*x^n]])/(a^(3/2)*(2 - n))
```

Rubi in Sympy [A] time = 15.1529, size = 60, normalized size = 0.83

$$-\frac{2c^2x}{a\left(-n+2\right)\sqrt{ax^2+bx^n}}+\frac{2c^2\operatorname{atanh}\left(\frac{\sqrt{a}x}{\sqrt{ax^2+bx^n}}\right)}{a^{\frac{3}{2}}\left(-n+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(c**2*x**2/(a*x**2+b*x**n)**(3/2),x)
```

```
[Out] -2*c**2*x/(a*(-n + 2)*sqrt(a*x**2 + b*x**n)) + 2*c**2*atanh(sqrt(
a)*x/sqrt(a*x**2 + b*x**n))/(a**(3/2)*(-n + 2))
```

Mathematica [A] time = 0.189848, size = 91, normalized size = 1.26

$$\frac{2c^2\left(\sqrt{a}x-\sqrt{b}x^{n/2}\sqrt{\frac{ax^{2-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{1-\frac{n}{2}}}{\sqrt{b}}\right)\right)}{a^{3/2}(n-2)\sqrt{ax^2+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c^2*x^2)/(a*x^2 + b*x^n)^(3/2),x]
```

```
[Out] (2*c^2*(Sqrt[a]*x - Sqrt[b]*x^(n/2)*Sqrt[1 + (a*x^(2 - n))/b]*Arc
Sinh[(Sqrt[a]*x^(1 - n/2))/Sqrt[b]]))/(a^(3/2)*(-2 + n)*Sqrt[a*x^
2 + b*x^n])
```

Maple [F] time = 0.048, size = 0, normalized size = 0.

$$\int c^2x^2\left(ax^2+bx^n\right)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(c^2*x^2/(a*x^2+b*x^n)^(3/2),x)
```

```
[Out] int(c^2*x^2/(a*x^2+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$c^2 \int \frac{x^2}{(ax^2 + bx^n)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(c^2*x^2/(a*x^2 + b*x^n)^(3/2),x, algorithm="maxima")
```

```
[Out] c^2*integrate(x^2/(a*x^2 + b*x^n)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(c^2*x^2/(a*x^2 + b*x^n)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$c^2 \int \frac{x^2}{ax^2\sqrt{ax^2 + bx^n} + bx^n\sqrt{ax^2 + bx^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(c**2*x**2/(a*x**2+b*x**n)**(3/2),x)
```

```
[Out] c**2*Integral(x**2/(a*x**2*sqrt(a*x**2 + b*x**n) + b*x**n*sqrt(a*
x**2 + b*x**n)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{c^2x^2}{(ax^2 + bx^n)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(c^2*x^2/(a*x^2 + b*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(c^2*x^2/(a*x^2 + b*x^n)^(3/2), x)
```

3.401 $\int \frac{\sqrt{cx}}{(ax+bx^n)^{3/2}}\,dx$

Optimal. Leaf size=85

$$\frac{2c\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{a^{3/2}(1-n)\sqrt{cx}}-\frac{2\sqrt{cx}}{a(1-n)\sqrt{ax+bx^n}}$$

```
[Out] (-2*Sqrt[c*x])/(a*(1 - n)*Sqrt[a*x + b*x^n]) + (2*c*Sqrt[x]*ArcTa
nh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^n]])/(a^(3/2)*(1 - n)*Sqrt[c*
x])
```

Rubi [A] time = 0.235133, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.19$

$$\frac{2c\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{a^{3/2}(1-n)\sqrt{cx}}-\frac{2\sqrt{cx}}{a(1-n)\sqrt{ax+bx^n}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[c*x]/(a*x + b*x^n)^(3/2),x]
```

```
[Out] (-2*Sqrt[c*x])/(a*(1 - n)*Sqrt[a*x + b*x^n]) + (2*c*Sqrt[x]*ArcTa
nh[(Sqrt[a]*Sqrt[x])/Sqrt[a*x + b*x^n]])/(a^(3/2)*(1 - n)*Sqrt[c*
x])
```

Rubi in Sympy [A] time = 23.5995, size = 70, normalized size = 0.82

$$-\frac{2\sqrt{cx}}{a\left(-n+1\right)\sqrt{ax+bx^n}}+\frac{2\sqrt{cx}\operatorname{atanh}\left(\frac{\sqrt{a}\sqrt{x}}{\sqrt{ax+bx^n}}\right)}{a^{\frac{3}{2}}\sqrt{x}\left(-n+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((c*x)**(1/2)/(a*x+b*x**n)**(3/2),x)
```

```
[Out] -2*sqrt(c*x)/(a*(-n + 1)*sqrt(a*x + b*x**n)) + 2*sqrt(c*x)*atanh(
sqrt(a)*sqrt(x)/sqrt(a*x + b*x**n))/(a**(3/2)*sqrt(x)*(-n + 1))
```

Mathematica [A] time = 0.20224, size = 104, normalized size = 1.22

$$\frac{2\sqrt{cx}\left(\sqrt{a}\sqrt{x}-\sqrt{b}x^{n/2}\sqrt{\frac{ax^{1-n}}{b}+1}\sinh^{-1}\left(\frac{\sqrt{a}x^{\frac{1}{2}-\frac{n}{2}}}{\sqrt{b}}\right)\right)}{a^{3/2}(n-1)\sqrt{x}\sqrt{ax+bx^n}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[c*x]/(a*x + b*x^n)^(3/2),x]
```

```
[Out] (2*Sqrt[c*x]*(Sqrt[a]*Sqrt[x] - Sqrt[b]*x^(n/2)*Sqrt[1 + (a*x^(1
- n))/b]*ArcSinh[(Sqrt[a]*x^(1/2 - n/2))/Sqrt[b]]))/(a^(3/2)*(-1
+ n)*Sqrt[x]*Sqrt[a*x + b*x^n])
```

Maple [F] time = 0.05, size = 0, normalized size = 0.

$$\int 1\sqrt{cx}\,(ax+bx^n)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^(1/2)/(a*x+b*x^n)^(3/2),x)
```

```
[Out] int((c*x)^(1/2)/(a*x+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{cx}}{(ax+bx^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x)/(a*x + b*x^n)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(c*x)/(a*x + b*x^n)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x)/(a*x + b*x^n)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{cx}}{(ax+bx^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**(1/2)/(a*x+b*x**n)**(3/2),x)
```

```
[Out] Integral(sqrt(c*x)/(a*x + b*x**n)**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{cx}}{(ax+bx^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x)/(a*x + b*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(c*x)/(a*x + b*x^n)^(3/2), x)
```

3.402 $\int \frac{1}{cx(a+bx^n)^{3/2}}\,dx$

Optimal. Leaf size=54

$$\frac{2}{acn\sqrt{a+bx^n}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{a^{3/2}cn}$$

```
[Out] 2/(a*c*n*Sqrt[a + b*x^n]) - (2*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]])/
(a^(3/2)*c*n)
```

Rubi [A] time = 0.0874904, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.278

$$\frac{2}{acn\sqrt{a+bx^n}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{a^{3/2}cn}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(c*x*(a + b*x^n)^(3/2)),x]
```

```
[Out] 2/(a*c*n*Sqrt[a + b*x^n]) - (2*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]])/
(a^(3/2)*c*n)
```

Rubi in Sympy [A] time = 10.2156, size = 42, normalized size = 0.78

$$\frac{2}{acn\sqrt{a+bx^n}}-\frac{2\,\text{atanh}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{a^{\frac{3}{2}}cn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/c/x/(a+b*x**n)**(3/2),x)
```

```
[Out] 2/(a*c*n*sqrt(a + b*x**n)) - 2*atanh(sqrt(a + b*x**n)/sqrt(a))/(a
**(3/2)*c*n)
```

Mathematica [A] time = 0.073822, size = 52, normalized size = 0.96

$$\frac{\frac{2}{an\sqrt{a+bx^n}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)}{a^{3/2}n}}{c}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(c*x*(a + b*x^n)^(3/2)),x]
```

```
[Out] (2/(a*n*Sqrt[a + b*x^n]) - (2*ArcTanh[Sqrt[a + b*x^n]/Sqrt[a]])/(
a^(3/2)*n))/c
```

Maple [A] time = 0., size = 42, normalized size = 0.8

$$\frac{1}{cn}\left(-2\frac{1}{a^{3/2}}Artanh\left(\frac{\sqrt{a+bx^n}}{\sqrt{a}}\right)+2\frac{1}{a\sqrt{a+bx^n}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/c/x/(a+b*x^n)^(3/2),x)
```

```
[Out] 1/c/n*(-2/a^(3/2)*arctanh((a+b*x^n)^(1/2)/a^(1/2))+2/a/(a+b*x^n)^
(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^(3/2)*c*x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.255504, size = 1, normalized size = 0.02

$$\left[\frac{\sqrt{bx^n + a}\log\left(\frac{\sqrt{a}bx^n - 2\sqrt{bx^n + a}a + 2a^{\frac{3}{2}}}{x^n}\right) + 2\sqrt{a}}{\sqrt{bx^n + a}a^{\frac{3}{2}}cn}, \frac{2\left(\sqrt{bx^n + a}\arctan\left(\frac{a}{\sqrt{bx^n + a}\sqrt{-a}}\right) + \sqrt{-a}\right)}{\sqrt{bx^n + a}\sqrt{-a}acn}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^(3/2)*c*x),x, algorithm="fricas")
```

```
[Out] [(sqrt(b*x^n + a)*log((sqrt(a)*b*x^n - 2*sqrt(b*x^n + a)*a + 2*a^
(3/2))/x^n) + 2*sqrt(a))/(sqrt(b*x^n + a)*a^(3/2)*c*n), 2*(sqrt(b
*x^n + a)*arctan(a/(sqrt(b*x^n + a)*sqrt(-a))) + sqrt(-a))/(sqrt(
b*x^n + a)*sqrt(-a)*a*c*n)]
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/c/x/(a+b*x**n)**(3/2),x)
```

```
[Out] Exception raised: TypeError
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(bx^n + a)^{\frac{3}{2}}cx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a)^(3/2)*c*x),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^n + a)^(3/2)*c*x), x)
```

3.403 $\int \frac{1}{(cx)^{5/2}\left(\frac{a}{x}+bx^n\right)^{3/2}}\,dx$

Optimal. Leaf size=90

$$\frac{2}{ac^2(n+1)\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}-\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{a^{3/2}c^2(n+1)\sqrt{cx}}$$

```
[Out] 2/(a*c^2*(1 + n)*Sqrt[c*x]*Sqrt[a/x + b*x^n]) - (2*Sqrt[x]*ArcTan
h[Sqrt[a]/(Sqrt[x]*Sqrt[a/x + b*x^n])])/(a^(3/2)*c^2*(1 + n)*Sqrt
[c*x])
```

Rubi [A] time = 0.289163, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$\frac{2}{ac^2(n+1)\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}-\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{a^{3/2}c^2(n+1)\sqrt{cx}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((c*x)^(5/2)*(a/x + b*x^n)^(3/2)),x]
```

```
[Out] 2/(a*c^2*(1 + n)*Sqrt[c*x]*Sqrt[a/x + b*x^n]) - (2*Sqrt[x]*ArcTan
h[Sqrt[a]/(Sqrt[x]*Sqrt[a/x + b*x^n])])/(a^(3/2)*c^2*(1 + n)*Sqrt
[c*x])
```

Rubi in Sympy [A] time = 24.7318, size = 76, normalized size = 0.84

$$\frac{2}{ac^2\sqrt{cx}\,(n+1)\,\sqrt{\frac{a}{x}+bx^n}}-\frac{2\sqrt{cx}\,\operatorname{atanh}\left(\frac{\sqrt{a}}{\sqrt{x}\sqrt{\frac{a}{x}+bx^n}}\right)}{a^{\frac{3}{2}}c^3\sqrt{x}\,(n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(c*x)**(5/2)/(a/x+b*x**n)**(3/2),x)
```

```
[Out] 2/(a*c**2*sqrt(c*x)*(n + 1)*sqrt(a/x + b*x**n)) - 2*sqrt(c*x)*ata
nh(sqrt(a)/(sqrt(x)*sqrt(a/x + b*x**n)))/(a**(3/2)*c**3*sqrt(x)*(
n + 1))
```

Mathematica [A] time = 0.196703, size = 104, normalized size = 1.16

$$\frac{2\left(-\sqrt{a+bx^{n+1}}\log\left(\sqrt{a}\sqrt{a+bx^{n+1}}+a\right)+\log\left(x^{\frac{n+1}{2}}\right)\sqrt{a+bx^{n+1}}+\sqrt{a}\right)}{a^{3/2}c^2(n+1)\sqrt{cx}\sqrt{\frac{a}{x}+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/((c*x)^(5/2)*(a/x + b*x^n)^(3/2)),x]
```

```
[Out] (2*(Sqrt[a] + Sqrt[a + b*x^(1 + n)]*Log[x^((1 + n)/2)] - Sqrt[a +
 b*x^(1 + n)]*Log[a + Sqrt[a]*Sqrt[a + b*x^(1 + n)]]))/(a^(3/2)*c
^2*(1 + n)*Sqrt[c*x]*Sqrt[a/x + b*x^n])
```

Maple [F] time = 0.057, size = 0, normalized size = 0.

$$\int 1 (cx)^{-\frac{5}{2}} \left(\frac{a}{x}+b x^{n}\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(c*x)^(5/2)/(a/x+b*x^n)^(3/2),x)
```

```
[Out] int(1/(c*x)^(5/2)/(a/x+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^{n}+\frac{a}{x}\right)^{\frac{3}{2}} (cx)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^n + a/x)^(3/2)*(c*x)^(5/2)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^n + a/x)^(3/2)*(c*x)^(5/2)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^n + a/x)^(3/2)*(c*x)^(5/2)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(c*x)**(5/2)/(a/x+b*x**n)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^{n}+\frac{a}{x}\right)^{\frac{3}{2}} (cx)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a/x)^(3/2)*(c*x)^(5/2)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*x^n + a/x)^(3/2)*(c*x)^(5/2)), x)
```

3.404 $\int \frac{1}{c^4x^4\left(\frac{a}{x^2}+bx^n\right)^{3/2}}\,dx$

Optimal. Leaf size=72

$$\frac{2}{ac^4(n+2)x\sqrt{\frac{a}{x^2}+bx^n}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{a^{3/2}c^4(n+2)}$$

```
[Out] 2/(a*c^4*(2 + n)*x*Sqrt[a/x^2 + b*x^n]) - (2*ArcTanh[Sqrt[a]/(x*S
qrt[a/x^2 + b*x^n])])/(a^(3/2)*c^4*(2 + n))
```

Rubi [A] time = 0.248364, antiderivative size = 72, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{2}{ac^4(n+2)x\sqrt{\frac{a}{x^2}+bx^n}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{a^{3/2}c^4(n+2)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/(c^4*x^4*(a/x^2 + b*x^n)^(3/2)),x]
```

```
[Out] 2/(a*c^4*(2 + n)*x*Sqrt[a/x^2 + b*x^n]) - (2*ArcTanh[Sqrt[a]/(x*S
qrt[a/x^2 + b*x^n])])/(a^(3/2)*c^4*(2 + n))
```

Rubi in Sympy [A] time = 19.6254, size = 60, normalized size = 0.83

$$\frac{2}{ac^4x\,(n+2)\,\sqrt{\frac{a}{x^2}+bx^n}}-\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{a}}{x\sqrt{\frac{a}{x^2}+bx^n}}\right)}{a^{\frac{3}{2}}c^4\,(n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/c**4/x**4/(a/x**2+b*x**n)**(3/2),x)
```

```
[Out] 2/(a*c**4*x*(n + 2)*sqrt(a/x**2 + b*x**n)) - 2*atanh(sqrt(a)/(x*s
qrt(a/x**2 + b*x**n)))/(a**(3/2)*c**4*(n + 2))
```

Mathematica [A] time = 0.182052, size = 100, normalized size = 1.39

$$\frac{2\left(-\sqrt{a+bx^{n+2}}\log\left(\sqrt{a}\sqrt{a+bx^{n+2}}+a\right)+\log\left(x^{\frac{n+2}{2}}\right)\sqrt{a+bx^{n+2}}+\sqrt{a}\right)}{a^{3/2}c^4(n+2)x\sqrt{\frac{a}{x^2}+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/(c^4*x^4*(a/x^2 + b*x^n)^(3/2)),x]
```

```
[Out] (2*(Sqrt[a] + Sqrt[a + b*x^(2 + n)]*Log[x^((2 + n)/2)] - Sqrt[a +
 b*x^(2 + n)]*Log[a + Sqrt[a]*Sqrt[a + b*x^(2 + n)]]))/(a^(3/2)*c
^4*(2 + n)*x*Sqrt[a/x^2 + b*x^n])
```

Maple [F] time = 0.053, size = 0, normalized size = 0.

$$\int \frac{1}{c^4x^4}\left(\frac{a}{x^2}+bx^n\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/c^4/x^4/(a/x^2+b*x^n)^(3/2),x)

[Out] int(1/c^4/x^4/(a/x^2+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{1}{\left(bx^n+\frac{a}{x^2}\right)^{\frac{3}{2}}x^4}\,dx}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a/x^2)^(3/2)*c^4*x^4),x, algorithm="maxima")

[Out] integrate(1/((b*x^n + a/x^2)^(3/2)*x^4), x)/c^4
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a/x^2)^(3/2)*c^4*x^4),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{1}{ax^2\sqrt{\frac{a}{x^2}+bx^n}+bx^4x^n\sqrt{\frac{a}{x^2}+bx^n}}\,dx}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/c**4/x**4/(a/x**2+b*x**n)**(3/2),x)

[Out] Integral(1/(a*x**2*sqrt(a/x**2 + b*x**n) + b*x**4*x**n*sqrt(a/x**
2 + b*x**n)), x)/c**4
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^n+\frac{a}{x^2}\right)^{\frac{3}{2}}c^4x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a/x^2)^(3/2)*c^4*x^4),x, algorithm="giac")

[Out] integrate(1/((b*x^n + a/x^2)^(3/2)*c^4*x^4), x)
```

3.405 $\int \frac{1}{(cx)^{11/2}\left(\frac{a}{x^3}+bx^n\right)^{3/2}}\,dx$

Optimal. Leaf size=90

$$\frac{2}{ac^4(n+3)(cx)^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}-\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{x^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{a^{3/2}c^5(n+3)\sqrt{cx}}$$

```
[Out] 2/(a*c^4*(3 + n)*(c*x)^(3/2)*Sqrt[a/x^3 + b*x^n]) - (2*Sqrt[x]*Ar
cTanh[Sqrt[a]/(x^(3/2)*Sqrt[a/x^3 + b*x^n])])/(a^(3/2)*c^5*(3 + n
)*Sqrt[c*x])
```

Rubi [A] time = 0.329996, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174

$$\frac{2}{ac^4(n+3)(cx)^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}-\frac{2\sqrt{x}\tanh^{-1}\left(\frac{\sqrt{a}}{x^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{a^{3/2}c^5(n+3)\sqrt{cx}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/((c*x)^(11/2)*(a/x^3 + b*x^n)^(3/2)),x]
```

```
[Out] 2/(a*c^4*(3 + n)*(c*x)^(3/2)*Sqrt[a/x^3 + b*x^n]) - (2*Sqrt[x]*Ar
cTanh[Sqrt[a]/(x^(3/2)*Sqrt[a/x^3 + b*x^n])])/(a^(3/2)*c^5*(3 + n
)*Sqrt[c*x])
```

Rubi in Sympy [A] time = 25.1742, size = 80, normalized size = 0.89

$$\frac{2}{ac^4\,(cx)^{\frac{3}{2}}\,(n+3)\,\sqrt{\frac{a}{x^3}+bx^n}}-\frac{2\sqrt{cx}\,\operatorname{atanh}\left(\frac{\sqrt{a}}{x^{\frac{3}{2}}\sqrt{\frac{a}{x^3}+bx^n}}\right)}{a^{\frac{3}{2}}c^6\sqrt{x}\,(n+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(c*x)**(11/2)/(a/x**3+b*x**n)**(3/2),x)
```

```
[Out] 2/(a*c**4*(c*x)**(3/2)*(n + 3)*sqrt(a/x**3 + b*x**n)) - 2*sqrt(c*
x)*atanh(sqrt(a)/(x**(3/2)*sqrt(a/x**3 + b*x**n)))/(a**(3/2)*c**6
*sqrt(x)*(n + 3))
```

Mathematica [A] time = 0.219712, size = 104, normalized size = 1.16

$$\frac{2\left(-\sqrt{a+bx^{n+3}}\log\left(\sqrt{a}\sqrt{a+bx^{n+3}}+a\right)+\log\left(x^{\frac{n+3}{2}}\right)\sqrt{a+bx^{n+3}}+\sqrt{a}\right)}{a^{3/2}c^4(n+3)(cx)^{3/2}\sqrt{\frac{a}{x^3}+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/((c*x)^(11/2)*(a/x^3 + b*x^n)^(3/2)),x]
```

```
[Out] (2*(Sqrt[a] + Sqrt[a + b*x^(3 + n)]*Log[x^((3 + n)/2)] - Sqrt[a +
 b*x^(3 + n)]*Log[a + Sqrt[a]*Sqrt[a + b*x^(3 + n)]]))/(a^(3/2)*c
^4*(3 + n)*(c*x)^(3/2)*Sqrt[a/x^3 + b*x^n])
```

Maple [F] time = 0.059, size = 0, normalized size = 0.

$$\int 1\,(cx)^{-\frac{11}{2}}\left(\frac{a}{x^3}+bx^n\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(c*x)^(11/2)/(a/x^3+b*x^n)^(3/2),x)
```

```
[Out] int(1/(c*x)^(11/2)/(a/x^3+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^n+\frac{a}{x^3}\right)^{\frac{3}{2}}(cx)^{\frac{11}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^n + a/x^3)^(3/2)*(c*x)^(11/2)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*x^n + a/x^3)^(3/2)*(c*x)^(11/2)), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/((b*x^n + a/x^3)^(3/2)*(c*x)^(11/2)),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(c*x)**(11/2)/(a/x**3+b*x**n)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^n+\frac{a}{x^3}\right)^{\frac{3}{2}}(cx)^{\frac{11}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a/x^3)^(3/2)*(c*x)^(11/2)),x, algorithm="giac")

[Out] integrate(1/((b*x^n + a/x^3)^(3/2)*(c*x)^(11/2)), x)
```

3.406 $\int \frac{1}{c^7 x^7 \left(\frac{a}{x^4}+bx^n\right)^{3/2}}\,dx$

Optimal. Leaf size=72

$$\frac{2}{ac^7(n+4)x^2\sqrt{\frac{a}{x^4}+bx^n}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}}{x^2\sqrt{\frac{a}{x^4}+bx^n}}\right)}{a^{3/2}c^7(n+4)}$$

```
[Out] 2/(a*c^7*(4 + n)*x^2*Sqrt[a/x^4 + b*x^n]) - (2*ArcTanh[Sqrt[a]/(x
^2*Sqrt[a/x^4 + b*x^n])])/(a^(3/2)*c^7*(4 + n))
```

Rubi [A] time = 0.253784, antiderivative size = 72, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$\frac{2}{ac^7(n+4)x^2\sqrt{\frac{a}{x^4}+bx^n}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{a}}{x^2\sqrt{\frac{a}{x^4}+bx^n}}\right)}{a^{3/2}c^7(n+4)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(c^7*x^7*(a/x^4 + b*x^n)^(3/2)),x]
```

```
[Out] 2/(a*c^7*(4 + n)*x^2*Sqrt[a/x^4 + b*x^n]) - (2*ArcTanh[Sqrt[a]/(x
^2*Sqrt[a/x^4 + b*x^n])])/(a^(3/2)*c^7*(4 + n))
```

Rubi in Sympy [A] time = 19.7097, size = 63, normalized size = 0.88

$$\frac{2}{ac^7x^2\left(n+4\right)\sqrt{\frac{a}{x^4}+bx^n}}-\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{a}}{x^2\sqrt{\frac{a}{x^4}+bx^n}}\right)}{a^{\frac{3}{2}}c^7\left(n+4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(1/c**7/x**7/(a/x**4+b*x**n)**(3/2),x)
```

```
[Out] 2/(a*c**7*x**2*(n + 4)*sqrt(a/x**4 + b*x**n)) - 2*atanh(sqrt(a)/(
x**2*sqrt(a/x**4 + b*x**n)))/(a**(3/2)*c**7*(n + 4))
```

Mathematica [A] time = 0.191948, size = 100, normalized size = 1.39

$$\frac{2\left(-\sqrt{a+bx^{n+4}}\log\left(\sqrt{a}\sqrt{a+bx^{n+4}}+a\right)+\log\left(x^{\frac{n+4}{2}}\right)\sqrt{a+bx^{n+4}}+\sqrt{a}\right)}{a^{3/2}c^7(n+4)x^2\sqrt{\frac{a}{x^4}+bx^n}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(c^7*x^7*(a/x^4 + b*x^n)^(3/2)),x]
```

```
[Out] (2*(Sqrt[a] + Sqrt[a + b*x^(4 + n)]*Log[x^((4 + n)/2)] - Sqrt[a +
 b*x^(4 + n)]*Log[a + Sqrt[a]*Sqrt[a + b*x^(4 + n)]]))/(a^(3/2)*c
```

```
^7*(4 + n)*x^2*Sqrt[a/x^4 + b*x^n])
```

Maple [F] time = 0.054, size = 0, normalized size = 0.

$$\int \frac{1}{c^7x^7}\left(\frac{a}{x^4}+bx^n\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/c^7/x^7/(a/x^4+b*x^n)^(3/2),x)

[Out] int(1/c^7/x^7/(a/x^4+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{\int \frac{1}{\left(bx^n+\frac{a}{x^4}\right)^{\frac{3}{2}}x^7}\,dx}{c^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a/x^4)^(3/2)*c^7*x^7),x, algorithm="maxima")

[Out] integrate(1/((b*x^n + a/x^4)^(3/2)*x^7), x)/c^7
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a/x^4)^(3/2)*c^7*x^7),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/c**7/x**7/(a/x**4+b*x**n)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^n+\frac{a}{x^4}\right)^{\frac{3}{2}}c^7x^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x^n + a/x^4)^(3/2)*c^7*x^7),x, algorithm="giac")

[Out] integrate(1/((b*x^n + a/x^4)^(3/2)*c^7*x^7), x)
```

3.407 $\int \frac{1}{\sqrt{\frac{a+bx^3}{x}}}\,dx$

Optimal. Leaf size=32

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x}+bx^2}}\right)}{3\sqrt{b}}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[a/x + b*x^2]])/(3*Sqrt[b])
```

Rubi [A] time = 0.0319365, antiderivative size = 32, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x}+bx^2}}\right)}{3\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[(a + b*x^3)/x],x]

[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[a/x + b*x^2]])/(3*Sqrt[b])
```

Rubi in Sympy [A] time = 2.49159, size = 27, normalized size = 0.84

$$\frac{2\,\text{atanh}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x}+bx^2}}\right)}{3\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/((b*x**3+a)/x)**(1/2),x)

[Out] 2*atanh(sqrt(b)*x/sqrt(a/x + b*x**2))/(3*sqrt(b))
```

Mathematica [A] time = 0.0501372, size = 63, normalized size = 1.97

$$\frac{2\sqrt{a+bx^3}\tanh^{-1}\left(\frac{\sqrt{b}x^{3/2}}{\sqrt{a+bx^3}}\right)}{3\sqrt{b}\sqrt{x}\sqrt{\frac{a+bx^3}{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[(a + b*x^3)/x],x]

[Out] (2*Sqrt[a + b*x^3]*ArcTanh[(Sqrt[b]*x^(3/2))/Sqrt[a + b*x^3]])/(3
*Sqrt[b]*Sqrt[x]*Sqrt[(a + b*x^3)/x])
```

Maple [C] time = 0.022, size = 477, normalized size = 14.9

$$-4\frac{(bx^3+a)\left(i\sqrt{3}-1\right)\left(-bx+\sqrt[3]{-ab^2}\right)^2}{b^2\sqrt{x(bx^3+a)}\left(i\sqrt{3}-3\right)}\sqrt{-\frac{\left(i\sqrt{3}-3\right)xb}{\left(i\sqrt{3}-1\right)\left(-bx+\sqrt[3]{-ab^2}\right)}}\sqrt{\frac{i\sqrt{3}\sqrt[3]{-ab^2}+2bx+\sqrt[3]{-ab^2}}{\left(i\sqrt{3}+1\right)\left(-bx+\sqrt[3]{-ab^2}\right)}}\sqrt{\frac{i\sqrt{3}\sqrt[3]{-ab^2}-2bx}{\left(i\sqrt{3}-1\right)\left(-bx\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/((b*x^3+a)/x)^(1/2),x)
```

```
[Out] -4*(b*x^3+a)*(I*3^(1/2)-1)*(-(I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*
x+(-a*b^2)^(1/3)))^(1/2)*(-b*x+(-a*b^2)^(1/3))^2*((I*3^(1/2)*(-a*
b^2)^(1/3)+2*b*x+(-a*b^2)^(1/3))/(I*3^(1/2)+1)/(-b*x+(-a*b^2)^(1/
3)))^(1/2)*((I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^2)^(1/3))/(I*3^
(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2)/b^2*(EllipticF((-(I*3^(1/2)
-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),((I*3^(1/2)+3)
*(I*3^(1/2)-1)/(I*3^(1/2)+1)/(I*3^(1/2)-3))^(1/2))-EllipticPi((-(
I*3^(1/2)-3)*x*b/(I*3^(1/2)-1)/(-b*x+(-a*b^2)^(1/3)))^(1/2),(I*3^
(1/2)-1)/(I*3^(1/2)-3),((I*3^(1/2)+3)*(I*3^(1/2)-1)/(I*3^(1/2)+1)
/(I*3^(1/2)-3))^(1/2)))/((b*x^3+a)/x)^(1/2)/(x*(b*x^3+a))^(1/2)/(
I*3^(1/2)-3)/(1/b^2*x*(-b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(
1/3)+2*b*x+(-a*b^2)^(1/3))*(I*3^(1/2)*(-a*b^2)^(1/3)-2*b*x-(-a*b^
2)^(1/3)))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^3 + a)/x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.344618, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(-\left(8\,b^2x^6+8\,abx^3+a^2\right)\sqrt{b}-4\left(2\,b^2x^5+abx^2\right)\sqrt{\frac{bx^3+a}{x}}\right)}{6\sqrt{b}},\ \frac{\arctan\left(\frac{2\sqrt{-b}x^2\sqrt{\frac{bx^3+a}{x}}}{2\,bx^3+a}\right)}{3\sqrt{-b}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^3 + a)/x),x, algorithm="fricas")
```

```
[Out] [1/6*log(-(8*b^2*x^6 + 8*a*b*x^3 + a^2)*sqrt(b) - 4*(2*b^2*x^5 +
a*b*x^2)*sqrt((b*x^3 + a)/x))/sqrt(b), 1/3*arctan(2*sqrt(-b)*x^2*
sqrt((b*x^3 + a)/x)/(2*b*x^3 + a))/sqrt(-b)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x**3+a)/x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^3 + a)/x),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.408 $\int \frac{1}{\sqrt{\frac{a+bx^4}{x^2}}} dx$

Optimal. Leaf size=32

$$\frac{\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x^2}+bx^2}}\right)}{2\sqrt{b}}$$

```
[Out] ArcTanh[(Sqrt[b]*x)/Sqrt[a/x^2 + b*x^2]]/(2*Sqrt[b])
```

Rubi [A] time = 0.0311199, antiderivative size = 32, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x^2}+bx^2}}\right)}{2\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[(a + b*x^4)/x^2],x]
```

```
[Out] ArcTanh[(Sqrt[b]*x)/Sqrt[a/x^2 + b*x^2]]/(2*Sqrt[b])
```

Rubi in Sympy [A] time = 2.50865, size = 27, normalized size = 0.84

$$\frac{\operatorname{atanh}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x^2}+bx^2}}\right)}{2\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/((b*x**4+a)/x**2)**(1/2),x)
```

```
[Out] atanh(sqrt(b)*x/sqrt(a/x**2 + b*x**2))/(2*sqrt(b))
```

Mathematica [A] time = 0.0371462, size = 59, normalized size = 1.84

$$\frac{\sqrt{a+bx^4}\tanh^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a+bx^4}}\right)}{2\sqrt{b}x\sqrt{\frac{a+bx^4}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[(a + b*x^4)/x^2],x]
```

```
[Out] (Sqrt[a + b*x^4]*ArcTanh[(Sqrt[b]*x^2)/Sqrt[a + b*x^4]])/(2*Sqrt[
b]*x*Sqrt[(a + b*x^4)/x^2])
```

Maple [A] time = 0.012, size = 49, normalized size = 1.5

$$\frac{1}{2x}\sqrt{bx^4+a}\ln\left(\sqrt{b}x^2+\sqrt{bx^4+a}\right)\frac{1}{\sqrt{\frac{bx^4+a}{x^2}}}\frac{1}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/((b*x^4+a)/x^2)^(1/2),x)
```

```
[Out] 1/2/((b*x^4+a)/x^2)^(1/2)/x*(b*x^4+a)^(1/2)*ln(b^(1/2)*x^2+(b*x^4
+a)^(1/2))/b^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^4 + a)/x^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.239087, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(-2\,bx^3\sqrt{\frac{bx^4+a}{x^2}}-\left(2\,bx^4+a\right)\sqrt{b}\right)}{4\,\sqrt{b}},-\frac{\sqrt{-b}\arctan\left(\frac{\sqrt{-b}x}{\sqrt{\frac{bx^4+a}{x^2}}}\right)}{2\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^4 + a)/x^2),x, algorithm="fricas")
```

```
[Out] [1/4*log(-2*b*x^3*sqrt((b*x^4 + a)/x^2) - (2*b*x^4 + a)*sqrt(b))/
sqrt(b), -1/2*sqrt(-b)*arctan(sqrt(-b)*x/sqrt((b*x^4 + a)/x^2))/b
]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x**4+a)/x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^4 + a)/x^2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.409 $\int \frac{1}{\sqrt{\frac{a+bx^5}{x^3}}}\,dx$

Optimal. Leaf size=32

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x^3}+bx^2}}\right)}{5\sqrt{b}}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[a/x^3 + b*x^2]])/(5*Sqrt[b])
```

Rubi [A] time = 0.0341457, antiderivative size = 32, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x^3}+bx^2}}\right)}{5\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[(a + b*x^5)/x^3],x]

[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[a/x^3 + b*x^2]])/(5*Sqrt[b])
```

Rubi in Sympy [A] time = 2.51158, size = 29, normalized size = 0.91

$$\frac{2\,\text{atanh}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x^3}+bx^2}}\right)}{5\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/((b*x**5+a)/x**3)**(1/2),x)

[Out] 2*atanh(sqrt(b)*x/sqrt(a/x**3 + b*x**2))/(5*sqrt(b))
```

Mathematica [A] time = 0.0378524, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{\frac{a+bx^5}{x^3}}}\,dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[1/Sqrt[(a + b*x^5)/x^3],x]

[Out] Integrate[1/Sqrt[(a + b*x^5)/x^3], x]
```

Maple [F] time = 0.04, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{\frac{bx^5+a}{x^3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/((b*x^5+a)/x^3)^(1/2),x)
```

```
[Out] int(1/((b*x^5+a)/x^3)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^5 + a)/x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.701436, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(-\left(8\,b^{2}x^{10} + 8\,abx^{5} + a^{2}\right)\sqrt{b} - 4\left(2\,b^{2}x^{9} + abx^{4}\right)\sqrt{\frac{bx^{5}+a}{x^{3}}}\right)}{10\,\sqrt{b}}, -\frac{\sqrt{-b}\arctan\left(\frac{2\,\sqrt{-b}x^{4}\sqrt{\frac{bx^{5}+a}{x^{3}}}}{2\,bx^{5}+a}\right)}{5\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^5 + a)/x^3),x, algorithm="fricas")
```

```
[Out] [1/10*log(-(8*b^2*x^10 + 8*a*b*x^5 + a^2)*sqrt(b) - 4*(2*b^2*x^9
+ a*b*x^4)*sqrt((b*x^5 + a)/x^3))/sqrt(b), -1/5*sqrt(-b)*arctan(2
*sqrt(-b)*x^4*sqrt((b*x^5 + a)/x^3)/(2*b*x^5 + a))/b]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((b*x**5+a)/x**3)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^5 + a)/x^3),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.410 $\int \frac{1}{\sqrt{x^{2-n}(a+bx^n)}}\,dx$

Optimal. Leaf size=37

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^{2-n}+bx^2}}\right)}{\sqrt{b}n}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[b*x^2 + a*x^(2 - n)]])/(Sqrt[b]*n)
```

Rubi [A] time = 0.0477664, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^{2-n}+bx^2}}\right)}{\sqrt{b}n}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[x^(2 - n)*(a + b*x^n)],x]
```

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[b*x^2 + a*x^(2 - n)]])/(Sqrt[b]*n)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x^{-n+2}\,(a+bx^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x**(2-n)*(a+b*x**n))**(1/2),x)
```

```
[Out] Integral(1/sqrt(x**(-n + 2)*(a + b*x**n)), x)
```

Mathematica [B] time = 0.101867, size = 76, normalized size = 2.05

$$\frac{2x^{\frac{2-n}{2}}\sqrt{a+bx^n}\tanh^{-1}\left(\frac{\sqrt{b}x^{n/2}}{\sqrt{a+bx^n}}\right)}{\sqrt{b}n\sqrt{x^{2-n}\,(a+bx^n)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[x^(2 - n)*(a + b*x^n)],x]
```

```
[Out] (2*x^((2 - n)/2)*Sqrt[a + b*x^n]*ArcTanh[(Sqrt[b]*x^(n/2))/Sqrt[a
 + b*x^n]])/(Sqrt[b]*n*Sqrt[x^(2 - n)*(a + b*x^n)])
```

Maple [F] time = 0.077, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x^{2-n}\,(a+bx^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x^(2-n)*(a+b*x^n))^(1/2),x)
```

```
[Out] int(1/(x^(2-n)*(a+b*x^n))^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^n + a)*x^(-n + 2)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.239073, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(\frac{2\,b^{\frac{3}{2}}xx^{n}+a\sqrt{b}x+2\,bx^{n}\sqrt{\frac{bx^{2}x^{n}+ax^{2}}{x^{n}}}}{x}\right)}{\sqrt{b}n}, \frac{2\,\sqrt{-b}\arctan\left(\frac{bx}{\sqrt{-b}\sqrt{\frac{bx^{2}x^{n}+ax^{2}}{x^{n}}}}\right)}{bn}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^n + a)*x^(-n + 2)),x, algorithm="fricas")
```

```
[Out] [log((2*b^(3/2)*x*x^n + a*sqrt(b)*x + 2*b*x^n*sqrt((b*x^2*x^n + a
*x^2)/x^n))/x)/(sqrt(b)*n), 2*sqrt(-b)*arctan(b*x/(sqrt(-b)*sqrt(
(b*x^2*x^n + a*x^2)/x^n)))/(b*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x**(2-n)*(a+b*x**n))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(bx^{n}+a)x^{-n+2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^n + a)*x^(-n + 2)),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt((b*x^n + a)*x^(-n + 2)), x)
```

3.411 $\int \frac{1}{\sqrt{\frac{a-bx^3}{x}}}\,dx$

Optimal. Leaf size=33

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x}-bx^2}}\right)}{3\sqrt{b}}$$

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[a/x - b*x^2]])/(3*Sqrt[b])
```

Rubi [A] time = 0.032214, antiderivative size = 33, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x}-bx^2}}\right)}{3\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[(a - b*x^3)/x],x]

[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[a/x - b*x^2]])/(3*Sqrt[b])
```

Rubi in Sympy [A] time = 2.3435, size = 27, normalized size = 0.82

$$\frac{2\,\mathrm{atan}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x}-bx^2}}\right)}{3\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/((-b*x**3+a)/x)**(1/2),x)

[Out] 2*atan(sqrt(b)*x/sqrt(a/x - b*x**2))/(3*sqrt(b))
```

Mathematica [A] time = 0.0740441, size = 66, normalized size = 2.

$$\frac{2\sqrt{a-bx^3}\tan^{-1}\left(\frac{\sqrt{b}\,x^{3/2}}{\sqrt{a-bx^3}}\right)}{3\sqrt{b}\sqrt{x}\sqrt{\frac{a-bx^3}{x}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[(a - b*x^3)/x],x]

[Out] (2*Sqrt[a - b*x^3]*ArcTan[(Sqrt[b]*x^(3/2))/Sqrt[a - b*x^3]])/(3*
Sqrt[b]*Sqrt[x]*Sqrt[(a - b*x^3)/x])
```

Maple [C] time = 0.285, size = 471, normalized size = 14.3

$$4\frac{(bx^3-a)\left(i\sqrt{3}+1\right)\left(-bx+\sqrt[3]{ab^2}\right)^2}{b^2\sqrt{-(bx^3-a)\,x}\left(i\sqrt{3}+3\right)}\sqrt{-\frac{\left(i\sqrt{3}+3\right)xb}{\left(i\sqrt{3}+1\right)\left(-bx+\sqrt[3]{ab^2}\right)}}\sqrt{\frac{i\sqrt{3}\sqrt[3]{ab^2}-2\,bx-\sqrt[3]{ab^2}}{\left(i\sqrt{3}-1\right)\left(-bx+\sqrt[3]{ab^2}\right)}}\sqrt{\frac{i\sqrt{3}\sqrt[3]{ab^2}+2\,bx+\sqrt[3]{ab^2}}{\left(i\sqrt{3}+1\right)\left(-bx+\sqrt[3]{ab^2}\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/((-b*x^3+a)/x)^(1/2),x)
```

```
[Out] 4*(b*x^3-a)*(I*3^(1/2)+1)*(-(I*3^(1/2)+3)*x*b/(I*3^(1/2)+1)/(-b*x
+(a*b^2)^(1/3)))^(1/2)*(-b*x+(a*b^2)^(1/3))^2*((I*3^(1/2)*(a*b^2)
^(1/3)-2*b*x-(a*b^2)^(1/3))/(I*3^(1/2)-1)/(-b*x+(a*b^2)^(1/3)))^(
1/2)*((I*3^(1/2)*(a*b^2)^(1/3)+2*b*x+(a*b^2)^(1/3))/(I*3^(1/2)+1)
/(-b*x+(a*b^2)^(1/3)))^(1/2)/b^2*(EllipticF((-(I*3^(1/2)+3)*x*b/(
I*3^(1/2)+1)/(-b*x+(a*b^2)^(1/3)))^(1/2),((I*3^(1/2)-3)*(I*3^(1/2
)+1)/(I*3^(1/2)-1)/(I*3^(1/2)+3))^(1/2))-EllipticPi((-(I*3^(1/2)+
3)*x*b/(I*3^(1/2)+1)/(-b*x+(a*b^2)^(1/3)))^(1/2),(I*3^(1/2)+1)/(I
*3^(1/2)+3),((I*3^(1/2)-3)*(I*3^(1/2)+1)/(I*3^(1/2)-1)/(I*3^(1/2)
+3))^(1/2)))/(-(b*x^3-a)/x)^(1/2)/(-(b*x^3-a)*x)^(1/2)/(I*3^(1/2)
+3)/(-1/b^2*x*(-b*x+(a*b^2)^(1/3))*(I*3^(1/2)*(a*b^2)^(1/3)-2*b*x
-(a*b^2)^(1/3))*(I*3^(1/2)*(a*b^2)^(1/3)+2*b*x+(a*b^2)^(1/3)))^(1
/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^3 - a)/x),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.346706, size = 1, normalized size = 0.03

$$\left[\frac{\log\left(-\left(8\,b^2x^6-8\,abx^3+a^2\right)\sqrt{-b}-4\left(2\,b^2x^5-abx^2\right)\sqrt{-\frac{bx^3-a}{x}}\right)}{6\sqrt{-b}},-\frac{\arctan\left(\frac{2\sqrt{b}x^2\sqrt{-\frac{bx^3-a}{x}}}{2\,bx^3-a}\right)}{3\sqrt{b}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^3 - a)/x),x, algorithm="fricas")
```

```
[Out] [1/6*log(-(8*b^2*x^6 - 8*a*b*x^3 + a^2)*sqrt(-b) - 4*(2*b^2*x^5 -
 a*b*x^2)*sqrt(-(b*x^3 - a)/x))/sqrt(-b), -1/3*arctan(2*sqrt(b)*x
^2*sqrt(-(b*x^3 - a)/x)/(2*b*x^3 - a))/sqrt(b)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((-b*x**3+a)/x)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^3 - a)/x),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.412 $\int \frac{1}{\sqrt{\frac{a-bx^4}{x^2}}} dx$

Optimal. Leaf size=33

$$\frac{\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x^2}-bx^2}}\right)}{2\sqrt{b}}$$

```
[Out] ArcTan[(Sqrt[b]*x)/Sqrt[a/x^2 - b*x^2]]/(2*Sqrt[b])
```

Rubi [A] time = 0.035161, antiderivative size = 33, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$\frac{\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x^2}-bx^2}}\right)}{2\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[(a - b*x^4)/x^2],x]
```

```
[Out] ArcTan[(Sqrt[b]*x)/Sqrt[a/x^2 - b*x^2]]/(2*Sqrt[b])
```

Rubi in Sympy [A] time = 2.34827, size = 27, normalized size = 0.82

$$\frac{\operatorname{atan}\left(\frac{\sqrt{b}x}{\sqrt{\frac{a}{x^2}-bx^2}}\right)}{2\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/((-b*x**4+a)/x**2)**(1/2),x)
```

```
[Out] atan(sqrt(b)*x/sqrt(a/x**2 - b*x**2))/(2*sqrt(b))
```

Mathematica [A] time = 0.0394158, size = 62, normalized size = 1.88

$$\frac{\sqrt{a-bx^4}\tan^{-1}\left(\frac{\sqrt{b}x^2}{\sqrt{a-bx^4}}\right)}{2\sqrt{b}x\sqrt{\frac{a-bx^4}{x^2}}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[(a - b*x^4)/x^2],x]
```

```
[Out] (Sqrt[a - b*x^4]*ArcTan[(Sqrt[b]*x^2)/Sqrt[a - b*x^4]])/(2*Sqrt[b
]*x*Sqrt[(a - b*x^4)/x^2])
```

Maple [B] time = 0.007, size = 53, normalized size = 1.6

$$\frac{1}{2x}\sqrt{-bx^4+a}\arctan\left(x^2\sqrt{b}\frac{1}{\sqrt{-bx^4+a}}\right)\frac{1}{\sqrt{-\frac{bx^4-a}{x^2}}}\frac{1}{\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/((-b*x^4+a)/x^2)^(1/2),x)
```

```
[Out] 1/2/(-(b*x^4-a)/x^2)^(1/2)/x*(-b*x^4+a)^(1/2)/b^(1/2)*arctan(x^2*
b^(1/2)/(-b*x^4+a)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$b\int \frac{x^5}{(bx^4-a)\sqrt{-bx^4+a}}\,dx+\frac{x^2}{2\sqrt{-bx^4+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^4 - a)/x^2),x, algorithm="maxima")
```

```
[Out] b*integrate(x^5/((b*x^4 - a)*sqrt(-b*x^4 + a)), x) + 1/2*x^2/sqrt
(-b*x^4 + a)
```

Fricas [A] time = 0.238164, size = 1, normalized size = 0.03

$$\left[-\frac{\sqrt{-b}\log\left(2\,bx^3\sqrt{-\frac{bx^4-a}{x^2}}+\left(2\,bx^4-a\right)\sqrt{-b}\right)}{4\,b},\frac{\arctan\left(\frac{\sqrt{b}x}{\sqrt{-\frac{bx^4-a}{x^2}}}\right)}{2\sqrt{b}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^4 - a)/x^2),x, algorithm="fricas")
```

```
[Out] [-1/4*sqrt(-b)*log(2*b*x^3*sqrt(-(b*x^4 - a)/x^2) + (2*b*x^4 - a)
*sqrt(-b))/b, 1/2*arctan(sqrt(b)*x/sqrt(-(b*x^4 - a)/x^2))/sqrt(b
)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((-b*x**4+a)/x**2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^4 - a)/x^2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.413 $\int \frac{1}{\sqrt{\frac{a-bx^5}{x^3}}}\,dx$

Optimal. Leaf size=33

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x^3}-bx^2}}\right)}{5\sqrt{b}}$$

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[a/x^3 - b*x^2]])/(5*Sqrt[b])
```

Rubi [A] time = 0.0352506, antiderivative size = 33, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x^3}-bx^2}}\right)}{5\sqrt{b}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[(a - b*x^5)/x^3],x]

[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[a/x^3 - b*x^2]])/(5*Sqrt[b])
```

Rubi in Sympy [A] time = 2.35731, size = 29, normalized size = 0.88

$$\frac{2\,\mathrm{atan}\left(\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x^3}-bx^2}}\right)}{5\sqrt{b}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/((-b*x**5+a)/x**3)**(1/2),x)

[Out] 2*atan(sqrt(b)*x/sqrt(a/x**3 - b*x**2))/(5*sqrt(b))
```

Mathematica [A] time = 0.0393985, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{\frac{a-bx^5}{x^3}}}\,dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[1/Sqrt[(a - b*x^5)/x^3],x]

[Out] Integrate[1/Sqrt[(a - b*x^5)/x^3], x]
```

Maple [F] time = 0.052, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{\frac{-bx^5+a}{x^3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/((-b*x^5+a)/x^3)^(1/2),x)
```

```
[Out] int(1/((-b*x^5+a)/x^3)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^5 - a)/x^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.728592, size = 1, normalized size = 0.03

$$\left[-\frac{\sqrt{-b}\log\left(-\left(8\,b^2x^{10}-8\,abx^5+a^2\right)\sqrt{-b}-4\left(2\,b^2x^9-abx^4\right)\sqrt{-\frac{bx^5-a}{x^3}}\right)}{10\,b},-\frac{\arctan\left(\frac{2\,\sqrt{b}x^4\sqrt{-\frac{bx^5-a}{x^3}}}{2\,bx^5-a}\right)}{5\,\sqrt{b}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^5 - a)/x^3),x, algorithm="fricas")
```

```
[Out] [-1/10*sqrt(-b)*log(-(8*b^2*x^10 - 8*a*b*x^5 + a^2)*sqrt(-b) - 4*
(2*b^2*x^9 - a*b*x^4)*sqrt(-(b*x^5 - a)/x^3))/b, -1/5*arctan(2*sq
rt(b)*x^4*sqrt(-(b*x^5 - a)/x^3)/(2*b*x^5 - a))/sqrt(b)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/((-b*x**5+a)/x**3)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^5 - a)/x^3),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.414 $\int \frac{1}{\sqrt{x^{2-n}(a-bx^n)}}\,dx$

Optimal. Leaf size=38

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^{2-n}-bx^2}}\right)}{\sqrt{b}n}$$

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[-(b*x^2) + a*x^(2 - n)]])/(Sqrt[b]*n)
```

Rubi [A] time = 0.043375, antiderivative size = 38, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^{2-n}-bx^2}}\right)}{\sqrt{b}n}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[x^(2 - n)*(a - b*x^n)],x]
```

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[-(b*x^2) + a*x^(2 - n)]])/(Sqrt[b]*n)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x^{-n+2}\left(a-bx^n\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x**(2-n)*(a-b*x**n))**(1/2),x)
```

```
[Out] Integral(1/sqrt(x**(-n + 2)*(a - b*x**n)), x)
```

Mathematica [A] time = 0.120053, size = 76, normalized size = 2.

$$\frac{2x^{1-\frac{n}{2}}\sqrt{a-bx^n}\tan^{-1}\left(\frac{\sqrt{b}x^{n/2}}{\sqrt{a-bx^n}}\right)}{\sqrt{b}n\sqrt{x^2\left(ax^{-n}-b\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[x^(2 - n)*(a - b*x^n)],x]
```

```
[Out] (2*x^(1 - n/2)*Sqrt[a - b*x^n]*ArcTan[(Sqrt[b]*x^(n/2))/Sqrt[a -
b*x^n]])/(Sqrt[b]*n*Sqrt[x^2*(-b + a/x^n)])
```

Maple [F] time = 0.112, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x^{2-n}\left(a-bx^n\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x^(2-n)*(a-b*x^n))^(1/2),x)

[Out] int(1/(x^(2-n)*(a-b*x^n))^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^n - a)*x^(-n + 2)),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.251685, size = 1, normalized size = 0.03

$$\left[-\frac{\sqrt{-b}\log\left(-\frac{2\sqrt{-b}bxx^n-a\sqrt{-b}x+2bx^n\sqrt{-\frac{bx^2x^n-ax^2}{x^n}}}{x}\right)}{bn}, \frac{2\arctan\left(\frac{\sqrt{b}x}{\sqrt{-\frac{bx^2x^n-ax^2}{x^n}}}\right)}{\sqrt{b}n}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^n - a)*x^(-n + 2)),x, algorithm="fricas")

[Out] [-sqrt(-b)*log(-(2*sqrt(-b)*b*x*x^n - a*sqrt(-b)*x + 2*b*x^n*sqrt
(-(b*x^2*x^n - a*x^2)/x^n))/x)/(b*n), 2*arctan(sqrt(b)*x/sqrt(-(b
*x^2*x^n - a*x^2)/x^n))/(sqrt(b)*n)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x**(2-n)*(a-b*x**n))**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{-(bx^n-a)x^{-n+2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^n - a)*x^(-n + 2)),x, algorithm="giac")

[Out] integrate(1/sqrt(-(b*x^n - a)*x^(-n + 2)), x)
```

3.415 $\int \frac{1}{\sqrt{x^n(a+bx^{2-n})}}\,dx$

Optimal. Leaf size=37

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}(2-n)}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[b*x^2 + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi [A] time = 0.0447621, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}(2-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[x^n*(a + b*x^(2 - n))],x]
```

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[b*x^2 + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi in Sympy [A] time = 3.4138, size = 31, normalized size = 0.84

$$\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}\,(-n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x**n*(a+b*x**(2-n)))**(1/2),x)
```

```
[Out] 2*atanh(sqrt(b)*x/sqrt(a*x**n + b*x**2))/(sqrt(b)*(-n + 2))
```

Mathematica [B] time = 0.107424, size = 78, normalized size = 2.11

$$-\frac{2\sqrt{a}x^{n/2}\sqrt{\frac{bx^{2-n}}{a}+1}\,\sinh^{-1}\left(\frac{\sqrt{b}x^{1-\frac{n}{2}}}{\sqrt{a}}\right)}{\sqrt{b}(n-2)\sqrt{ax^n+bx^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[x^n*(a + b*x^(2 - n))],x]
```

```
[Out] (-2*Sqrt[a]*x^(n/2)*Sqrt[1 + (b*x^(2 - n))/a]*ArcSinh[(Sqrt[b]*x^
(1 - n/2))/Sqrt[a]])/(Sqrt[b]*(-2 + n)*Sqrt[b*x^2 + a*x^n])
```

Maple [F] time = 0.073, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x^n\,(a+bx^{2-n})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x^n*(a+b*x^(2-n)))^(1/2),x)

[Out] int(1/(x^n*(a+b*x^(2-n)))^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(bx^{-n+2} + a)x^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^(-n + 2) + a)*x^n),x, algorithm="maxima")

[Out] integrate(1/sqrt((b*x^(-n + 2) + a)*x^n), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^(-n + 2) + a)*x^n),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x**n*(a+b*x**(2-n)))**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(bx^{-n+2} + a)x^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((b*x^(-n + 2) + a)*x^n),x, algorithm="giac")

[Out] integrate(1/sqrt((b*x^(-n + 2) + a)*x^n), x)
```

3.416 $\int \frac{1}{\sqrt{x^2(b+ax^{-2+n})}}\,dx$

Optimal. Leaf size=37

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}(2-n)}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[b*x^2 + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi [A] time = 0.040827, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}(2-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[x^2*(b + a*x^(-2 + n))],x]

[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[b*x^2 + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi in Sympy [A] time = 3.45585, size = 31, normalized size = 0.84

$$\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}\,(-n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x**2*(b+a*x**(-2+n)))**(1/2),x)

[Out] 2*atanh(sqrt(b)*x/sqrt(a*x**n + b*x**2))/(sqrt(b)*(-n + 2))
```

Mathematica [B] time = 0.025789, size = 78, normalized size = 2.11

$$-\frac{2\sqrt{a}x^{n/2}\sqrt{\frac{bx^{2-n}}{a}+1}\sinh^{-1}\left(\frac{\sqrt{b}x^{1-\frac{n}{2}}}{\sqrt{a}}\right)}{\sqrt{b}(n-2)\sqrt{ax^n+bx^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[x^2*(b + a*x^(-2 + n))],x]

[Out] (-2*Sqrt[a]*x^(n/2)*Sqrt[1 + (b*x^(2 - n))/a]*ArcSinh[(Sqrt[b]*x^
(1 - n/2))/Sqrt[a]])/(Sqrt[b]*(-2 + n)*Sqrt[b*x^2 + a*x^n])
```

Maple [F] time = 0.086, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x^2\,(b+ax^{-2+n})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x^2*(b+a*x^(-2+n)))^(1/2),x)
```

```
[Out] int(1/(x^2*(b+a*x^(-2+n)))^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(ax^{n-2}+b)x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 2) + b)*x^2),x, algorithm="maxima")
```

```
[Out] integrate(1/sqrt((a*x^(n - 2) + b)*x^2), x)
```

Fricas [A] time = 0.247903, size = 1, normalized size = 0.03

$$\left[\frac{\sqrt{b}\log\left(\frac{a\sqrt{b}xx^{n-2}+2\,b^{\frac{3}{2}}x-2\,\sqrt{ax^2x^{n-2}+bx^2}b}{xx^{n-2}}\right)}{bn-2\,b}, -\frac{2\,\sqrt{-b}\arctan\left(\frac{bx}{\sqrt{ax^2x^{n-2}+bx^2}\sqrt{-b}}\right)}{bn-2\,b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 2) + b)*x^2),x, algorithm="fricas")
```

```
[Out] [sqrt(b)*log((a*sqrt(b)*x*x^(n - 2) + 2*b^(3/2)*x - 2*sqrt(a*x^2*
x^(n - 2) + b*x^2)*b)/(x*x^(n - 2)))/(b*n - 2*b), -2*sqrt(-b)*arc
tan(b*x/(sqrt(a*x^2*x^(n - 2) + b*x^2)*sqrt(-b)))/(b*n - 2*b)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x**2*(b+a*x**(-2+n)))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(ax^{n-2}+b)x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 2) + b)*x^2),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt((a*x^(n - 2) + b)*x^2), x)
```

3.417 $\int \frac{1}{\sqrt{x(bx+ax^{-1+n})}}\,dx$

Optimal. Leaf size=37

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}(2-n)}$$

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[b*x^2 + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi [A] time = 0.0397467, antiderivative size = 37, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$\frac{2\tanh^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}(2-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[x*(b*x + a*x^(-1 + n))],x]
```

```
[Out] (2*ArcTanh[(Sqrt[b]*x)/Sqrt[b*x^2 + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi in Sympy [A] time = 3.46239, size = 31, normalized size = 0.84

$$\frac{2\,\mathrm{atanh}\left(\frac{\sqrt{b}x}{\sqrt{ax^n+bx^2}}\right)}{\sqrt{b}\,(-n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x*(b*x+a*x**(-1+n)))**(1/2),x)
```

```
[Out] 2*atanh(sqrt(b)*x/sqrt(a*x**n + b*x**2))/(sqrt(b)*(-n + 2))
```

Mathematica [B] time = 0.0260076, size = 78, normalized size = 2.11

$$-\frac{2\sqrt{a}x^{n/2}\sqrt{\frac{bx^{2-n}}{a}+1}\sinh^{-1}\left(\frac{\sqrt{b}x^{1-\frac{n}{2}}}{\sqrt{a}}\right)}{\sqrt{b}(n-2)\sqrt{ax^n+bx^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[x*(b*x + a*x^(-1 + n))],x]
```

```
[Out] (-2*Sqrt[a]*x^(n/2)*Sqrt[1 + (b*x^(2 - n))/a]*ArcSinh[(Sqrt[b]*x^
(1 - n/2))/Sqrt[a]])/(Sqrt[b]*(-2 + n)*Sqrt[b*x^2 + a*x^n])
```

Maple [F] time = 0.067, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x\,(bx+ax^{-1+n})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x*(b*x+a*x^(-1+n)))^(1/2),x)

[Out] int(1/(x*(b*x+a*x^(-1+n)))^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(ax^{n-1} + bx)x}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 1) + b*x)*x),x, algorithm="maxima")

[Out] integrate(1/sqrt((a*x^(n - 1) + b*x)*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 1) + b*x)*x),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x*(b*x+a*x**(-1+n)))**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(ax^{n-1} + bx)x}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 1) + b*x)*x),x, algorithm="giac")

[Out] integrate(1/sqrt((a*x^(n - 1) + b*x)*x), x)
```

3.418 $\int \frac{1}{\sqrt{x^n(a-bx^{2-n})}}\,dx$

Optimal. Leaf size=38

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}(2-n)}$$

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[-(b*x^2) + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi [A] time = 0.0410929, antiderivative size = 38, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}(2-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[x^n*(a - b*x^(2 - n))],x]
```

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[-(b*x^2) + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi in Sympy [A] time = 3.25418, size = 31, normalized size = 0.82

$$\frac{2\,\mathrm{atan}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}\,(-n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x**n*(a-b*x**(2-n)))**(1/2),x)
```

```
[Out] 2*atan(sqrt(b)*x/sqrt(a*x**n - b*x**2))/(sqrt(b)*(-n + 2))
```

Mathematica [B] time = 0.128499, size = 80, normalized size = 2.11

$$-\frac{2\sqrt{a}x^{n/2}\sqrt{1-\frac{bx^{2-n}}{a}}\sin^{-1}\left(\frac{\sqrt{b}x^{1-\frac{n}{2}}}{\sqrt{a}}\right)}{\sqrt{b}(n-2)\sqrt{ax^n-bx^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[x^n*(a - b*x^(2 - n))],x]
```

```
[Out] (-2*Sqrt[a]*x^(n/2)*Sqrt[1 - (b*x^(2 - n))/a]*ArcSin[(Sqrt[b]*x^(
1 - n/2))/Sqrt[a]])/(Sqrt[b]*(-2 + n)*Sqrt[-(b*x^2) + a*x^n])
```

Maple [F] time = 0.078, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x^n\,(a-bx^{2-n})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x^n*(a-b*x^(2-n)))^(1/2),x)
```

```
[Out] int(1/(x^n*(a-b*x^(2-n)))^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{-(bx^{-n+2} - a)x^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^(-n + 2) - a)*x^n),x, algorithm="maxima")
```

```
[Out] integrate(1/sqrt(-(b*x^(-n + 2) - a)*x^n), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^(-n + 2) - a)*x^n),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x**n*(a-b*x**(2-n)))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{-(bx^{-n+2} - a)x^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(-(b*x^(-n + 2) - a)*x^n),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt(-(b*x^(-n + 2) - a)*x^n), x)
```

3.419 $\int \frac{1}{\sqrt{x^2(-b+ax^{-2+n})}}\,dx$

Optimal. Leaf size=38

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}(2-n)}$$

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[-(b*x^2) + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi [A] time = 0.0401303, antiderivative size = 38, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}(2-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[x^2*(-b + a*x^(-2 + n))],x]
```

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[-(b*x^2) + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi in Sympy [A] time = 3.29955, size = 31, normalized size = 0.82

$$\frac{2\,\mathrm{atan}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}\,(-n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x**2*(-b+a*x**(-2+n)))**(1/2),x)
```

```
[Out] 2*atan(sqrt(b)*x/sqrt(a*x**n - b*x**2))/(sqrt(b)*(-n + 2))
```

Mathematica [B] time = 0.0284596, size = 80, normalized size = 2.11

$$-\frac{2\sqrt{a}x^{n/2}\sqrt{1-\frac{bx^{2-n}}{a}}\sin^{-1}\left(\frac{\sqrt{b}x^{1-\frac{n}{2}}}{\sqrt{a}}\right)}{\sqrt{b}(n-2)\sqrt{ax^n-bx^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[x^2*(-b + a*x^(-2 + n))],x]
```

```
[Out] (-2*Sqrt[a]*x^(n/2)*Sqrt[1 - (b*x^(2 - n))/a]*ArcSin[(Sqrt[b]*x^(
1 - n/2))/Sqrt[a]])/(Sqrt[b]*(-2 + n)*Sqrt[-(b*x^2) + a*x^n])
```

Maple [F] time = 0.088, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x^2\,(-b+ax^{-2+n})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x^2*(-b+a*x^(-2+n)))^(1/2),x)

[Out] int(1/(x^2*(-b+a*x^(-2+n)))^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(ax^{n-2} - b)x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 2) - b)*x^2),x, algorithm="maxima")

[Out] integrate(1/sqrt((a*x^(n - 2) - b)*x^2), x)
```

Fricas [A] time = 0.247138, size = 1, normalized size = 0.03

$$\left[-\frac{\sqrt{-b}\log\left(\frac{a\sqrt{-b}xx^{n-2}-2\sqrt{-b}bx+2\sqrt{ax^2x^{n-2}-bx^2}b}{xx^{n-2}}\right)}{bn-2b}, -\frac{2\sqrt{b}\arctan\left(\frac{\sqrt{b}x}{\sqrt{ax^2x^{n-2}-bx^2}}\right)}{bn-2b}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 2) - b)*x^2),x, algorithm="fricas")

[Out] [-sqrt(-b)*log((a*sqrt(-b)*x*x^(n - 2) - 2*sqrt(-b)*b*x + 2*sqrt(
a*x^2*x^(n - 2) - b*x^2)*b)/(x*x^(n - 2)))/(b*n - 2*b), -2*sqrt(b
)*arctan(sqrt(b)*x/sqrt(a*x^2*x^(n - 2) - b*x^2))/(b*n - 2*b)]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x**2*(-b+a*x**(-2+n)))**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(ax^{n-2} - b)x^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 2) - b)*x^2),x, algorithm="giac")

[Out] integrate(1/sqrt((a*x^(n - 2) - b)*x^2), x)
```

3.420 $\int \frac{1}{\sqrt{x(-bx+ax^{-1+n})}}\,dx$

Optimal. Leaf size=38

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}(2-n)}$$

```
[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[-(b*x^2) + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi [A] time = 0.0393685, antiderivative size = 38, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$\frac{2\tan^{-1}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}(2-n)}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[x*(-(b*x) + a*x^(-1 + n))],x]

[Out] (2*ArcTan[(Sqrt[b]*x)/Sqrt[-(b*x^2) + a*x^n]])/(Sqrt[b]*(2 - n))
```

Rubi in Sympy [A] time = 3.29205, size = 31, normalized size = 0.82

$$\frac{2\,\mathrm{atan}\left(\frac{\sqrt{b}x}{\sqrt{ax^n-bx^2}}\right)}{\sqrt{b}\,(-n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x*(-b*x+a*x**(-1+n)))**(1/2),x)

[Out] 2*atan(sqrt(b)*x/sqrt(a*x**n - b*x**2))/(sqrt(b)*(-n + 2))
```

Mathematica [B] time = 0.0278225, size = 80, normalized size = 2.11

$$-\frac{2\sqrt{a}x^{n/2}\sqrt{1-\frac{bx^{2-n}}{a}}\sin^{-1}\left(\frac{\sqrt{b}x^{1-\frac{n}{2}}}{\sqrt{a}}\right)}{\sqrt{b}(n-2)\sqrt{ax^n-bx^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[x*(-(b*x) + a*x^(-1 + n))],x]

[Out] (-2*Sqrt[a]*x^(n/2)*Sqrt[1 - (b*x^(2 - n))/a]*ArcSin[(Sqrt[b]*x^(
1 - n/2))/Sqrt[a]])/(Sqrt[b]*(-2 + n)*Sqrt[-(b*x^2) + a*x^n])
```

Maple [F] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{x\,(-bx+ax^{-1+n})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x*(-b*x+a*x^(-1+n))))^(1/2),x)

[Out] int(1/(x*(-b*x+a*x^(-1+n))))^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(ax^{n-1} - bx)x}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 1) - b*x)*x),x, algorithm="maxima")

[Out] integrate(1/sqrt((a*x^(n - 1) - b*x)*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 1) - b*x)*x),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x*(-b*x+a*x**(-1+n)))**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{(ax^{n-1} - bx)x}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt((a*x^(n - 1) - b*x)*x),x, algorithm="giac")

[Out] integrate(1/sqrt((a*x^(n - 1) - b*x)*x), x)
```

3.421 $\int (cx)^m \left(ax^j+bx^n\right)^{3/2} dx$

Optimal. Leaf size=107

$$\frac{2bx^{n+1}(cx)^m\sqrt{ax^j+bx^n}\,{}_2F_1\left(-\frac{3}{2},\frac{m+\frac{3n}{2}+1}{j-n};\frac{m+\frac{3n}{2}+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{(2m+3n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

```
[Out] (2*b*x^(1 + n)*(c*x)^m*Sqrt[a*x^j + b*x^n]*Hypergeometric2F1[-3/2
, (1 + m + (3*n)/2)/(j - n), 1 + (1 + m + (3*n)/2)/(j - n), -((a*
x^(j - n))/b)])/((2 + 2*m + 3*n)*Sqrt[1 + (a*x^(j - n))/b])
```

Rubi [A] time = 0.20198, antiderivative size = 107, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{2bx^{n+1}(cx)^m\sqrt{ax^j+bx^n}\,{}_2F_1\left(-\frac{3}{2},\frac{m+\frac{3n}{2}+1}{j-n};\frac{m+\frac{3n}{2}+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{(2m+3n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^m*(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (2*b*x^(1 + n)*(c*x)^m*Sqrt[a*x^j + b*x^n]*Hypergeometric2F1[-3/2
, (1 + m + (3*n)/2)/(j - n), 1 + (1 + m + (3*n)/2)/(j - n), -((a*
x^(j - n))/b)])/((2 + 2*m + 3*n)*Sqrt[1 + (a*x^(j - n))/b])
```

Rubi in Sympy [A] time = 24.1581, size = 97, normalized size = 0.91

$$\frac{2bx^{-m-\frac{n}{2}}x^{m+\frac{3n}{2}+1}(cx)^m\sqrt{ax^j+bx^n}\,{}_2F_1\left(\left.\begin{matrix}-\frac{3}{2},\frac{m+\frac{3n}{2}+1}{j-n}\\ \frac{j+m+\frac{n}{2}+1}{j-n}\end{matrix}\right|-\frac{ax^{j-n}}{b}\right)}{\sqrt{\frac{ax^{j-n}}{b}+1}\,(2m+3n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**m*(a*x**j+b*x**n)**(3/2),x)
```

```
[Out] 2*b*x**(-m - n/2)*x**(m + 3*n/2 + 1)*(c*x)**m*sqrt(a*x**j + b*x**
n)*hyper((-3/2, (m + 3*n/2 + 1)/(j - n)), ((j + m + n/2 + 1)/(j -
 n),), -a*x**(j - n)/b)/(sqrt(a*x**(j - n)/b + 1)*(2*m + 3*n + 2)
)
```

Mathematica [B] time = 0.490255, size = 218, normalized size = 2.04

$$\frac{2(cx)^m\left(3a^2(j-n)^2x^{2j+1}\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{4j+2m-n+2}{2j-2n};\frac{6j+2m-3n+2}{2j-2n};-\frac{ax^{j-n}}{b}\right)+x^{-m}(4j+2m-n+2)\left(ax^j+bx^n\right)\left(a(-j+2m\right.\right.}{(2m+3n+2)(4j+2m-n+2)(2j+2m+n+2)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^m*(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (2*(c*x)^m*(((2 + 4*j + 2*m - n)*(a*x^j + b*x^n)*(a*(2 - j + 2*m
+ 4*n)*x^(1 + j + m) + b*(2 + 2*j + 2*m + n)*x^(1 + m + n)))/x^m
```

```
+ 3*a^2*(j - n)^2*x^(1 + 2*j)*Sqrt[1 + (a*x^(j - n))/b]*Hypergeom
etric2F1[1/2, (2 + 4*j + 2*m - n)/(2*j - 2*n), (2 + 6*j + 2*m - 3
*n)/(2*j - 2*n), -((a*x^(j - n))/b)]))/((2 + 4*j + 2*m - n)*(2 +
2*j + 2*m + n)*(2 + 2*m + 3*n)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.428, size = 0, normalized size = 0.

$$\int (cx)^m \left(ax^j + bx^n\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^m*(a*x^j+b*x^n)^(3/2),x)
```

```
[Out] int((c*x)^m*(a*x^j+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax^j + bx^n\right)^{\frac{3}{2}} (cx)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(3/2)*(c*x)^m,x, algorithm="maxima")
```

```
[Out] integrate((a*x^j + b*x^n)^(3/2)*(c*x)^m, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(3/2)*(c*x)^m,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**m*(a*x**j+b*x**n)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax^j + bx^n\right)^{\frac{3}{2}} (cx)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(3/2)*(c*x)^m,x, algorithm="giac")

[Out] integrate((a*x^j + b*x^n)^(3/2)*(c*x)^m, x)
```

3.422 $\int (cx)^m \sqrt{ax^j + bx^n}\, dx$

Optimal. Leaf size=100

$$\frac{2x(cx)^m \sqrt{ax^j + bx^n}\, {}_2F_1\left(-\frac{1}{2}, \frac{m+\frac{n}{2}+1}{j-n}; \frac{2m+n+2}{2j-2n} + 1; -\frac{ax^{j-n}}{b}\right)}{(2m+n+2)\sqrt{\frac{ax^{j-n}}{b} + 1}}$$

```
[Out] (2*x*(c*x)^m*Sqrt[a*x^j + b*x^n]*Hypergeometric2F1[-1/2, (1 + m +
 n/2)/(j - n), 1 + (2 + 2*m + n)/(2*j - 2*n), -((a*x^(j - n))/b)]
)/((2 + 2*m + n)*Sqrt[1 + (a*x^(j - n))/b])
```

Rubi [A] time = 0.203223, antiderivative size = 100, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$\frac{2x(cx)^m \sqrt{ax^j + bx^n}\, {}_2F_1\left(-\frac{1}{2}, \frac{m+\frac{n}{2}+1}{j-n}; \frac{2m+n+2}{2j-2n} + 1; -\frac{ax^{j-n}}{b}\right)}{(2m+n+2)\sqrt{\frac{ax^{j-n}}{b} + 1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^m*Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*x*(c*x)^m*Sqrt[a*x^j + b*x^n]*Hypergeometric2F1[-1/2, (1 + m +
 n/2)/(j - n), 1 + (2 + 2*m + n)/(2*j - 2*n), -((a*x^(j - n))/b)]
)/((2 + 2*m + n)*Sqrt[1 + (a*x^(j - n))/b])
```

Rubi in Sympy [A] time = 23.6995, size = 90, normalized size = 0.9

$$\frac{2x^{-m-\frac{n}{2}}x^{m+\frac{n}{2}+1}(cx)^m \sqrt{ax^j + bx^n}\, {}_2F_1\left(\begin{matrix} -\frac{1}{2}, \frac{m+\frac{n}{2}+1}{j-n} \\ \frac{j+m-\frac{n}{2}+1}{j-n} \end{matrix}\middle| -\frac{ax^{j-n}}{b}\right)}{\sqrt{\frac{ax^{j-n}}{b} + 1}\,(2m+n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**m*(a*x**j+b*x**n)**(1/2),x)
```

```
[Out] 2*x**(-m - n/2)*x**(m + n/2 + 1)*(c*x)**m*sqrt(a*x**j + b*x**n)*h
yper((-1/2, (m + n/2 + 1)/(j - n)), ((j + m - n/2 + 1)/(j - n),),
 -a*x**(j - n)/b)/(sqrt(a*x**(j - n)/b + 1)*(2*m + n + 2))
```

Mathematica [A] time = 0.278688, size = 156, normalized size = 1.56

$$\frac{2x(cx)^m \left((2j+2m-n+2)\left(ax^j + bx^n\right) - a(j-n)x^j \sqrt{\frac{ax^{j-n}}{b} + 1}\, {}_2F_1\left(\frac{1}{2}, \frac{2j+2m-n+2}{2j-2n}; \frac{4j+2m-3n+2}{2j-2n}; -\frac{ax^{j-n}}{b}\right)\right)}{(2m+n+2)(2j+2m-n+2)\sqrt{ax^j + bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^m*Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*x*(c*x)^m*((2 + 2*j + 2*m - n)*(a*x^j + b*x^n) - a*(j - n)*x^j
*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[1/2, (2 + 2*j + 2*m
- n)/(2*j - 2*n), (2 + 4*j + 2*m - 3*n)/(2*j - 2*n), -((a*x^(j -
```

```
n))/b)]))/((2 + 2*j + 2*m - n)*(2 + 2*m + n)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.321, size = 0, normalized size = 0.

$$\int (cx)^m \sqrt{ax^j + bx^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^m*(a*x^j+b*x^n)^(1/2),x)

[Out] int((c*x)^m*(a*x^j+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax^j + bx^n}\,(cx)^m\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*(c*x)^m,x, algorithm="maxima")

[Out] integrate(sqrt(a*x^j + b*x^n)*(c*x)^m, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*(c*x)^m,x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int (cx)^m \sqrt{ax^j + bx^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**m*(a*x**j+b*x**n)**(1/2),x)

[Out] Integral((c*x)**m*sqrt(a*x**j + b*x**n), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax^j + bx^n}\,(cx)^m\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n)*(c*x)^m,x, algorithm="giac")

[Out] integrate(sqrt(a*x^j + b*x^n)*(c*x)^m, x)
```

3.423 $\int \frac{(cx)^m}{\sqrt{ax^j+bx^n}}\,dx$

Optimal. Leaf size=102

$$\frac{2x(cx)^m\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{m-\frac{n}{2}+1}{j-n};\frac{m-\frac{n}{2}+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{(2m-n+2)\sqrt{ax^j+bx^n}}$$

```
[Out] (2*x*(c*x)^m*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[1/2, (1
+ m - n/2)/(j - n), 1 + (1 + m - n/2)/(j - n), -((a*x^(j - n))/b)
])/((2 + 2*m - n)*Sqrt[a*x^j + b*x^n])
```

Rubi [A] time = 0.20067, antiderivative size = 102, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{2x(cx)^m\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{m-\frac{n}{2}+1}{j-n};\frac{m-\frac{n}{2}+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{(2m-n+2)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^m/Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*x*(c*x)^m*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[1/2, (1
+ m - n/2)/(j - n), 1 + (1 + m - n/2)/(j - n), -((a*x^(j - n))/b)
])/((2 + 2*m - n)*Sqrt[a*x^j + b*x^n])
```

Rubi in Sympy [A] time = 24.9933, size = 92, normalized size = 0.9

$$\frac{2x^{-m-\frac{n}{2}}x^{m-\frac{n}{2}+1}(cx)^m\sqrt{ax^j+bx^n}\,{}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{m-\frac{n}{2}+1}{j-n}\\ \frac{j+m-\frac{3n}{2}+1}{j-n}\end{matrix}\middle|-\frac{ax^{j-n}}{b}\right)}{b\sqrt{\frac{ax^{j-n}}{b}+1}\,(2m-n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**m/(a*x**j+b*x**n)**(1/2),x)
```

```
[Out] 2*x**(-m - n/2)*x**(m - n/2 + 1)*(c*x)**m*sqrt(a*x**j + b*x**n)*h
yper((1/2, (m - n/2 + 1)/(j - n)), ((j + m - 3*n/2 + 1)/(j - n),)
, -a*x**(j - n)/b)/(b*sqrt(a*x**(j - n)/b + 1)*(2*m - n + 2))
```

Mathematica [A] time = 0.100018, size = 106, normalized size = 1.04

$$\frac{2x(cx)^m\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{2m-n+2}{2j-2n};\frac{2m-n+2}{2j-2n}+1;-\frac{ax^{j-n}}{b}\right)}{(2m-n+2)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^m/Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*x*(c*x)^m*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[1/2, (2
+ 2*m - n)/(2*j - 2*n), 1 + (2 + 2*m - n)/(2*j - 2*n), -((a*x^(j
- n))/b)])/((2 + 2*m - n)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.109, size = 0, normalized size = 0.

$$\int (cx)^m \frac{1}{\sqrt{ax^j + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x)^m/(a*x^j+b*x^n)^(1/2),x)
```

```
[Out] int((c*x)^m/(a*x^j+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^m}{\sqrt{ax^j + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x)^m/sqrt(a*x^j + b*x^n),x, algorithm="maxima")
```

```
[Out] integrate((c*x)^m/sqrt(a*x^j + b*x^n), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x)^m/sqrt(a*x^j + b*x^n),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^m}{\sqrt{ax^j + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x)**m/(a*x**j+b*x**n)**(1/2),x)
```

```
[Out] Integral((c*x)**m/sqrt(a*x**j + b*x**n), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^m}{\sqrt{ax^j + bx^n}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x)^m/sqrt(a*x^j + b*x^n),x, algorithm="giac")
```

```
[Out] integrate((c*x)^m/sqrt(a*x^j + b*x^n), x)
```

3.424 $\int \frac{(cx)^m}{(ax^j+bx^n)^{3/2}}\,dx$

Optimal. Leaf size=111

$$\frac{2x^{1-n}(cx)^m\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{3}{2},\frac{m-\frac{3n}{2}+1}{j-n};\frac{m-\frac{3n}{2}+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{b(2m-3n+2)\sqrt{ax^j+bx^n}}$$

```
[Out] (2*x^(1 - n)*(c*x)^m*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[
3/2, (1 + m - (3*n)/2)/(j - n), 1 + (1 + m - (3*n)/2)/(j - n), -(
(a*x^(j - n))/b)])/(b*(2 + 2*m - 3*n)*Sqrt[a*x^j + b*x^n])
```

Rubi [A] time = 0.211938, antiderivative size = 111, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{2x^{1-n}(cx)^m\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{3}{2},\frac{m-\frac{3n}{2}+1}{j-n};\frac{m-\frac{3n}{2}+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{b(2m-3n+2)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^m/(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (2*x^(1 - n)*(c*x)^m*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[
3/2, (1 + m - (3*n)/2)/(j - n), 1 + (1 + m - (3*n)/2)/(j - n), -(
(a*x^(j - n))/b)])/(b*(2 + 2*m - 3*n)*Sqrt[a*x^j + b*x^n])
```

Rubi in Sympy [A] time = 25.6007, size = 99, normalized size = 0.89

$$\frac{2x^{-m-\frac{n}{2}}x^{m-\frac{3n}{2}+1}(cx)^m\sqrt{ax^j+bx^n}\,{}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{m-\frac{3n}{2}+1}{j-n}\\ \frac{j+m-\frac{5n}{2}+1}{j-n}\end{matrix}\middle|-\frac{ax^{j-n}}{b}\right)}{b^2\sqrt{\frac{ax^{j-n}}{b}+1}\,(2m-3n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**m/(a*x**j+b*x**n)**(3/2),x)
```

```
[Out] 2*x**(-m - n/2)*x**(m - 3*n/2 + 1)*(c*x)**m*sqrt(a*x**j + b*x**n)
*hyper((3/2, (m - 3*n/2 + 1)/(j - n)), ((j + m - 5*n/2 + 1)/(j -
n),), -a*x**(j - n)/b)/(b**2*sqrt(a*x**(j - n)/b + 1)*(2*m - 3*n
+ 2))
```

Mathematica [A] time = 0.163507, size = 116, normalized size = 1.05

$$\frac{2x^{1-j}(cx)^m\left(\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{-2j+2m-n+2}{2j-2n};\frac{2m-3n+2}{2j-2n};-\frac{ax^{j-n}}{b}\right)-1\right)}{a(j-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^m/(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (2*x^(1 - j)*(c*x)^m*(-1 + Sqrt[1 + (a*x^(j - n))/b]*Hypergeometr
ic2F1[1/2, (2 - 2*j + 2*m - n)/(2*j - 2*n), (2 + 2*m - 3*n)/(2*j
```

```
- 2*n), -((a*x^(j - n))/b)]))/(a*(j - n)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.09, size = 0, normalized size = 0.

$$\int (cx)^m \left(a x^j + b x^n\right)^{-\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x)^m/(a*x^j+b*x^n)^(3/2),x)

[Out] int((c*x)^m/(a*x^j+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^m}{(a x^j + b x^n)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x)^m/(a*x^j + b*x^n)^(3/2),x, algorithm="maxima")

[Out] integrate((c*x)^m/(a*x^j + b*x^n)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x)^m/(a*x^j + b*x^n)^(3/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x)**m/(a*x**j+b*x**n)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^m}{(a x^j + b x^n)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^m/(a*x^j + b*x^n)^(3/2),x, algorithm="giac")

[Out] integrate((c*x)^m/(a*x^j + b*x^n)^(3/2), x)
```

3.425 $\int \frac{(cx)^m}{(ax^j+bx^n)^{5/2}}\,dx$

Optimal. Leaf size=111

$$\frac{2x^{1-2n}(cx)^m\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{5}{2},\frac{m-\frac{5n}{2}+1}{j-n};\frac{m-\frac{5n}{2}+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{b^2(2m-5n+2)\sqrt{ax^j+bx^n}}$$

```
[Out] (2*x^(1 - 2*n)*(c*x)^m*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F
1[5/2, (1 + m - (5*n)/2)/(j - n), 1 + (1 + m - (5*n)/2)/(j - n),
-((a*x^(j - n))/b)])/(b^2*(2 + 2*m - 5*n)*Sqrt[a*x^j + b*x^n])
```

Rubi [A] time = 0.215499, antiderivative size = 111, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$\frac{2x^{1-2n}(cx)^m\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{5}{2},\frac{m-\frac{5n}{2}+1}{j-n};\frac{m-\frac{5n}{2}+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{b^2(2m-5n+2)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[(c*x)^m/(a*x^j + b*x^n)^(5/2),x]
```

```
[Out] (2*x^(1 - 2*n)*(c*x)^m*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F
1[5/2, (1 + m - (5*n)/2)/(j - n), 1 + (1 + m - (5*n)/2)/(j - n),
-((a*x^(j - n))/b)])/(b^2*(2 + 2*m - 5*n)*Sqrt[a*x^j + b*x^n])
```

Rubi in Sympy [A] time = 25.4198, size = 99, normalized size = 0.89

$$\frac{2x^{-m-\frac{n}{2}}x^{m-\frac{5n}{2}+1}(cx)^m\sqrt{ax^j+bx^n}\,{}_2F_1\left(\begin{matrix}\frac{5}{2},\frac{m-\frac{5n}{2}+1}{j-n}\\ \frac{j+m-\frac{7n}{2}+1}{j-n}\end{matrix}\middle|-\frac{ax^{j-n}}{b}\right)}{b^3\sqrt{\frac{ax^{j-n}}{b}+1}\,(2m-5n+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x)**m/(a*x**j+b*x**n)**(5/2),x)
```

```
[Out] 2*x**(-m - n/2)*x**(m - 5*n/2 + 1)*(c*x)**m*sqrt(a*x**j + b*x**n)
*hyper((5/2, (m - 5*n/2 + 1)/(j - n)), ((j + m - 7*n/2 + 1)/(j -
n),), -a*x**(j - n)/b)/(b**3*sqrt(a*x**(j - n)/b + 1)*(2*m - 5*n
+ 2))
```

Mathematica [A] time = 0.553667, size = 166, normalized size = 1.5

$$\frac{2x^{1-2j}(cx)^m\left(-(2j-2m+3n-2)\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{-4j+2m-n+2}{2j-2n};\frac{-2j+2m-3n+2}{2j-2n};-\frac{ax^{j-n}}{b}\right)-\frac{a(j-n)x^j}{ax^j+bx^n}+2j-2m+3n-2\right)}{3a^2(j-n)^2\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(c*x)^m/(a*x^j + b*x^n)^(5/2),x]
```

```
[Out] (2*x^(1 - 2*j)*(c*x)^m*(-2 + 2*j - 2*m + 3*n - (a*(j - n)*x^j)/(a
*x^j + b*x^n) - (-2 + 2*j - 2*m + 3*n)*Sqrt[1 + (a*x^(j - n))/b]*
```

```
Hypergeometric2F1[1/2, (2 - 4*j + 2*m - n)/(2*j - 2*n), (2 - 2*j
+ 2*m - 3*n)/(2*j - 2*n), -((a*x^(j - n))/b)]))/(3*a^2*(j - n)^2*
Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.094, size = 0, normalized size = 0.

$$\int (cx)^m \left(ax^j + bx^n\right)^{-\frac{5}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x)^m/(a*x^j+b*x^n)^(5/2),x)

[Out] int((c*x)^m/(a*x^j+b*x^n)^(5/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^m}{(ax^j + bx^n)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^m/(a*x^j + b*x^n)^(5/2),x, algorithm="maxima")

[Out] integrate((c*x)^m/(a*x^j + b*x^n)^(5/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^m/(a*x^j + b*x^n)^(5/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)**m/(a*x**j+b*x**n)**(5/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(cx)^m}{(ax^j + bx^n)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x)^m/(a*x^j + b*x^n)^(5/2),x, algorithm="giac")

[Out] integrate((c*x)^m/(a*x^j + b*x^n)^(5/2), x)
```

3.426 $\int \left(ax^j + bx^n\right)^{3/2} dx$

Optimal. Leaf size=97

$$\frac{2bx^{n+1}\sqrt{ax^j+bx^n}\,{}_2F_1\left(-\frac{3}{2},\frac{\frac{3n}{2}+1}{j-n};\frac{2j+n+2}{2(j-n)};-\frac{ax^{j-n}}{b}\right)}{(3n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

```
[Out] (2*b*x^(1 + n)*Sqrt[a*x^j + b*x^n]*Hypergeometric2F1[-3/2, (1 + (
3*n)/2)/(j - n), (2 + 2*j + n)/(2*(j - n)), -((a*x^(j - n))/b)])/
((2 + 3*n)*Sqrt[1 + (a*x^(j - n))/b])
```

Rubi [A] time = 0.135562, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{2bx^{n+1}\sqrt{ax^j+bx^n}\,{}_2F_1\left(-\frac{3}{2},\frac{\frac{3n}{2}+1}{j-n};\frac{2j+n+2}{2(j-n)};-\frac{ax^{j-n}}{b}\right)}{(3n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (2*b*x^(1 + n)*Sqrt[a*x^j + b*x^n]*Hypergeometric2F1[-3/2, (1 + (
3*n)/2)/(j - n), (2 + 2*j + n)/(2*(j - n)), -((a*x^(j - n))/b)])/
((2 + 3*n)*Sqrt[1 + (a*x^(j - n))/b])
```

Rubi in Sympy [A] time = 12.4465, size = 80, normalized size = 0.82

$$\frac{2bx^{-\frac{n}{2}}x^{\frac{3n}{2}+1}\sqrt{ax^j+bx^n}\,{}_2F_1\left(\begin{matrix}-\frac{3}{2},\frac{\frac{3n}{2}+1}{j-n}\\ \frac{j+\frac{n}{2}+1}{j-n}\end{matrix}\middle| -\frac{ax^{j-n}}{b}\right)}{(3n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**j+b*x**n)**(3/2),x)
```

```
[Out] 2*b*x**(-n/2)*x**(3*n/2 + 1)*sqrt(a*x**j + b*x**n)*hyper((-3/2, (
3*n/2 + 1)/(j - n)), ((j + n/2 + 1)/(j - n),), -a*x**(j - n)/b)/(
(3*n + 2)*sqrt(a*x**(j - n)/b + 1))
```

Mathematica [A] time = 0.316899, size = 177, normalized size = 1.82

$$\frac{2x\left(3a^2(j-n)^2x^{2j}\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{4j-n+2}{2j-2n};\frac{6j-3n+2}{2j-2n};-\frac{ax^{j-n}}{b}\right)+(4j-n+2)\left(ax^j+bx^n\right)\left(a(-j+4n+2)x^j+b(2j+n+2)x^r\right.\right.}{(3n+2)(4j-n+2)(2j+n+2)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^j + b*x^n)^(3/2),x]
```

```
[Out] (2*x*((2 + 4*j - n)*(a*x^j + b*x^n)*(a*(2 - j + 4*n)*x^j + b*(2 +
 2*j + n)*x^n) + 3*a^2*(j - n)^2*x^(2*j)*Sqrt[1 + (a*x^(j - n))/b
]*Hypergeometric2F1[1/2, (2 + 4*j - n)/(2*j - 2*n), (2 + 6*j - 3*
```

```
n)/(2*j - 2*n), -((a*x^(j - n))/b)]))/((2 + 4*j - n)*(2 + 2*j + n
)*(2 + 3*n)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.118, size = 0, normalized size = 0.

$$\int \left(ax^j + bx^n\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*x^j+b*x^n)^(3/2),x)

[Out] int((a*x^j+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax^j + bx^n\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^j + b*x^n)^(3/2),x, algorithm="maxima")

[Out] integrate((a*x^j + b*x^n)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^j + b*x^n)^(3/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax^j + bx^n\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x**j+b*x**n)**(3/2),x)

[Out] Integral((a*x**j + b*x**n)**(3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(ax^j + bx^n\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(3/2),x, algorithm="giac")

[Out] integrate((a*x^j + b*x^n)^(3/2), x)
```

3.427 $\int \sqrt{ax^j + bx^n}\, dx$

Optimal. Leaf size=87

$$\frac{2x\sqrt{ax^j+bx^n}\,{}_2F_1\left(-\frac{1}{2},\frac{n+2}{2(j-n)};\frac{n+2}{2j-2n}+1;-\frac{ax^{j-n}}{b}\right)}{(n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

```
[Out] (2*x*Sqrt[a*x^j + b*x^n]*Hypergeometric2F1[-1/2, (2 + n)/(2*(j -
n)), 1 + (2 + n)/(2*j - 2*n), -((a*x^(j - n))/b)])/((2 + n)*Sqrt[
1 + (a*x^(j - n))/b])
```

Rubi [A] time = 0.136193, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{2x\sqrt{ax^j+bx^n}\,{}_2F_1\left(-\frac{1}{2},\frac{n+2}{2(j-n)};\frac{n+2}{2j-2n}+1;-\frac{ax^{j-n}}{b}\right)}{(n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*x*Sqrt[a*x^j + b*x^n]*Hypergeometric2F1[-1/2, (2 + n)/(2*(j -
n)), 1 + (2 + n)/(2*j - 2*n), -((a*x^(j - n))/b)])/((2 + n)*Sqrt[
1 + (a*x^(j - n))/b])
```

Rubi in Sympy [A] time = 12.0182, size = 75, normalized size = 0.86

$$\frac{2x^{-\frac{n}{2}}x^{\frac{n}{2}+1}\sqrt{ax^j+bx^n}\,{}_2F_1\left(\begin{matrix}-\frac{1}{2},\frac{n+2}{2(j-n)}\\ \frac{j-\frac{n}{2}+1}{j-n}\end{matrix}\middle| -\frac{ax^{j-n}}{b}\right)}{(n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**j+b*x**n)**(1/2),x)
```

```
[Out] 2*x**(-n/2)*x**(n/2 + 1)*sqrt(a*x**j + b*x**n)*hyper((-1/2, (n +
2)/(2*(j - n))), ((j - n/2 + 1)/(j - n),), -a*x**(j - n)/b)/((n +
 2)*sqrt(a*x**(j - n)/b + 1))
```

Mathematica [A] time = 0.236125, size = 134, normalized size = 1.54

$$\frac{2x\left(a(j-n)x^j\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{2j-n+2}{2j-2n};\frac{4j-3n+2}{2j-2n};-\frac{ax^{j-n}}{b}\right)-(2j-n+2)\left(ax^j+bx^n\right)\right)}{(n+2)(-2j+n-2)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*x*(-((2 + 2*j - n)*(a*x^j + b*x^n)) + a*(j - n)*x^j*Sqrt[1 + (
a*x^(j - n))/b]*Hypergeometric2F1[1/2, (2 + 2*j - n)/(2*j - 2*n),
 (2 + 4*j - 3*n)/(2*j - 2*n), -((a*x^(j - n))/b)]))/((2 + n)*(-2
```

```
- 2*j + n)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.09, size = 0, normalized size = 0.

$$\int \sqrt{ax^j + bx^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x^j+b*x^n)^(1/2),x)

[Out] int((a*x^j+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax^j + bx^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n),x, algorithm="maxima")

[Out] integrate(sqrt(a*x^j + b*x^n), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax^j + bx^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x**j+b*x**n)**(1/2),x)

[Out] Integral(sqrt(a*x**j + b*x**n), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{ax^j + bx^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(a*x^j + b*x^n),x, algorithm="giac")

[Out] integrate(sqrt(a*x^j + b*x^n), x)
```

3.428 $\int \frac{1}{\sqrt{ax^j+bx^n}}\,dx$

Optimal. Leaf size=93

$$\frac{2x\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{2-n}{2(j-n)};\frac{1-\frac{n}{2}}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{(2-n)\sqrt{ax^j+bx^n}}$$

```
[Out] (2*x*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[1/2, (2 - n)/(2*
(j - n)), 1 + (1 - n/2)/(j - n), -((a*x^(j - n))/b)])/((2 - n)*Sq
rt[a*x^j + b*x^n])
```

Rubi [A] time = 0.12887, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{2x\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{2-n}{2(j-n)};\frac{1-\frac{n}{2}}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{(2-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[1/Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (2*x*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[1/2, (2 - n)/(2*
(j - n)), 1 + (1 - n/2)/(j - n), -((a*x^(j - n))/b)])/((2 - n)*Sq
rt[a*x^j + b*x^n])
```

Rubi in Sympy [A] time = 13.1735, size = 78, normalized size = 0.84

$$\frac{2x^{-\frac{n}{2}}x^{-\frac{n}{2}+1}\sqrt{ax^j+bx^n}\,{}_2F_1\left(\begin{matrix}\frac{1}{2},-\frac{n-2}{2(j-n)}\\ \frac{j-\frac{3n}{2}+1}{j-n}\end{matrix}\middle|-\frac{ax^{j-n}}{b}\right)}{b\,(-n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x**j+b*x**n)**(1/2),x)
```

```
[Out] 2*x**(-n/2)*x**(-n/2 + 1)*sqrt(a*x**j + b*x**n)*hyper((1/2, -(n -
 2)/(2*(j - n))), ((j - 3*n/2 + 1)/(j - n),), -a*x**(j - n)/b)/(b
*(-n + 2)*sqrt(a*x**(j - n)/b + 1))
```

Mathematica [A] time = 0.0750133, size = 88, normalized size = 0.95

$$-\frac{2x\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},\frac{n-2}{2(n-j)};\frac{n-2}{2(n-j)}+1;-\frac{ax^{j-n}}{b}\right)}{(n-2)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[1/Sqrt[a*x^j + b*x^n],x]
```

```
[Out] (-2*x*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[1/2, (-2 + n)/(
2*(-j + n)), 1 + (-2 + n)/(2*(-j + n)), -((a*x^(j - n))/b)])/((-2
 + n)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.068, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{a x^j + b x^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x^j+b*x^n)^(1/2),x)

[Out] int(1/(a*x^j+b*x^n)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{a x^j + b x^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x^j + b*x^n),x, algorithm="maxima")

[Out] integrate(1/sqrt(a*x^j + b*x^n), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x^j + b*x^n),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{a x^j + b x^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**j+b*x**n)**(1/2),x)

[Out] Integral(1/sqrt(a*x**j + b*x**n), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{a x^j + b x^n}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/sqrt(a*x^j + b*x^n),x, algorithm="giac")

[Out] integrate(1/sqrt(a*x^j + b*x^n), x)
```

3.429 $\int \frac{1}{(ax^j+bx^n)^{3/2}}\,dx$

Optimal. Leaf size=101

$$\frac{2x^{1-n}\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{3}{2},\frac{1-\frac{3n}{2}}{j-n};\frac{1-\frac{3n}{2}}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{b(2-3n)\sqrt{ax^j+bx^n}}$$

```
[Out] (2*x^(1 - n)*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[3/2, (1
- (3*n)/2)/(j - n), 1 + (1 - (3*n)/2)/(j - n), -((a*x^(j - n))/b)
])/(b*(2 - 3*n)*Sqrt[a*x^j + b*x^n])
```

Rubi [A] time = 0.142158, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{2x^{1-n}\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{3}{2},\frac{1-\frac{3n}{2}}{j-n};\frac{1-\frac{3n}{2}}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{b(2-3n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^j + b*x^n)^(-3/2),x]
```

```
[Out] (2*x^(1 - n)*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[3/2, (1
- (3*n)/2)/(j - n), 1 + (1 - (3*n)/2)/(j - n), -((a*x^(j - n))/b)
])/(b*(2 - 3*n)*Sqrt[a*x^j + b*x^n])
```

Rubi in Sympy [A] time = 13.6764, size = 82, normalized size = 0.81

$$\frac{2x^{-\frac{n}{2}}x^{-\frac{3n}{2}+1}\sqrt{ax^j+bx^n}\,{}_2F_1\left(\begin{matrix}\frac{3}{2},\frac{-\frac{3n}{2}+1}{j-n}\\ \frac{j-\frac{5n}{2}+1}{j-n}\end{matrix}\middle|-\frac{ax^{j-n}}{b}\right)}{b^2(-3n+2)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x**j+b*x**n)**(3/2),x)
```

```
[Out] 2*x**(-n/2)*x**(-3*n/2 + 1)*sqrt(a*x**j + b*x**n)*hyper((3/2, (-3
*n/2 + 1)/(j - n)), ((j - 5*n/2 + 1)/(j - n),), -a*x**(j - n)/b)/
(b**2*(-3*n + 2)*sqrt(a*x**(j - n)/b + 1))
```

Mathematica [A] time = 0.13877, size = 104, normalized size = 1.03

$$\frac{2x^{1-j}\left(\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{1}{2},-\frac{2j+n-2}{2(j-n)};\frac{2-3n}{2j-2n};-\frac{ax^{j-n}}{b}\right)-1\right)}{a(j-n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^j + b*x^n)^(-3/2),x]
```

```
[Out] (2*x^(1 - j)*(-1 + Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[1/
2, -(-2 + 2*j + n)/(2*(j - n)), (2 - 3*n)/(2*j - 2*n), -((a*x^(j
- n))/b)]))/(a*(j - n)*Sqrt[a*x^j + b*x^n])
```

Maple [F] time = 0.058, size = 0, normalized size = 0.

$$\int \left(a x^{j}+b x^{n}\right)^{-\frac{3}{2}}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x^j+b*x^n)^(3/2),x)

[Out] int(1/(a*x^j+b*x^n)^(3/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax^{j}+bx^{n}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(-3/2),x, algorithm="maxima")

[Out] integrate((a*x^j + b*x^n)^(-3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(-3/2),x, algorithm="fricas")

[Out] Exception raised: TypeError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax^{j}+bx^{n}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**j+b*x**n)**(3/2),x)

[Out] Integral((a*x**j + b*x**n)**(-3/2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(ax^{j}+bx^{n}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(-3/2),x, algorithm="giac")

[Out] integrate((a*x^j + b*x^n)^(-3/2), x)
```

3.430 $\int \frac{1}{(ax^j+bx^n)^{5/2}}\,dx$

Optimal. Leaf size=101

$$\frac{2x^{1-2n}\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{5}{2},\frac{1-\frac{5n}{2}}{j-n};\frac{1-\frac{5n}{2}}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{b^2(2-5n)\sqrt{ax^j+bx^n}}$$

```
[Out] (2*x^(1 - 2*n)*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[5/2, (
1 - (5*n)/2)/(j - n), 1 + (1 - (5*n)/2)/(j - n), -((a*x^(j - n))/
b)])/(b^2*(2 - 5*n)*Sqrt[a*x^j + b*x^n])
```

Rubi [A] time = 0.141901, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{2x^{1-2n}\sqrt{\frac{ax^{j-n}}{b}+1}\,{}_2F_1\left(\frac{5}{2},\frac{1-\frac{5n}{2}}{j-n};\frac{1-\frac{5n}{2}}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{b^2(2-5n)\sqrt{ax^j+bx^n}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^j + b*x^n)^(-5/2),x]
```

```
[Out] (2*x^(1 - 2*n)*Sqrt[1 + (a*x^(j - n))/b]*Hypergeometric2F1[5/2, (
1 - (5*n)/2)/(j - n), 1 + (1 - (5*n)/2)/(j - n), -((a*x^(j - n))/
b)])/(b^2*(2 - 5*n)*Sqrt[a*x^j + b*x^n])
```

Rubi in Sympy [A] time = 13.6373, size = 82, normalized size = 0.81

$$\frac{2x^{-\frac{n}{2}}x^{-\frac{5n}{2}+1}\sqrt{ax^j+bx^n}\,{}_2F_1\left(\begin{matrix}\frac{5}{2},\ \frac{-\frac{5n}{2}+1}{j-n}\\ \frac{j-\frac{7n}{2}+1}{j-n}\end{matrix}\middle|\,-\frac{ax^{j-n}}{b}\right)}{b^3\left(-5n+2\right)\sqrt{\frac{ax^{j-n}}{b}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x**j+b*x**n)**(5/2),x)
```

```
[Out] 2*x**(-n/2)*x**(-5*n/2 + 1)*sqrt(a*x**j + b*x**n)*hyper((5/2, (-5
*n/2 + 1)/(j - n)), ((j - 7*n/2 + 1)/(j - n),), -a*x**(j - n)/b)/
(b**3*(-5*n + 2)*sqrt(a*x**(j - n)/b + 1))
```

Mathematica [A] time = 0.404327, size = 185, normalized size = 1.83

$$\frac{2x^{1-2j}\left(\left(8j^2+2j(7n-6)+3n^2-8n+4\right)\sqrt{\frac{ax^{j-n}}{b}+1}\left(ax^j+bx^n\right)\,{}_2F_1\left(\frac{1}{2},-\frac{4j+n-2}{2(j-n)};\frac{-2j-3n+2}{2j-2n};-\frac{ax^{j-n}}{b}\right)-(4j+n-2)\left(a(j+4\right.\right.}{3a^2(-4j-n+2)(j-n)^2\left(ax^j+bx^n\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^j + b*x^n)^(-5/2),x]
```

```
[Out] (2*x^(1 - 2*j)*(-((-2 + 4*j + n)*(a*(-2 + j + 4*n)*x^j + b*(-2 +
2*j + 3*n)*x^n)) + (4 + 8*j^2 - 8*n + 3*n^2 + 2*j*(-6 + 7*n))*Sqr
t[1 + (a*x^(j - n))/b]*(a*x^j + b*x^n)*Hypergeometric2F1[1/2, -(-
```

```
2 + 4*j + n)/(2*(j - n)), (2 - 2*j - 3*n)/(2*j - 2*n), -((a*x^(j
- n))/b)]))/(3*a^2*(2 - 4*j - n)*(j - n)^2*(a*x^j + b*x^n)^(3/2))
```

Maple [F] time = 0.059, size = 0, normalized size = 0.

$$\int \left(a x^{j}+b x^{n}\right)^{-\frac{5}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x^j+b*x^n)^(5/2),x)
```

```
[Out] int(1/(a*x^j+b*x^n)^(5/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(a x^{j}+b x^{n}\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(-5/2),x, algorithm="maxima")
```

```
[Out] integrate((a*x^j + b*x^n)^(-5/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(-5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**j+b*x**n)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(a x^{j}+b x^{n}\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^(-5/2),x, algorithm="giac")

[Out] integrate((a*x^j + b*x^n)^(-5/2), x)
```

3.431 $\int \sqrt{\frac{1+x}{x^5}}\,dx$

Optimal. Leaf size=18

$$-\frac{2}{3}\left(\frac{1}{x^5}+\frac{1}{x^4}\right)^{3/2}x^6$$

```
[Out] (-2*(x^(-5) + x^(-4))^(3/2)*x^6)/3
```

Rubi [A] time = 0.0155205, antiderivative size = 18, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182

$$-\frac{2}{3}\left(\frac{1}{x^5}+\frac{1}{x^4}\right)^{3/2}x^6$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[(1 + x)/x^5],x]

[Out] (-2*(x^(-5) + x^(-4))^(3/2)*x^6)/3
```

Rubi in Sympy [A] time = 1.18497, size = 20, normalized size = 1.11

$$-\frac{2x^6\left(\frac{1}{x^4}+\frac{1}{x^5}\right)^{\frac{3}{2}}}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(((1+x)/x**5)**(1/2),x)

[Out] -2*x**6*(x**(-4) + x**(-5))**(3/2)/3
```

Mathematica [A] time = 0.0119901, size = 18, normalized size = 1.

$$-\frac{2}{3}x^6\left(\frac{x+1}{x^5}\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[(1 + x)/x^5],x]

[Out] (-2*x^6*((1 + x)/x^5)^(3/2))/3
```

Maple [A] time = 0.006, size = 16, normalized size = 0.9

$$-\frac{2\,x\,(1+x)}{3}\sqrt{\frac{1+x}{x^5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(((1+x)/x^5)^(1/2),x)
```

```
[Out] -2/3*x*(1+x)*((1+x)/x^5)^(1/2)
```

Maxima [A] time = 1.41484, size = 14, normalized size = 0.78

$$-\frac{2\,(x+1)^{\frac{3}{2}}}{3\,x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((x + 1)/x^5),x, algorithm="maxima")
```

```
[Out] -2/3*(x + 1)^(3/2)/x^(3/2)
```

Fricas [A] time = 0.227398, size = 22, normalized size = 1.22

$$-\frac{2}{3}\left(x^2+x\right)\sqrt{\frac{x+1}{x^5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((x + 1)/x^5),x, algorithm="fricas")
```

```
[Out] -2/3*(x^2 + x)*sqrt((x + 1)/x^5)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{\frac{x+1}{x^5}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((1+x)/x**5)**(1/2),x)
```

```
[Out] Integral(sqrt((x + 1)/x**5), x)
```

GIAC/XCAS [A] time = 0.229375, size = 68, normalized size = 3.78

$$\frac{2\left(3\left(x-\sqrt{x^2+x}\right)^2\operatorname{sign}(x)+3\left(x-\sqrt{x^2+x}\right)\operatorname{sign}(x)+\operatorname{sign}(x)\right)}{3\left(x-\sqrt{x^2+x}\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((x + 1)/x^5),x, algorithm="giac")
```

```
[Out] 2/3*(3*(x - sqrt(x^2 + x))^2*sign(x) + 3*(x - sqrt(x^2 + x))*sign
(x) + sign(x))/(x - sqrt(x^2 + x))^3
```

3.432 $\int \sqrt{x + x^{5/2}}\,dx$

Optimal. Leaf size=20

$$\frac{4\left(x^{5/2}+x\right)^{3/2}}{9x^{3/2}}$$

```
[Out] (4*(x + x^(5/2))^(3/2))/(9*x^(3/2))
```

Rubi [A] time = 0.00959661, antiderivative size = 20, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{4\left(x^{5/2}+x\right)^{3/2}}{9x^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x + x^(5/2)],x]

[Out] (4*(x + x^(5/2))^(3/2))/(9*x^(3/2))
```

Rubi in Sympy [A] time = 1.02098, size = 17, normalized size = 0.85

$$\frac{4\left(x^{\frac{5}{2}}+x\right)^{\frac{3}{2}}}{9x^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x+x**(5/2))**(1/2),x)

[Out] 4*(x**(5/2) + x)**(3/2)/(9*x**(3/2))
```

Mathematica [A] time = 0.0193071, size = 29, normalized size = 1.45

$$\left(\frac{4x}{9}+\frac{4}{9\sqrt{x}}\right)\sqrt{x\left(x^{3/2}+1\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x + x^(5/2)],x]

[Out] (4/(9*Sqrt[x]) + (4*x)/9)*Sqrt[x*(1 + x^(3/2))]
```

Maple [A] time = 0.013, size = 18, normalized size = 0.9

$$\frac{4}{9}\sqrt{x+x^{\frac{5}{2}}}\left(1+x^{\frac{3}{2}}\right)\frac{1}{\sqrt{x}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x+x^(5/2))^(1/2),x)
```

```
[Out] 4/9*(x+x^(5/2))^(1/2)/x^(1/2)*(1+x^(3/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{x^{\frac{5}{2}} + x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x^(5/2) + x),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(x^(5/2) + x), x)
```

Fricas [A] time = 0.253817, size = 26, normalized size = 1.3

$$\frac{4\,\sqrt{x^{\frac{5}{2}} + x}\left(x^2 + \sqrt{x}\right)}{9\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x^(5/2) + x),x, algorithm="fricas")
```

```
[Out] 4/9*sqrt(x^(5/2) + x)*(x^2 + sqrt(x))/x
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{x^{\frac{5}{2}} + x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x+x**(5/2))**(1/2),x)
```

```
[Out] Integral(sqrt(x**(5/2) + x), x)
```

GIAC/XCAS [A] time = 0.21918, size = 15, normalized size = 0.75

$$\frac{4}{9}\left(x^{\frac{3}{2}} + 1\right)^{\frac{3}{2}} - \frac{4}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(x^(5/2) + x),x, algorithm="giac")
```

```
[Out] 4/9*(x^(3/2) + 1)^(3/2) - 4/9
```

3.433 $\int \frac{1}{\sqrt{x}+x^{3/2}}\,dx$

Optimal. Leaf size=8

$$2\tan^{-1}\left(\sqrt{x}\right)$$

```
[Out] 2*ArcTan[Sqrt[x]]
```

Rubi [A] time = 0.00955469, antiderivative size = 8, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231

$$2\tan^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[x] + x^(3/2))^(-1),x]

[Out] 2*ArcTan[Sqrt[x]]
```

Rubi in Sympy [A] time = 2.13316, size = 7, normalized size = 0.88

$$2\,\text{atan}\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(x**(3/2)+x**(1/2)),x)

[Out] 2*atan(sqrt(x))
```

Mathematica [A] time = 0.00499973, size = 8, normalized size = 1.

$$2\tan^{-1}\left(\sqrt{x}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[x] + x^(3/2))^(-1),x]

[Out] 2*ArcTan[Sqrt[x]]
```

Maple [A] time = 0.005, size = 7, normalized size = 0.9

$$2\arctan\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(x^(3/2)+x^(1/2)),x)

[Out] 2*arctan(x^(1/2))
```

Maxima [A] time = 1.53271, size = 8, normalized size = 1.

$$2\arctan\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x^(3/2) + sqrt(x)),x, algorithm="maxima")

[Out] 2*arctan(sqrt(x))
```

Fricas [A] time = 0.235233, size = 8, normalized size = 1.

$$2 \arctan\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x^(3/2) + sqrt(x)),x, algorithm="fricas")

[Out] 2*arctan(sqrt(x))
```

Sympy [A] time = 0.522218, size = 7, normalized size = 0.88

$$2 \operatorname{atan}\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x**(3/2)+x**(1/2)),x)

[Out] 2*atan(sqrt(x))
```

GIAC/XCAS [A] time = 0.216758, size = 8, normalized size = 1.

$$2 \arctan\left(\sqrt{x}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(x^(3/2) + sqrt(x)),x, algorithm="giac")

[Out] 2*arctan(sqrt(x))
```

3.434 $\int x\sqrt{x^2\left(a+bx^3\right)}\,dx$

Optimal. Leaf size=25

$$\frac{2\left(x^2\left(a+bx^3\right)\right)^{3/2}}{9bx^3}$$

```
[Out] (2*(x^2*(a + b*x^3))^(3/2))/(9*b*x^3)
```

Rubi [A] time = 0.0137916, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059

$$\frac{2\left(x^2\left(a+bx^3\right)\right)^{3/2}}{9bx^3}$$

Antiderivative was successfully verified.

```
[In]  Int[x*Sqrt[x^2*(a + b*x^3)],x]

[Out] (2*(x^2*(a + b*x^3))^(3/2))/(9*b*x^3)
```

Rubi in Sympy [A] time = 6.72121, size = 20, normalized size = 0.8

$$\frac{2\left(ax^2+bx^5\right)^{\frac{3}{2}}}{9bx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(x**2*(b*x**3+a))**(1/2),x)

[Out] 2*(a*x**2 + b*x**5)**(3/2)/(9*b*x**3)
```

Mathematica [A] time = 0.0231226, size = 25, normalized size = 1.

$$\frac{2\left(x^2\left(a+bx^3\right)\right)^{3/2}}{9bx^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x*Sqrt[x^2*(a + b*x^3)],x]

[Out] (2*(x^2*(a + b*x^3))^(3/2))/(9*b*x^3)
```

Maple [A] time = 0.008, size = 29, normalized size = 1.2

$$\frac{2\,bx^3+2\,a}{9\,bx}\sqrt{x^2\left(bx^3+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(x^2*(b*x^3+a))^(1/2),x)

[Out] 2/9*(b*x^3+a)*(x^2*(b*x^3+a))^(1/2)/b/x
```

Maxima [A] time = 1.39294, size = 19, normalized size = 0.76

$$\frac{2\left(bx^3+a\right)^{\frac{3}{2}}}{9\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 + a)*x^2)*x,x, algorithm="maxima")
```

```
[Out] 2/9*(b*x^3 + a)^(3/2)/b
```

Fricas [A] time = 0.227703, size = 38, normalized size = 1.52

$$\frac{2\sqrt{bx^5+ax^2}\left(bx^3+a\right)}{9\,bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 + a)*x^2)*x,x, algorithm="fricas")
```

```
[Out] 2/9*sqrt(b*x^5 + a*x^2)*(b*x^3 + a)/(b*x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(x**2*(b*x**3+a))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.223694, size = 36, normalized size = 1.44

$$\frac{2\left(bx^3+a\right)^{\frac{3}{2}}\operatorname{sign}\left(x\right)}{9\,b}-\frac{2\,a^{\frac{3}{2}}\operatorname{sign}\left(x\right)}{9\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 + a)*x^2)*x,x, algorithm="giac")
```

```
[Out] 2/9*(b*x^3 + a)^(3/2)*sign(x)/b - 2/9*a^(3/2)*sign(x)/b
```

3.435 $\int x\sqrt{ax^2+bx^5}\,dx$

Optimal. Leaf size=25

$$\frac{2\left(ax^2+bx^5\right)^{3/2}}{9bx^3}$$

```
[Out] (2*(a*x^2 + b*x^5)^(3/2))/(9*b*x^3)
```

Rubi [A] time = 0.0132812, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059

$$\frac{2\left(ax^2+bx^5\right)^{3/2}}{9bx^3}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sqrt[a*x^2 + b*x^5],x]

[Out] (2*(a*x^2 + b*x^5)^(3/2))/(9*b*x^3)
```

Rubi in Sympy [A] time = 5.67898, size = 20, normalized size = 0.8

$$\frac{2\left(ax^2+bx^5\right)^{\frac{3}{2}}}{9bx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x*(b*x**5+a*x**2)**(1/2),x)

[Out] 2*(a*x**2 + b*x**5)**(3/2)/(9*b*x**3)
```

Mathematica [A] time = 0.00769527, size = 25, normalized size = 1.

$$\frac{2\left(x^2\left(a+bx^3\right)\right)^{3/2}}{9bx^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sqrt[a*x^2 + b*x^5],x]

[Out] (2*(x^2*(a + b*x^3))^(3/2))/(9*b*x^3)
```

Maple [A] time = 0.007, size = 29, normalized size = 1.2

$$\frac{2\,bx^3+2\,a}{9\,bx}\sqrt{bx^5+ax^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(b*x^5+a*x^2)^(1/2),x)

[Out] 2/9*(b*x^3+a)*(b*x^5+a*x^2)^(1/2)/b/x
```

Maxima [A] time = 1.38814, size = 19, normalized size = 0.76

$$\frac{2\left(bx^3+a\right)^{\frac{3}{2}}}{9\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^5 + a*x^2)*x,x, algorithm="maxima")
```

```
[Out] 2/9*(b*x^3 + a)^(3/2)/b
```

Fricas [A] time = 0.219466, size = 38, normalized size = 1.52

$$\frac{2\sqrt{bx^5+ax^2}\left(bx^3+a\right)}{9\,bx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^5 + a*x^2)*x,x, algorithm="fricas")
```

```
[Out] 2/9*sqrt(b*x^5 + a*x^2)*(b*x^3 + a)/(b*x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\sqrt{x^2\left(a+bx^3\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(b*x**5+a*x**2)**(1/2),x)
```

```
[Out] Integral(x*sqrt(x**2*(a + b*x**3)), x)
```

GIAC/XCAS [A] time = 0.224842, size = 36, normalized size = 1.44

$$\frac{2\left(bx^3+a\right)^{\frac{3}{2}}\operatorname{sign}(x)}{9\,b}-\frac{2\,a^{\frac{3}{2}}\operatorname{sign}(x)}{9\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(b*x^5 + a*x^2)*x,x, algorithm="giac")
```

```
[Out] 2/9*(b*x^3 + a)^(3/2)*sign(x)/b - 2/9*a^(3/2)*sign(x)/b
```

3.436 $\int \sqrt{x^4 (a + bx^3)}\, dx$

Optimal. Leaf size=25

$$\frac{2 \left(ax^4 + bx^7\right)^{3/2}}{9bx^6}$$

```
[Out] (2*(a*x^4 + b*x^7)^(3/2))/(9*b*x^6)
```

Rubi [A] time = 0.0195503, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{2 \left(ax^4 + bx^7\right)^{3/2}}{9bx^6}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[x^4*(a + b*x^3)],x]

[Out] (2*(a*x^4 + b*x^7)^(3/2))/(9*b*x^6)
```

Rubi in Sympy [A] time = 1.601, size = 20, normalized size = 0.8

$$\frac{2 \left(ax^4 + bx^7\right)^{\frac{3}{2}}}{9bx^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**4*(b*x**3+a))**(1/2),x)

[Out] 2*(a*x**4 + b*x**7)**(3/2)/(9*b*x**6)
```

Mathematica [A] time = 0.0206469, size = 25, normalized size = 1.

$$\frac{2 \left(x^4 \left(a + bx^3\right)\right)^{3/2}}{9bx^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[x^4*(a + b*x^3)],x]

[Out] (2*(x^4*(a + b*x^3))^(3/2))/(9*b*x^6)
```

Maple [A] time = 0.007, size = 29, normalized size = 1.2

$$\frac{2\,bx^3 + 2\,a}{9\,bx^2}\sqrt{x^4\,(bx^3 + a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^4*(b*x^3+a))^(1/2),x)

[Out] 2/9*(b*x^3+a)*(x^4*(b*x^3+a))^(1/2)/b/x^2
```

Maxima [A] time = 1.39816, size = 19, normalized size = 0.76

$$\frac{2\,{\left(b x^{3} + a\right)}^{\frac{3}{2}}}{9\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 + a)*x^4),x, algorithm="maxima")
```

```
[Out] 2/9*(b*x^3 + a)^(3/2)/b
```

Fricas [A] time = 0.226226, size = 38, normalized size = 1.52

$$\frac{2\,\sqrt{b x^{7} + a x^{4}}{\left(b x^{3} + a\right)}}{9\,b x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 + a)*x^4),x, algorithm="fricas")
```

```
[Out] 2/9*sqrt(b*x^7 + a*x^4)*(b*x^3 + a)/(b*x^2)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**4*(b*x**3+a))**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.222829, size = 19, normalized size = 0.76

$$\frac{2\,{\left(b x^{3} + a\right)}^{\frac{3}{2}}}{9\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^3 + a)*x^4),x, algorithm="giac")
```

```
[Out] 2/9*(b*x^3 + a)^(3/2)/b
```

3.437 $\int \frac{1}{\sqrt[3]{a\sqrt[3]{x}+bx^{2/3}}}\,dx$

Optimal. Leaf size=988

result too large to display

```
[Out] (-45*a^2*(a + 2*b*x^(1/3))*(-((b*(a*x^(1/3) + b*x^(2/3)))/a^2))^(
1/3))/(14*2^(1/3)*b^3*(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3)
)*x^(1/3))/a^2))^(1/3))*(a*x^(1/3) + b*x^(2/3))^(1/3)) - (45*a*(a
 + b*x^(1/3))*x^(1/3))/(28*b^2*(a*x^(1/3) + b*x^(2/3))^(1/3)) + (
9*(a + b*x^(1/3))*x^(2/3))/(7*b*(a*x^(1/3) + b*x^(2/3))^(1/3)) -
(45*3^(1/4)*Sqrt[2 + Sqrt[3]]*a^4*(1 - 2^(2/3)*(-((b*(a + b*x^(1/
3))*x^(1/3))/a^2))^(1/3))*Sqrt[(1 + 2^(2/3)*(-((b*(a + b*x^(1/3))
*x^(1/3))/a^2))^(1/3) + 2*2^(1/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/
a^2))^(2/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3)
)/a^2))^(1/3))^2]*(-((b*(a*x^(1/3) + b*x^(2/3)))/a^2))^(1/3)*Elli
pticE[ArcSin[(1 + Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3)
)/a^2))^(1/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/
3))/a^2))^(1/3))], -7 + 4*Sqrt[3]])/(28*2^(1/3)*b^3*Sqrt[-((1 - 2
^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))/(1 - Sqrt[3] -
 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))^2)]*(a + 2*b
*x^(1/3))*(a*x^(1/3) + b*x^(2/3))^(1/3)) + (15*3^(3/4)*a^4*(1 - 2
^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))*Sqrt[(1 + 2^(2
/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3) + 2*2^(1/3)*(-((b*
(a + b*x^(1/3))*x^(1/3))/a^2))^(2/3))/(1 - Sqrt[3] - 2^(2/3)*(-((
b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))^2]*(-((b*(a*x^(1/3) + b*x
^(2/3)))/a^2))^(1/3)*EllipticF[ArcSin[(1 + Sqrt[3] - 2^(2/3)*(-((
b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))/(1 - Sqrt[3] - 2^(2/3)*(-
((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))], -7 + 4*Sqrt[3]])/(7*2
^(5/6)*b^3*Sqrt[-((1 - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2
))^(1/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a
^2))^(1/3))^2)]*(a + 2*b*x^(1/3))*(a*x^(1/3) + b*x^(2/3))^(1/3))
```

Rubi [A] time = 3.90204, antiderivative size = 988, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 10, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.526$

$$-\frac{45\sqrt[4]{3}\sqrt{2+\sqrt{3}}\left(1-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}\right)\sqrt{\frac{2\sqrt[3]{2}\left(-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}\right)^{2/3}+2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}+1}{\left(-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}-\sqrt{3}+1\right)^2}}\sqrt[3]{-\frac{b\left(\sqrt[3]{x}a+bx^{2/3}\right)}{a^2}}E\left(\sin\cdots\right.}{28\sqrt[3]{2}b^3\sqrt{-\frac{1-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}}{\left(-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}-\sqrt{3}+1\right)^2}}\left(a+2b\sqrt[3]{x}\right)\sqrt[3]{\sqrt[3]{x}a+bx^{2/3}}\cdots}$$

$$+\frac{15\ 3^{3/4}\left(1-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}\right)\sqrt{\frac{2\sqrt[3]{2}\left(-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}\right)^{2/3}+2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}+1}{\left(-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}-\sqrt{3}+1\right)^2}}\sqrt[3]{-\frac{b\left(\sqrt[3]{x}a+bx^{2/3}\right)}{a^2}}F\left(\sin^{-1}\left(\cdots\right.\right.}{7\ 2^{5/6}b^3\sqrt{-\frac{1-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}}{\left(-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}-\sqrt{3}+1\right)^2}}\left(a+2b\sqrt[3]{x}\right)\sqrt[3]{\sqrt[3]{x}a+bx^{2/3}}}$$

$$-\frac{45\left(a+2b\sqrt[3]{x}\right)\sqrt[3]{-\frac{b\left(\sqrt[3]{x}a+bx^{2/3}\right)}{a^2}}a^2}{14\sqrt[3]{2}b^3\left(-2^{2/3}\sqrt[3]{-\frac{b\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}}{a^2}}-\sqrt{3}+1\right)\sqrt[3]{\sqrt[3]{x}a+bx^{2/3}}}-\frac{45\left(a+b\sqrt[3]{x}\right)\sqrt[3]{x}a}{28b^2\sqrt[3]{\sqrt[3]{x}a+bx^{2/3}}}+\frac{9\left(a+b\sqrt[3]{x}\right)x^{2/3}}{7b\sqrt[3]{\sqrt[3]{x}a+bx^{2/3}}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(a*x^(1/3) + b*x^(2/3))^(-1/3),x]
```

```
[Out] (-45*a^2*(a + 2*b*x^(1/3))*(-((b*(a*x^(1/3) + b*x^(2/3)))/a^2))^(
1/3))/(14*2^(1/3)*b^3*(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3)
)*x^(1/3))/a^2))^(1/3))*(a*x^(1/3) + b*x^(2/3))^(1/3)) - (45*a*(a
 + b*x^(1/3))*x^(1/3))/(28*b^2*(a*x^(1/3) + b*x^(2/3))^(1/3)) + (
9*(a + b*x^(1/3))*x^(2/3))/(7*b*(a*x^(1/3) + b*x^(2/3))^(1/3)) -
(45*3^(1/4)*Sqrt[2 + Sqrt[3]]*a^4*(1 - 2^(2/3)*(-((b*(a + b*x^(1/
3))*x^(1/3))/a^2))^(1/3))*Sqrt[(1 + 2^(2/3)*(-((b*(a + b*x^(1/3))
*x^(1/3))/a^2))^(1/3) + 2*2^(1/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/
a^2))^(2/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3)
)/a^2))^(1/3))^2]*(-((b*(a*x^(1/3) + b*x^(2/3)))/a^2))^(1/3)*Elli
pticE[ArcSin[(1 + Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3)
)/a^2))^(1/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/
3))/a^2))^(1/3))], -7 + 4*Sqrt[3]])/(28*2^(1/3)*b^3*Sqrt[-((1 - 2
^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))/(1 - Sqrt[3] -
 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))^2)]*(a + 2*b
*x^(1/3))*(a*x^(1/3) + b*x^(2/3))^(1/3)) + (15*3^(3/4)*a^4*(1 - 2
^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))*Sqrt[(1 + 2^(2
/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3) + 2*2^(1/3)*(-((b*
(a + b*x^(1/3))*x^(1/3))/a^2))^(2/3))/(1 - Sqrt[3] - 2^(2/3)*(-((
b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))^2]*(-((b*(a*x^(1/3) + b*x
^(2/3)))/a^2))^(1/3)*EllipticF[ArcSin[(1 + Sqrt[3] - 2^(2/3)*(-((
b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))/(1 - Sqrt[3] - 2^(2/3)*(-
((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))], -7 + 4*Sqrt[3]])/(7*2
^(5/6)*b^3*Sqrt[-((1 - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2
))^(1/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a
^2))^(1/3))^2)]*(a + 2*b*x^(1/3))*(a*x^(1/3) + b*x^(2/3))^(1/3))
```

Rubi in Sympy [A] time = 110.057, size = 799, normalized size = 0.81

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(1/(a*x**(1/3)+b*x**(2/3))**(1/3),x)
```

```
[Out] -45*2**(2/3)*3**(1/4)*a**4*sqrt(((1 - (-a - 2*b*x**(1/3))**2/a**2
)**(2/3) + (1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1)/(-(1 - (
-a - 2*b*x**(1/3))**2/a**2)**(1/3) - sqrt(3) + 1)**2)*(b*(-a*x**(
1/3) - b*x**(2/3))/a**2)**(1/3)*sqrt(sqrt(3) + 2)*(a*x**(1/3) + b
*x**(2/3))**(2/3)*(-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1)
*elliptic_e(asin((-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1 +
 sqrt(3))/(-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) - sqrt(3) +
1)), -7 + 4*sqrt(3))/(56*b**3*x**(1/3)*sqrt(((1 - (-a - 2*b*x**(1
/3))**2/a**2)**(1/3) - 1)/(-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1
/3) - sqrt(3) + 1)**2)*(a + b*x**(1/3))*(a + 2*b*x**(1/3))) + 15*
2**(1/6)*3**(3/4)*a**4*sqrt(((1 - (-a - 2*b*x**(1/3))**2/a**2)**(
2/3) + (1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1)/(-(1 - (-a -
 2*b*x**(1/3))**2/a**2)**(1/3) - sqrt(3) + 1)**2)*(b*(-a*x**(1/3)
 - b*x**(2/3))/a**2)**(1/3)*(a*x**(1/3) + b*x**(2/3))**(2/3)*(-(1
 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1)*elliptic_f(asin((-(1
- (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1 + sqrt(3))/(-(1 - (-a -
 2*b*x**(1/3))**2/a**2)**(1/3) - sqrt(3) + 1)), -7 + 4*sqrt(3))/(
14*b**3*x**(1/3)*sqrt(((1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) -
 1)/(-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) - sqrt(3) + 1)**2)
*(a + b*x**(1/3))*(a + 2*b*x**(1/3))) - 45*2**(2/3)*a**2*(b*(-a*x
**(1/3) - b*x**(2/3))/a**2)**(1/3)*(a + 2*b*x**(1/3))*(a*x**(1/3)
 + b*x**(2/3))**(2/3)/(28*b**3*x**(1/3)*(a + b*x**(1/3))*(-(1 - (
-a - 2*b*x**(1/3))**2/a**2)**(1/3) - sqrt(3) + 1)) - 45*a*(a*x**(
1/3) + b*x**(2/3))**(2/3)/(28*b**2) + 9*x**(1/3)*(a*x**(1/3) + b*
x**(2/3))**(2/3)/(7*b)
```

Mathematica [C] time = 0.0826017, size = 99, normalized size = 0.1

$$\frac{9\left(5a^2\sqrt[3]{x}\sqrt[3]{\frac{b\sqrt[3]{x}}{a}+1}\,{}_2F_1\left(\frac{1}{3},\frac{2}{3};\frac{5}{3};-\frac{b\sqrt[3]{x}}{a}\right)-5a^2\sqrt[3]{x}-abx^{2/3}+4b^2x\right)}{28b^2\sqrt[3]{\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^(1/3) + b*x^(2/3))^(-1/3),x]
```

```
[Out] (9*(-5*a^2*x^(1/3) - a*b*x^(2/3) + 4*b^2*x + 5*a^2*(1 + (b*x^(1/3
))/a)^(1/3)*x^(1/3)*Hypergeometric2F1[1/3, 2/3, 5/3, -((b*x^(1/3)
)/a)]))/(28*b^2*((a + b*x^(1/3))*x^(1/3))^(1/3))
```

Maple [F] time = 0.025, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt[3]{a\sqrt[3]{x}+bx^{\frac{2}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x^(1/3)+b*x^(2/3))^(1/3),x)
```

```
[Out] int(1/(a*x^(1/3)+b*x^(2/3))^(1/3),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^{\frac{2}{3}} + ax^{\frac{1}{3}}\right)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(2/3) + a*x^(1/3))^(-1/3),x, algorithm="maxima")
```

```
[Out] integrate((b*x^(2/3) + a*x^(1/3))^(-1/3), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(2/3) + a*x^(1/3))^(-1/3),x, algorithm="fricas")
```

```
[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt[3]{a\sqrt[3]{x} + bx^{\frac{2}{3}}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**(1/3)+b*x**(2/3))**(1/3),x)
```

```
[Out] Integral((a*x**(1/3) + b*x**(2/3))**(-1/3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(bx^{\frac{2}{3}} + ax^{\frac{1}{3}}\right)^{\frac{1}{3}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(2/3) + a*x^(1/3))^(-1/3),x, algorithm="giac")
```

```
[Out] integrate((b*x^(2/3) + a*x^(1/3))^(-1/3), x)
```

3.438 $\int \frac{1}{\left(a\sqrt[3]{x}+bx^{2/3}\right)^{2/3}}\,dx$

Optimal. Leaf size=487

$$\frac{6\sqrt[3]{2}3^{3/4}\sqrt{2-\sqrt{3}}a^4\left(1-2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}\right)\sqrt{\frac{2\sqrt[3]{2}\left(-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}\right)^{2/3}+2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}+1}{\left(-2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}-\sqrt{3}+1\right)^2}}\left(-\frac{b\left(a\sqrt[3]{x}+bx^{2/3}\right)}{a^2}\right)^{2/3}F}{5b^3\sqrt{-\frac{1-2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}}{\left(-2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}-\sqrt{3}+1\right)^2}}\left(a+2b\sqrt[3]{x}\right)\left(a\sqrt[3]{x}+bx^{2/3}\right)^{2/3}}$$

$$-\frac{18a\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{5b^2\left(a\sqrt[3]{x}+bx^{2/3}\right)^{2/3}}+\frac{9x^{2/3}\left(a+b\sqrt[3]{x}\right)}{5b\left(a\sqrt[3]{x}+bx^{2/3}\right)^{2/3}}$$

```
[Out] (-18*a*(a + b*x^(1/3))*x^(1/3))/(5*b^2*(a*x^(1/3) + b*x^(2/3))^(2
/3)) + (9*(a + b*x^(1/3))*x^(2/3))/(5*b*(a*x^(1/3) + b*x^(2/3))^(
2/3)) + (6*2^(1/3)*3^(3/4)*Sqrt[2 - Sqrt[3]]*a^4*(1 - 2^(2/3)*(-(
(b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))*Sqrt[(1 + 2^(2/3)*(-((b*
(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3) + 2*2^(1/3)*(-((b*(a + b*x^(
1/3))*x^(1/3))/a^2))^(2/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x
^(1/3))*x^(1/3))/a^2))^(1/3))^2]*(-((b*(a*x^(1/3) + b*x^(2/3)))/a
^2))^(2/3)*EllipticF[ArcSin[(1 + Sqrt[3] - 2^(2/3)*(-((b*(a + b*x
^(1/3))*x^(1/3))/a^2))^(1/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b
*x^(1/3))*x^(1/3))/a^2))^(1/3))], -7 + 4*Sqrt[3]])/(5*b^3*Sqrt[-(
(1 - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))/(1 - Sqr
t[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))^2)]*(a
 + 2*b*x^(1/3))*(a*x^(1/3) + b*x^(2/3))^(2/3))
```

Rubi [A] time = 1.70098, antiderivative size = 487, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.421$

$$\frac{6\sqrt[3]{2}3^{3/4}\sqrt{2-\sqrt{3}}a^4\left(1-2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}\right)\sqrt{\frac{2\sqrt[3]{2}\left(-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}\right)^{2/3}+2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}+1}{\left(-2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}-\sqrt{3}+1\right)^2}}\left(-\frac{b\left(a\sqrt[3]{x}+bx^{2/3}\right)}{a^2}\right)^{2/3}F}{5b^3\sqrt{-\frac{1-2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}}{\left(-2^{2/3}\sqrt[3]{-\frac{b\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{a^2}}-\sqrt{3}+1\right)^2}}\left(a+2b\sqrt[3]{x}\right)\left(a\sqrt[3]{x}+bx^{2/3}\right)^{2/3}}$$

$$-\frac{18a\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)}{5b^2\left(a\sqrt[3]{x}+bx^{2/3}\right)^{2/3}}+\frac{9x^{2/3}\left(a+b\sqrt[3]{x}\right)}{5b\left(a\sqrt[3]{x}+bx^{2/3}\right)^{2/3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^(1/3) + b*x^(2/3))^(-2/3),x]
```

```
[Out] (-18*a*(a + b*x^(1/3))*x^(1/3))/(5*b^2*(a*x^(1/3) + b*x^(2/3))^(2
/3)) + (9*(a + b*x^(1/3))*x^(2/3))/(5*b*(a*x^(1/3) + b*x^(2/3))^(
2/3)) + (6*2^(1/3)*3^(3/4)*Sqrt[2 - Sqrt[3]]*a^4*(1 - 2^(2/3)*(-(
(b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))*Sqrt[(1 + 2^(2/3)*(-((b*
```

```
(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3) + 2*2^(1/3)*(-((b*(a + b*x^(
1/3))*x^(1/3))/a^2))^(2/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b*x
^(1/3))*x^(1/3))/a^2))^(1/3))^2]*(-((b*(a*x^(1/3) + b*x^(2/3)))/a
^2))^(2/3)*EllipticF[ArcSin[(1 + Sqrt[3] - 2^(2/3)*(-((b*(a + b*x
^(1/3))*x^(1/3))/a^2))^(1/3))/(1 - Sqrt[3] - 2^(2/3)*(-((b*(a + b
*x^(1/3))*x^(1/3))/a^2))^(1/3))], -7 + 4*Sqrt[3]])/(5*b^3*Sqrt[-(
(1 - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))/(1 - Sqr
t[3] - 2^(2/3)*(-((b*(a + b*x^(1/3))*x^(1/3))/a^2))^(1/3))^2]*(a
 + 2*b*x^(1/3))*(a*x^(1/3) + b*x^(2/3))^(2/3))
```

Rubi in Sympy [A] time = 50.4987, size = 376, normalized size = 0.77

$$\frac{6\sqrt[3]{2}\cdot 3^{\frac{3}{4}}a^4\sqrt{\frac{\left(1-\frac{\left(-a-2b\sqrt[3]{x}\right)^2}{a^2}\right)^{\frac{2}{3}}+\sqrt[3]{1-\frac{\left(-a-2b\sqrt[3]{x}\right)^2}{a^2}}+1}{\left(-\sqrt[3]{1-\frac{\left(-a-2b\sqrt[3]{x}\right)^2}{a^2}}-\sqrt{3}+1\right)^2}}\left(\frac{b\left(-a\sqrt[3]{x}-bx^{\frac{2}{3}}\right)}{a^2}\right)^{\frac{2}{3}}\sqrt{-\sqrt{3}+2}\sqrt[3]{a\sqrt[3]{x}+bx^{\frac{2}{3}}}\left(-\sqrt[3]{1-\frac{\left(-a-2b\sqrt[3]{x}\right)^2}{a^2}}+\cdots\right.}{5b^3\sqrt[3]{x}\sqrt{\frac{\sqrt[3]{1-\frac{\left(-a-2b\sqrt[3]{x}\right)^2}{a^2}}-1}{\left(-\sqrt[3]{1-\frac{\left(-a-2b\sqrt[3]{x}\right)^2}{a^2}}-\sqrt{3}+1\right)^2}}\left(a+b\sqrt[3]{x}\right)\left(a+2b\sqrt[3]{x}\right)}$$

$$-\frac{18a\sqrt[3]{a\sqrt[3]{x}+bx^{\frac{2}{3}}}}{5b^2}+\frac{9\sqrt[3]{x}\sqrt[3]{a\sqrt[3]{x}+bx^{\frac{2}{3}}}}{5b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   rubi_integrate(1/(a*x**(1/3)+b*x**(2/3))**(2/3),x)
```

```
[Out] 6*2**(1/3)*3**(3/4)*a**4*sqrt(((1 - (-a - 2*b*x**(1/3))**2/a**2)*
*(2/3) + (1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1)/(-(1 - (-a
 - 2*b*x**(1/3))**2/a**2)**(1/3) - sqrt(3) + 1)**2)*(b*(-a*x**(1/
3) - b*x**(2/3))/a**2)**(2/3)*sqrt(-sqrt(3) + 2)*(a*x**(1/3) + b*
x**(2/3))**(1/3)*(-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1)*
elliptic_f(asin((-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) + 1 +
sqrt(3))/(-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3) - sqrt(3) + 1
)), -7 + 4*sqrt(3))/(5*b**3*x**(1/3)*sqrt(((1 - (-a - 2*b*x**(1/3
))**2/a**2)**(1/3) - 1)/(-(1 - (-a - 2*b*x**(1/3))**2/a**2)**(1/3
) - sqrt(3) + 1)**2)*(a + b*x**(1/3))*(a + 2*b*x**(1/3))) - 18*a*
(a*x**(1/3) + b*x**(2/3))**(1/3)/(5*b**2) + 9*x**(1/3)*(a*x**(1/3
) + b*x**(2/3))**(1/3)/(5*b)
```

Mathematica [C] time = 0.0639572, size = 98, normalized size = 0.2

$$\frac{9\left(2a^2\sqrt[3]{x}\left(\frac{b\sqrt[3]{x}}{a}+1\right)^{2/3}{}_2F_1\left(\frac{1}{3},\frac{2}{3};\frac{4}{3};-\frac{b\sqrt[3]{x}}{a}\right)-2a^2\sqrt[3]{x}-abx^{2/3}+b^2x\right)}{5b^2\left(\sqrt[3]{x}\left(a+b\sqrt[3]{x}\right)\right)^{2/3}}$$

Antiderivative was successfully verified.

```
[In]   Integrate[(a*x^(1/3) + b*x^(2/3))^(-2/3),x]
```

```
[Out] (9*(-2*a^2*x^(1/3) - a*b*x^(2/3) + b^2*x + 2*a^2*(1 + (b*x^(1/3))
/a)^(2/3)*x^(1/3)*Hypergeometric2F1[1/3, 2/3, 4/3, -((b*x^(1/3))/
a)]))/(5*b^2*((a + b*x^(1/3))*x^(1/3))^(2/3))
```

Maple [F] time = 0.026, size = 0, normalized size = 0.

$$\int \left(a\sqrt[3]{x}+b x^{\frac{2}{3}}\right)^{-\frac{2}{3}}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(1/(a*x^(1/3)+b*x^(2/3))^(2/3),x)

[Out] int(1/(a*x^(1/3)+b*x^(2/3))^(2/3),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{\frac{2}{3}}+a x^{\frac{1}{3}}\right)^{\frac{2}{3}}}\, d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(2/3) + a*x^(1/3))^(-2/3),x, algorithm="maxima")

[Out] integrate((b*x^(2/3) + a*x^(1/3))^(-2/3), x)
```

Fricas [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(2/3) + a*x^(1/3))^(-2/3),x, algorithm="fricas")

[Out] Timed out
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(a\sqrt[3]{x}+b x^{\frac{2}{3}}\right)^{\frac{2}{3}}}\, d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(1/(a*x**(1/3)+b*x**(2/3))**(2/3),x)

[Out] Integral((a*x**(1/3) + b*x**(2/3))**(-2/3), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b x^{\frac{2}{3}}+a x^{\frac{1}{3}}\right)^{\frac{2}{3}}}\, d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(2/3) + a*x^(1/3))^(-2/3),x, algorithm="giac")

[Out] integrate((b*x^(2/3) + a*x^(1/3))^(-2/3), x)
```

3.439 $\int x^m \left(ax^j+bx^n\right)^p \,dx$

Optimal. Leaf size=89

$$\frac{x^{m+1}\left(a+bx^{n-j}\right)\left(ax^j+bx^n\right)^p {}_2F_1\left(1,p+\frac{m+jp+1}{n-j}+1;\frac{m+jp+1}{n-j}+1;-\frac{bx^{n-j}}{a}\right)}{a(jp+m+1)}$$

```
[Out] (x^(1 + m)*(a*x^j + b*x^n)^p*(a + b*x^(-j + n))*Hypergeometric2F1
[1, 1 + p + (1 + m + j*p)/(-j + n), 1 + (1 + m + j*p)/(-j + n), -
((b*x^(-j + n))/a)])/(a*(1 + m + j*p))
```

Rubi [A] time = 0.139515, antiderivative size = 92, normalized size of antiderivative = 1.03, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$\frac{x^{m+1}\left(\frac{ax^{j-n}}{b}+1\right)^{-p}\left(ax^j+bx^n\right)^p {}_2F_1\left(-p,\frac{m+np+1}{j-n};\frac{m+np+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{m+np+1}$$

Antiderivative was successfully verified.

```
[In]  Int[x^m*(a*x^j + b*x^n)^p,x]
```

```
[Out] (x^(1 + m)*(a*x^j + b*x^n)^p*Hypergeometric2F1[-p, (1 + m + n*p)/
(j - n), 1 + (1 + m + n*p)/(j - n), -((a*x^(j - n))/b)])/((1 + m
+ n*p)*(1 + (a*x^(j - n))/b)^p)
```

Rubi in Sympy [A] time = 29.4771, size = 82, normalized size = 0.92

$$\frac{x^m x^{-m-np} x^{m+np+1}\left(ax^j+bx^n\right)^p\left(\frac{ax^{j-n}}{b}+1\right)^{-p} {}_2F_1\left(\begin{matrix}-p,\frac{m+np+1}{j-n}\\1+\frac{m+np+1}{j-n}\end{matrix}\middle|-\frac{ax^{j-n}}{b}\right)}{m+np+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**m*(a*x**j+b*x**n)**p,x)
```

```
[Out] x**m*x**(-m - n*p)*x**(m + n*p + 1)*(a*x**j + b*x**n)**p*(a*x**(j
 - n)/b + 1)**(-p)*hyper((-p, (m + n*p + 1)/(j - n)), (1 + (m + n
*p + 1)/(j - n),), -a*x**(j - n)/b)/(m + n*p + 1)
```

Mathematica [A] time = 0.112327, size = 92, normalized size = 1.03

$$\frac{x^{m+1}\left(\frac{ax^{j-n}}{b}+1\right)^{-p}\left(ax^j+bx^n\right)^p {}_2F_1\left(-p,\frac{m+np+1}{j-n};\frac{m+np+1}{j-n}+1;-\frac{ax^{j-n}}{b}\right)}{m+np+1}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^m*(a*x^j + b*x^n)^p,x]
```

```
[Out] (x^(1 + m)*(a*x^j + b*x^n)^p*Hypergeometric2F1[-p, (1 + m + n*p)/
(j - n), 1 + (1 + m + n*p)/(j - n), -((a*x^(j - n))/b)])/((1 + m
+ n*p)*(1 + (a*x^(j - n))/b)^p)
```

Maple [F] time = 0.339, size = 0, normalized size = 0.

$$\int x^{m} \left(a x^{j}+b x^{n}\right)^{p}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^m*(a*x^j+b*x^n)^p,x)

[Out] int(x^m*(a*x^j+b*x^n)^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a x^{j}+b x^{n}\right)^{p} x^{m}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^p*x^m,x, algorithm="maxima")

[Out] integrate((a*x^j + b*x^n)^p*x^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(a x^{j}+b x^{n}\right)^{p} x^{m}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^p*x^m,x, algorithm="fricas")

[Out] integral((a*x^j + b*x^n)^p*x^m, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**m*(a*x**j+b*x**n)**p,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(a x^{j}+b x^{n}\right)^{p} x^{m}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x^j + b*x^n)^p*x^m,x, algorithm="giac")

[Out] integrate((a*x^j + b*x^n)^p*x^m, x)
```

3.440 $\int x^{-1-pq}\left(bx^n+ax^q\right)^p\,dx$

Optimal. Leaf size=69

$$-\frac{x^{-pq}\left(a+bx^{n-q}\right)\left(ax^q+bx^n\right)^p\,{}_2F_1\left(1,p+1;p+2;\frac{bx^{n-q}}{a}+1\right)}{a(p+1)(n-q)}$$

```
[Out] -(((a + b*x^(n - q))*(b*x^n + a*x^q)^p*Hypergeometric2F1[1, 1 + p
, 2 + p, 1 + (b*x^(n - q))/a])/(a*(1 + p)*(n - q)*x^(p*q)))
```

Rubi [A] time = 0.132133, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{x^{-pq}\left(a+bx^{n-q}\right)\left(ax^q+bx^n\right)^p\,{}_2F_1\left(1,p+1;p+2;\frac{bx^{n-q}}{a}+1\right)}{a(p+1)(n-q)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 - p*q)*(b*x^n + a*x^q)^p,x]
```

```
[Out] -(((a + b*x^(n - q))*(b*x^n + a*x^q)^p*Hypergeometric2F1[1, 1 + p
, 2 + p, 1 + (b*x^(n - q))/a])/(a*(1 + p)*(n - q)*x^(p*q)))
```

Rubi in Sympy [A] time = 16.2699, size = 63, normalized size = 0.91

$$-\frac{x^{-pq}\left(a+bx^{n-q}\right)^{-p}\left(a+bx^{n-q}\right)^{p+1}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(\begin{matrix}1,p+1\\p+2\end{matrix}\middle|1+\frac{bx^{n-q}}{a}\right)}{a\,(n-q)\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-p*q-1)*(b*x**n+a*x**q)**p,x)
```

```
[Out] -x**(-p*q)*(a + b*x**(n - q))**(-p)*(a + b*x**(n - q))**(p + 1)*(
a*x**q + b*x**n)**p*hyper((1, p + 1), (p + 2,), 1 + b*x**(n - q)/
a)/(a*(n - q)*(p + 1))
```

Mathematica [A] time = 0.110643, size = 73, normalized size = 1.06

$$\frac{x^{-pq}\left(ax^q+bx^n\right)^p\left(\frac{ax^{q-n}}{b}+1\right)^{-p}\,{}_2F_1\left(-p,-p;1-p;-\frac{ax^{q-n}}{b}\right)}{p(n-q)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 - p*q)*(b*x^n + a*x^q)^p,x]
```

```
[Out] ((b*x^n + a*x^q)^p*Hypergeometric2F1[-p, -p, 1 - p, -((a*x^(-n +
q))/b)])/(p*(n - q)*x^(p*q)*(1 + (a*x^(-n + q))/b)^p)
```

Maple [F] time = 0.347, size = 0, normalized size = 0.

$$\int x^{-pq-1}\left(bx^n+ax^q\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-p*q-1)*(b*x^n+a*x^q)^p,x)

[Out] int(x^(-p*q-1)*(b*x^n+a*x^q)^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + ax^q)^p x^{-pq-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-p*q - 1),x, algorithm="maxima")

[Out] integrate((b*x^n + a*x^q)^p*x^(-p*q - 1), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bx^n + ax^q)^p x^{-pq-1}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-p*q - 1),x, algorithm="fricas")

[Out] integral((b*x^n + a*x^q)^p*x^(-p*q - 1), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-p*q-1)*(b*x**n+a*x**q)**p,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + ax^q)^p x^{-pq-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-p*q - 1),x, algorithm="giac")

[Out] integrate((b*x^n + a*x^q)^p*x^(-p*q - 1), x)
```

3.441 $\int x^{-1-np}\left(bx^n+ax^q\right)^p\,dx$

Optimal. Leaf size=66

$$-\frac{x^{-np}\left(a+bx^{n-q}\right)\left(ax^q+bx^n\right)^p\,{}_2F_1\left(1,1;1-p;-\frac{bx^{n-q}}{a}\right)}{ap(n-q)}$$

```
[Out] -(((a + b*x^(n - q))*(b*x^n + a*x^q)^p*Hypergeometric2F1[1, 1, 1
- p, -((b*x^(n - q))/a)])/(a*p*(n - q)*x^(n*p)))
```

Rubi [A] time = 0.135674, antiderivative size = 74, normalized size of antiderivative = 1.12, number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136

$$-\frac{x^{-np}\left(\frac{bx^{n-q}}{a}+1\right)^{-p}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(-p,-p;1-p;-\frac{bx^{n-q}}{a}\right)}{p(n-q)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 - n*p)*(b*x^n + a*x^q)^p,x]
```

```
[Out] -(((b*x^n + a*x^q)^p*Hypergeometric2F1[-p, -p, 1 - p, -((b*x^(n -
 q))/a)])/(p*(n - q)*x^(n*p)*(1 + (b*x^(n - q))/a)^p))
```

Rubi in Sympy [A] time = 17.8103, size = 65, normalized size = 0.98

$$-\frac{x^{-np}x^{p(-n+q)}x^{p(n-q)}\left(1+\frac{bx^{n-q}}{a}\right)^{-p}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(\begin{matrix}-p,-p\\-p+1\end{matrix}\middle|-\frac{bx^{n-q}}{a}\right)}{p\,(n-q)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-n*p-1)*(b*x**n+a*x**q)**p,x)
```

```
[Out] -x**(-n*p)*x**(p*(-n + q))*x**(p*(n - q))*(1 + b*x**(n - q)/a)**(
-p)*(a*x**q + b*x**n)**p*hyper((-p, -p), (-p + 1,), -b*x**(n - q)
/a)/(p*(n - q))
```

Mathematica [A] time = 0.088626, size = 74, normalized size = 1.12

$$-\frac{x^{-np}\left(\frac{bx^{n-q}}{a}+1\right)^{-p}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(-p,-p;1-p;-\frac{bx^{n-q}}{a}\right)}{p(n-q)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 - n*p)*(b*x^n + a*x^q)^p,x]
```

```
[Out] -(((b*x^n + a*x^q)^p*Hypergeometric2F1[-p, -p, 1 - p, -((b*x^(n -
 q))/a)])/(p*(n - q)*x^(n*p)*(1 + (b*x^(n - q))/a)^p))
```

Maple [F] time = 0.342, size = 0, normalized size = 0.

$$\int x^{-np-1}\left(bx^n+ax^q\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-n*p-1)*(b*x^n+a*x^q)^p,x)

[Out] int(x^(-n*p-1)*(b*x^n+a*x^q)^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + ax^q)^p x^{-np-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-n*p - 1),x, algorithm="maxima")

[Out] integrate((b*x^n + a*x^q)^p*x^(-n*p - 1), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bx^n + ax^q)^p x^{-np-1}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-n*p - 1),x, algorithm="fricas")

[Out] integral((b*x^n + a*x^q)^p*x^(-n*p - 1), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-n*p-1)*(b*x**n+a*x**q)**p,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + ax^q)^p x^{-np-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-n*p - 1),x, algorithm="giac")

[Out] integrate((b*x^n + a*x^q)^p*x^(-n*p - 1), x)
```

3.442 $\int x^{-1-n-(-1+p)q}\left(bx^n+ax^q\right)^p\,dx$

Optimal. Leaf size=69

$$\frac{bx^{-pq}\left(a+bx^{n-q}\right)\left(ax^q+bx^n\right)^p\,{}_2F_1\left(2,p+1;p+2;\frac{bx^{n-q}}{a}+1\right)}{a^2(p+1)(n-q)}$$

```
[Out] (b*(a + b*x^(n - q))*(b*x^n + a*x^q)^p*Hypergeometric2F1[2, 1 + p
, 2 + p, 1 + (b*x^(n - q))/a])/(a^2*(1 + p)*(n - q)*x^(p*q))
```

Rubi [A] time = 0.150952, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$\frac{bx^{-pq}\left(a+bx^{n-q}\right)\left(ax^q+bx^n\right)^p\,{}_2F_1\left(2,p+1;p+2;\frac{bx^{n-q}}{a}+1\right)}{a^2(p+1)(n-q)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 - n - (-1 + p)*q)*(b*x^n + a*x^q)^p,x]
```

```
[Out] (b*(a + b*x^(n - q))*(b*x^n + a*x^q)^p*Hypergeometric2F1[2, 1 + p
, 2 + p, 1 + (b*x^(n - q))/a])/(a^2*(1 + p)*(n - q)*x^(p*q))
```

Rubi in Sympy [A] time = 22.1997, size = 92, normalized size = 1.33

$$\frac{x^{n-q}x^{-n-pq+q}\left(-\frac{b}{a}\right)^{\frac{2n-pq+q(p-1)-q}{n-q}}\left(a+bx^{n-q}\right)^{-p}\left(a+bx^{n-q}\right)^{p+1}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(\begin{matrix}2,p+1\\p+2\end{matrix}\middle|1+\frac{bx^{n-q}}{a}\right)}{b\,(n-q)\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1-n-(-1+p)*q)*(b*x**n+a*x**q)**p,x)
```

```
[Out] x**(n - q)*x**(-n - p*q + q)*(-b/a)**((2*n - p*q + q*(p - 1) - q)
/(n - q))*(a + b*x**(n - q))**(-p)*(a + b*x**(n - q))**(p + 1)*(a
*x**q + b*x**n)**p*hyper((2, p + 1), (p + 2,), 1 + b*x**(n - q)/a
)/(b*(n - q)*(p + 1))
```

Mathematica [A] time = 0.140689, size = 82, normalized size = 1.19

$$\frac{x^{-n-pq+q}\left(ax^q+bx^n\right)^p\left(\frac{ax^{q-n}}{b}+1\right)^{-p}\,{}_2F_1\left(1-p,-p;2-p;-\frac{ax^{q-n}}{b}\right)}{(p-1)(n-q)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 - n - (-1 + p)*q)*(b*x^n + a*x^q)^p,x]
```

```
[Out] (x^(-n + q - p*q)*(b*x^n + a*x^q)^p*Hypergeometric2F1[1 - p, -p,
2 - p, -((a*x^(-n + q))/b)])/((-1 + p)*(n - q)*(1 + (a*x^(-n + q)
)/b)^p)
```

Maple [F] time = 0.343, size = 0, normalized size = 0.

$$\int x^{-1-n-(-1+p)q} \left(b x^{n}+a x^{q}\right)^{p}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1-n-(-1+p)*q)*(b*x^n+a*x^q)^p,x)

[Out] int(x^(-1-n-(-1+p)*q)*(b*x^n+a*x^q)^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + ax^q)^p x^{-(p-1)q-n-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-(p - 1)*q - n - 1),x, algorithm="maxima")

[Out] integrate((b*x^n + a*x^q)^p*x^(-(p - 1)*q - n - 1), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left((bx^n + ax^q)^p x^{-(p-1)q-n-1}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-(p - 1)*q - n - 1),x, algorithm="fricas")

[Out] integral((b*x^n + a*x^q)^p*x^(-(p - 1)*q - n - 1), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1-n-(-1+p)*q)*(b*x**n+a*x**q)**p,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (bx^n + ax^q)^p x^{-(p-1)q-n-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-(p - 1)*q - n - 1),x, algorithm="giac")

[Out] integrate((b*x^n + a*x^q)^p*x^(-(p - 1)*q - n - 1), x)
```

3.443 $\int x^{-1-n(-1+p)-q}\left(bx^n+ax^q\right)^p\,dx$

Optimal. Leaf size=84

$$\frac{x^{n(-p)+n-q}\left(\frac{bx^{n-q}}{a}+1\right)^{-p}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(1-p,-p;2-p;-\frac{bx^{n-q}}{a}\right)}{(1-p)(n-q)}$$

```
[Out] (x^(n - n*p - q)*(b*x^n + a*x^q)^p*Hypergeometric2F1[1 - p, -p, 2
 - p, -((b*x^(n - q))/a)])/((1 - p)*(n - q)*(1 + (b*x^(n - q))/a)
^p)
```

Rubi [A] time = 0.169325, antiderivative size = 84, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111

$$\frac{x^{n(-p)+n-q}\left(\frac{bx^{n-q}}{a}+1\right)^{-p}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(1-p,-p;2-p;-\frac{bx^{n-q}}{a}\right)}{(1-p)(n-q)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 - n*(-1 + p) - q)*(b*x^n + a*x^q)^p,x]
```

```
[Out] (x^(n - n*p - q)*(b*x^n + a*x^q)^p*Hypergeometric2F1[1 - p, -p, 2
 - p, -((b*x^(n - q))/a)])/((1 - p)*(n - q)*(1 + (b*x^(n - q))/a)
^p)
```

Rubi in Sympy [A] time = 20.6691, size = 54, normalized size = 0.64

$$\frac{x^{-np+n-q}\left(1+\frac{bx^{n-q}}{a}\right)^{-p}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(\begin{matrix}-p,-p+1\\-p+2\end{matrix}\middle|-\frac{bx^{n-q}}{a}\right)}{(n-q)\,(-p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1-n*(-1+p)-q)*(b*x**n+a*x**q)**p,x)
```

```
[Out] x**(-n*p + n - q)*(1 + b*x**(n - q)/a)**(-p)*(a*x**q + b*x**n)**p
*hyper((-p, -p + 1), (-p + 2,), -b*x**(n - q)/a)/((n - q)*(-p + 1
))
```

Mathematica [A] time = 0.0987244, size = 83, normalized size = 0.99

$$-\frac{x^{n(-p)+n-q}\left(\frac{bx^{n-q}}{a}+1\right)^{-p}\left(ax^q+bx^n\right)^p\,{}_2F_1\left(1-p,-p;2-p;-\frac{bx^{n-q}}{a}\right)}{(p-1)(n-q)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 - n*(-1 + p) - q)*(b*x^n + a*x^q)^p,x]
```

```
[Out] -((x^(n - n*p - q)*(b*x^n + a*x^q)^p*Hypergeometric2F1[1 - p, -p,
 2 - p, -((b*x^(n - q))/a)])/((-1 + p)*(n - q)*(1 + (b*x^(n - q))
/a)^p))
```

Maple [F] time = 0.343, size = 0, normalized size = 0.

$$\int x^{-1-n(-1+p)-q}\left(b x^{n}+a x^{q}\right)^{p} d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1-n*(-1+p)-q)*(b*x^n+a*x^q)^p,x)

[Out] int(x^(-1-n*(-1+p)-q)*(b*x^n+a*x^q)^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\left(b x^{n}+a x^{q}\right)^{p} x^{-n(p-1)-q-1} d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-n*(p - 1) - q - 1),x, algorithm="maxima")

[Out] integrate((b*x^n + a*x^q)^p*x^(-n*(p - 1) - q - 1), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\operatorname{integral}\left(\left(b x^{n}+a x^{q}\right)^{p} x^{-n p+n-q-1}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-n*(p - 1) - q - 1),x, algorithm="fricas")

[Out] integral((b*x^n + a*x^q)^p*x^(-n*p + n - q - 1), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1-n*(-1+p)-q)*(b*x**n+a*x**q)**p,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\left(b x^{n}+a x^{q}\right)^{p} x^{-n(p-1)-q-1} d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^n + a*x^q)^p*x^(-n*(p - 1) - q - 1),x, algorithm="giac")

[Out] integrate((b*x^n + a*x^q)^p*x^(-n*(p - 1) - q - 1), x)
```

3.444 $\int \left(ax^m + bx^{1+m+mp}\right)^p \, dx$

Optimal. Leaf size=44

$$\frac{x^{-m(p+1)}\left(ax^m + bx^{mp+m+1}\right)^{p+1}}{b(p+1)(mp+1)}$$

```
[Out] (a*x^m + b*x^(1 + m + m*p))^(1 + p)/(b*(1 + p)*(1 + m*p)*x^(m*(1
+ p)))
```

Rubi [A] time = 0.0372563, antiderivative size = 44, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$

$$\frac{x^{-m(p+1)}\left(ax^m + bx^{mp+m+1}\right)^{p+1}}{b(p+1)(mp+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(a*x^m + b*x^(1 + m + m*p))^p,x]
```

```
[Out] (a*x^m + b*x^(1 + m + m*p))^(1 + p)/(b*(1 + p)*(1 + m*p)*x^(m*(1
+ p)))
```

Rubi in Sympy [A] time = 3.14091, size = 34, normalized size = 0.77

$$\frac{x^{-m(p+1)}\left(ax^m + bx^{mp+m+1}\right)^{p+1}}{b\,(p+1)\,(mp+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((a*x**m+b*x**(m*p+m+1))**p,x)
```

```
[Out] x**(-m*(p + 1))*(a*x**m + b*x**(m*p + m + 1))**(p + 1)/(b*(p + 1)
*(m*p + 1))
```

Mathematica [A] time = 0.0886071, size = 43, normalized size = 0.98

$$\frac{x^{-m(p+1)}\left(x^m\left(a + bx^{mp+1}\right)\right)^{p+1}}{b(p+1)(mp+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a*x^m + b*x^(1 + m + m*p))^p,x]
```

```
[Out] (x^m*(a + b*x^(1 + m*p)))^(1 + p)/(b*(1 + p)*(1 + m*p)*x^(m*(1 +
p)))
```

Maple [F] time = 0.127, size = 0, normalized size = 0.

$$\int \left(ax^m + bx^{mp+m+1}\right)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((a*x^m+b*x^(m*p+m+1))^p,x)
```

```
[Out] int((a*x^m+b*x^(m*p+m+1))^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^{mp+m+1} + ax^{m}\right)^{p} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(m*p + m + 1) + a*x^m)^p,x, algorithm="maxima")
```

```
[Out] integrate((b*x^(m*p + m + 1) + a*x^m)^p, x)
```

Fricas [A] time = 0.256402, size = 86, normalized size = 1.95

$$\frac{\left(bxx^{mp+m+1} + axx^{m}\right)\left(bx^{mp+m+1} + ax^{m}\right)^{p}}{(bmp^{2} + (bm + b)p + b)x^{mp+m+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(m*p + m + 1) + a*x^m)^p,x, algorithm="fricas")
```

```
[Out] (b*x*x^(m*p + m + 1) + a*x*x^m)*(b*x^(m*p + m + 1) + a*x^m)^p/((b
*m*p^2 + (b*m + b)*p + b)*x^(m*p + m + 1))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((a*x**m+b*x**(m*p+m+1))**p,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^{mp+m+1} + ax^{m}\right)^{p} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(m*p + m + 1) + a*x^m)^p,x, algorithm="giac")
```

```
[Out] integrate((b*x^(m*p + m + 1) + a*x^m)^p, x)
```

3.445 $\int \left(x^m \left(a+bx^{1+mp}\right)\right)^p \, dx$

Optimal. Leaf size=44

$$\frac{x^{-m(p+1)} \left(ax^m+bx^{mp+m+1}\right)^{p+1}}{b(p+1)(mp+1)}$$

```
[Out] (a*x^m + b*x^(1 + m + m*p))^(1 + p)/(b*(1 + p)*(1 + m*p)*x^(m*(1
+ p)))
```

Rubi [A] time = 0.0365398, antiderivative size = 44, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$\frac{x^{-m(p+1)} \left(ax^m+bx^{mp+m+1}\right)^{p+1}}{b(p+1)(mp+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^m*(a + b*x^(1 + m*p)))^p,x]
```

```
[Out] (a*x^m + b*x^(1 + m + m*p))^(1 + p)/(b*(1 + p)*(1 + m*p)*x^(m*(1
+ p)))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \left(x^m \left(a+bx^{mp+1}\right)\right)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**m*(a+b*x**(m*p+1)))**p,x)
```

```
[Out] Integral((x**m*(a + b*x**(m*p + 1)))**p, x)
```

Mathematica [A] time = 0.0277841, size = 43, normalized size = 0.98

$$\frac{x^{-m(p+1)} \left(x^m \left(a+bx^{mp+1}\right)\right)^{p+1}}{b(p+1)(mp+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^m*(a + b*x^(1 + m*p)))^p,x]
```

```
[Out] (x^m*(a + b*x^(1 + m*p)))^(1 + p)/(b*(1 + p)*(1 + m*p)*x^(m*(1 +
p)))
```

Maple [F] time = 0.104, size = 0, normalized size = 0.

$$\int \left(x^m \left(a+bx^{mp+1}\right)\right)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^m*(a+b*x^(m*p+1)))^p,x)
```

```
[Out] int((x^m*(a+b*x^(m*p+1)))^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(\left(bx^{mp+1}+a\right)x^{m}\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^(m*p + 1) + a)*x^m)^p,x, algorithm="maxima")
```

```
[Out] integrate(((b*x^(m*p + 1) + a)*x^m)^p, x)
```

Fricas [A] time = 0.254669, size = 82, normalized size = 1.86

$$\frac{\left(bxx^{mp+1}+ax\right)\left(bx^{mp+1}x^{m}+ax^{m}\right)^{p}}{(bmp^{2}+(bm+b)p+b)x^{mp+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^(m*p + 1) + a)*x^m)^p,x, algorithm="fricas")
```

```
[Out] (b*x*x^(m*p + 1) + a*x)*(b*x^(m*p + 1)*x^m + a*x^m)^p/((b*m*p^2 +
 (b*m + b)*p + b)*x^(m*p + 1))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**m*(a+b*x**(m*p+1)))**p,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(\left(bx^{mp+1}+a\right)x^{m}\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^(m*p + 1) + a)*x^m)^p,x, algorithm="giac")
```

```
[Out] integrate(((b*x^(m*p + 1) + a)*x^m)^p, x)
```

3.446 $\int x^n \left(x^m \left(a+bx^{1+n+mp}\right)\right)^p\,dx$

Optimal. Leaf size=46

$$\frac{x^{-m(p+1)}\left(ax^m+bx^{mp+m+n+1}\right)^{p+1}}{b(p+1)(mp+n+1)}$$

```
[Out] (a*x^m + b*x^(1 + m + n + m*p))^(1 + p)/(b*(1 + p)*(1 + n + m*p)*
x^(m*(1 + p)))
```

Rubi [A] time = 0.12024, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$

$$\frac{x^{-m(p+1)}\left(ax^m+bx^{mp+m+n+1}\right)^{p+1}}{b(p+1)(mp+n+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^n*(x^m*(a + b*x^(1 + n + m*p)))^p,x]
```

```
[Out] (a*x^m + b*x^(1 + m + n + m*p))^(1 + p)/(b*(1 + p)*(1 + n + m*p)*
x^(m*(1 + p)))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^n \left(x^m \left(a+bx^{mp+n+1}\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**n*(x**m*(a+b*x**(m*p+n+1)))**p,x)
```

```
[Out] Integral(x**n*(x**m*(a + b*x**(m*p + n + 1)))**p, x)
```

Mathematica [A] time = 0.109913, size = 45, normalized size = 0.98

$$\frac{x^{-m(p+1)}\left(x^m\left(a+bx^{mp+n+1}\right)\right)^{p+1}}{b(p+1)(mp+n+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^n*(x^m*(a + b*x^(1 + n + m*p)))^p,x]
```

```
[Out] (x^m*(a + b*x^(1 + n + m*p)))^(1 + p)/(b*(1 + p)*(1 + n + m*p)*x^
(m*(1 + p)))
```

Maple [F] time = 0.241, size = 0, normalized size = 0.

$$\int x^n \left(x^m \left(a+bx^{mp+n+1}\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^n*(x^m*(a+b*x^(m*p+n+1)))^p,x)
```

```
[Out] int(x^n*(x^m*(a+b*x^(m*p+n+1)))^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(\left(bx^{mp+n+1}+a\right)x^m\right)^p x^n\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^(m*p + n + 1) + a)*x^m)^p*x^n,x, algorithm="maxima")
```

```
[Out] integrate(((b*x^(m*p + n + 1) + a)*x^m)^p*x^n, x)
```

Fricas [A] time = 0.26075, size = 103, normalized size = 2.24

$$\frac{\left(bxx^{mp+n+1}x^n+axx^n\right)\left(bx^{mp+n+1}x^m+ax^m\right)^p}{(bmp^2+bn+(bm+bn+b)p+b)x^{mp+n+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^(m*p + n + 1) + a)*x^m)^p*x^n,x, algorithm="fricas")
```

```
[Out] (b*x*x^(m*p + n + 1)*x^n + a*x*x^n)*(b*x^(m*p + n + 1)*x^m + a*x^
m)^p/((b*m*p^2 + b*n + (b*m + b*n + b)*p + b)*x^(m*p + n + 1))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**n*(x**m*(a+b*x**(m*p+n+1)))**p,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(\left(bx^{mp+n+1}+a\right)x^m\right)^p x^n\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^(m*p + n + 1) + a)*x^m)^p*x^n,x, algorithm="giac")
```

```
[Out] integrate(((b*x^(m*p + n + 1) + a)*x^m)^p*x^n, x)
```

3.447 $\int x^n \left(ax^m + bx^{1+m+n+mp}\right)^p \, dx$

Optimal. Leaf size=46

$$\frac{x^{-m(p+1)} \left(ax^m + bx^{mp+m+n+1}\right)^{p+1}}{b(p+1)(mp+n+1)}$$

```
[Out] (a*x^m + b*x^(1 + m + n + m*p))^(1 + p)/(b*(1 + p)*(1 + n + m*p)*
x^(m*(1 + p)))
```

Rubi [A] time = 0.0845235, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$

$$\frac{x^{-m(p+1)} \left(ax^m + bx^{mp+m+n+1}\right)^{p+1}}{b(p+1)(mp+n+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^n*(a*x^m + b*x^(1 + m + n + m*p))^p,x]
```

```
[Out] (a*x^m + b*x^(1 + m + n + m*p))^(1 + p)/(b*(1 + p)*(1 + n + m*p)*
x^(m*(1 + p)))
```

Rubi in Sympy [A] time = 11.0193, size = 37, normalized size = 0.8

$$\frac{x^{-m(p+1)} \left(ax^m + bx^{mp+m+n+1}\right)^{p+1}}{b\,(p+1)\,(mp+n+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**n*(a*x**m+b*x**(m*p+m+n+1))**p,x)
```

```
[Out] x**(-m*(p + 1))*(a*x**m + b*x**(m*p + m + n + 1))**(p + 1)/(b*(p
+ 1)*(m*p + n + 1))
```

Mathematica [A] time = 0.0366624, size = 45, normalized size = 0.98

$$\frac{x^{-m(p+1)} \left(x^m \left(a + bx^{mp+n+1}\right)\right)^{p+1}}{b(p+1)(mp+n+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^n*(a*x^m + b*x^(1 + m + n + m*p))^p,x]
```

```
[Out] (x^m*(a + b*x^(1 + n + m*p)))^(1 + p)/(b*(1 + p)*(1 + n + m*p)*x^
(m*(1 + p)))
```

Maple [F] time = 0.345, size = 0, normalized size = 0.

$$\int x^n \left(ax^m + bx^{mp+m+n+1}\right)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^n*(a*x^m+b*x^(m*p+m+n+1))^p,x)
```

```
[Out] int(x^n*(a*x^m+b*x^(m*p+m+n+1))^p,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^{mp+m+n+1} + ax^m\right)^p x^n\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(m*p + m + n + 1) + a*x^m)^p*x^n,x, algorithm="maxima")
```

```
[Out] integrate((b*x^(m*p + m + n + 1) + a*x^m)^p*x^n, x)
```

Fricas [A] time = 0.256261, size = 107, normalized size = 2.33

$$\frac{\left(bxx^{mp+m+n+1}x^n + axx^m x^n\right)\left(bx^{mp+m+n+1} + ax^m\right)^p}{(bmp^2 + bn + (bm + bn + b)p + b)x^{mp+m+n+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(m*p + m + n + 1) + a*x^m)^p*x^n,x, algorithm="fricas")
```

```
[Out] (b*x*x^(m*p + m + n + 1)*x^n + a*x*x^m*x^n)*(b*x^(m*p + m + n + 1
) + a*x^m)^p/((b*m*p^2 + b*n + (b*m + b*n + b)*p + b)*x^(m*p + m
+ n + 1))
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**n*(a*x**m+b*x**(m*p+m+n+1))**p,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(bx^{mp+m+n+1} + ax^m\right)^p x^n\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x^(m*p + m + n + 1) + a*x^m)^p*x^n,x, algorithm="giac")
```

```
[Out] integrate((b*x^(m*p + m + n + 1) + a*x^m)^p*x^n, x)
```

3.448 $\int \sqrt{x^{2(-1+n)}(a+bx^n)}\,dx$

Optimal. Leaf size=44

$$\frac{2x^{3(1-n)}\left(ax^{-2(1-n)}+bx^{3n-2}\right)^{3/2}}{3bn}$$

```
[Out] (2*x^(3*(1 - n))*(a/x^(2*(1 - n)) + b*x^(-2 + 3*n))^(3/2))/(3*b*n
)
```

Rubi [A] time = 0.0392088, antiderivative size = 44, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{2x^{3(1-n)}\left(ax^{-2(1-n)}+bx^{3n-2}\right)^{3/2}}{3bn}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[x^(2*(-1 + n))*(a + b*x^n)],x]

[Out] (2*x^(3*(1 - n))*(a/x^(2*(1 - n)) + b*x^(-2 + 3*n))^(3/2))/(3*b*n
)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{x^{2n-2}(a+bx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**(-2+2*n)*(a+b*x**n))**(1/2),x)

[Out] Integral(sqrt(x**(2*n - 2)*(a + b*x**n)), x)
```

Mathematica [A] time = 0.0608137, size = 36, normalized size = 0.82

$$\frac{2x^{3-3n}\left(x^{2n-2}(a+bx^n)\right)^{3/2}}{3bn}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[x^(2*(-1 + n))*(a + b*x^n)],x]

[Out] (2*x^(3 - 3*n)*(x^(-2 + 2*n)*(a + b*x^n))^(3/2))/(3*b*n)
```

Maple [A] time = 0.051, size = 40, normalized size = 0.9

$$\frac{(2\,a+2\,bx^n)\,x}{3\,bx^n n}\sqrt{\frac{(x^n)^2\,(a+bx^n)}{x^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^(-2+2*n)*(a+b*x^n))^(1/2),x)
```

```
[Out] 2/3*(1/x^2*(x^n)^2*(a+b*x^n))^(1/2)*(a+b*x^n)/(x^n)*x/b/n
```

Maxima [A] time = 1.40278, size = 23, normalized size = 0.52

$$\frac{2\,(bx^n + a)^{\frac{3}{2}}}{3\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n + a)*x^(2*n - 2)),x, algorithm="maxima")

[Out] 2/3*(b*x^n + a)^(3/2)/(b*n)
```

Fricas [A] time = 0.24123, size = 59, normalized size = 1.34

$$\frac{2\,(bxx^n + ax)\sqrt{\frac{bx^{3\,n}+ax^{2\,n}}{x^2}}}{3\,bnx^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n + a)*x^(2*n - 2)),x, algorithm="fricas")

[Out] 2/3*(b*x*x^n + a*x)*sqrt((b*x^(3*n) + a*x^(2*n))/x^2)/(b*n*x^n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**(-2+2*n)*(a+b*x**n))**(1/2),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{(bx^n + a)x^{2\,n-2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt((b*x^n + a)*x^(2*n - 2)),x, algorithm="giac")

[Out] integrate(sqrt((b*x^n + a)*x^(2*n - 2)), x)
```

3.449 $\int \sqrt[3]{x^{3(-1+n)}(a+bx^n)}\,dx$

Optimal. Leaf size=44

$$\frac{3x^{4(1-n)}\left(ax^{-3(1-n)}+bx^{4n-3}\right)^{4/3}}{4bn}$$

```
[Out] (3*x^(4*(1 - n))*(a/x^(3*(1 - n)) + b*x^(-3 + 4*n))^(4/3))/(4*b*n
)
```

Rubi [A] time = 0.038292, antiderivative size = 44, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{3x^{4(1-n)}\left(ax^{-3(1-n)}+bx^{4n-3}\right)^{4/3}}{4bn}$$

Antiderivative was successfully verified.

```
[In] Int[(x^(3*(-1 + n))*(a + b*x^n))^(1/3),x]
```

```
[Out] (3*x^(4*(1 - n))*(a/x^(3*(1 - n)) + b*x^(-3 + 4*n))^(4/3))/(4*b*n
)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt[3]{x^{3n-3}(a+bx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**(-3+3*n)*(a+b*x**n))**(1/3),x)
```

```
[Out] Integral((x**(3*n - 3)*(a + b*x**n))**(1/3), x)
```

Mathematica [A] time = 0.0538202, size = 36, normalized size = 0.82

$$\frac{3x^{4-4n}\left(x^{3n-3}(a+bx^n)\right)^{4/3}}{4bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^(3*(-1 + n))*(a + b*x^n))^(1/3),x]
```

```
[Out] (3*x^(4 - 4*n)*(x^(-3 + 3*n)*(a + b*x^n))^(4/3))/(4*b*n)
```

Maple [A] time = 0.037, size = 40, normalized size = 0.9

$$\frac{3\,x\,(a+bx^n)}{4\,bx^n n}\sqrt[3]{\frac{(x^n)^3\,(a+bx^n)}{x^3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^(-3+3*n)*(a+b*x^n))^(1/3),x)
```

```
[Out] 3/4*(1/x^3*(x^n)^3*(a+b*x^n))^(1/3)*x/(x^n)*(a+b*x^n)/b/n
```

Maxima [A] time = 1.40374, size = 23, normalized size = 0.52

$$\frac{3\,(bx^n+a)^{\frac{4}{3}}}{4\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^(3*n - 3))^(1/3),x, algorithm="maxima")
```

```
[Out] 3/4*(b*x^n + a)^(4/3)/(b*n)
```

Fricas [A] time = 0.242581, size = 59, normalized size = 1.34

$$\frac{3\,(bxx^n+ax)\left(\frac{bx^{4\,n}+ax^{3\,n}}{x^3}\right)^{\frac{1}{3}}}{4\,bnx^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^(3*n - 3))^(1/3),x, algorithm="fricas")
```

```
[Out] 3/4*(b*x*x^n + a*x)*((b*x^(4*n) + a*x^(3*n))/x^3)^(1/3)/(b*n*x^n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**(-3+3*n)*(a+b*x**n))**(1/3),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int\left((bx^n+a)x^{3\,n-3}\right)^{\frac{1}{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^(3*n - 3))^(1/3),x, algorithm="giac")
```

```
[Out] integrate(((b*x^n + a)*x^(3*n - 3))^(1/3), x)
```

3.450 $\int \sqrt[4]{x^{4(-1+n)}\,(a+bx^n)}\,dx$

Optimal. Leaf size=44

$$\frac{4x^{5(1-n)}\left(ax^{-4(1-n)}+bx^{5n-4}\right)^{5/4}}{5bn}$$

```
[Out] (4*x^(5*(1 - n))*(a/x^(4*(1 - n)) + b*x^(-4 + 5*n))^(5/4))/(5*b*n
)
```

Rubi [A] time = 0.0388117, antiderivative size = 44, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$

$$\frac{4x^{5(1-n)}\left(ax^{-4(1-n)}+bx^{5n-4}\right)^{5/4}}{5bn}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^(4*(-1 + n))*(a + b*x^n))^(1/4),x]
```

```
[Out] (4*x^(5*(1 - n))*(a/x^(4*(1 - n)) + b*x^(-4 + 5*n))^(5/4))/(5*b*n
)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt[4]{x^{4n-4}\,(a+bx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**(-4+4*n)*(a+b*x**n))**(1/4),x)
```

```
[Out] Integral((x**(4*n - 4)*(a + b*x**n))**(1/4), x)
```

Mathematica [A] time = 0.0545949, size = 36, normalized size = 0.82

$$\frac{4x^{5-5n}\left(x^{4n-4}\,(a+bx^n)\right)^{5/4}}{5bn}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^(4*(-1 + n))*(a + b*x^n))^(1/4),x]
```

```
[Out] (4*x^(5 - 5*n)*(x^(-4 + 4*n)*(a + b*x^n))^(5/4))/(5*b*n)
```

Maple [A] time = 0.037, size = 40, normalized size = 0.9

$$\frac{4\,x\,(a+bx^n)}{5\,bx^n n}\sqrt[4]{\frac{(x^n)^4\,(a+bx^n)}{x^4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^(-4+4*n)*(a+b*x^n))^(1/4),x)
```

```
[Out] 4/5*(1/x^4*(x^n)^4*(a+b*x^n))^(1/4)*x/(x^n)*(a+b*x^n)/b/n
```

Maxima [A] time = 1.40948, size = 23, normalized size = 0.52

$$\frac{4\,(bx^n+a)^{\frac{5}{4}}}{5\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^(4*n - 4))^(1/4),x, algorithm="maxima")

[Out] 4/5*(b*x^n + a)^(5/4)/(b*n)
```

Fricas [A] time = 0.245078, size = 59, normalized size = 1.34

$$\frac{4\,(bxx^n+ax)\left(\frac{bx^{5\,n}+ax^{4\,n}}{x^4}\right)^{\frac{1}{4}}}{5\,bnx^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^(4*n - 4))^(1/4),x, algorithm="fricas")

[Out] 4/5*(b*x*x^n + a*x)*((b*x^(5*n) + a*x^(4*n))/x^4)^(1/4)/(b*n*x^n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**(-4+4*n)*(a+b*x**n))**(1/4),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left((bx^n+a)x^{4\,n-4}\right)^{\frac{1}{4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^(4*n - 4))^(1/4),x, algorithm="giac")

[Out] integrate(((b*x^n + a)*x^(4*n - 4))^(1/4), x)
```

3.451 $\int \left(x^{(-1+n)p}(a+bx^n)\right)^{\frac{1}{p}}\,dx$

Optimal. Leaf size=57

$$\frac{px^{(1-n)(p+1)}\left(ax^{-(1-n)p}+bx^{n-(1-n)p}\right)^{\frac{1}{p}+1}}{bn(p+1)}$$

```
[Out] (p*x^((1 - n)*(1 + p))*(a/x^((1 - n)*p) + b*x^(n - (1 - n)*p))^(1
 + p^(-1)))/(b*n*(1 + p))
```

Rubi [A] time = 0.0618204, antiderivative size = 57, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$

$$\frac{px^{(1-n)(p+1)}\left(ax^{-(1-n)p}+bx^{np+n-p}\right)^{\frac{1}{p}+1}}{bn(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^((-1 + n)*p)*(a + b*x^n))^p^(-1),x]
```

```
[Out] (p*x^((1 - n)*(1 + p))*(a/x^((1 - n)*p) + b*x^(n - p + n*p))^(1 +
 p^(-1)))/(b*n*(1 + p))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \left(x^{p(n-1)}(a+bx^n)\right)^{\frac{1}{p}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**((-1+n)*p)*(a+b*x**n))**(1/p),x)
```

```
[Out] Integral((x**(p*(n - 1))*(a + b*x**n))**(1/p), x)
```

Mathematica [A] time = 0.0551251, size = 46, normalized size = 0.81

$$\frac{px^{1-n}(a+bx^n)\left(x^{(n-1)p}(a+bx^n)\right)^{\frac{1}{p}}}{bn(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^((-1 + n)*p)*(a + b*x^n))^p^(-1),x]
```

```
[Out] (p*x^(1 - n)*(a + b*x^n)*(x^((-1 + n)*p)*(a + b*x^n))^p^(-1))/(b*
n*(1 + p))
```

Maple [F] time = 0.108, size = 0, normalized size = 0.

$$\int \sqrt[p]{x^{(-1+n)p}(a+bx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^((-1+n)*p)*(a+b*x^n))^(1/p),x)

[Out] int((x^((-1+n)*p)*(a+b*x^n))^(1/p),x)
```

Maxima [A] time = 1.51668, size = 45, normalized size = 0.79

$$\frac{(bpx^n + ap)(bx^n + a)^{\left(\frac{1}{p}\right)}}{bn(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^((n - 1)*p))^(1/p),x, algorithm="maxima")

[Out] (b*p*x^n + a*p)*(b*x^n + a)^(1/p)/(b*n*(p + 1))
```

Fricas [A] time = 0.264947, size = 63, normalized size = 1.11

$$\frac{(bpxx^n + apx)\left((bx^n + a)x^{(n-1)p}\right)^{\left(\frac{1}{p}\right)}}{(bnp + bn)x^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^((n - 1)*p))^(1/p),x, algorithm="fricas")

[Out] (b*p*x*x^n + a*p*x)*((b*x^n + a)*x^((n - 1)*p))^(1/p)/((b*n*p + b
*n)*x^n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**((-1+n)*p)*(a+b*x**n))**(1/p),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left((bx^n + a)x^{(n-1)p}\right)^{\left(\frac{1}{p}\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^((n - 1)*p))^(1/p),x, algorithm="giac")

[Out] integrate(((b*x^n + a)*x^((n - 1)*p))^(1/p), x)
```

3.452 $\int \left(x^{\frac{-1+n}{p}}(a+bx^n)\right)^p dx$

Optimal. Leaf size=61

$$\frac{x^{\frac{(1-n)(p+1)}{p}}\left(ax^{-\frac{1-n}{p}}+bx^{n-\frac{1-n}{p}}\right)^{p+1}}{bn(p+1)}$$

```
[Out] (x^(((1 - n)*(1 + p))/p)*(b*x^(n - (1 - n)/p) + a/x^((1 - n)/p))^
(1 + p))/(b*n*(1 + p))
```

Rubi [A] time = 0.0547491, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{x^{\frac{(1-n)(p+1)}{p}}\left(ax^{-\frac{1-n}{p}}+bx^{-\frac{n(-p)-n+1}{p}}\right)^{p+1}}{bn(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^((-1 + n)/p)*(a + b*x^n))^p,x]
```

```
[Out] (x^(((1 - n)*(1 + p))/p)*(a/x^((1 - n)/p) + b/x^((1 - n - n*p)/p)
)^(1 + p))/(b*n*(1 + p))
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \left(x^{\frac{n-1}{p}}(a+bx^n)\right)^p dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**((-1+n)/p)*(a+b*x**n))**p,x)
```

```
[Out] Integral((x**((n - 1)/p)*(a + b*x**n))**p, x)
```

Mathematica [A] time = 0.0656618, size = 45, normalized size = 0.74

$$\frac{x^{1-n}(a+bx^n)\left(x^{\frac{n-1}{p}}(a+bx^n)\right)^p}{bn(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^((-1 + n)/p)*(a + b*x^n))^p,x]
```

```
[Out] (x^(1 - n)*(a + b*x^n)*(x^((-1 + n)/p)*(a + b*x^n))^p)/(b*n*(1 +
p))
```

Maple [F] time = 0.105, size = 0, normalized size = 0.

$$\int \left(x^{\frac{-1+n}{p}}(a+bx^n)\right)^p dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^((-1+n)/p)*(a+b*x^n))^p,x)

[Out] int((x^((-1+n)/p)*(a+b*x^n))^p,x)
```

Maxima [A] time = 1.54104, size = 38, normalized size = 0.62

$$\frac{(bx^n + a)(bx^n + a)^p}{bn(p + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^((n - 1)/p))^p,x, algorithm="maxima")

[Out] (b*x^n + a)*(b*x^n + a)^p/(b*n*(p + 1))
```

Fricas [A] time = 0.259787, size = 73, normalized size = 1.2

$$\frac{(bxx^n + ax)\left(bx^n x^{\frac{n-1}{p}} + ax^{\frac{n-1}{p}}\right)^p}{(bnp + bn)x^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^((n - 1)/p))^p,x, algorithm="fricas")

[Out] (b*x*x^n + a*x)*(b*x^n*x^((n - 1)/p) + a*x^((n - 1)/p))^p/((b*n*p
 + b*n)*x^n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**((-1+n)/p)*(a+b*x**n))**p,x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left((bx^n + a)x^{\frac{n-1}{p}}\right)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((b*x^n + a)*x^((n - 1)/p))^p,x, algorithm="giac")

[Out] integrate(((b*x^n + a)*x^((n - 1)/p))^p, x)
```

3.453 $\int x^{-1+n-p(1+q)} \left(ax^n+bx^p\right)^q \, dx$

Optimal. Leaf size=39

$$\frac{x^{-p(q+1)} \left(ax^n+bx^p\right)^{q+1}}{a(q+1)(n-p)}$$

```
[Out] (a*x^n + b*x^p)^(1 + q)/(a*(n - p)*(1 + q)*x^(p*(1 + q)))
```

Rubi [A] time = 0.0932318, antiderivative size = 39, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.04

$$\frac{x^{-p(q+1)} \left(ax^n+bx^p\right)^{q+1}}{a(q+1)(n-p)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 + n - p*(1 + q))*(a*x^n + b*x^p)^q,x]
```

```
[Out] (a*x^n + b*x^p)^(1 + q)/(a*(n - p)*(1 + q)*x^(p*(1 + q)))
```

Rubi in Sympy [A] time = 10.0923, size = 27, normalized size = 0.69

$$\frac{x^{-p(q+1)} \left(ax^n+bx^p\right)^{q+1}}{a\,(n-p)\,(q+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1+n-p*(1+q))*(a*x**n+b*x**p)**q,x)
```

```
[Out] x**(-p*(q + 1))*(a*x**n + b*x**p)**(q + 1)/(a*(n - p)*(q + 1))
```

Mathematica [B] time = 0.213892, size = 100, normalized size = 2.56

$$\frac{x^{-p(q+1)} \left(\frac{ax^{n-p}}{b}+1\right)^{-q} \left(ax^n+bx^p\right)^q \left(bx^p \left(\left(\frac{ax^{n-p}}{b}+1\right)^q-1\right)+ax^n \left(\frac{ax^{n-p}}{b}+1\right)^q\right)}{a(q+1)(n-p)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 + n - p*(1 + q))*(a*x^n + b*x^p)^q,x]
```

```
[Out] ((a*x^n + b*x^p)^q*(a*x^n*(1 + (a*x^(n - p))/b)^q + b*x^p*(-1 + (
1 + (a*x^(n - p))/b)^q)))/(a*(n - p)*(1 + q)*x^(p*(1 + q))*(1 + (
a*x^(n - p))/b)^q)
```

Maple [F] time = 0.351, size = 0, normalized size = 0.

$$\int x^{-1+n-p(1+q)} \left(ax^n+bx^p\right)^q \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1+n-p*(1+q))*(a*x^n+b*x^p)^q,x)
```

[Out] int(x^(-1+n-p*(1+q))*(a*x^n+b*x^p)^q,x)

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (ax^n + bx^p)^q x^{-p(q+1)+n-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^n + b*x^p)^q*x^(-p*(q + 1) + n - 1),x, algorithm="maxima")
```

```
[Out] integrate((a*x^n + b*x^p)^q*x^(-p*(q + 1) + n - 1), x)
```

Fricas [A] time = 0.267723, size = 103, normalized size = 2.64

$$\frac{\left(axx^{-pq+n-p-1}x^n + bxx^{-pq+n-p-1}x^p\right)(ax^n + bx^p)^q}{(an - ap + (an - ap)q)x^n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^n + b*x^p)^q*x^(-p*(q + 1) + n - 1),x, algorithm="fricas")
```

```
[Out] (a*x*x^(-p*q + n - p - 1)*x^n + b*x*x^(-p*q + n - p - 1)*x^p)*(a*
x^n + b*x^p)^q/((a*n - a*p + (a*n - a*p)*q)*x^n)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1+n-p*(1+q))*(a*x**n+b*x**p)**q,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (ax^n + bx^p)^q x^{-p(q+1)+n-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*x^n + b*x^p)^q*x^(-p*(q + 1) + n - 1),x, algorithm="giac")
```

```
[Out] integrate((a*x^n + b*x^p)^q*x^(-p*(q + 1) + n - 1), x)
```

3.454 $\int x^{-1-nq-p(1+q)}\left(x^n\left(a+bx^p\right)\right)^q\,dx$

Optimal. Leaf size=40

$$-\frac{x^{(q+1)(-(n+p))}\left(ax^n+bx^{n+p}\right)^{q+1}}{ap(q+1)}$$

```
[Out] -((a*x^n + b*x^(n + p))^(1 + q)/(a*p*(1 + q)*x^((n + p)*(1 + q)))
)
```

Rubi [A] time = 0.121238, antiderivative size = 40, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071

$$-\frac{x^{(q+1)(-(n+p))}\left(ax^n+bx^{n+p}\right)^{q+1}}{ap(q+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[x^(-1 - n*q - p*(1 + q))*(x^n*(a + b*x^p))^q,x]
```

```
[Out] -((a*x^n + b*x^(n + p))^(1 + q)/(a*p*(1 + q)*x^((n + p)*(1 + q)))
)
```

Rubi in Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^{-nq-p(q+1)-1}\left(x^n\left(a+bx^p\right)\right)^q\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**(-1-n*q-p*(1+q))*(x**n*(a+b*x**p))**q,x)
```

```
[Out] Integral(x**(-n*q - p*(q + 1) - 1)*(x**n*(a + b*x**p))**q, x)
```

Mathematica [A] time = 0.118367, size = 38, normalized size = 0.95

$$-\frac{x^{(q+1)(-(n+p))}\left(x^n\left(a+bx^p\right)\right)^{q+1}}{ap(q+1)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[x^(-1 - n*q - p*(1 + q))*(x^n*(a + b*x^p))^q,x]
```

```
[Out] -((x^n*(a + b*x^p))^(1 + q)/(a*p*(1 + q)*x^((n + p)*(1 + q))))
```

Maple [F] time = 0.25, size = 0, normalized size = 0.

$$\int x^{-1-nq-p(1+q)}\left(x^n\left(a+bx^p\right)\right)^q\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^(-1-n*q-p*(1+q))*(x^n*(a+b*x^p))^q,x)
```

```
[Out] int(x^(-1-n*q-p*(1+q))*(x^n*(a+b*x^p))^q,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(\left(bx^{p}+a\right)x^{n}\right)^{q}x^{-p(q+1)-nq-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^p + a)*x^n)^q*x^(-p*(q + 1) - n*q - 1),x, algorithm="maxima")
```

```
[Out] integrate(((b*x^p + a)*x^n)^q*x^(-p*(q + 1) - n*q - 1), x)
```

Fricas [A] time = 0.262127, size = 86, normalized size = 2.15

$$-\frac{\left(bxx^{-(n+p)q-p-1}x^{p}+axx^{-(n+p)q-p-1}\right)\left(bx^{n}x^{p}+ax^{n}\right)^{q}}{apq+ap}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^p + a)*x^n)^q*x^(-p*(q + 1) - n*q - 1),x, algorithm="fricas")
```

```
[Out] -(b*x*x^(-(n + p)*q - p - 1)*x^p + a*x*x^(-(n + p)*q - p - 1))*(b
*x^n*x^p + a*x^n)^q/(a*p*q + a*p)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**(-1-n*q-p*(1+q))*(x**n*(a+b*x**p))**q,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(\left(bx^{p}+a\right)x^{n}\right)^{q}x^{-p(q+1)-nq-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((b*x^p + a)*x^n)^q*x^(-p*(q + 1) - n*q - 1),x, algorithm="giac")
```

```
[Out] integrate(((b*x^p + a)*x^n)^q*x^(-p*(q + 1) - n*q - 1), x)
```

4 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Mathematica/Rubi followed by one for Maple. The following are links to the source code.

The following are the listing of the above functions.

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)
(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)

(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*         GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)

GradeAntiderivative[result_,optimal_] :=
  If[ExpnType[result]<=ExpnType[optimal],
    If[FreeQ[result,Complex] || Not[FreeQ[optimal,Complex]],
      If[LeafCount[result]<=2*LeafCount[optimal],
        "A",
      "B"],
    "C"],
  If[FreeQ[result,Integrate] && FreeQ[result,Int],
    "C",
  "F"]]

(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)
```

```
ExpnType[expn_] :=
  If[AtomQ[expn], 1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]
```

```
ElementaryFunctionQ[func_] :=
  MemberQ[{
        Exp,Log,
        Sin,Cos,Tan,Cot,Sec,Csc,
        ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
        Sinh,Cosh,Tanh,Coth,Sech,Csch,
        ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]

SpecialFunctionQ[func_] :=
  MemberQ[{
        Erf, Erfc, Erfi,
        FresnelS, FresnelC,
        ExpIntegralE, ExpIntegralEi, LogIntegral,
        SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
        Gamma, LogGamma, PolyGamma,
        Zeta, PolyLog, ProductLog,
        EllipticF, EllipticE, EllipticPi
},func]
HypergeometricFunctionQ[func_] := MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]
AppellFunctionQ[func_] := MemberQ[{AppellF1},func]
```

```
# File: GradeAntiderivative.mpl Original version thanks to Albert Rich emailed on 03/21/2017
#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
GradeAntiderivative := proc(result,optimal)
local leaf_count_result, leaf_count_optimal,ExpnType_result,ExpnType_optimal;

      leaf_count_result:=leafcount(result);
      #do NOT call ExpnType() if leaf size is too large. Recursion problem
      if leaf_count_result > 500000 then
          return "B";
      fi;

      leaf_count_optimal:=leafcount(optimal);

      ExpnType_result:=ExpnType(result);
      ExpnType_optimal:=ExpnType(optimal);
  #This check below actually is not needed, since I only call this grading only for
  #passed integrals. i.e. I check for "F" before calling this.

  if not type(result,freeof('int')) then
     return "F";
  end if;

  if ExpnType_result<=ExpnType_optimal then
      if is_contains_complex(result) then
         if is_contains_complex(optimal) then
            #both result and optimal complex
            if leaf_count_result<=2*leaf_count_optimal then
               return "A";
            else
               return "B";
            end if
         else #result contains complex but optimal is not
            return "C";
         end if
      else # result do not contain complex
           # this assumes optimal do not as well
         if leaf_count_result<=2*leaf_count_optimal then
            return "A";
         else
            return "B";
         end if
      end if
  else #ExpnType(result) > ExpnType(optimal)
      return "C";
  end if
end proc:
```

```
# is_contains_complex(result) takes expressions and returns true if it contains "I"
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
      1 else
    max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
        1 else
      max(2,ExpnType(op(1,expn))) end if else
    max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' or op(0,expn)='integrate' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
  end if
end proc:
```

```
ElementaryFunctionQ := proc(func)
  member(func,[exp,log,ln, sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[erf,erfc,erfi,FresnelS,FresnelC,Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:
AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
    op(2,u) else
  apply(op(0,u),op(2..nops(u),u))
  end if
end proc:
#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```